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Exploration of Artificial Intelligence in Francophone Higher Education: Innovations, Challenges and Perspectives

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Abstract

Artificial intelligence (AI) is revolutionizing higher education, offering new perspectives and practices while raising complex challenges. This article provides a comprehensive understanding of AI, its historical and technological evolution, and its current impact on higher education. Through the analysis of workshop reports, observations, and related documentation, it identifies key insights into the reflections and practices surrounding AI in Francophone higher education. The study emphasizes the unique dynamics within this context, highlighting the cultural and ethical dimensions of AI integration on an exploratory basis. It proposes insights for strategic orientations for responsible and inclusive adoption of AI, aligning technological innovation with values of equity, diversity, and collaboration. Through a synthesis of different perspectives, this article provides information to enlighten the higher education ecosystem on the practices, reflections and initiatives carried out by stakeholders in the French-speaking university community.

Keywords: Artificial Intelligence, Higher Education, Francophone Context, Pedagogical Innovation, Ethics

Introduction

Today, the concept of artificial intelligence, once abstract and arcane, has moved from the realms of science fiction to the realms of reality. This transformative technology is revolutionizing various sectors of society, including higher education. Artificial intelligence offers unprecedented opportunities in higher education to increase productivity, improve professional practices and enrich learning experiences, whether for students, teachers, researchers or administrative staff. Drawing on observations, workshop reports, and documents, this paper aims to synthesize reflections from events on AI in education during year 2024[1] organized in France and Québec with stakeholders across

[1] Conference on AI of DemoUHA multidisciplinary chair at the University of Upper Alsace, International Education Symposium of CRIFPE (Interuniversity Research Center on Training and the Teaching Profession) in

France, Belgium, Montreal, Québec, Switzerland, and Tunisia, etc. exploring the challenges, opportunities, and transformative potential of AI in these French-speaking contexts. The perceptions gathered enable us to understand how these actors themselves construct a contextual reality around uses of AI. By comparing these perceptions with existing theoretical frameworks and recent surveys, this paper offers a unique analysis of Francophone specificities of AI integration in higher education.

To guide the reader through this exploration, the article is structured into several key sections. It begins by offering a comprehensive understanding of AI, tracing its historical and technological evolution to contextualize its current applications in higher education. Then, following sections provide a global overview of AI's transformative potential, including its impact on professional practices, learning, and governance in academia. Building on this foundation, other sections delve into the specific context of Francophone higher education, highlighting its unique approaches, innovations, and challenges. Finally, the article concludes with strategic recommendations for fostering the ethical and inclusive integration of AI in higher education, offering transferable insights to inspire institutional practices and policy-making. By addressing these dimensions, the article seeks to contribute to a nuanced understanding of AI's role in higher education, bridging regional perspectives and global imperatives to support the responsible adoption of this transformative technology.

Artificial Intelligence: An Ancient Concept Rooted in Collective Imaginary

Contrary to the contemporary portrayal of artificial intelligence (AI) as a modern innovation, its conceptual origins trace back millennia. In ancient Greek mythology, AI-like constructs were imagined in the form of automata created by Hephaestus, the god of fire and metallurgy. These mechanical beings could mimic human actions, reflecting a blend of technical ingenuity and philosophical curiosity (Marcinkowski & Wilgaux, 2004). In one of the passages from his eponymous work, entitled “The Politics”, Aristotle gives us a prophetic vision of a world in which Hephaestus' automata could put an end to slavery, by quoting this (Ibid., p.3):

“*If every instrument were capable, on a simple instruction, or even sensing what was going to be asked of it, of performing the work that was proper to it, as is said of Daedalus‘ statues or Hephaestus’ tripods, which the poet says: “Went by themselves to the*

Montreal, EUCOR doctoral seminars (University of Upper Alsace, University of Basel, University of Strasbourg) on digital transformation in higher education, AI Study Day at Paris AgroTech, AI Reflection Day at the University of Upper Alsace, AI Round Table during the ELAN autumn day at the University of Upper Alsace, AI Study Day at the University of Strasbourg on the reasoned uses of AI for teaching French as a Foreign and Second Language (FFSL), IA seminar for the University of La Rochelle's IA day, IA seminar for the University of Paris 1 Panthéon-Sorbonne's IA day, IA seminar for the University of Orléans' Pro3 project day.

assembly of the gods", if, in the same way, the shuttles wove by themselves, and the plectrums plucked the zither all by themselves, then, neither master craftsmen would need workers, nor masters slaves. "

Aristotle envisioned a world where such devices could replace human labor, suggesting that if tools like the self-moving tripods of Hephaestus could function autonomously, slavery would become obsolete. The figure of Hephaestus in Greek mythology offers a fascinating prism for analyzing our contemporary relationship with technology and automation.

These considerations raise fundamental questions about the balance between technological progress and the preservation of human skills. Just as we wonder today about the impact of AI on employment, the Greeks explored the complex relationship between man and machine through the myth of Hephaestus. As a divine blacksmith, Hephaestus had the ability to create "automata" that mimicked human capabilities, while remaining an unsurpassed craftsman himself. This idea resonates particularly with our contemporary questions: to what extent can the machine replace the human being? What is the place of creativity and craftsmanship in an increasingly automated world?

The rapid development of automation technologies such as AI leads us to consider the need to integrate an ethical dimension into the responsible use of these technologies. In Greek mythology, the automata of Hephaestus are not mere tools, but works of art that question the boundary between the natural and the artificial. Hephaestus thus emerges as a prophetic figure who, through the prism of Greek mythology, anticipates and illuminates our contemporary questions about artificial intelligence and the place of human beings in a technological world. His myth invites us to reflect on the need to maintain a balance between technological innovation and the preservation of fundamental human values.

