GLOBAL MULTIDISCIPLINARY PERSPECTIVES JOURNAL

Interrogative AI Pedagogy in the Middle Years: A Conceptual Framework for Engagement, Writing Development, and Critical Digital Literacy in Urban Canadian Grades 5-8 Classrooms

Dr. Robin Persad
Ontario Institute for Studies in Education, University of Toronto, Toronto, Ontario, Canada

* Corresponding Author: **Dr. Robin Persad**

Article Info

ISSN (online): 3107-3972
Volume: 03
Issue: 06
Received: 06-09-2026
Accepted: 04-10-2026
Published: 02-11-2026
Page No: 17-26

Abstract
Generative artificial intelligence (AI) reached middle years classrooms before there was much scholarship on how to teach with it. Reviews of AI in elementary education tend to describe what the systems can do, and the Ontario Teachers' Federation (2026) notes that AI's effect on teaching and learning in Ontario K-12 education has not been systematically investigated. This conceptual article asks under what instructional conditions AI integration in urban Canadian Grades 5-8 classrooms is likely to produce learning, as opposed to its appearance, and which students are most affected when those conditions are missing. Using a theory synthesis approach, I bring together research on engagement, scaffolding, multilingual learners, technological pedagogical content knowledge, AI literacy, and digital equity. The result is interrogative AI pedagogy, a framework resting on four propositions: novelty is an entry point and not a design; AI scaffolds have to be designed to fade; justification, not the finished product, should be what teachers assess; and AI literacy must be taught and assessed explicitly. I also theorize a scaffold-substitution paradox. The multilingual learners and students with learning exceptionalities who stand to gain most from AI scaffolds are the same students most exposed to letting AI do their thinking for them. A sample instructional sequence shows how the framework might look in practice. The article closes with implications for assessment and teacher professional learning in urban boards, and with propositions that future empirical studies can test.

DOI: https://doi.org/10.54660/GMPJ.2026.3.6.17-26

Keywords: artificial intelligence, conceptual framework, middle years education, urban education, writing instruction, critical digital literacy, educational equity

Interrogative AI Pedagogy in the Middle Years

Introduction

Few technologies have unsettled education as quickly as artificial intelligence (AI). It has changed what teachers are able to do in a lesson and, almost as fast, what they now have to do. The Ontario Teachers' Federation (OTF, 2026) [16] insists that decisions about generative AI in K-12 classrooms stay anchored in teachers' professional judgment, warning that adoption without scrutiny could de-skill the profession. That warning goes beyond procedure. How a teacher designs AI-integrated instruction decides whose learning is supported and whose is put at risk, which makes design an ethical matter as much as a technical one. Thinking it through properly means theorizing from the realities of particular classrooms.

Most research on AI in education has been conducted in colleges and universities. Middle years classrooms have received far less attention. When Boulhrir and Hamash (2025) [1] reviewed ten years of studies (2013 to 2023) on AI in elementary (K-6)

education, they found that the work leaned toward describing what AI systems can do, with less said about how teachers should build instruction around them. Ontario is no exception: the OTF (2026) [16] observes that the impact of AI on teaching practice and student learning in the province's K-12 schools has not been systematically investigated. The gap matters. Between Grades 5 and 8, students consolidate their foundational literacy and start to regulate their own learning, and the habits they form here follow them into secondary school.

Nowhere are the stakes higher than in urban Canadian classrooms, where linguistic, ethnocultural, and socioeconomic diversity is ordinary (Statistics Canada, 2022) [19]. Students from equity-denied groups, meaning those whose social identities or location have been used to exclude them from fair access to resources and to the decisions that affect them (Eizadirad & Walton, 2025) [6], sit beside classmates whose home access to devices and paid AI tools looks very different from their own. The OTF (2026) [16] points out that access to generative AI is itself unequal, and that models trained mostly on English-language data carry linguistic and cultural bias. Questions about whose knowledge AI centres, and which students it treats as capable users, cannot wait until after implementation. They determine whether AI integration serves inclusive public education or works against it.

My purpose is to theorize the instructional conditions under which AI integration in urban Canadian Grades 5-8 classrooms is likely to produce real learning, and to identify the students who are most affected when those conditions are absent. Four questions guide the article: (1) What does existing research suggest about how AI integration shapes the behavioural, emotional, and cognitive engagement of middle years students? (2) Under what conditions can AI function as a scaffold for writing development instead of a substitute for it? (3) What forms of critical digital literacy do middle years students need in order to work with AI, and how can they be taught? (4) How do these conditions bear differently on students from equity-denied groups in urban classrooms? The article is theoretical. It reports no data collected from students; it synthesizes research from several fields into a framework that teachers can use to plan instruction and that researchers can put to the test. I write for classroom teachers and for school and system leaders, and equally for the teacher educators, policymakers, and researchers who are shaping how AI enters K-12 schools.

Two contributions follow. The first is interrogative AI pedagogy, a framework of four propositions that treats every AI output as a text to be questioned, revised, and justified, never simply submitted. The second is the scaffold-substitution paradox, which explains why AI support that is left undesigned is likely to widen achievement gaps in diverse urban classrooms. The article begins with the Ontario context that makes these questions urgent and then describes its conceptual approach. A review of the relevant literature and the gap it leaves comes next, followed by the theoretical framework. The four propositions and the paradox are then developed one at a time and illustrated through a sample instructional sequence. The closing sections discuss what the framework contributes and set out next steps for practice, policy, and research, along with the framework's limits.

