Durable Skills in the Age of AI: A Study of Student Perspectives at One Ontario College

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Keywords
durable skills, artificial intelligence, college students, soft skills

Article History
Received 12 June 2025
Received in revised form 1 Dec 2025
Accepted 4 Dec 2025
Available online 5 Jan 2026

Abstract
This study investigates the impact of generative AI tools on teaching and learning within the Canadian college context. Despite the global emergence of data on AI usage in education, there is a notable gap in research specific to Canadian institutions broadly, and colleges in particular. This research aims to understand students' perceptions of AI and its role in developing durable skills such as critical thinking, communication, and creativity. Through an online survey, the study examines students' familiarity with AI tools like ChatGPT as well as their self-reported perceptions about the impact of this new technology on the development of durable skills. Students recognize the potential of generative AI to aid in learning but also express concerns about reliability, ethical implications, and the impact on skill development. The study underscores the importance of responsible AI use and continuous adaptation and integration into pedagogy to help support students' development of durable skills. The authors propose that, while AI offers significant opportunities for enhancing education, its integration must be carefully managed to ensure it supports rather than undermines the development of these essential skills.

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Introduction

It is now widely known that artificial intelligence tools are impacting teaching and learning (for better or for worse). While anecdotal experiences have been emerging over the past few years, it is important to research this topic in a more formal manner and in the Canadian college context to better understand the impact these tools are having on our students' learning. Although data have been emerging worldwide (Forman et al., 2023) on the use of generative AI in various education and work-related contexts, there is little data emerging from Canadian institutions (Janzen & Milian, 2023), and there is a particular void regarding the college sector. In order to establish how these tools should or should not be used in the classroom, it is pertinent that we investigate our students' perceptions about them. Particularly, our study investigates how AI might relate to the 'durable skills' that transfer from education to industry and provide long-lasting competencies in human-centred

abilities, like problem solving, critical thinking, cooperation, and leadership (American Succeeds, 2025). The Faculty of Liberal Studies at Durham College has strengthened our commitment to durable skills in recent years to emphasize the value of the General Education and Communications courses that are delivered in this area. With the emergence of AI, this connection was a natural line of inquiry for the researchers. As such, the present investigation follows a "what is" line of inquiry, as described by Hutchings (2000). Specifically, we hope to make conclusions that relate to how AI might contribute to durable skill development, specifically in the Canadian college context.

Literature Review

Large Language Models (LLMs) are trained on large amounts of text and can be used for a variety of tasks, including natural language understanding (NLU), generating text (NLG), reasoning (NLR), and processing (NLP) (Zubiaga, 2024; Dong et al., 2019). For example, ChatGPT is an LLM that functions in a chat format, where users can input conversational commands and receive instant output on any topic, making its applications practically endless. In that this creates new, original content, it can be called Generative AI. However, the existence of these platforms also raises several concerns. These include the unclear sources of their training data, built-in biases, data contamination, and the risk of producing harmful or offensive content. Other issues involve privacy, accuracy, hallucinations (when the model generates false or misleading information), and the potential for misuse, such as cheating (Zubiaga, 2024). Because of their size and speed of development, it can be hard to fully understand or explain how LLMs work. This complexity reflects the current cultural response to AI, marked by rapid growth coupled with concern and confusion, showing that AI is now a major social issue. As a result of this, we are motivated to understand students' current perceptions of AI in order to capture data that may help educators better prepare for current and future challenges involving AI.

Generative AI in Education

Leveraging these LLMs/generative AI for use to help students learn seems to be a natural trajectory. Although AI has been present in post-secondary classrooms for nearly a decade (see Kim et al., 2020), it has only become ubiquitous and available to the masses in recent years. Early research seems to be showing that, in some contexts, students are benefiting (e.g., individualized teaching) from using AI as part of the learning activities (Baidoo-Anu & Owusu, 2023; Buckhard, 2022; Sousa et al., 2021). To build on this, our study surveys students' perceptions of AI and its role in developing durable skills such as critical thinking, communication, and creativity. In the area of Scholarship of Teaching and Learning research, this is what Hutchings (2000) would term a "what is" question, where the investigation is describing the current state of affairs.

Before generative AI came onto the scene, Kim et al. (2020) examined student perceptions of an AI teaching assistant in an American university in the context of online education. Results showed that ease of communication with the AI was correlated with their intention to participate in education with an AI teaching assistant and that this ease of communication, along with its perceived usefulness, predicted favourable attitudes of using an AI teaching assistant and resulted in stronger intentions of engaging in a course where such technology was being used. In this way, student perceptions can provide insight into student behaviour around AI which then can inform teaching practice.

Although more data are emerging globally, there is still little on Canadian student usage (Janzen & Milian, 2023). In terms of the Canadian post-secondary context, Janzen and Milian (2023) have examined students' familiarity with and use of generative AI, but not their perceptions of the technology as used in education or its perceived impact on the future of post-secondary education. They do highlight that 46% of college student respondents were familiar with ChatGPT (specifically) and that most students who reported using it for course-related work did so as either a learning aid or as an exploratory tool (75% and 79%, respectively).

American high school students report a mostly positive perception of generative AI and expect it to have a significant impact on their lives for years to come (Forman et al, 2023). An impact on the post-secondary sector is certain and transformative (Jazen & Milian, 2023; Lund & Wang, 2023; Rajabi et al., 2023),and has already been felt by most instructors. Foltyneck et al. (2023) call for ethical use of AI in education, making a handful of suggestions to that end, but does this align with the concerns and perceptions of students in a Canadian college context? The present study aims to answer this question.