Understanding AI: A Long History of Technological Innovation

The modern conceptualization of AI began in the mid-20th century. In fact, the history of artificial intelligence (AI) represents one of the most fascinating scientific adventures of 21st century. Spanning more than seven decades, this technological odyssey is a perfect illustration of our progress in creating machines capable of imitating and even surpassing certain human faculties.

The foundations of AI were laid in 1950 by Alan Turing, the renowned British mathematician and cryptologist (LeCun, 2019). His pioneering work, notably in the famous "Turing Test", laid the conceptual foundations for assessing a machine's ability to simulate human conversation (Ibid.,). This innovative approach paved the way for in-depth reflection on the possibility of creating thinking machines. The term "Artificial Intelligence" was officially introduced at the historic Dartmouth Conference in 1956, at the instigation of John McCarthy. This conference, bringing together the most eminent researchers of the time, marked the official birth of this new disciplinary field and defined

the fundamental directions of AI research.

The first developments in artificial intelligence were aimed at creating systems to support human reasoning based on formal logic. These so-called "*symbolic*" or "*logical*" AIs operated according to simple algorithmic principles of the conditional ("if-then") type, enabling the construction of decision trees. This approach, based on predefined rules and logical sequences, mainly served as a decision-making tool, breaking down complex problems into sequences of binary choices. This initial vision of AI as an assistant to logical reasoning contrasts significantly with current approaches based on machine learning and neural networks, which privilege the processing of massive data and learning from experience rather than the programming of explicit rules (Le Cun, 2019 p.19-21).

In 1956, Marvin Minsky defined artificial intelligence as the design of computer programs capable of performing complex cognitive tasks, including learning and reasoning (Brons, 2023 p. 27). This seminal definition laid the conceptual foundations that still guide AI research today, focusing on the reproduction of human mental capacities within artificial systems. In 1957, Frank Rosenblatt developed the Perceptron at Cornell University (Brons, 2023). This innovation marked the beginning of the ability of machines to learn, inspired by the functioning of the human brain, through the creation of artificial neural networks (Ibid., p. 29). This breakthrough marks a new stage in the development of sophisticated artificial intelligence systems.

The 1960s-1970s marked a difficult period for artificial intelligence, characterized by the questioning of the capabilities of machine to learn through neural networks (Le Cun, 2019). Minsky and Papert's critical publication on perceptrons in particular highlighted the technical limitations of these systems, leading to a period of disinterest and reduced funding, known as the "AI winter" (Ibid., p.24). In 1966, Joseph Weizenbaum created ELIZA, the first chatbot in history and direct ancestor of modern conversational agents like ChatGPT (Brons, 2023). This revolutionary innovation represented the first attempt to create a dialogue between man and machine. ELIZA operated on a principle that, while rudimentary by today's standards, was innovative for its time: the system analyzed users' textual inputs for specific keywords, then generated pre-programmed responses based on these words. The chatbot then maintained the conversation by systematically asking a new question, creating the illusion of a continuous, coherent exchange (Ibid., p. 29). Paradoxically, Weizenbaum had developed ELIZA not to demonstrate the potential of artificial intelligence, but rather to highlight its fundamental limitations. His aim was to highlight the superficial nature of human-machine communication, even though his invention would paradoxically pave the way for decades of development in the field of conversational agents. ELIZA's operation, based on pattern recognition and idea association, already prefigured certain aspects of modern chatbots, although the latter rely on much more sophisticated technologies such as deep learning and natural language processing. Initially conceived as a demonstration of the limitations of AI, this project has

become a cornerstone in the history of human-computer interaction, laying the conceptual foundations on which today's most advanced virtual assistants are based. ELIZA's legacy can be found in the basic design of today's chatbots, even if the underlying technologies have evolved considerably.

By the way, the 1970s saw the emergence of the first expert systems, the most notable of which was MYCIN (Russell & Norvig, 2010). This pioneering system, developed for diagnosing blood diseases and prescribing treatments, represented a significant advance in the application of AI to the medical field. MYCIN already demonstrated an impressive ability to reproduce the diagnostic reasoning of medical experts. On the move, the 1980s-1990s saw a significant revival in the field, driven by the emergence of expert systems. This renaissance was supported by major investments from universities and companies, enabling significant advances in machine learning and the development of neural networks (Le Cun, 2019).

Another milestone was reached in 1986 with Navlab, the first self-driving vehicle. This innovation foreshadowed today's revolution in autonomous mobility, and paved the way for further research in the field of intelligent vehicles. Year 1997 marked a historic turning point with the victory of IBM's Deep Blue over world chess champion Gary Kasparov (Le Cun, 2019). This event demonstrated for the first time the ability of a machine to outperform humans in a complex intellectual domain, prompting much reflection on the potential and limits of AI. The years 2000 to today mark a period of spectacular acceleration in the development of AI, driven by three key factors (Brons, 2023 p. 32): the explosion in computational power, access to massive volumes of data thanks to the Internet, and algorithmic innovations. This technological convergence has enabled AI to expand into strategic sectors such as healthcare, finance and transport. Technology giants, particularly Google and IBM, have played a catalytic role in this evolution, developing increasingly sophisticated AI applications and democratizing access to them.

Between the late 2000s and 2021, artificial intelligence has revolutionized many aspects of our daily lives. Concrete applications illustrate this transformation: voice recognition on our smartphones, the development of autonomous vehicles, and medical imaging analysis for disease diagnosis. This evolution is based on a major innovation: artificial neural networks, inspired by the workings of the human brain, which enable machines to learn from experience (Blons, 2023). These advances are essentially based on machine learning, and particularly deep learning, giving AI systems an unprecedented capacity for autonomous learning (Le Cun, 2019).