Context and Rationale: AI Arrives in Ontario Classrooms

Generative AI moved into Ontario schools quickly. The OTF (2026) [16] traces the growth of classroom conversations about AI to the public release of ChatGPT in 2022 and notes that boards have since begun, slowly, to release approved generative AI systems to teachers and students. Provincial policy has not kept pace. The Council of Ontario Directors of Education (CODE, n.d.) reports that the Ontario Ministry of Education had not issued AI guidance to school boards beyond directing that one mandatory professional development day in 2025-2026 address AI. In the absence of provincial direction, boards have relied on their own guidelines, many adapted from a model developed with the Educational Computing Network of Ontario (ECNO, 2025) [5].

Survey evidence suggests that teachers are working in that gap. A Leger survey of 756 Canadian teachers in Grades 6 to 12, commissioned by the Fraser Institute and conducted between November 2025 and January 2026, found that fewer than half of respondents (49.3%) had received training from their school or board on using AI for lessons and in-class materials, and that 63.6% had received no training on how to instruct students to use AI reasonably (MacPherson, 2026) [14]. Among Ontario respondents, 72.7% reported using AI in their own work at least weekly, yet only 50.7% said their school had a policy on student AI use (Fraser Institute, 2026) [7]. Respondents were not randomly selected, so the figures should be read as patterns, not precise population estimates. Even so, they point the same way as the OTF's (2026) observation that AI's effect on Ontario teaching and learning has not been systematically investigated.

These conditions converge in classrooms that are among the most linguistically diverse in the country's history. In 2021, nearly one in four people in Canada (23.0%) were, or had been, landed immigrants or permanent residents, the largest share in more than 150 years (Statistics Canada, 2022) [19], and 23.2% of the population reported a mother tongue other than English or French (Statistics Canada, 2025) [20]. A middle years teacher in an urban Ontario school is therefore likely to be introducing AI, with limited training and uneven policy guidance, to a class in which many students are learning in a language other than their first. This is the context the framework was built for. It is also why equity sits inside the framework as a design condition instead of at its edges as an afterthought.

Conceptual Approach: Theorizing Before the Evidence Arrives

Defining Key Terms

Several terms are used consistently throughout the article. *Generative AI* refers to AI systems that produce new text, images, or other content in response to user prompts; in middle years writing instruction, the most relevant examples are chatbots built on large language models. *Middle years* refers to Grades 5 to 8. *Equity-denied* refers to students and communities whose social identities or location have been used to exclude them from fair access to resources and to the decisions that affect them (Eizadirad & Walton, 2025) [6]. *Scaffolding* refers to temporary support that a more capable other provides and gradually withdraws as the learner takes over a task (Wood *et al*., 1976) [22]. *Critical digital literacy* is the capacity to analyze, evaluate, and ethically engage with digital content and the systems that produce it. *AI literacy*, one component of it, refers to the competencies that allow people to critically evaluate AI technologies, collaborate with them, and use them as tools (Long & Magerko, 2020) [11].

Finally, *interrogative AI pedagogy*, the framework proposed here, names an instructional orientation in which every AI-generated output is treated as a text for the student to question, revise, and justify, and never simply to accept or submit.

Design of the Inquiry

This is a conceptual paper. Jaakkola (2020) [10] describes conceptual articles as ones that build arguments by integrating existing theory and evidence, without collecting new data, and identifies several designs for doing so. I follow what Jaakkola calls a theory synthesis design, which links concepts from different literatures to offer a new or enhanced view of a phenomenon. The design fits where knowledge about AI in middle years education now stands. Relevant evidence is scattered across research on engagement, literacy, multilingual education, educational technology, and AI literacy, and no single body of work explains how these strands interact in a Grades 5-8 classroom. Large-scale empirical work will be better designed if that synthesis comes first.

Selection of Literature

I selected sources purposively, not through a systematic search. Selection was guided by relevance to elementary and middle years schooling; by relevance to engagement, writing development, or critical digital literacy, the learning outcomes the framework addresses; by attention to equity, particularly for multilingual learners and students in diverse urban settings; and by standing as a foundational or widely cited contribution in its field. Policy sources were included where they bear directly on Ontario and Canadian K-12 education. Purposive selection lets the synthesis draw on foundational theory alongside recent work on generative AI. It also means the review is not exhaustive, a limitation I return to later.

Trajectory of the Argument

The argument moves from evidence toward a framework. The literature review sets out what is known about AI, engagement, writing, critical digital literacy, and digital equity, and closes by naming the gap those literatures leave. Four propositions follow. Each is built the same way: a claim, the evidence from the literature that supports it, and an analysis of what that evidence means for middle years classrooms. A fifth claim, the scaffold-substitution paradox, emerges where the propositions meet research on digital equity. Last, an illustrative instructional sequence shows how the propositions could play out in a Grades 5-8 writing program. It is a design. It is not a report of an implemented study.

Positionality

I write as a practising Ontario educator and researcher working in culturally and linguistically diverse school communities. That work shaped the questions I ask here and the classroom realities I attend to, such as English language learners at varying stages of acquisition learning in the same room as students with identified learning exceptionalities. I do not offer professional experience as evidence. The claims in this article rest on published research, and the propositions are framed so that empirical studies can test them and, where necessary, disconfirm them.

Literature Review: What AI Can Do and What It Takes to Teach with It

Promise and Peril: Artificial Intelligence in Educational Contexts

Advocates have long presented AI as a force that could change education, in part by widening access to individualized instruction. Luckin *et al*. (2016) [12] argue that AI could provide one-on-one tutoring at scale, a level of individualized support no human workforce could offer, while augmenting teacher expertise instead of replacing it. Boulhrir and Hamash's (2025) [1] systematic review supports a more modest version of the claim: in elementary settings, AI tools can support differentiation and raise engagement when they are embedded in intentional instructional designs. The qualifier carries the weight. These benefits are real but conditional, and the condition is pedagogical. Whether AI serves learners or harms them is decided, above all, by how instruction around it is designed.