Durable Skills

The dichotomy between hard and soft skills has long been established (Neely, 2021); hard skills referred to the technical and vocational skills specific to a particular job or career, while soft skills referred to the people skills necessary for success at any job. These may also have been referred to as transferable, employability, or human skills. However, like many aspects of our understanding of work, this type of skill framing has evolved. Now, durable skills imply the long-lasting nature of essential ways of using what you know, like critical thinking, communication, collaboration, and creativity (America Succeeds, 2025). Durability versus perishability acknowledges the inevitability of change and evolution in work, in that many hard or technical skills eventually become obsolete. Durable skills equip learners and workers with capabilities to thrive in changing environments by offering not just ways of thinking but also character skills, like fortitude, growth mindset, and leadership, that employers desire, even above technical skills (America Succeeds, 2025). To best prepare post-secondary students for work in the 21st century, it is necessary for these skills to be introduced and practiced in the classroom and campus environment broadly.

Canada's framework, Skills for Success, are described as the skills necessary to be successful in all aspects of life, including work and learning (Government of Canada, 2024). They include creativity and innovation, problem solving, reading, writing, numeracy, communication, adaptability, collaboration, and digital skills. Similarly, Ontario colleges have the Essential Employability Skills (EES) framework, which are the durable skills that graduates are required to achieve prior to graduation (Government of Ontario, 2024). These skills are divided into six categories that are similar to the Skills for Success: communication (e.g., reading and writing), numeracy (e.g., mathematical reasoning), critical thinking and problem solving (e.g., creative and innovative thinking), information management (e.g., information literacy and internet skills), interpersonal (e.g., teamwork), and personal (e.g., adaptability).

Much like the impact of AI, durable skills transcend specific disciplines and are applicable across various aspects of life and work. The value of durable skills in education lies in their ability to prepare students for the complexities of the modern world. As technology and industries evolve rapidly, the knowledge and technical skills required for specific jobs can quickly become outdated. However, durable skills remain relevant and provide a foundation for continuous learning and adaptation. One reported concern with using generative AI (and specifically ChatGPT) in education has been that students will not develop the durable skills they ought to be honing during their studies (specifically critical thinking, problem-solving, research ability, and analytical skills) which could have a negative impact on both their academic success as well as their eventual workplace success (Kasneci et al., 2023; Sok & Heng, 2023; Sullivan et al., 2023).

The Present Study

Through a brief online survey administered to students anonymously, the present study hopes to gain a better understanding of college students' views of generative AI and the perceived relationship to the development and use of various durable skills, such as numeracy, writing, and critical thinking. Our hypothesis is that students are mostly familiar with the existence of AI tools, especially ChatGPT, but how they are currently using them, how they might expect to use them in the future, and the relationship to durable skills development is less clearly understood and therefore difficult to predict. This exploratory study aims to describe the current state of college students' familiarity with generative AI tools and the relationship perceived between the use of these tools in academia and numerous durable skills. While this survey was only administered within one Canadian college in Ontario, and may not be representative of a larger student population, it offers a preliminary look at the issue within a localized context that provides a snapshot of a rapidly changing educational and technological landscape.

Method

Participants

A total of 61 self-reported responses to the survey were collected from one Canadian college, located in Southern Ontario. More than half of respondents (53.3%) were 21 years or older, with the remaining 46.7% falling under the age of 21. Notably, women comprised nearly twice as many respondents (60%) as men (31.7%). Among the prominent faculties represented, Business (25%), Media, Art, and Design (18.3%), Liberal Studies (16.7%), and Social & Community Services (11.7%) stood out. The majority of respondents were domestic students (86.4%), and most were not registered for accommodations (74.6%).

Materials and Procedures

The college's ethics review board approved this study

prior to its commencement. Student participants were recruited during the 2023-2024 academic year through their professors who emailed them the study invitation which was shared with them by the researchers, including the consent form and survey link. Because our Faculty serves all programs in the college (delivering both general education courses and communications courses), students were recruited from across the college.

Students wishing to participate clicked on the survey link and answered the questions anonymously online. The list of questions (see Appendix A) was developed to ascertain students' current perceptions of generative AI in their current educational context as well as outside of that context (e.g., work), with a particular focus on durable/transferable skills (critical thinking, communication, numeracy, creativity, etc). Given that we were interested in how participants perceive the transferability of certain skills, the survey instrument aimed to broadly capture their self-reported usage of AI tools and perception of the advantages and disadvantages in relation to building durable skills across the educational, work, and personal contexts. Specific tools included on the survey, like ChatGPT and DALLE, were included based on the researchers' anecdotal experiences with students on previous assignments where AI use was allowed.

Data Analyses

The primary approach to data analyses is descriptive (Dewar et al., 2018; Hutchings, 2000) and qualitative in nature, exploring patterns and trying to understand the perspective of students in these self-reported responses. Hutchings (2000) would frame this as asking a "what is question, which is a descriptive inquiry into participants' responses. Using an open-coding inductive approach, where themes come from the data itself in a bottom-up way (Braun & Clarke, 2006), the two primary investigators collaborated to code the data manually and identify themes. As such, rather than reporting quantitative significance of statistical tests, we will be describing the self-reported data collected and attempt to draw some meaningful conclusions from these patterns. As part of this descriptive inquiry, we will also examine respondents' open-ended responses to identify common themes.

Results and Discussion

The survey results were collected and any student who provided the same value for all of the questions was removed before analysis. We focus our results and discussion on describing this sample of respondents' perceptions of generative AI at the time of the study. Our goal is to better understand these perceptions in order to gain insight into students' behaviour towards AI; as a consequence, faculty can be better informed about ways to include AI in their courses to fulfill not only their own learning goals, but also their students'. We propose some interpretations of results in light of the current AI context.