The year 2022 marks a decisive turning point with the launch of ChatGPT, which represents a spectacular breakthrough in the history of AI. This system, based on a deep learning technology called the “transformer”, uses advanced neural networks to understand and generate text in a natural way. Unlike its ancestor ELIZA, which worked with pre-programmed responses, ChatGPT can analyze context, understand relationships between

words and generate original content by learning from huge volumes of textual data. Its emergence represents a new paradigm in the history of AI. This democratisation of advanced AI, made accessible through an intuitive conversational interface and in sophisticated discussions, enables anyone to generate contents and solve complex problems without any particular technical expertise. For the first time in 70 years of AI technological achievements (1950-2021), AI is no longer an abstract technology for the general public, but a tangible reality accessible to all (Mogavi et al., 2023; Shilpa & Menon, 2023).

In summary, the history of AI reveals an evolution marked by four distinct generations that have transformed our understanding and mental representations of this technology. It all started in the 1950s and 1980s with symbolic artificial intelligence, where systems were designed to mimic human reasoning through a formal logical approach. This first generation, also known as "*logical AI*" or "*symbolic AI*", was based on simple "*if-then*" algorithmic principles and allowed complex problems to be broken down into binary choices through the construction of decision trees.

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This historic progression illustrates the transition from AI based on simple logical rules to complex systems capable of autonomous learning and creation. Each generation marks a qualitative leap in the capabilities and applications of artificial intelligence.

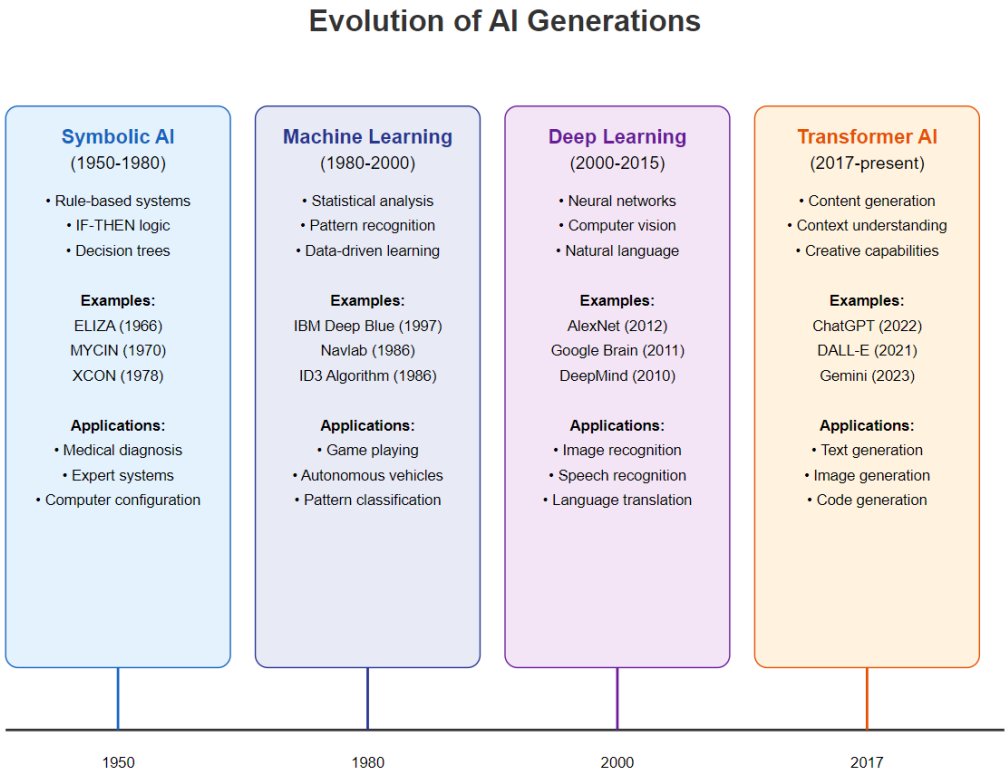

Figure 1. Evolution of AI generation (1950-2017)

This revolution opens up fascinating prospects, but also raises major issues in terms of regulation, data protection and impact on the labor market and education. These issues are at the heart of reflections in the university community. Our participation in several events in 2024 devoted to AI in French-speaking higher education, particularly in France and Quebec, enabled us to analyze three fundamental aspects: the perception of the impact of AI by university professionals from different French speaking countries and regions in the world, the development of its concrete uses in teaching, and the development of ethical recommendations for the responsible integration of these technologies.

A Global Outlook on Prospectives of AI Impact

Cigref's strategic orientation report[2], which is an association of major French companies and public administrations, suggests that by 2030, AI, particularly generative AI, will radically alter the organization of work through the creation of new types of jobs linked to the development and supervision of generative AI, for which certain specific

[2] Source : https://www.cigref.fr/rapport-dorientation-strategique-2023-du-cigref-10-ruptures-a-lhorizon-2030-2040

skills would be required. It is estimated that, by 2030, generative AI will become increasingly powerful, with a considerable reduction in error rates. Users - students, teachers, employees - will use this type of technology to carry out their daily tasks and increase their productivity. For example, it will become possible for a developer to program in natural language with generative AI rather than in traditional programming language. Thus, the various reflections and debates conducted on AI by researchers, intellectuals and civil society figures are unanimous: the apogee of AI will shape tomorrow's world into two kinds of individuals, those who will know how to use AI and those who will not be able to integrate it into their practices. The terms *"Gods"* and *"Useless"* are used by historian Yuval Noah Harari in his book "*Homo Deus*" published in 2016, to refer to the emergence of two future classes of people in relation to the progress and advances of AI: an elite master of AI with developed skills in its use, and economically useless and outdated people, whose skills are null when it comes to using AI.