Critical scholars see the other side of the ledger. Selwyn (2019) [18] argues that AI systems are not neutral. Shaped by their training data and algorithmic architecture, they can reproduce structural biases, obscure authorship, and reward the appearance of learning over its substance. Students who meet AI without being taught how it works and where it fails are the ones most likely to have their learning undermined. For middle years learners, whose metacognitive capacity is still developing, the danger is sharper still, and it calls for teaching that puts critical engagement ahead of passive use.

Teacher preparation, more than the technology, decides whether AI integration produces learning or only surface compliance. MacDowell *et al*. (2024) [13], in a self-study of an undergraduate teacher education course on multimedia design, examine how preservice and in-service teachers can be prepared with the knowledge, skills, and mindsets to teach and create with generative AI, and they recommend that AI literacy be integrated meaningfully into teacher education programs. The OTF (2026) [16] makes a similar case from the profession's side. It calls on the province to fund professional learning on generative AI that teachers themselves initiate and lead, and it wants technology corporations kept out of that role. Both sources treat teacher readiness, not tool availability, as the first condition of effective integration.

Design, Not Access: Pedagogy and Technology Integration

Access to technology is not the same as integrating it well. Mishra and Koehler (2006) [15] developed the Technological Pedagogical Content Knowledge (TPACK) framework to describe the knowledge teachers need where technology, pedagogy, and content meet. On their account, a teacher has to understand at once what a tool does, how it relates to particular learning goals, and which instructional structures keep students actively learning. In a writing lesson that uses AI, the teacher has to weigh what the tool can generate against what students still need to do themselves as developing writers. Seen through TPACK, the point is plain: handing students AI tools without pedagogical preparation is not enough.

AI sharpens this challenge. Unlike earlier classroom tools, it produces finished-looking work that students and teachers can struggle to tell apart from strong human writing. TPACK

(Mishra & Koehler, 2006) [15] implies that technology supports learning when it is embedded in clear goals and deliberate instructional structures. Those structures have to be built; they do not come with the tool. The cost of failing to build them is higher with AI than with earlier technologies, because unguided AI makes it easy for students to skip the cognitive work that learning depends on. Instructional design therefore carries an unusual burden, and TPACK shifts from a helpful heuristic to something closer to a professional obligation.

Looking Engaged Versus Being Engaged: Student Engagement in the Middle Years

Engagement is not one thing. Fredricks *et al*. (2004) [8] describe three dimensions that together predict academic success and longer-term outcomes. Behavioural engagement is participation and on-task effort. Emotional engagement is a student's affective connection to school and to learning tasks. Cognitive engagement is the mental investment a student brings to the work, visible in the strategies they use and in how deeply they process new information. Fredricks and colleagues argue that the three are interdependent, so participation without cognitive investment amounts to a thin kind of engagement. The point matters in an AI-integrated classroom, where a student can look busy, typing and generating and submitting, while avoiding the thinking that learning requires.

Engagement tends to fall as students move from elementary to secondary schooling, a decline linked to reduced autonomy, heavier academic demands, and a sense that classroom activities lack relevance (Fredricks *et al*., 2004) [8]. AI could interrupt that slide. Its interactivity, and the room it gives students to direct their own inquiry, may restore some sense of ownership over learning. Novelty, though, is a short-term resource. It can lift behavioural engagement for a few weeks, but it cannot carry cognitive engagement across a whole sequence of learning, which depends on tasks that offer real intellectual challenge. Teachers have to design that challenge in. The technology will not supply it.

Scaffold or Crutch: Writing Development and AI

Writing is recursive and demanding. A writer has to generate ideas, organize them, draft, revise, and keep an audience in mind, all at once. That load falls heavily on many middle years students, especially English language learners and students with little academic literacy support at home. Boulhrir and Hamash (2025) [1] identify AI tools as potential scaffolds in elementary literacy, able to lower the threshold of entry into writing by modelling text structures and giving immediate feedback. For students who have been kept out of academic writing communities, that lower threshold is a legitimate equity gain. Scaffolding, however, has a precise meaning. Wood *et al*. (1976) [22] describe it as support that a more capable other provides and then gradually withdraws as the learner takes over the task. Support that never fades is not a scaffold at all. The question to ask of AI is whether it is set up to strengthen the learner or to stand in for the learner's effort.

The risk to writing development is just as real, and instructional design has to confront it directly. Selwyn (2019) [18] warns that AI's apparent efficiency can yield polished outputs that hide how little the learner has done. I call this condition an illusion of understanding. The cognitive work of composing (deciding what to say, structuring an argument, choosing evidence) has been done by the machine, and the student has supplied little beyond the prompt. AI can still help writers grow, but only when students must engage critically with what it generates, explaining what they keep and defending what they change or discard. Remove that requirement and the scaffold turns into a crutch.

Teaching Students to Question the Machine: Critical Digital Literacy

Critical digital literacy is the capacity to analyze, evaluate, and ethically engage with digital content and the systems that produce it. It does not arrive as a side effect of using technology; it has to be taught. Long and Magerko (2020) [11] define AI literacy as a set of competencies that allow people to critically evaluate AI technologies, collaborate with them, and use them as tools. Their definition implies a sequence. Students need at least a broad sense of how AI produces its outputs before they can evaluate those outputs, and that understanding grows through structured practice across learning contexts. Exposure to AI tools alone will not produce it.

In Canada, critical digital literacy also carries equity weight. The AI tools most available to K-12 students were built in commercial settings that did not centre the knowledge systems or learning needs of all Canadian students. The OTF (2026) [16] calls for generative AI literacy that includes evaluating outputs for credibility and bias, and notes that mostly English training data builds linguistic and cultural bias into what these tools produce. Teaching critical digital literacy in the middle years is therefore more than a digital citizenship add-on. Students will take part in civic and working life in a society where AI-generated text is increasingly hard to tell from human writing, and they need to be ready for that. This preparation is one of the article's central concerns.