Digital Literacy

Before asking respondents about their AI use, we first asked about their general digital literacy skills. By establishing whether students feel capable using a search engine, editing files, or engaging in basic troubleshooting, we hoped to reveal more accurate conclusions about AI use and its relationship to durable skills. In terms of students' familiarity with other digital tools, a significant portion of respondents demonstrated proficiency, with 71.6% self-reporting being able to use a search engine's advanced features independently, and 95% capable of creating and editing digital text files without assistance. Moreover, 85% reported being able to find solutions to technical problems on the internet.

The results indicate high proficiency in digital skills among respondents. The majority in our sample are capable of independently using advanced features of search engines, creating and editing digital text files, and troubleshooting technical issues online. This indicates a strong aptitude for technology, which is increasingly essential in today's digital age. However, anecdotally, we as faculty know that there is more to this picture as many of our students often struggle with even basic digital skills (e.g., uploading a file to the Learning Management System [LMS]). This observed struggle with some of the fundamental ways students interact with technology in academic settings (i.e., more basic digital skills) highlights a potential discrepancy between self-reported proficiency and actual competence in these basic digital tasks, which could result in a hesitancy to interact with this new technology of AI.

Familiarity with AI

The findings from our survey provide an understanding of respondents' self-reported familiarity with and attitudes towards AI in academic settings, offering insights into their perceptions and behaviours. Regarding familiarity with

generative AI, 22% of respondents indicated being very familiar with ChatGPT. The majority fell within the higher familiarity range, suggesting that students are generally well-acquainted with ChatGPT but appears to point to lower numbers self-reported proficiency than earlier reports of college student familiarity (reporting 46%) had indicated when the technology was newer, though ChatGPT is still reported as the most familiar, which aligns with previous reports (Janzen & Milian, 2023). Awareness of other AI text generators and other image generators appeared to be low, with a significant portion of respondents indicating a lack of familiarity with these other AI tools. Specifically, 40.7% rated their familiarity with other AI text generators as 1 (not familiar at all). For image generators, familiarity was even lower: 66.1% of respondents rated their familiarity with DALL-E as 1 (not familiar at all), and 52% gave the same rating for other image generation tools. While familiarity with ChatGPT is relatively high, the low awareness of other AI generator tools like the DALL-E image generators is surprising. This suggests potential gaps in respondents' exposure to or education about various AI technologies. It may suggest the growing ubiquity of the OpenAI environment or a self-preservation effect in responding to the survey, with respondents being concerned about possibly admitting to unethical use of this technology (Ling & Imas, 2025).

Generative AI tools were largely adopted by college students for academic purposes. A majority of participants engage with such applications beyond their studies, with daily usage prevailing. Approximately three-quarters (75.6%) of respondents acknowledge utilizing or contemplating the use of AI tools for drafting communications to educators and peers. This communicates a significant shift in student behaviours that requires our attention and understanding. Clearly, the use of AI is becoming routine for students. But what are the motivations and perceptions that fuel this use? And is it helping or harming their development of important durable skills? The context and perceived value of AI to students will be detailed below.

Use of AI

Motivation for respondents to use generative AI at school, when allowed, resulted in a split. Slightly more than half (56%) self-reported on the lower end (1-5, indicating they were not motivated to use it), while 44% responded on the higher end (6-10), indicating higher motivation for use. When these respondents were asked the same question about actual use of AI in school when they were not allowed, these numbers varied greatly: 13.6% of respondents indicated the slight likelihood of using AI, with no student indicating a high likelihood of using AI when not allowed. The majority, 86.4%, indicated a lower likelihood of using AI when not allowed, including 54.2% who answered not likely at all. The majority of respondents, 86.4%, saw little to no likelihood to use AI in their co-op placements. Only 13.5% responded between somewhat up to very likely to use it in placement. The majority of respondents, 81%, indicated little to no likelihood of using AI in their workplace with 48.3% indicated none at all. Asking about using AI in their personal lives gave a more balanced response, with slightly more respondents (23.7%) indicated very unlikely to use AI in their personal lives, but 42.5% indicated they were somewhat, to very likely to use AI in these instances.

Respondents were asked about the potential benefits of using AI in an academic setting. Students agreed to many possible advantages in their self-reported responses. Of the 59 respondents, 71% indicated that using AI would be advantageous with regards to the wording of their work, 44% responded that it could be a time saver, 50.8% indicated a benefit to help with clarity; learning new information would be a benefit for 35.6% of respondents. Of the students who responded, 8.5% indicated that AI could help them avoid plagiarism, 20.3% used it for entertainment, while 62.7% saw a benefit in using AI as an idea generator. Also, 18.6% of respondents indicated that they did not consider using AI as a benefit in an academic setting therefore did not use AI at all. In a recent study examining students' self-disclosed AI use in college, nearly a third reported using AI for research (29%), followed by studying (24%) and writing assignments (14%; Dancey et al., 2025), which seems to align with our findings.

Participants were also asked to consider the possible disadvantages of using AI in an academic setting. For this question, participants reported being most concerned about reliability, with 78% of respondents indicating that it is not always reliable. Being accused of plagiarism was their next biggest concern, with 71.2% seeing this as a disadvantage. The other choices they were given all had strong responses as disadvantages of using AI including not learning the material themselves (47.5%), extra work being required to check reliability (33.9%), difficulty getting the response needed (40.7%), bias (35.6%), not personal enough (47.5%), privacy (32.2%), and ethical concerns (45.8%), with 13.6% of

respondents indicating that this question was not applicable to them since they do not use AI.