Several studies on the prospects of AI, highlight a reconfiguration of our relationship to work and creativity. Recent studies highlight the transformative impact of AI on work and creativity. AI is expected to revolutionize various sectors, including healthcare, transportation, and banking, by complementing human skills rather than fully automating jobs (Harayama et al., 2024). While some predict mass unemployment due to technological advancements, others argue for a more nuanced view considering cultural, social, and governmental factors (Patulny et al., 2020). The future workforce may shift towards emotion-based soft-skill services and creative professions, as AI potentially replaces repetitive tasks (Patulny et al., 2020; Clifton et al., 2020). However, the impact of AI on work will likely be uneven, depending on factors such as place, economic activity, and education levels (Clifton et al., 2020). As AI continues to advance, there is a growing need for continuous learning and skills development to foster human-machine complementarity (Harayama et al., 2024). With AI rapid advances, Pinar Seyhan Demirdag, Co-founder and CEO of Cuebric, a GAI company, predicts[3] that over the next two to three years, AI technology will evolve considerably, making it possible to generate ultra-realistic 3D graphics, optimize energy systems, predict transport flows and create complex architectural and engineering simulations. In 10 to 15 years' time, she suggests that its impact will be probably more radical: AI will be capable of producing quality books, films and artistic works, and will transform entire sectors such as robotics, agriculture and manufacturing. According to Pinar, this technological transformation will be accompanied by major societal upheavals, with the disappearance of many repetitive and tedious jobs,

[3] Source : Linkedin Learning. Découvrir l'IA générative. https://www.linkedin.com/learning/de-couvrir-l-ia-generative/bienvenue-dans-decouvrir-l-ia-generative

offset by the emergence of new professions centered on creativity and emotional skills. These comments are echoed by Jérémy Lamri, a researcher specializing in the development of employability and human potential, in his book entitled "Travailler à l'ère des Ia génératives". Moreover, the author points out that jobs with high added value or emphasizing human interaction will be less impacted by AI (Lamri et al., 2023 p. 86).

In this same vein, OpenAI's study indicates that 80% of workers may see at least 10% of their tasks affected by large language models (LLMs), while 19% could have up to 50% of their work impacted (Eloundou & al., 2023). This aligns with Goldman Sachs' projection that AI could replace 25% of labor duties in the US and Europe (Bangash & al., 2024). High-skilled tasks are particularly vulnerable to AI automation with educated white-collar workers earning up to $80,000 annually most likely to be affected (Bangash & al., 2023). However, AI's impact extends across wage levels and industries (Eloundou & al., 2023). While these technologies may disrupt labor markets, they could also boost productivity and create new jobs (Bangash & al., 2024). Scientific and critical thinking fields will be less affected, while writing and programming will undergo profound changes (Eloundou et al.,2023). According to several studies, despite these exciting technological prospects, significant risks remain: the normalization of mediocrity, dehumanization, the development of laziness and the potential suppression of human creativity. To face these challenges, developing behavioral skills, maintaining a critical and creative mindset, and focusing on the uniqueness of each individual. AI is only a tool, an engine whose direction will depend solely on human vision. The challenge lies in knowing how to use AI, supervise it and evaluate its content. Prompt engineering skills will be essential for communicating with the AI and giving it precise instructions for generating quality content. Moreover, higher education must draw key lessons from lived experiences of practice transformation, particularly in terms of pedagogy, to be better prepared for the future. AI will not be the only technology that will disrupt the educational landscape. Technologies such as virtual reality, augmented reality, blockchain, and quantum computing are also on the horizon. Like AI, they will bring their own set of challenges but also opportunities, development prospects, and improvements in living conditions.

A Focus of the Impact of AI in French Higher Education

The advent of artificial intelligence (AI), particularly generative AIs such as ChatGPT, Claude, Gemini, etc., has sparked lively debate in francophone academic circles. The integration and adoption of artificial intelligence technologies in French speaking higher education raises concerns and misgivings among those involved, but also raises hopes in terms of opportunities. By way of example, a survey conducted by Institut Le Sphynx in France between June and August 2023 highlights a significant discrepancy between teachers' perceptions and the reality of student practices when it comes to artificial

intelligence (AI)[4]. The study, based on a sample of 1,242 teachers and 4,443 students, shows that 88% of teachers believe their students use AI, and 80% believe they copy AI-generated content for their assignments. However, only 55% of students claim to use AI frequently, and only 9% admit to copying and pasting AI content. This marked overestimation of AI use by teacher's contrasts with student practice at this period of time. Nevertheless, the survey reveals a point of convergence: two-thirds of teachers and students share concerns about the impact of AI, while opposing its prohibition.

A survey of 1,233 first-year students at the University of Namur in Belgium, conducted between February and March 2023, revealed moderate adoption of ChatGPT (Lobet et al., 2024). According to this study, only 13% of students reported using ChatGPT The study also reveals that other AI tools are more popular, notably Google Translate (67%) and DeepL (39%). The main perceived advantages of ChatGPT are its ability to explain (42%), its speed (26%) and its ease of use (12%).

However, in 2024 a vertiginous evolution in the use of AI in French higher education was observed. Conducted in April 2024 among 1,600 students at the Pôle Léonard de Vinci, the study reveals a massive and revolutionary adoption of generative AI in French academia[5]. For example, almost 100% of students (99%) use these technologies, 92% of them on a regular basis and 30% on a daily basis. The ecosystem of tools is dominated by ChatGPT (88% use), followed by Dall-E (29%), Google Bard/Gemini (27%), Microsoft Bing Copilot (24%) and Midjourney (24%). A third of students are willing to pay 20 euros a month for access to the premium version of ChatGPT 4, demonstrating their commitment to these technologies. Beyond their use, students perceive these tools as real assets: 83% say they reduce their working time, 79% believe they improve their ability to solve complex problems, and 65% note an increase in their productivity. Dependency is significant: 52% recognize that ChatGPT influences their choices, and 51% admit that they would find it difficult to do without it. Contrary to general fears, 70% of students have a positive view of artificial intelligence, while remaining aware of the potential risks. Eighty percent identify data security issues, and 64% acknowledge dependence on foreign technology giants.