Access Is Not Equity: AI in Urban Canadian Classrooms

Research on educational technology has long shown that access alone does not equalize outcomes. Warschauer and Matuchniak (2010) [21], synthesizing evidence on digital equity, found that differences in how young people use technology, and in the social support surrounding that use, often matter more than differences in physical access. Reich (2020) [17] reaches a related conclusion across successive waves of educational technology: new tools tend to be taken up most productively by students who already hold advantages, so that innovation without deliberate design can widen the gaps it promises to close. Generative AI fits this pattern closely. In an urban classroom, one student may arrive with paid AI subscriptions and a parent who models critical use, while a classmate encounters AI only at school and only through the tasks the teacher designs.

Multilingual learners occupy a particular position in this landscape. Cummins (2021) [4] argues that multilingual students' academic language develops most powerfully when instruction connects to the linguistic resources they already have and when scaffolds are gradually released, not permanently relied upon. AI gives multilingual learners immediate syntactic models and vocabulary, which is a real affordance. The same tools, however, return text in a dominant-language register that the OTF (2026) [16] identifies as carrying linguistic and cultural bias. The equity question in urban AI integration is therefore larger than access. It is whether instructional design turns AI support into

independent capability for the students who most need it, a question that has rarely been examined at the classroom level and that sits at the centre of this article.

Synthesis: The Gap This Article Addresses

These strands make a single argument. AI can lower barriers to participation and composition (Boulhrir & Hamash, 2025; Luckin *et al*., 2016) [1, 12]. Whether it does so depends on instructional design (Mishra & Koehler, 2006) [15], on tasks that demand cognitive and not just behavioural engagement (Fredricks *et al*., 2004) [8], on scaffolds that fade (Wood *et al*., 1976) [22], on students being taught to evaluate what AI produces (Long & Magerko, 2020) [11], and on teachers being prepared to teach that (MacDowell *et al*., 2024) [13]. In diverse urban classrooms each condition has an equity dimension, because the students most likely to benefit from AI support are also those for whom poorly designed support is most likely to replace learning (Reich, 2020; Warschauer & Matuchniak, 2010) [17, 21]. Three gaps follow. The knowledge base sits mostly in post-secondary settings and in accounts of what AI can do, with pedagogical design treated less fully (Boulhrir & Hamash, 2025) [1]. Evidence from Ontario K-12 settings is largely missing (OTF, 2026) [16]. And because these literatures have grown up separately, no existing framework explains how engagement, scaffolding, assessment, and AI literacy interact for middle years learners. The framework developed below addresses that third gap directly; in doing so, it gives empirical work on the first two a clearer design to test.

Theoretical Framework: Four Lenses on AI-Integrated Learning

Four theoretical lenses inform the framework, one for each guiding question, and a fifth holds them together. For the first question, on engagement, I draw on Fredricks *et al*.'s (2004) multidimensional model. Separating behavioural, emotional, and cognitive engagement makes it possible to ask what kind of engagement AI produces, and not only whether it produces any. For the second, scaffolding theory (Wood *et al*., 1976) [22], read alongside Cummins's (2021) [4] work on multilingual learners, specifies when support builds capability and when it replaces it.

The third question draws on Long and Magerko's (2020) [11] definition of AI literacy, which frames students' relationship to AI as competencies that can be taught. The fourth draws on critical scholarship on digital equity (Reich, 2020; Warschauer & Matuchniak, 2010) [17, 21] and on the concept of equity-denied groups (Eizadirad & Walton, 2025) [6]; both turn attention to who benefits from a technology and who carries its risks. TPACK (Mishra & Koehler, 2006) [15] connects the lenses by placing the decisive variable in the teacher's design knowledge, not in the tool. As a set, they suggest that AI's value in a middle years classroom depends on design choices in which pedagogy and equity cannot be pulled apart. Each proposition below starts from that premise.

Interrogative AI Pedagogy: A Conceptual Framework

I define interrogative AI pedagogy as an instructional orientation in which every AI-generated output is treated as a text for the student to question, revise, and justify. Nothing the AI produces is simply accepted or handed in. The idea borrows from literacy practices teachers already know, among them active reading, source evaluation, revision, and metacognitive reflection, and applies them to a new kind of text. Four propositions and one derived paradox make up the framework. Table 1 summarizes them, and the sections that follow develop each in turn.

Table 1: Interrogative AI Pedagogy: Propositions, Core Claims, and Grounding in the Literature

Element	Core Claim	Grounding in the Literature
Proposition 1: Novelty is an entry point, not a design	AI raises behavioural and emotional engagement quickly; only tasks that require argument with AI sustain cognitive engagement	Fredricks *et al*. (2004) [8]; Mishra & Koehler (2006) [15]
Proposition 2: AI scaffolds must be designed to fade	AI lowers barriers to composition, but support that never withdraws replaces the learning it was meant to enable	Wood *et al*. (1976) [22]; Cummins (2021) [4]; Boulhrir & Hamash (2025) [1]
Proposition 3: Justification is the unit of assessment	Product-only assessment makes an illusion of understanding likely; assessing reasoning makes learning visible	Selwyn (2019) [18]; Fredricks *et al*. (2004) [8]
Proposition 4: AI literacy is taught and assessed explicitly	Critical stances toward AI do not develop through exposure and require sequenced instruction	Long & Magerko (2020) [11]; OTF (2026) [16]; MacDowell *et al*. (2024) [13] on teacher preparation
Scaffold-substitution paradox	Students with the most to gain from AI scaffolds are most exposed to substitution when Propositions 2 and 3 are absent	Reich (2020) [17]; Warschauer & Matuchniak (2010) [21]; Cummins (2021) [4]

Note. OTF = Ontario Teachers' Federation. Propositions are theoretical claims derived from the literature and have not been empirically tested.