Considering the possible ethical issues (broadly defined) with using AI in academic work, respondents were asked if they were concerned about ethical implications: 32% answered not at all concerned or neutral, while 68% answered on the higher end of the scale, including 23.7% who responded that they were very concerned, suggesting that many are actively thinking about the potential risks and responsibilities associated with AI in learning environments. We made the conscious decision not to define ethical issues as to not prime or otherwise influence students who might not have previously considered these issues (e.g., stealing artists' work for training of large language models); we wanted to know, without our influence, whether ethical issues were taken into consideration when students made decisions about AI use.

These ethical concerns may help explain students' attitudes toward AI integration in the classroom. When asked about the use of AI in education, respondents had very strong opinions. When asked about a teacher using AI as part of a lesson or assessment, and whether this would increase the student's engagement, the majority (74.6%) answered *somewhat disagree* to *strongly disagree*. Only 25.5% of respondents answered that a teacher using AI would increase their engagement, including only 3.4% who *strongly agreed*. This suggests a disconnect between the promise of AI as an educational tool and students' current comfort or enthusiasm about its use.

Looking beyond the classroom, respondents were then asked if they believe that AI will replace most jobs done by humans in the next five years. This question had a large majority (78%) of students answering between *neutral* and *strongly disagree* that this would happen. Only 21.6% of students agreed that AI may replace human jobs in the next five years, with only one student (1.2%) answering that they strongly agreed that AI will replace human jobs. The above findings highlight a cautious student perspective: while many recognize the potential benefits of generative AI, concerns about ethics, reliability, and academic integrity remain strong.

Durable Skills

With respect to the development of durable skills (see Table 1), respondents were relatively split as to whether they perceive AI tools as helpful in transferring skills such as critical thinking and writing to new contexts, but tended to lean more towards disagreement (18.6% *strongly disagree* and 18.6% *neutral*). Admittedly, the nuances of how AI tools impact and affect skill development and application is only starting to be fully realized and explored in any appreciable manner. Walter (2024) notes:

> The use of AI in education offers unique opportunities to cultivate critical thinking. AI systems, with their vast databases and analytical capabilities, can present students with complex problems and scenarios that require more than just rote memorization or basic understanding. These systems can challenge students to use higher-order thinking skills, such as analysis, synthesis, and evaluation, to navigate through these problems. (p.19)

Our study about student perceptions of AI suggest that those "unique opportunities" are still being worked out—student perspectives may be blurred on the prospects, both good and bad, at this present time.

For the question "*Overall, I see value in using AI tools to help support my academic work*" self-reported responses lacked consensus, although 22.8% indicated a strong disagreement with it, 15.8% were neutral and 10.5% strongly agreed suggesting some polarization. Students are using AI tools to support their academic work, but do they see "value"? A reasonable inference may be that students understand the expediency of AI, but the full implications of its value, especially in supporting and enhancing academic work, is still being unpacked. A question arises, too, as to the nature of that value—if an AI tool helped a student achieve an A grade, then that student may perceive it as valuable.

The suppositions noted in the immediately preceding two paragraphs, then, are generally supported with respect to how respondents addressed the next series of questions, which invited considerations of how AI tools in education supported skill development: creativity, problem solving, teamwork, time management, information literacy, numeracy, critical thinking, writing/communication. Respondents overwhelmingly appear not to fully grasp how AI supports skill development. "Does not support that skill development at all" was the most frequent response in each category of durable skills, followed by teamwork (47.5%) followed by problem solving (37.3%), critical thinking (36.2%), writing/

communication (32.2%), time management (30.5%), creativity (28.8%), numeracy (27.1%), and information literacy (22.4%). Going by that alone, students mostly don't understand how AI supports the development of these durable skills. For the information literacy category, no respondents rated the technology as having the highest possible impact (the top two scores). However, several respondents did feel that AI use helped improve information literacy to some degree, just not in an extreme way. The results are unlikely to be surprising given that curriculum redesign around AI and its implications remain in its infancy. If educators and curriculum specialists are still working through how AI can support skill development, then students, too, remain somewhat in the dark.

As suggested, the nuances of how AI can complement or enhance skill development is not yet fully appreciated or understood. Students understand this relationship the most in the context of information literacy, but even there, a gap exists between understanding information literacy as accessing information versus information literacy as knowing what to do with that accessed information; many conflate access to information with being informed, but they are not the same thing (Boles, 2025; News Literacy Project, n.d.). The other point to return to is whether AI is currently viewed as "valuable," so to speak, and that will require further study. There may be some interesting insights gleaned from looking at whether perceived value in the current context equals expediency or efficiency. The value that AI tools currently offer the average college student may be in workload management, but not in skill development or transference – at least not from their perspective at this present time. This could be extrapolated to suggest that the way faculty model AI support of skill development is either unclear or perhaps haphazard, which anecdotally may be somewhat borne out in the uneven policies around AI use one sees rolling out at colleges and universities globally.

Examining respondent perceptions of whether they think that durable skills are more, less, or equally important to develop

Table 1. Summary of descriptive statistics. Low values reflect negative self-reported statements (e.g., 1 = Strongly disagree, Does not support, Not important at all) while high values refer to positive statements (Strongly agree, Greatly supports Very important). Refer to Appendix A for list of questions and response scale.