Furthermore, KPMG's 2024 study[6] of Quebec higher education reveals that 59% of Canadian students use generative AI for their academic work, an increase of 13% since 2023. Of the 423 students surveyed (43% at university), 75% believe that these tools

[4] Source : https://www.lesphinx-developpement.fr/blog/enseignement-et-ia-generative/

[5] Source : https://open.devinci.fr/ressource/etude-2024-impact-ia-generatives-etudiants/

[6] Source : https://kpmg.com/ca/fr/home/media/press-releases/2024/10/students-using-gen-ai-say-they-are-not-learning-as-much.html#:~:text=Selon%20le%20sondage%2C%20jusqu'%C3%A0,des%20travaux%20(38%20%25).

improve the quality of their work. However, 67% admit to learning less, and 82% have already presented AI-generated content as their own. The main uses include: generating ideas (46%), carrying out research (41%), and modifying work (38%). 70% prefer AI to their teachers for help, while 65% feel cheated.

What can we learn from these facts? Indeed, these figures reveal a rapid and complex technological transformation between 2023 and 2024 in French higher education. Initially characterized by moderate use and cautious perception, AI integration has progressed dramatically, moving from reported use by 55% of students to near-universal adoption of 99% in less than a year. This upheaval is accompanied by a significant gap between the perception of teachers and the reality of student practices: while 88% of teachers were already anticipating massive use of AIs, students showed a more nuanced appropriation. The evolution of tools is equally remarkable, with a shift from simple translators to complex generative AIs like ChatGPT, which is fast becoming the dominant tool, used by 88% of students. This adoption is not passive, but considered: 70% of students develop a positive view of artificial intelligence, while remaining critical, with 80% identifying data security issues and 64% aware of technological dependencies. Motivations have also evolved, moving from an initial search for explanatory ease to the perception of genuine productivity levers: 83% see AI as reducing working time, 79% as amplifying complex problem-solving capacities. A particularly significant indicator is the financial commitment: a third of students are prepared to pay €20 a month for premium access, demonstrating a high perceived value. This transformation is not just technological but cultural, marking a generational shift in the approach to intelligent technologies, where mass adoption sits alongside a critical awareness of ethical and societal issues. The studies highlight a phenomenon that goes beyond the simple use of a tool: it is a profound reshaping of learning, working and thinking methods that is taking place, heralding significant changes in higher education and the professional world.

In this fast-paced AI race, universities, as institutions of excellence, must adapt by developing a quality training offer for students that meets today's challenges. Integrating AI with an ethical and responsible dimension is essential to learning. The French-speaking university community is brimming with ideas, reflections and innovations to support this transformation, both technologically and pedagogically. In the following section, we will outline the various reflections and proposals of players involved in French-speaking higher education, notably from France, Belgium, French-speaking Switzerland, Quebec, Tunisia and elsewhere.

AI's Perceived Impact on French-Speaking Higher Education Academics and Professionals

Thus, discussions among French academics and professionals in higher education, particularly from different French speaking developed countries, oscillate between

challenges and opportunities linked to the use of artificial intelligence in research and teaching. On the one hand, issues relating to plagiarism, academic integrity and personal data protection are among the challenges to be met for the ethical use of AI in higher education, for both teachers and students. On the other hand, the possibilities offered by AI are immense in terms of the personalization of students' learning paths, assessment, pedagogical innovation, and scientific research:

Personalization of Students Learning

To this proposal, AI is seen by miscellaneous French speaking stakeholders, as a tool that facilitates the creation of learning paths tailored to the individual needs of learners, as illustrated by a virtual assistant project presented in the international conference of Education in Montreal co-hosted by UQAM (Université de Québec à Montreal) in May 2024, capable of generating personalized review questions and simplifying complex content according to each student's level. These conversational agents and generative AI systems enable learning content to be tailored to the specific needs of learners, offering personalized reformulations and explanations. In the same vein, proposals for blockchain technology, coupled with AI, were put forward at the round table, to help secure learning data while facilitating greater personalization of learning paths. In the field of active learning support, at a study day on AI at the University of Strasbourg, concrete examples of the use of ChatGPT, were shared to compare translations made by students and by AI or to create role-playing games aimed at reinforcing students' social skills, with the objective of preparing students for job interviews or internships. However, this AI-driven personalization raises issues of confidentiality and requires human supervision to ensure its pedagogical relevance. In general terms, teachers retain a central role in coaching and assessment, with AI as a complementary tool to enrich the individualized learning experience.

Using AI for Assessment

This personalization also extends to assessment, with automated feedback systems providing individualized feedback. Discussions at campus AgroParisTech of Université Paris Saclay, highlighted the promising potential of AI for form generation, automated feedback and the evaluation of performance criteria, while emphasizing that human assessment remains indispensable for more nuanced aspects such as contextual understanding and the appreciation of student intentionality. The integration of AI into assessment practices can be seen at several levels according to various professionals. At the design level, AI facilitates the automated creation of assessment content such as MCQs, exercises and quizzes, while enabling their integration into learning platforms. In the linguistic field, some teachers at the Université de Haute Alsace, point out that IA offers

possibilities for correcting and improving translations that develop learners' analytical skills. For others, AI also helps to analyze learning data for more accurate assessment of individual progress. A professor emeritus at the University of Strasbourg, France, has highlighted the use of AI in the supervision of doctoral students. In fact, AI can lighten the workload of thesis supervisors by taking care of formal corrections (spelling, grammar), enabling them to concentrate on scientific and methodological content. This approach optimizes the time devoted to supervision, while maintaining the quality of supervision. In addition, AI facilitates the analysis of argumentative coherence and the detection of patterns in doctoral research, making the revision process more efficient. It can also help identify gaps in the literature review or suggest complementary sources. However, this use raises ethical and confidentiality issues, notably concerning the protection of research data and the need to maintain substantial human supervision in doctoral evaluation.