Proposition 1: Novelty Is an Entry Point, Not a Design

Proposition 1 holds that AI will probably raise visible engagement quickly in Grades 5-8, and that the lift will fade unless tasks ask students to think both with the AI and against it. Fredricks *et al*. (2004) [8] separate behavioural engagement (participation and effort), emotional engagement (affective connection to learning), and cognitive engagement (the strategies students use and how deeply they process information), and argue that the three depend on one another. Their review also documents a decline in engagement across the transition from elementary to secondary school, tied to reduced autonomy and perceived irrelevance. AI's interactivity offers one way to interrupt that decline. Both Luckin *et al*. (2016) [12] and Boulhrir and Hamash (2025) [1] list increased engagement among AI's potential benefits, provided it sits inside intentional instructional designs.

What this evidence suggests is that novelty acts on the most visible kinds of engagement. A student typing prompts, generating text, and showing outputs to classmates is behaviourally and emotionally engaged, yet may be doing very little of the cognitive work that produces learning. Novelty also wears off. A design that depends on it should expect engagement to drop once AI becomes routine. The tasks that keep cognitive demand high after that point ask students to compare AI suggestions with their own ideas, find its errors, or argue against a position it has generated. In

TPACK terms (Mishra & Koehler, 2006) [15], it is the teacher's task design that decides which kind of engagement AI activates.

Proposition 2: AI Scaffolds Must Be Designed to Fade

Proposition 2 is that AI can scaffold writing development only if its support is designed to be withdrawn. Writing makes heavy, simultaneous demands on ideation, organization, drafting, and revision, and those demands press hardest on English language learners and on students with little academic literacy support at home. Boulhrir and Hamash (2025) [1] identify AI tools as potential scaffolds in elementary literacy that can lower the threshold of entry into writing tasks. Multilingual learners in particular can use AI-generated sentence models as syntactic templates, adapting a structure instead of building one from nothing.

Here the concept of scaffolding sets a condition. Wood *et al.* (1976) [22] describe scaffolding as support that a more capable other provides and then gradually withdraws as the learner takes over the task. Cummins (2021) [4] adds that scaffolds for multilingual learners do their job when they hand responsibility to the student and connect to the linguistic resources the student already has. A generative AI tool never withdraws by itself; it will write a complete paragraph as readily on the tenth request as on the first. Fading, then, has to be built into the instructional design. One route moves from AI-generated models in early drafts, to AI feedback on drafts students have written, to revision with no AI at all. Without a sequence of that kind the support stays in place, and what began as a scaffold becomes a substitute.

Proposition 3: Justification Is the Unit of Assessment

Proposition 3 concerns assessment. If the finished written product is the only thing evaluated, students have every reason to optimize it by any available means, including wholesale reliance on AI. Selwyn (2019) [18] warns that AI's apparent efficiency can yield polished work that conceals how little the learner contributed. I have called that condition an illusion of understanding: a text that seems to show learning, submitted by a student who cannot say why its argument is structured as it is or what evidence holds it up.

On this reading, the illusion of understanding has less to do with AI than with how work is assessed. Fredricks *et al.* (2004) [8] link cognitive engagement to tasks that require intellectual ownership, and an assessment that rewards only the product removes any need for ownership. Ask students to justify each AI-generated sentence they keep, and to explain what they changed or rejected, and their reasoning becomes visible. Once visible, it can be assessed. The change does more than guard against misuse. Assessing process is a sounder approach to writing instruction with or without AI in the room, because it evaluates the thinking that writing is supposed to develop.

Proposition 4: AI Literacy Is Taught and Assessed Explicitly

Proposition 4 holds that critical digital literacy about AI will not develop through exposure; it has to be taught, sequenced, and assessed explicitly. Long and Magerko (2020) [11] define AI literacy as a set of competencies that allow people to critically evaluate AI technologies, collaborate with them, and use them as tools. Their account implies that students need an age-appropriate grasp of how AI generates outputs before they can judge those outputs well. MacDowell *et al.* (2024) [13] make a parallel point about teacher education, recommending that AI literacy be built deliberately into how teachers are prepared instead of being left to informal experimentation. The OTF (2026) [16] adds two cautions. Models trained mainly on English-language data carry linguistic and cultural bias, and AI tools may affirm users even when what the user has entered is factually wrong.

Middle years students are likely to start from trust. Fluent, confident prose invites the assumption that it is correct, and younger students have had less practice telling fluency from accuracy. AI literacy instruction should therefore build over time. It can begin with how AI generates text, move on to recognizing common errors such as confabulated facts, generic argument, and embedded cultural assumptions, and then require students to apply evaluation criteria to AI-generated text in every writing task. Taught this way, critical digital literacy becomes a named and assessed part of the writing program, no longer a stand-alone digital citizenship unit that is taught once and set aside.

The Scaffold-Substitution Paradox

When the four propositions meet research on digital equity, a paradox comes into view. Warschauer and Matuchniak (2010) [21] found that differences in how young people use technology, and in the support around that use, often matter more than differences in physical access. Reich (2020) [17] shows that successive educational technologies have tended to deliver their benefits most fully to students who were already advantaged. In an urban Canadian classroom, the students most likely to benefit from AI scaffolds are often the same students with the least support for critical AI use at home. They include English language learners and students with writing-related learning exceptionalities, as well as students who rarely get to practise extended writing outside school.