Description	Median	Mean	SD
I think that AI tools can help me develop skills such as critical thinking and writing.	4	3.98	2.58
I think that AI tools can help me to transfer skills such as critical thinking and writing to new contexts.	5	4.37	2.59
Overall, I see value in using AI tools to help support my academic work.	5	4.77	3.05
To what extent do you believe that the use of AI tools in education supports the development of creativity?	4	4.05	2.69
To what extent do you believe that the use of AI tools in education supports the development of problem solving?	3	3.81	2.78
To what extent do you believe that the use of AI tools in education supports the development of teamwork?	2	2.71	1.99
To what extent do you believe that the use of AI tools in education supports the development of time management?	4	4.53	3.04
To what extent do you believe that the use of AI tools in education supports the development of information literacy?	4	4.10	2.54
To what extent do you believe that the use of AI tools in education supports the development of numeracy?	3	3.71	2.33
To what extent do you believe that the use of AI tools in education supports the development of critical thinking?	2	3.22	2.36
To what extent do you believe that the use of AI tools in education supports the development of writing/communication?	4	4.03	2.75

with the presence of generative AI, the frequencies are shown in Table 2 (question scale 1-10, with higher scores meaning more important). In general, the responses mirrored the pattern reported above, where most respondents indicated that the building of these skills was less important now. Means were typically around 7.5 and 8.0 for medians, with most student responses in the lower end of the distributions (7-10), indicating that these skills were less important now than they had previously been.

Breaking these down further, whether or not a student was registered with the centre which supports student accommodations had no impact on the distribution of responses, though age, gender, and international student status did. When examining data separately by respondent age, 19- and 20-year-olds found creativity particularly important to develop with the presence of generative AI, as demonstrated by the higher means (8.4 and 8.6, respectively) and medians (8.5 and 9.5, respectively). Additionally, 18-year-olds indicated that time management was now more important than any other age group (mean = 8, median = 9). Age also impacted responses for numeracy, whereby 19-year-olds found this skill less important than other age groups(mean 5.6 and median 5). Gender differences were also identified in the pattern of results when examined separately: men rated the importance of all of these skills lower than women, with median scores approximately 2 points lower, though numeracy and critical thinking showed larger differences than the other skills. Although no statistical tests were conducted to assess the statistical significance

Table 2. Frequency of response for each of the ratings on the questions asking whether they thought these skills were more or less important now that Generative AI is available (1 = much less important, 10 = much more important)

Description/Rating	1 (less important)	2	3	4	5	6	7	8	9	10 (more important)
I think that AI tools can help me develop skills such as critical thinking and writing.	18	2	9	5	5	6	9	3	2	0
I think that AI tools can help me to transfer skills such as critical thinking and writing to new contexts.	11	7	7	4	11	5	7	2	4	1
Overall, I see value in using AI tools to help support my academic work.	13	4	7	3	5	9	4	3	3	6
To what extent do you believe that the use of AI tools in education supports the development of creativity?	17	5	4	8	6	7	6	2	2	2
To what extent do you believe that the use of AI tools in education supports the development of problem solving?	22	3	6	4	5	7	4	5	2	1
To what extent do you believe that the use of AI tools in education supports the development of teamwork?	28	6	5	3	11	5	0	1	0	0

Table continued to next page...

Description/Rating	1 (less important)	2	3	4	5	6	7	8	9	10 (more important)
To what extent do you believe that the use of AI tools in education supports the development of time management?	18	2	5	5	4	7	6	6	2	4
To what extent do you believe that the use of AI tools in education supports the development of information literacy?	13	10	5	2	6	8	8	6	0	0
To what extent do you believe that the use of AI tools in education supports the development of numeracy?	16	6	8	7	6	7	5	4	0	0
To what extent do you believe that the use of AI tools in education supports the development of critical thinking?	21	9	5	6	4	7	2	3	1	0
To what extent do you believe that the use of AI tools in education supports the development of writing/ communication?	19	5	4	4	7	5	6	7	2	0

of this difference, it is interesting to note nonetheless as a possible avenue for further exploration.

For respondents self-identifying as international students, many patterns of responses matched those of domestic students with a few exceptions: for the skills of problem solving, writing/communication, and critical thinking, international students saw these as being less important now than domestic students did. For the skill of numeracy, international students saw this skill as being more important now than domestic students did. Although there have been previously reported differences in the use of ChatGPT by international and domestic students (Janzen & Milian, 2023), future research should investigate the underlying causes of these differences (e.g., English language proficiency needs not currently being met by the available supports)

Creativity

Opinions on the capacity of generative AI to augment human creativity are somewhat divided, as evidenced by the larger number of students providing extreme ratings of either 1 (18.6%) or 10 (5.1%) compared to the questions about other durable skills. Although most students reported one of the middle values on the scale, this dichotomy in the extreme scores indicates that while some individuals perceive substantial potential in AI to bolster creativity, others harbor doubts or skepticism. There is a prevalent uncertainty regarding the discernment between human-originated and AI-generated content within creative domains. A notable segment of respondents express moderate confidence, alongside considerable numbers manifesting low or partial confidence. To our knowledge, the relationship between creativity and AI use has not previously been reported elsewhere.

The survey also indicates a belief in generative AI's moderate to significant ability to support artists and designers in their creative endeavours. Despite a moderate confidence level among many respondents, there exists a degree of skepticism concerning AI's role in creative industries (11.9%). A large proportion of participants (40.8%) appear disinclined to employ AI-driven tools for future creative projects, reflecting an underlying interest tempered by hesitation or uncertainty.

Skepticism persists regarding AI's capability to emulate human creativity. When asked to what extent respondents believe that AI can replicate the depth and complexity of human creativity, most respondents were uncertain or attributed low potential to AI (30.5%), contrasted by a smaller, yet noteworthy group with stronger belief in AI's ability to replicate human creativity (5.1%). The data does not point to a definitive consensus on the willingness to collaborate with AI on creative ventures. A considerable faction is receptive (25.4%), some exhibiting reluctance (8.5%), and a significant number remaining neutral or undecided (11.9%). The findings highlight a polarized engagement with generative AI and its creative prospects. While a substantial majority are eager to expand their knowledge, a smaller group shows limited interest, and a negligible fraction remains indifferent.