AI as a Tool for Pedagogical Innovation

According to the teachers, AI offers unprecedented opportunities to transform teaching methods. They identified several innovative uses for AI in their teaching. In terms of creating pedagogical content, AI can be used to generate lesson plans, produce quizzes and adapt learning materials according to students' needs, such as the automatic generation of personalized questions or the creation of flashcards on learning platforms such as Moodle. In terms of developing critical thinking skills, teachers set up activities where students analyze the answers generated by the AI, identifying errors and biases to refine their own thinking, which also raises awareness of the limits of these technologies. In the context of active pedagogy, notably for flipped classes, AI is used to prepare debates or discussions based on automatically generated summaries or questions, thus encouraging active student participation. In language learning, AI is exploited to suggest translations that students need to improve, or to support them in learning a foreign language, although limits remain in terms of pragmatism and accuracy. Nevertheless, these opportunities come with practical challenges, not least the considerable amount of time teachers have to devote to checking and adjusting content produced by tools like ChatGPT. However, innovation is not limited to the use of tools: it implies a transformation of pedagogical practices, moving from a transmissive model to a more active and reflective learning approach, where AI becomes a support for learner autonomy, while maintaining the central role of the teacher in pedagogical support.

A Powerful Tool for Scientific Research

The impact of AI on scientific research can be seen at several strategic levels according to several researchers. In documentary research, AI improves the relevance of results via tools such as Semantic Scholar, and optimizes source selection. In data analysis,

it facilitates the processing of large volumes of information and the detection of patterns. In scientific writing, AI serves as an assistant for correcting, reformulating and structuring content. It also helps to translate scientific texts and check bibliographic references. AIs such as Scispace and Elicit are also used for automated and assisted literature reviews. However, AI is mainly based on open source data, which can create biases and gaps in scientific coverage. Human supervision therefore remains crucial to guarantee scientific rigor. Researchers need to verify the reliability of sources and the relevance of analyses generated by AI, while respecting research ethics and integrity.

Recommendations for the Ethical and Responsible Use of AI in French-Speaking Higher Education

Despite the opportunities offered by AI, several major challenges were identified by participants at these events. The issue of hallucinations and data reliability was of particular concern, as generative AIs such as ChatGPT sometimes produce erroneous or fabricated answers. In Montreal, participants stressed the importance of training teachers and students in prompt engineering to minimize these errors and optimize the relevance of the content generated. Plagiarism and academic integrity are also a crucial issue, as evidenced by the significant increase (up to 50%) in plagiarism cases reported by a participant from the University of Tunis, following the massive use of AI tools. Faced with the low reliability of current detectors, several teachers claim turning to alternative solutions such as oral evaluation or reformulation of content by students. Discussions at campus AgroParisTech of Université Paris Saclay, highlighted the problem of algorithmic bias, in particular the over-representation of American culture in language models, which limits their relevance in local or specific contexts. They also highlighted the need to train AIs on more diverse and representative data across regions, countries and cultures. In this context, the development of open source AI is of major interest in terms of diversification and representativeness, as well as in terms of confidentiality and protection of sensitive, strategic and personal data.

An analysis of the reflections shared at these events, whether through exchanges, debates or communications, has enabled us to retain the following central points:

- The ethical integration of AI in higher education requires a rigorous framework of recommendations.
- Transparency is the first pillar, requiring clear communication on the use of AI in all teaching and assessment processes.
- Personal data protection is a top priority, involving strict confidentiality measures and the disabling of data control to preserve user privacy.
- Academic integrity requires the establishment of precise rules concerning the acceptable use of AI, accompanied by in-depth training in the

detection of bias and hallucinations.

- Maintaining human supervision remains crucial, especially for important decisions and final evaluation, while equity of access must be guaranteed to avoid the creation of new educational inequalities.
- User training is a fundamental element, aimed at developing competencies in ethics and a critical mindset for a responsible use of AI tools.
- The gradual and structured introduction of AI, adapted to the different levels of professionals, teachers, academics, learners, enables a controlled appropriation of these technologies.

Moreover, on the pedagogical side, as part of the DémoUHA project[7] run by the Université de Haute Alsace, the TEGI (Train, Exploration, Guidance, Implementation) method has been developed for the ethical and responsible integration of generative AI into learning (Many & al., 2024). This method involves integrating GAI into teaching sessions in four progressive stages. The first training phase aims to make students aware of the issues, challenges and opportunities of GAI, following Conole's (2013) approach. The second exploration phase allows students to discover and experiment with different GAI tools such as ChatGPT, Bard, Gamma and AdobeFirefly, following the recommendations of Beetham and Sharpe (2013). The third phase of support focuses on the transmission of good user practices, in particular the development of "prompt engineering" skills as defined by Mollick and Mollick (2024). Finally, the fourth stage of ethical and responsible application assesses students' metacognition and critical posture in relation to GAI, developing their ability to detect false references, biases and hallucinations, according to Selwyn's (2012) approach. This methodical progression ensures thoughtful, controlled integration of GAI into higher education.

[7] The DemoUHA project, led by the Université de Haute Alsace since 2022, to support the university's responsible digital transformation. One of the aims of this project is also to shed light on the higher education ecosystem in terms of data and AI.