That overlap produces what I call the scaffold-substitution paradox. The students with the most to gain from an AI scaffold also face the strongest pull to let it stand in for them, because for them the distance between what they can write independently and what AI can write is greatest. If Proposition 2 is missing, the scaffold never fades. If Proposition 3 is missing, assessment rewards the substituted product. Put those two absences together and AI integration would be expected to widen achievement gaps while appearing to close them, since struggling writers' products would improve faster than their capabilities. I present the paradox as a theoretical claim. It explains why equity-conscious design has to come before AI integration and cannot be added afterward, and it points to a pattern that empirical studies should look for directly.

From Framework to Classroom: An Illustrative Instructional Sequence

This section sketches how the framework could be enacted, through a 10-week sequence for an urban Grades 5-8 writing program. It illustrates a design. It does not report an implemented study, and teachers would need to adapt it to local curriculum and to board guidelines on approved AI tools, as well as to the students in front of them. Table 2 lists its activity types.

The sequence relies on four activity types, each meant to make students critical agents in their dealings with AI output. In AI-supported brainstorming, students generate their own ideas first, then consult AI and compare its suggestions with their own, explaining which they prefer and why; AI adds to their thinking without replacing it (Proposition 1). Collaborative analysis has students read AI-generated texts and check them against source materials for strengths, gaps, and factual errors. In peer-led critique, students set AI responses beside their own drafts and record which arguments work better. Guided revision asks students to accept, modify, or reject each AI feedback suggestion with a written justification, so that the reasoning, more than the final product, becomes what is assessed (Proposition 3).

Table 2: Illustrative AI Integration Activities, Instructional Purposes, and Roles of AI

Activity Type	Instructional Purpose	Role of AI
AI-supported brainstorming	Generate ideas; compare AI suggestions with own thinking	Idea prompt generator (student evaluates and extends)
Analysis of AI-generated texts	Develop evaluative literacy; identify factual errors	Content producer (student as critical analyst)
Peer-led critique of AI responses	Build collaborative reasoning; surface limitations	Artifact for critique (not an authority)
Guided revision using AI feedback	Develop metacognition; justify decisions	Feedback tool (student accepts or rejects with justification)
Explicit AI literacy instruction	Understand how AI works; apply evaluation criteria	Subject of study and object of critique

Note. Activities are proposed for a 10-week sequence in Grades 5-8, and each includes a structured reflection component. The sequence is illustrative and has not been empirically tested.

Explicit AI literacy instruction runs through all four activity types in phases (Proposition 4). Weeks 1 and 2 focus on how AI generates text through pattern recognition in training data and what that means for reliability. In Weeks 3 and 4, students learn to spot common AI errors, among them confabulated facts and generic argument, along with cultural assumptions built into generated content. From Week 5 on, every writing task asks students to apply criteria for credibility, accuracy, perspective, and authorial voice to AI-generated text. AI's role in drafting shrinks across the 10 weeks. Students can use AI-generated models in early drafts; in the middle weeks AI gives feedback but no longer drafts; final pieces are revised without AI (Proposition 2). Throughout, a justification protocol applies: no AI-generated sentence can appear in a final submission until the student has explained it.

A brief composite scenario shows how the paradox might surface and how the framework responds. The scenario is constructed for illustration and does not describe real students. Imagine a Grade 7 English language learner, here called Student A, who has rarely completed extended writing. In the first brainstorming session, AI-generated sentence models let Student A produce a full draft for the first time, an important entry point. By the fifth week, however, Student A is submitting lightly edited AI drafts and cannot explain the argument in them. Under product-only assessment, these submissions would earn higher marks than Student A's earlier independent work, and the gain would be recorded as progress. The justification protocol changes that. Student A must explain each retained sentence aloud, which exposes the gap and redirects support toward the reasoning Student A has yet to develop. For the students the paradox describes, Propositions 2 and 3 have to work together.

Discussion: Rethinking What Counts as Success with AI

I set out to theorize the conditions under which AI integration in urban Grades 5-8 classrooms is likely to produce learning and not merely its appearance, and to identify which students bear the cost when those conditions are absent. The contribution has two parts. Interrogative AI pedagogy brings research on engagement, scaffolding, assessment, and AI literacy, which has developed largely in separate literatures, into one design orientation for middle years teachers. The scaffold-substitution paradox offers a classroom-level explanation for a pattern that technology research has documented across whole systems. Reviews of elementary AI research describe AI's potential to support differentiation (Boulhrir & Hamash, 2025) [1], yet they say little about how that support can slide into substitution for particular groups of learners. That silence is what the framework is designed to fill.

One consequence is an extension of Fredricks *et al.*'s (2004) model of engagement into AI-integrated classrooms, in a form teachers can act on. The framework predicts that AI will reliably produce behavioural and emotional engagement in the short term, and that only tasks requiring intellectual ownership will turn this into cognitive engagement. This reframes a common claim in AI advocacy. Rising engagement is often offered as evidence of AI's value. On the framework's terms, engagement that rests on novelty is where learning might begin, and nothing more.

Optimistic accounts of AI as an equalizer in literacy education also look different through this lens. Reading Boulhrir and Hamash's (2025) [1] account of AI's scaffolding potential next to Wood *et al.*'s (1976) definition of scaffolding and Cummins's (2021) [4] argument about transferring responsibility to multilingual learners, I locate AI's equity value in the fading of support. Provision alone does not deliver it. The distinction matters in practice. Providing AI support is easy to observe and to report; fading it takes deliberate design and is easy to leave out.

With respect to TPACK (Mishra & Koehler, 2006) [15], the framework identifies assessment design as a part of pedagogical knowledge that AI makes newly consequential. Earlier classroom technologies rarely produced finished student work on their own, so the alignment between tool and assessment drew less attention. Generative AI does produce finished work. Assessment that values process is now, I suggest, a necessary part of technological pedagogical content knowledge for anyone who teaches writing.