Thematic Analysis

In the final question of the survey, we also provided student respondents with the opportunity to share any additional thoughts they had about generative AI in an open textbox. These responses were examined thematically in an attempt to provide additional context to some of the quantitative responses summarized above. In total, 19 respondents wrote a response in the text box. Since two of those indicated that they had no additional thoughts to share, there were 17 viable responses to analyze thematically, so that is the denominator used for all of the percentages reported here (see Table 3).

Based on the responses provided by students regarding their perceptions of AI, several themes were extracted (by the primary investigator [PI] and co-primary investigator [co-PI] for the project) from the data using an open, inductive approach (Braun & Clarke, 2006). Themes were identified and added (collaboratively by the PI and co-PI) to the list of codes to be used to code subsequent responses. As such, the list of codes and themes was not decided a priori but was stimulus-driven.

First, there are diverging attitudes towards AI, ranging from skepticism and apprehension to enthusiasm and acceptance. Some respondents express concerns about AI's potential to replace human creativity, leading to a devaluation of authentic artistic expression and the proliferation of derivative content. One respondent stated, "AI is stealing mostly creative work, and for what? For derivative trash? This isn't liberating. And eventually if it's fed it's own work, it will become corrupt and useless. I'm not impressed." They also voice apprehension about the ethical implications and potential misuse of AI, particularly in academic settings, which may point to increasing awareness of the multifaceted concerns related to using AI, beyond its potential to eliminate future jobs which had previously been reported and the primary concern (Ghotbi & Ho, 2021). On the other hand, some respondents view AI as an inevitable part of human progress, likening its impact to transformative inventions like the calculator. One respondent explained, "I don't believe the advancement of AI will be nearly as scary as it's made out to be as long as the government keeps pace with & updated laws/regulations." They anticipate significant changes in education and advocate for embracing AI rather than resisting its advancement.

Second, respondents recognize both the benefits and drawbacks of AI in education. While acknowledging its

Table 3. Summary of themes identified in open-ended question about AI. Numbers indicate the number of distinct students whose responses related to that theme (raw numbers and percentages).

Theme	Raw number	%
Beneficial applications	5	29.41
Cautious about it	5	29.41
Detrimental to learning	4	23.53
Connection to durable skills	3	17.65
Will have an impact on art/creativity	4	23.53
Will have an impact on society	4	23.53

potential to aid non-native English speakers in language learning and simplifying complex concepts, they also caution against overreliance on AI for completing assignments. One response notes:

> I think its a really good tool for students whose first language is something other than English. They can sort of learn sentence structure and grammar through consistent use. On the flip side, it can be detrimental to students who use it for every single assignment. They wouldn't be learning anything and would only be relying on AI to complete all their assignments.

Concerns are raised about the potential erosion of critical thinking and creativity when students excessively depend on AI-generated content. However, some respondents highlight the utility of AI in specific tasks, such as generating content for cover letters or providing writing prompts. Both the concerns and benefits highlighted by our student sample appear similar in nature to the findings of Rajabi et al. (2023), whose sample raised concerns about academic integrity, the risk of not developing the required academic and durable skills required for future success.

Additionally, respondents emphasize the importance of ethical considerations and responsible use of AI. They advocate for continued education on information literacy and the enforcement of copyright laws to mitigate the risks associated with AI misuse. There is a consensus, at least among the explanations received from this subset of respondents, that AI should be used with clear guidelines, particularly in educational environments. Similar themes were reported by Dancey et al. (2025), including academic integrity, accuracy/bias, a dependence on AI, its effectiveness, and the need for training and guidelines.

Summary and Conclusions

This present study makes important contributions to the rapidly growing body of research on generative AI and its potential future impact on higher education by documenting present student perceptions, an important component of "what is" questions in the scholarship of teaching and learning (Hutchings, 2000). Overall, the survey findings provide valuable insights into some students' perceptions and attitudes towards AI in academic settings, highlighting both opportunities and challenges associated with its integration into education.

The survey findings underscore a high self-reported level of digital proficiency (e.g., using the tools in the LMS) and considerable familiarity with generative AI, particularly ChatGPT. Despite the high recognition of ChatGPT, the limited familiarity with other AI tools suggests that students' exposure to or education about diverse AI technologies remains insufficient. Our respondents do still seem to realize that they still need to develop their durable skills in spite of AI but this descriptive study was not able to explain the differences identified. For example, what factors could explain differences in students' perceptions of the value of these skills based on age, gender, and international vs. domestic student status? Future research should attempt to tease apart the differences reported here and explain them in a way that might allow faculty to better support student learning.

The thematic analysis of students' open-text responses revealed a range of attitudes toward AI, from skepticism and concerns about ethical implications to enthusiasm and acceptance of its potential benefits in education. Participants emphasized the importance of responsible use, ethical considerations, and continued education on information literacy to mitigate risks associated with AI misuse.