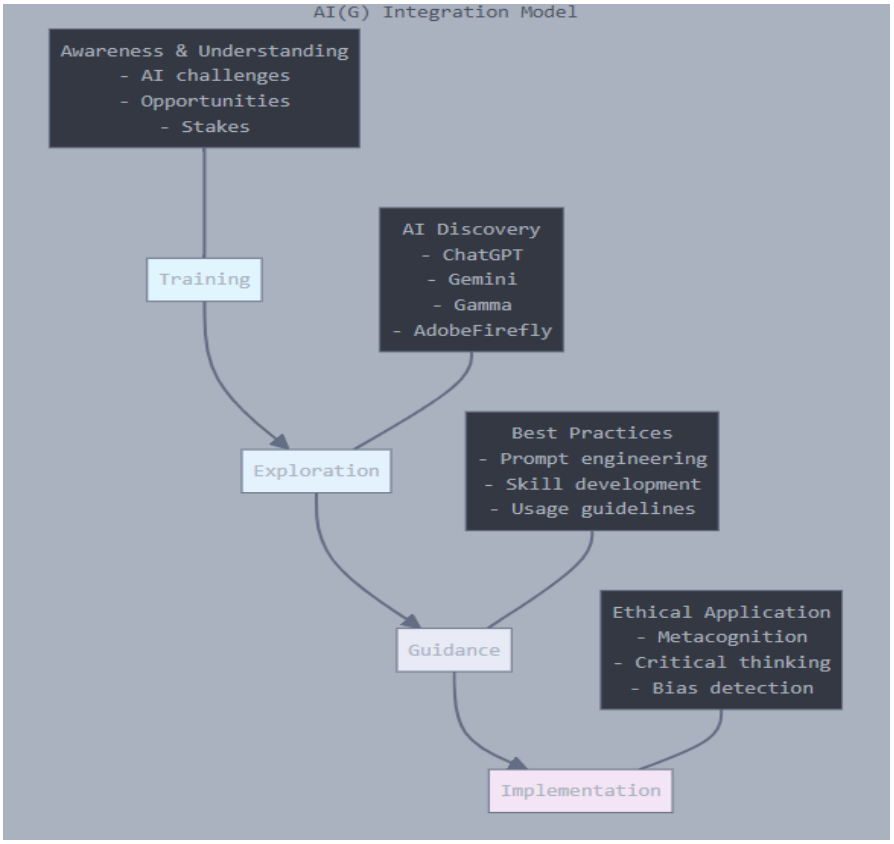

Figure 1: TEGI method for AI (G) integration in Learning (Many & al.,2024)

Finally, participants in the various events highlighted the risks of dependency linked to the unreasoned and unaccountable use of AI, which could compromise the cognitive autonomy of students, particularly in IT courses, where some are losing their ability to solve problems without technological assistance. Even moreso, alarmist and marketing rhetoric on AI in the media can develop a feeling of superiority of intelligence and efficiency of AI over humans. These distortions of reality through misinformation could have an impact not only on learner engagement, but also on their sense of efficacy. Hence the need to continually raise awareness, inform and train players in the ethics of AI. It's important to know, when compared with human intelligence, though, AI has limitations in terms of depth, intrinsic creativity and contextual understanding. As Russell and Norvig (2010) remind us, a system can produce behaviors that appear intelligent without possessing true understanding. This limitation is also highlighted by Bengio (2021), who points out that human intelligence relies on complex mechanisms such as consciousness, intuition and abstract thought, which are still inaccessible to current systems. In this respect, a study by Zheng and Meister (2024) reveals a technological paradox: the cognitive

slowness of the human brain (10 bits/second), which represents a data processing capacity of 10 bits per second, highlights the fact that AI significantly surpasses human capabilities, without representing superior intelligence. Our sensory systems can receive up to 10 million bits per second, but our brains meticulously filter and compress this information, concentrating on the essentials. Artificial intelligence undeniably excels in massive and rapid data processing, complex calculations and systematic task execution, but remains limited in eminently human areas such as creativity, intuition, contextual understanding and emotional intelligence. According to LeCun (2019), AI remains a generalist tool offering remarkable computational versatility, while humans retain their supremacy thanks to their capacity for specialized reasoning, fueled by unique contextual experience and nuanced intelligence. Thus, true intelligence is not measured by processing speed, but by the ability to interpret, understand and innovate holistically. AI remains a formidable technological tool, but to become truly meaningful, it still requires human vision and direction. Its computational power does not supplant the depth, nuance and complexity of human thought, but complements and enriches it. The challenge of the future will lie in our ability to integrate this technology as an extension of our cognitive abilities, rather than as a mere mechanical substitute.

Methodology

Epistemologically, this study adopts a constructivist approach, focusing on understanding and seeking meaning within a specific context rather than generalizing findings (Creswell & Creswell, 2017; Paillé & Mucchielli, 2016; Patton, 2015; Strauss, 1987; Pourtois & Desmet, 1997). Rooted in the idea that reality is socially constructed through human interactions, this framework underpins all methodological decisions (Charmaz, 2014). From this perspective, knowledge emerges from concrete experiences in a given context and environment, developing experiential knowledge, common sense theories or grounded theories (Pourtois & Desmet, 1997; Charmaz, 2014), which can subsequently inform broader generalizations for fundamental research.

Constructivist epistemology provides an exploratory and comprehensive lens for qualitative scientific research, allowing for a nuanced understanding of phenomena. Through the use of specific and original methods. In the humanities and social sciences, this approach values intersubjectivity, pluralism and collaboration, and emphasises the shared construction of meaning between participants and researchers within their environment (Coulombe et al., 2023). Meaning is thus co-constructed with and by the actors involved, placing their perceptions, experiences and interactions at the centre of the research process. Unlike positivist or post-positivist paradigms, constructivism asserts a 'subjectivist' stance and descriptive paradigm to reflect a faithful image of a reality or condition as experienced by the people involved in the research field (Charmaz, 2014), advocating for an alternative to traditional "*objectivist*" methodologies. The scientific rigor

of this approach relies on criteria such as authenticity, credibility, relevance, internal consistency, reliability, and transferability (Pourtois & Desmet, 1997; Charmaz, 2014; Patton, 2015). These criteria, tailored to qualitative research, ensure methodological rigor while moving beyond conventional notions of "*objectivity*" and "r*eproducibility*," often less pertinent in this epistemological framework. This study adopts a constructivist framework, recognizing that reality is co-constructed by the perceptions and experiences of stakeholders in Francophone higher education. Such an approach allows for a nuanced understanding of how cultural and ethical values shape the integration of AI.

Therefore, an inductive approach and qualitative analysis tools were adopted for data processing and analysis in this study (Patton, 2015; Corbin & Strauss, 2015; Charmaz, 2014). As Patton (2015) highlights, qualitative methods allow grounded theories, inferential assumptions, to emerge from observations, interviews, and other collected materials, enabling the production of contextual and experiential knowledge. Our methodological approach combines direct observations and documentary analysis. Data was collected during academic events such as conferences, workshops, and study days, where reflections on the integration of artificial intelligence (AI) in French-speaking higher education were shared. This data was either produced by us when we took part in these events (in collaboration with my team colleagues), or provided by speakers or session secretaries (on demand). The documentary analysis was based on contributions from these events, including reports, communication summaries, and presentation materials.

For this study, we analyzed intervention reports (n = 16), observation reports (n = 4), and workshop and seminary summaries (n = 11) from events in mostly in France and Canada (Québec) which brought together hundreds of attendees. The participants and communicators of these events come not only from France and Quebec but also from Belgium, French-speaking Switzerland, and Tunisia. Initially, we carried out a floating reading of the documents resulting from these events in order to appropriate the content and common sense deduced at first sight. Then, we utilized Atlas.ti software for automatic and systematic coding as to identify relationships of emerging themes that we classify into core categories. Indeed, we conducted a thematic analysis of our corpus to understand the perceptions and conditions of acceptance, adoption, and use of AI by stakeholders. We also incorporated survey results from three major studies conducted by Institut Sphinx (2023), Université Namur (2023), and Pôle Léonard de Vinci (2024) to provide quantitative context to our qualitative findings. The triangulation of this data allowed us to develop a literature review for a detailed understanding of AI and the challenges related to this technology, and to understand its impact on French-speaking higher education from the stakeholders' perspective. For interpretation of analysis results, we employed Opensource generative AI LLAMA 3.1 as a complementary tool for pattern identification in our corpus, cross-validation of identified themes, and data modelling and visualization.

However, certain methodological limitations should be noted. First, the absence of empirical interviews reduces the depth of subjective and narrative perceptions collected. Although observations allow for the analysis of contextual interactions, they do not directly capture participants' voices outside of formal communications or exchanges in workshops. Additionally, the student's population at events was primarily composed of doctoral students who were themselves involved in research projects. This concentration on a specific academic audience may bias the results by limiting the diversity of perspectives, particularly those of students at lower levels of study or non-academic stakeholders in higher education. We acknowledge also limitations about geographic representation shows gaps, particularly in African Francophone regions, potentially affecting the comprehensiveness of our findings. Selection bias may exist in workshops participation, possibly skewing perspectives toward more technologically engaged institutions. And more, the rapid evolution of AI technology during the study period presents challenges for the long-term stability of our findings. Despite these limitations, our methodological approach provides a framework for understanding AI integration in Francophone higher education while maintaining scientific validity and transparency.

Discussion

The integration of artificial intelligence (AI) in French-speaking higher education, as explored in this article, reflects a dynamic interplay of technology, pedagogy, and ethics. The observations and reflections gathered underscore how AI is redefining educational practices, while connecting to broader historical, ethical, and cultural dimensions. The historical overview, tracing AI from the automata of Hephaestus to contemporary generative models like ChatGPT, situates current perceptions within a continuum of reflection on the human-machine relationship. Teachers and researchers frame these developments in terms of creativity, autonomy, and ethics, while expressing caution about over-reliance on AI. This illustrates that AI is not merely a technical innovation but part of a deeper inquiry into human agency in the digital age.

Generative A I tools offer significant potential for personalizing learning and supporting educators in repetitive tasks. However, this study highlights the contextual variability in how these tools are interpreted and integrated. This variability underscores the importance of a situated, participatory approach to ethical and effective embedding. Ethical concerns, including algorithmic bias, privacy, and the risk of dehumanizing practices, remain central. These considerations underscore the need for collective governance guided by principles of equity and diversity. Enabling conditions for responsible AI integration identified by stakeholders include critical user education, ethical frameworks, and spaces for co-construction among students, teachers, and administrators.

Finally, the limitations of the study must be acknowledged. While the findings are enriched by geographic diversity (Europe and Canada), they do not fully capture realities

in regions with limited digital infrastructure, such as parts of Francophone Africa and Asia. In addition, the constructivist framework privileges contextual meanings over generalizability. While this limits the extrapolation of findings, it encourages readers to adapt key lessons to their institutional contexts. Future research should expand to diverse settings and employ complementary methodologies to deepen our understanding of the impact of AI in higher education.

Conclusion

The integration of Artificial Intelligence (AI) in French-speaking higher education, beyond its technological dimension, reflects a profound cultural and institutional transformation. The findings of this study, rooted in a constructivist approach, show that AI is not simply a tool, but a catalyst for new relationships with knowledge, learning, and governance. These dynamics reveal a tension between the opportunities offered by AI-personalizing pathways, supporting creativity, improving pedagogical practices-and the challenges it poses, particularly in terms of ethics, privacy, and equity. This article offers an unsettling perspective on the integration of artificial intelligence (AI) in French-speaking higher education, highlighting practical ways to adapt to the cultural specificities of this context. Pedagogically, it provides useful food for thought for rethinking teacher training and learner empowerment, particularly by exploring personalized and ethical approaches.

From a societal perspective, the study highlights the importance of promoting equity and inclusion in the use of educational technologies to reduce disparities in access to education. The development and adoption of open source AI technologies, such as LLAMA, may offer promising pathways for the ethical and accessible integration of AI in higher education contexts. It also helps to raise awareness of ethical issues, emphasizing the importance of thoughtful and responsible adoption of AI. Without claiming to provide definitive answers, this contribution aims above all to enrich the debate and provide tools for reflection to guide practices and decisions in a constantly evolving field.

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