Last, critical digital literacy is placed within the equity concerns the OTF (2026) [16] raises about inequitable access and biased training data. The framework carries the AI literacy competencies described by Long and Magerko (2020) [11] into Grades 5-8 by specifying a sequence through which students can move from trust to evaluation, and it

complements MacDowell *et al*.'s (2024) work on preparing teachers by describing what those teachers would need to be ready to teach. In diverse urban classrooms, where students' home experiences with AI vary widely, school may be the only place some students are taught to question AI at all. That makes explicit AI literacy instruction a matter of equity and not only of digital citizenship.

Next Steps and Further Areas for Exploration

Recommendations for Classroom Practice

In the classroom, the framework points to specific design commitments. Teachers can write AI evaluation criteria into writing rubrics. They can make oral or written justification of retained AI content a condition of submission. And they can teach AI literacy as a named and assessed competency instead of leaving it as an unstated expectation. Cochran-Smith and Lytle (2009) [2] argue that teachers generate powerful professional knowledge when they treat their own classrooms as sites of systematic inquiry. The framework invites that stance toward AI, which means watching closely to see which students are benefiting from AI support and which are using it in place of their own work. None of this is new. These are established literacy pedagogies, applied to a new kind of text.

Recommendations for Professional Learning and Policy

Beyond the classroom, the framework fits MacDowell *et al*.'s (2024) recommendation that AI literacy be integrated meaningfully into teacher education. It also suggests that professional learning should come before AI integration, not trail behind it once platforms are already in place. Teachers who have had no structured chance to develop their own critical AI literacy cannot reasonably be expected to develop it in their students. The OTF (2026) [16] recommends that professional learning on generative AI be led by teachers, not corporations, and that it build teachers' capacity to evaluate AI outputs for credibility and bias. For urban boards, the framework adds two items to that agenda: identifying which students are most at risk from unguided AI use, and using assessment design to head off the scaffold-substitution paradox. Training limited to tool mechanics will not prepare teachers for AI integration in diverse Canadian classrooms.

At the provincial level, the Educational Computing Network of Ontario (ECNO, 2025) [5] has published model generative AI guidelines that school boards can adapt. Because each board decides whether and how to adopt them, the guidance teachers and students actually work under probably varies from one board to the next, particularly in how explicitly it deals with pedagogical design, student AI literacy, and equity-informed implementation. A provincial framework setting minimum expectations in these areas would be a meaningful step toward AI integration that does not simply reproduce existing inequalities. The principles proposed here could inform such expectations, pending the empirical testing outlined below.

Limitations of the Framework

As a conceptual article, this work has limitations that should be stated plainly. Its propositions are derived from published research and have not been tested empirically; they are claims about what is likely, not findings about what occurs. The literature was selected purposively, so relevant studies may have been omitted, and research on generative AI in Grades 5-8 is developing quickly enough that some propositions may need revision as evidence accumulates. The framework is also developed with urban Canadian classrooms in mind. Its attention to multilingual learners and to variation in home access to AI reflects that context, and its relevance to rural, remote, or First Nations, Métis, and Inuit community schools, where infrastructure and community knowledge systems differ, should not be assumed. Finally, the illustrative sequence and composite scenario are design aids. They show how the framework could be enacted, but they are not evidence that it works.

Directions for Future Research

Because the framework is meant to be tested, each of its parts suggests a line of empirical research. For Proposition 1, studies could track behavioural, emotional, and cognitive engagement across several weeks of AI integration, comparing tasks that require students to argue with AI against tasks that only require them to use it. Proposition 2 invites comparisons of AI integration with and without a planned fading sequence, asking whether students' independent writing improves or only their AI-assisted products. Design-based research could test Proposition 3 by setting process-based assessment with justification protocols against product-only assessment. For Proposition 4, researchers could examine how far, and how fast, middle years students move from trusting AI output to evaluating it when instruction is explicitly sequenced.

The scaffold-substitution paradox calls for research that disaggregates outcomes by language status, identified exceptionality, and access to AI outside school, since aggregate gains can conceal exactly the uneven pattern the paradox predicts. Multi-site studies across urban boards would show whether the paradox varies with school-level factors such as device access and board AI guidelines, and longitudinal studies following students into secondary school would show whether critical digital literacy persists once explicit instruction ends. Research that centres student and family voice, including co-designed AI literacy units and conversations with parents in multilingual households, would add perspectives a conceptual article cannot supply. Comparative studies of urban, suburban, and rural classrooms would clarify which elements of interrogative AI pedagogy depend on the urban context assumed here. Any such study involving minors will require research ethics approval and parental consent, and practitioner inquiry networks of the kind envisioned by the Scholarship of Teaching and Learning (Hutchings & Shulman, 1999) [9] are well placed to carry this work forward under those conditions.

Conclusion: Teaching with AI Is Still Teaching

The middle years of schooling are consequential in ways that are easy to understate. Grades 5 to 8 are the years in which students either develop or fail to develop the habits of mind that will sustain them through the increasingly complex academic and civic demands of secondary school and beyond. Fredricks *et al*. (2004) [8] show that engagement is associated with long-term educational outcomes, so what students learn about how to learn in these years shapes their relationship to intellectual challenge for years afterward. AI does not change this foundational reality. What it does is make the pedagogical decisions of these years more visible

and more consequential.

This article has argued that AI's pedagogical value in middle years classrooms lies in the instructional conditions under which it is used, and not in the technology itself. Interrogative AI pedagogy names those conditions in four propositions. The scaffold-substitution paradox explains why their absence is likely to fall hardest on the students urban public education most needs to serve. Boulhrir and Hamash's (2025) [1] review suggests that AI can support elementary learners when instructional conditions are right; this article specifies what those conditions look like in Grades 5-8 and for whom the stakes are highest.