At present, our surveyed students don't appear to fully appreciate how AI helps in the development of critical thinking, problem solving, and writing/communication, but these are the areas where it has significant potential. That potential, though, has yet to be properly exploited and worked out in practice. It may be that there are certain skills that more easily lend themselves to demonstrating how AI tools can aid in their development. Our study suggests that information literacy may be one. Might that be able to provide a bridge into demonstrating how other skills can also benefit from AI support? Beyond this, the broader question remains how educators can leverage AI to help support skill development among college students and ensure that students see that correlation. But parallel to that, we should ask: what human skills must be cultivated to live in a future with AI? So, not AI supported skill development, but skills needed to successfully cohabitate with AI, so to speak. An example of a human skill is emotional intelligence. Metacognition also comes to mind. This is outside the scope of this research project, but invites some interesting conjecture. Additionally, students surveyed are using AI and feel relatively comfortable doing so, but that is not cleanly correlating with a perception of value. What accounts for that discrepancy? How is "value"

perceived in the context of AI use? In fact, how is "value" perceived/weighed in the context of skill development in general? Finally, what does modelling skill development in the so-called average post-secondary classroom really look like in the face of AI? How that question gets answered will significantly reshape the business of education.

This study was a first step in understanding student perceptions of generative AI in a Canadian college student sample which can help build towards the knowledge base needed to better leverage AI in the classroom. The information we gathered can help us to develop an experimental manipulation and/or intervention to further investigate the role of AI in developing and transferring durable skills, including how to leverage this technology to better serve the needs of our students. In addition to the subset of durable skills reported in the present study, there are others which might prove to be equally important, such as Emotional-Social Intelligence (including flexibility, growth mindset, social skills, empathy, among others), particularly since these are the types of unique human cognitive behaviours that machines currently find difficult to replicate (Dolev & Itzkovich, 2020).

Rather than shying away from including generative AI in courses, integrating it is going to be a key facet of students' future success in the workplace and institutions that embrace this challenge will see a more positive impact on students and in their campuses. On our campus, for example, the foundational Communications course (COMM 1100) has been redeveloped to embrace generative AI, and now supports students learning about multiple generative AI tools and reflecting on each tool's strengths, limitations, and responsible use. As such, students are confronted with the relevance and importance of developing their durable skills (e.g., critical thinking and writing clarity) in order to successfully use these tools in an appropriate way. Durable skills will continue to be important to develop to ensure that students are successful in their future work, as these skills are increasingly being demanded and valued by employers (Buhler et al., 2022; Hutson et al., 2022; Schislyaeva & Saychenko, 2022). As such, it may be even more important now to ensure that we teach students durable skills than it ever has been in the past (Hutson & Ceballos, 2023).

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Appendix

Please select one of the options below:

- I consent to participate in this study AND consent to having my anonymous data used in future similar studies
- I consent to participate in this study and DO NOT consent to having my anonymous data used in future similar studies
- I DO NOT consent to participating in this study (note: selecting this option will close the window.

What is your age?

- 17 or younger
- 18
- 19
- 20
- 21+
- Prefer not to answer

What is your gender identity?

- Man
- Woman
- Non-binary
- Prefer not to say

Please select the academic Faculty of the program you are currently studying at Durham College:

- Science, Engineering & Information Technology
- Business
- Liberal Studies
- Professional & Part-Time Learning
- Social and Community Services
- Health Sciences
- Media, Art & Design
- Skilled Trades & Apprenticeship
- Hospitality & Horticultural Sciences
- Unsure
- Prefer not to answer

What program are you in?

(short answer):_____

Are you an international student?

- Yes
- No
- Prefer not to answer

Are you registered for student accommodation with the Access and Support Centre (ASC)?

- Yes
- No
- Prefer not to answer

When I use a search engine, I can take advantage of its advanced features.

- No - I don't know how to do it.
- Yes - I can do it with help.
- Yes - I can do it on my own.
- Yes - I can do it with confidence and, if needed, I can support/guide others.

I know how to create and edit digital text files (e.g., Word, OpenDocument, Google Docs).

- No - I don't know how to do it.
- Yes - I can do it with help.
- Yes - I can do it on my own.
- Yes - I can do it with confidence and, if needed, I can support/guide others.

When I face a technical problem, I am able to find solutions on the Internet.

- No - I don't know how to do it.
- Yes - I can do it with help.
- Yes - I can do it on my own.
- Yes - I can do it with confidence and, if needed, I can support/guide others.

This next set of questions will ask you about generative AI; these are artificial intelligence tools that generate human-like output. The user puts in a prompt that asks the tool to create something entirely new (like text or images) based on the information it was given.

How familiar are you with CHAT GPT?
1 (Not at all familiar) - 10 (Extremely familiar)

How familiar are you with other text AI generators (e.g. Byte, etc)?
1 (Not at all familiar) - 10 (Extremely familiar)

How familiar are you with DALL-e?
1 (Not at all familiar) - 10 (Extremely familiar)

How familiar are you with other AI image generators (e.g. Craiyon)?
1 (Not at all familiar) - 10 (Extremely familiar)

How likely are you to use these generative AI tools at school (when allowed)?
1 (Not likely at all) - 10 (Very likely)

How likely are you to use these generative AI tools at placement? (if applicable; otherwise, skip this question)
1 (Not likely at all) - 10 (Very likely)

How likely are you to use these generative AI tools in personal life?
1 (Not likely at all) - 10 (Very likely)

How likely are you to use these generative AI tools at work?
1 (Not likely at all) - 10 (Very likely)

What do you see as the potential advantages of using these generative AI tools in the academic setting? Select all that apply.

- Save time
- Help with wording/writing
- Avoid detection (e.g. plagiarism/TurnItIn)
- Learn new information
- Clarity of question on assignment
- Idea-generation
- Quick/cheap entertainment (e.g., writing poems or stories)
- Not applicable - I do not use AI tools
- Other...

What do you see as the potential disadvantages of using AI? Select all that apply.

- Output is not always reliable
- I don't get to learn how to do things myself (e.g. writing/durable skills)
- Can cause me extra work (e.g. checking references)
- Difficult to get the desired output (e.g. prompt generation)
- Could be considered plagiarism
- Biased output
- Text is not personal/personalization
- Privacy/data security
- Ethical considerations regarding training data for model

- Not applicable - I do not use AI tools
- Other...

How concerned are you about potential ethical issues related to AI-generated content, such as plagiarism or copyright infringement?
1 (Not concerned at all) - 10 (Very concerned)

To what extent do you agree or disagree with the following statement: If my professor used these tools in the classroom (during their teaching or as part of assignments, for example), it would increase my engagement with the course.
1 (Strongly disagree) - 10 (Strongly agree)

To what extent do you agree or disagree with the following statement: I believe that AI will replace humans for most jobs in the next 5 years.
1 (Strongly disagree) - 10 (Strongly agree)

To what extent do you agree or disagree with the following statement: I think that AI tools can help me develop skills such as critical thinking and writing.
1 (Strongly disagree) - 10 (Strongly agree)

To what extent do you agree or disagree with the following statement: I think that AI tools can help me to transfer skills such as critical thinking and writing to new contexts.
1 (Strongly disagree) - 10 (Strongly agree)

To what extent do you agree or disagree with the following statement: Overall, I see value in using AI tools to help support my academic work.
1 (Strongly disagree) - 10 (Strongly agree)

To what extent do you believe that the use of AI tools in education supports the development of creativity?
1 (Does not support) - 10 (Greatly supports)

To what extent do you believe that the use of AI tools in education supports the development of problem solving?
1 (Does not support) - 10 (Greatly supports)

To what extent do you believe that the use of AI tools in education supports the development of teamwork?
1 (Does not support) - 10 (Greatly supports)

To what extent do you believe that the use of AI tools in education supports the development of time management?
1 (Does not support) - 10 (Greatly supports)

To what extent do you believe that the use of AI tools in education supports the development of information literacy?
1 (Does not support) - 10 (Greatly supports)

To what extent do you believe that the use of AI tools in education supports the development of numeracy?
1 (Does not support) - 10 (Greatly supports)

To what extent do you believe that the use of AI tools in education supports the development of critical thinking?
1 (Does not support) - 10 (Greatly supports)

To what extent do you believe that the use of AI tools in education supports the development of writing/ communication?
1 (Does not support) - 10 (Greatly supports)

Now that generative AI is available, do you think it is more or less important for college students to develop creativity? (1 being not important at all, 5 being no change, and 10 being very important)
1 (Not important at all) - 10 (Very important)

Now that generative AI is available, do you think it is more or less important for college students to develop problem solving? (1 being not important at all, 5 being no change, and 10 being very important)
1 (Not important at all) - 10 (Very important)

Now that generative AI is available, do you think it is more or less important for college students to develop teamwork? (1 being not important at all, 5 being no change, and 10 being very important)
1 (Not important at all) - 10 (Very important)

Now that generative AI is available, do you think it is more or less important for college students to develop time management? (1 being not important at all, 5 being no change, and 10 being very important)
1 (Not important at all) - 10 (Very important)

Now that generative AI is available, do you think it is more or less important for college students to develop information literacy? (1 being not important at all, 5 being no change, and 10 being very important)
1 (Not important at all) - 10 (Very important)

Now that generative AI is available, do you think it is more or less important for college students to develop numeracy? (1 being not important at all, 5 being no change, and 10 being very important)
1 (Not important at all) - 10 (Very important)

Now that generative AI is available, do you think it is more or less important for college students to develop critical thinking? (1 being not important at all, 5 being no change, and 10 being very important)
1 (Not important at all) - 10 (Very important)

Now that generative AI is available, do you think it is more or less important for college students to develop writing/ communication? (1 being not important at all, 5 being no change, and 10 being very important)
1 (Not important at all) - 10 (Very important)

How often do you actively use AI applications or tools in order to help you complete your academic work? Please select one:

- Daily
- Weekly
- Monthly
- Rarely
- Never

How often do you actively use AI applications or tools OUTSIDE of your academic studies? Please select one:

- Daily
- Weekly
- Monthly
- Rarely
- Never

Have you ever used or considered using AI-powered tools or applications to assist in composing emails or other messages to your professors or peers? Please select one:

- Yes, I have used AI tools for this purpose.
- No, I have not used AI tools, but I've considered it.
- No, I have never used or considered using AI tools for emailing professors or peers.
- Not sure

To what extent do you believe generative AI has the potential to enhance human creativity?
1 (Strongly disagree) - 10 (Strongly agree)

How confident are you in your ability to distinguish between content created by humans and content generated by AI in creative fields (e.g., art, music, writing)?
1 (Not confident at all) - 10 (Very confident)

To what extent do you think generative AI can assist artists and designers in their creative processes?
1 (Not helpful at all) - 10 (Extremely helpful)

How likely are you to use AI-powered tools or software to aid in your creative projects in the future?
1 - (Not likely at all) - 10 (Very likely)

To what extent do you believe that AI can replicate the depth and complexity of human creativity?
1 - (Not at all) - 10 (Completely)

How open are you to collaborating with AI systems to co-create artistic or other creative projects?
1 - (Not open at all) - 10 (Very open)

How interested are you in learning more about the technical aspects of generative AI and its role in creativity?
1 - (Not interested at all) - 10 (Completely interested)

Do you have any other thoughts about generative AI that you'd like to share with us? If so, please provide it in the textbox below, but remember not to provide any information which might reveal your identity as this survey is anonymous. Otherwise, thank you for taking the time to answer this survey. You can now submit your responses.
(short answer): _____