The teacher's role does not shrink in an AI-integrated classroom. It grows more demanding. Building on MacDowell *et al*. (2024) [13], I suggest that the educator who facilitates critical engagement with AI and designs tasks that resist dependency, while attending to the equity dimensions of implementation, is performing a more complex professional function than one who simply provides access to AI tools. Most educators have not yet had structured opportunities to develop the knowledge and habits of reflection that this function requires. The framework offered here is meant as a contribution to that learning. It is also a set of claims that classroom research can now test.

Disclosure of AI-Assisted Tools

No artificial intelligence (AI) tools or technologies were used in the preparation, writing, editing, analysis, or production of this manuscript. The manuscript was developed entirely by the author, who takes full responsibility for its content, interpretations, arguments, and conclusions.

References

1. Boulhrir T, Hamash M. Unpacking artificial intelligence in elementary education: A comprehensive thematic analysis systematic review. Computers and Education: Artificial Intelligence. 2025;8:100442. doi:10.1016/j.caeai.2025.100442
2. Cochran-Smith M, Lytle SL. Inquiry as stance: Practitioner research for the next generation. Teachers College Press; 2009.
3. Council of Ontario Directors of Education. AI in education [Leadership conversation]. [date unknown]. Available from: https://ontariodirectors.ca/download_file/a96dc55e-8302-4045-8bdf-3d0c10e7acc3/694
4. Cummins J. Rethinking the education of multilingual learners: A critical analysis of theoretical concepts. Multilingual Matters; 2021.
5. Educational Computing Network of Ontario. English generative AI guidelines for Ontario school boards (v1.3). ECNO; 2025. Available from: https://www.ecno.org/wp-content/uploads/2025/04/English-Generative-AI-Guidelines-v1.3.pdf
6. Eizadirad A, Walton G. The future of equity, diversity, and inclusion (EDI) in education: Keep, reform, or dismantle? Critical Education. 2025;16(4):29-43. doi:10.14288/ce.v16i4.187054
7. Fraser Institute. Survey of Canadian grades 6–12 teachers: Ontario [News release]. 2026. Available from: https://www.fraserinstitute.org/sites/default/files/2026-08/survey-of-canadian-grades-6-12-teachers-on-ai-use-newsrelease-on.pdf
8. Fredricks JA, Blumenfeld PC, Paris AH. School engagement: Potential of the concept, state of the evidence. Review of Educational Research. 2004;74(1):59-109. doi:10.3102/00346543074001059
9. Hutchings P, Shulman LS. The scholarship of teaching: New elaborations, new developments. Change: The Magazine of Higher Learning. 1999;31(5):10-15. doi:10.1080/00091389909602695
10. Jaakkola E. Designing conceptual articles: Four approaches. AMS Review. 2020;10(1–2):18-26. doi:10.1007/s13162-020-00161-0
11. Long D, Magerko B. What is AI literacy? Competencies and design considerations. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems. Association for Computing Machinery; 2020. p. 1-16. doi:10.1145/3313831.3376727
12. Luckin R, Holmes W, Griffiths M, Forcier LB. Intelligence unleashed: An argument for AI in education. Pearson/UCL Knowledge Lab; 2016. Available from: https://discovery.ucl.ac.uk/id/eprint/1475756
13. MacDowell P, Moskalyk K, Korchinski K, Morrison D. Preparing educators to teach and create with generative artificial intelligence. Canadian Journal of Learning and Technology. 2024;50(4):1-23. doi:10.21432/cjlt28606
14. MacPherson P. Survey of Canadian grades 6–12 teachers on AI training and school policies for its use. Fraser Institute; 2026. Available from: https://www.fraserinstitute.org/studies/survey-canadian-grades-6-12-teachers-on-ai-training-and-school-policies-for-its-use
15. Mishra P, Koehler MJ. Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record. 2006;108(6):1017-1054. doi:10.1111/j.1467-9620.2006.00684.x
16. Ontario Teachers' Federation. Generative artificial intelligence in K–12 Ontario education: Discussion paper by the Ontario Teachers' Federation (OTF) and its affiliates. 2026. Available from: https://www.otffeo.on.ca/en/wp-content/uploads/sites/2/2026/03/Generative-Artificial-Intelligence-in-K–12-Ontario-Education-Discussion-Paper-by-the-Ontario-Teachers'-Federation-OTF-and-its-Affiliates.pdf
17. Reich J. Failure to disrupt: Why technology alone can't transform education. Harvard University Press; 2020.
18. Selwyn N. Should robots replace teachers? AI and the future of education. Polity Press; 2019.
19. Statistics Canada. Immigrants make up the largest share of the population in over 150 years and continue to shape who we are as Canadians. The Daily; 2022. Available from: https://www150.statcan.gc.ca/n1/daily-quotidien/221026/dq221026a-eng.htm
20. Statistics Canada. Linguistic diversity in Canada: Shedding light on 2021 Census data on non-official languages. The Daily; 2025. Available from: https://www150.statcan.gc.ca/n1/daily-quotidien/250122/dq250122b-eng.htm

21. Warschauer M, Matuchniak T. New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. Review of Research in Education. 2010;34(1):179-225. doi:10.3102/0091732X09349791
22. Wood D, Bruner JS, Ross G. The role of tutoring in problem solving. Journal of Child Psychology and Psychiatry. 1976;17(2):89-100. doi:10.1111/j.1469-7610.1976.tb00381.x

How to Cite This Article
Persad R. Interrogative AI pedagogy in the middle years: a conceptual framework for engagement, writing development, and critical digital literacy in urban Canadian Grades 5–8 classrooms. Global Multidisciplinary Perspectives Journal. 2026;3(6):17-26. doi:10.54660/GMPJ.2026.3.6.17-26

Creative Commons (CC) License
This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution NonCommercial-ShareAlike 4.0 International (CC BYNCSA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms