

Rethinking Higher Education Pedagogy for Generation Z: Strategies, Challenges, and Theoretical Perspectives on Artificial Intelligence Integration



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Abstract

University students belonging to Generation Z have brought to higher education learning habits, attention patterns, and expectations formed almost exclusively in an environment where interactions with digital and algorithmically mediated technologies prevail. Simultaneously, advanced generative and adaptive artificial intelligence (AI) tools are no longer limited to peripheral applications within the field of educational technology but have become integral in helping students search for information, develop writing skills, receive constructive feedback, and manage their learning behavior. This paper offers a conceptual and systematic literature review of the topic of how AI could be effectively used in higher education in order to improve learning of Generation Z students. The study analyses peer-reviewed research articles found in Scopus- and Web of Science-indexed Journals over the period of 2015-2026 and focuses on the ways how personalized and adaptive learning systems, intelligent tutoring systems, and generative AI tools like ChatGPT influence students' motivation, engagement, and self-regulated learning. In order to do so, the review employs four theoretical frameworks: Prensky's framework of digital natives, Self-Determination Theory, Self-Regulated Learning Theory, and the Unified Theory of Acceptance and Use of Technology (UTAUT2). The paper discusses the existing pedagogical approaches such as flipped and hybrid classrooms, use of AI in formative assessment, gamification and project-based learning, and prompt literacy, as well as major problems associated with the application of AI in the learning process (algorithmic bias, academic integrity, dependency on AI, data privacy issues, and inequitable access). In the conclusion, AI has the highest potential in education when it is used to complement rather than to replace human instruction, and when universities combine technology use with training in critical thinking, digital ethics, and self-control. Implications for curriculum design, teacher development, and policy-making are discussed along with suggestions for future research.

Keywords: *Artificial Intelligence; Generation Z; Higher Education; Personalized Learning; Self-Regulated Learning; Technology Acceptance*

1. Introduction

Higher education is currently in the middle of a generation and technology change that occurred in a manner quicker than many institutions could have anticipated. Students attending lectures these days are born between 1997 and 2012, and so they are the first generation to have known a world without smartphones, search engines or social media (Dimock, 2019). This is Generation Z and the designation is not an easy marketing term to use for admission offices. It's a relationship with information that's different: fast, visual, non-linear and constantly filtered by the algorithms that guess what will be the next called "digital natives" by Prensky (2001) more than two decades ago. Although the phrase has been discussed and redefined, the concept of students who have grown up in a digital age is quite similar to the characteristics of today's students and classrooms. Students today are used to learning in a way that is interactive, just in time, and more passive than they are used to being passive in a lecture format.

Superimposed on this generational reality is a second, more recent, disruption: the quick, normalisation of the use of AI tools in academic life. The use of large

language models are connected to essay writing, literature search, coding assignment, language learning, exam preparation, and even revision program planning of the students. Now, the real challenge for instructors and administrators is how to shape, bound and teach AI in the classroom so it enhances learning Sharma D. (2023). The consequences of doing it correctly, are significant. At the same time, universities have to maintain academic standards, and create a learning experience that is relevant to those in their presence. Yet, when they are at odds, as they frequently are with the use of AI for writing, the itch is to either prohibit its use completely or embrace it without thinking critically about it because students are using it (Chan & Lee, 2023). The systematic reviews of the use of AI in higher education present a mixed picture: while clear benefits are seen in the terms of personalised feedback, engagement and academic outcomes, there are equally compelling evidences of poor self-regulatory abilities, algorithmic bias and increased inequity between institutions with and without a well-governed AI infrastructure. (Zawacki-Richter,

Marín, Bond, & Gouverneur, 2019; Chardonnes, 2025). There are parallel literatures on Learning Preferences of Generation Z and AI capabilities, one in the field of developmental and educational psychology, and the other in the field of computer science and learning analytics, but these are not combined with an outlook on how they can be applied practically in the classroom. It's important to understand the way Generation Z learns here, because otherwise, certain AI applications are pedagogically successful, while others are just automating an unsuccessful lecture. A chatbot that can provide factual answers when you ask it is a natural fit for a generation that has become used to being able to search for information whenever it wants, but isn't very helpful with metacognitive skills — planning, monitoring and evaluating one's own learning — that the same generation has been found to be less skilled at when there are constant digital distractions around them (Ophir, Nass, & Wagner, 2009; Zimmerman, 2002). There is also a policy aspect, making this a timely, not just a theoretical discussion. From the initial months following the launch of ChatGPT, when some institutions banned its use as a whole, to a year later when some institutions are using it enthusiastically without any oversight, there's been little uniformity in institutional reactions in between (Baek, Tate, & Warschauer, 2024). Despite faculty not knowing how to identify and respond to AI-generated questions and assignments submitted by students, they report the use of AI in creating their assessment materials and lecture notes. At the same time, ethical scholarship has raised a host of issues and concerns: data privacy, algorithmic bias against everybody not in the majority, the loss of original authorship, a growing digital divide between people of different incomes and places (Binns, 2018; Zhu, Sun, & Yang, 2025).

In this perspective the following three parallel goals are set. First, it collates empirical and conceptual research from last 10 years from Scopus Q1-Q3 indexed and Web of Science indexed journals. It includes both the pre-generative-AI period of intelligent tutoring systems, and the current usage and impact of large language models focusing on how AI is being used in higher education and how it relates to the learning behaviours of Generation Z. Second, it provides a foundation for this evidence by explaining not only what, but how, AI is effective with this population (digital natives), as well as why it is not effective, according to digital-native theory, Self-Determination Theory, Self-Regulated Learning Theory, and UTAUT2. Third, it goes from theory into practice - suggesting pedagogical approaches that the teacher and curriculum designer can use, and explicitly stating the trade-offs and risks involved with each approach. It's not about the potential of an AI-assisted University, nor yet another warning against the loss of thinking skills as AI takes over, but

a sound, evidence-based account of what learning with AI may truly resemble for Generation Z when designed with the capabilities of the technology and the cognitive and motivational reality of the students themselves.

2. Literature Review

The number of articles related to artificial intelligence in higher education have increased to such an extent that a narrow systematic review will include thousands of article citations. Farhood (2025) conducted research between Jan. 2015 and Jun. 2025 and focused his research to 125 studies that fit the parameters of what he was researching. This paper will look at several different aspects of using AI in higher education through four different lenses: personalized and adaptive learning systems, generative AI and student engagement, technology acceptance and usage trends, and the ethics and institutional issues associated with integrating AI into academic settings.

2.1 Personalised and Adaptive Learning Systems

There is considerable documentation about how AI driven adaptive systems provide customized content, pace and feedback to each learner. Zawacki-Richter et al. (2019) presented a systematic review on Intelligent Tutoring Systems, Learning Analytics Dashboards and Conversational Agents in Universities and reviewed over 200 AI based applications being utilized in higher education institutions during that time period. They identified two common gaps within those application areas - one of which was that many instructors were treated passively as consumers of these tools, instead of proactively as co-designers of them. They also stated that closing this gap would allow the instructor to play a supportive role, but currently AI based systems were creating barriers to their teaching roles. Since then there have been several additional systematic reviews that build upon Zawacki-Richter et al.'s (2019) findings. In addition to documenting some of the same findings, they also documented new ones. Hariyanto, Kristianingsih & Maharani (2025) completed a systematic review of 142 peer-reviewed articles published from 2015-2025. Their results demonstrated that AI-based adaptive systems provided better levels of personalization, engagement and equitable outcomes for students when the use of reinforcement learning and/or multimodal data were employed to modify content difficulty in real-time. In his systematic review published in the journal Trends in Higher Education, which included over 17,000 articles, Merino-Campos (2025) found that AI that personalises learning can effectively improve learning outcomes by tailoring teaching methods and feedback

to the needs of each student, but he noted that the evidence of this has been predominantly from short-term AI personalizations rather than multi-year deployments.

2.2 Generative AI and Student Engagement

The advent of generative AI has given rise to a new and rapidly expanding body of literature. In a study published in *Smart Learning Environments* (SLE), Chan and Lee (2023) polled students, faculty and staff, revealing that there exists a significant generational divide where Gen Z students were much more likely than their Gen X and Millennial counterparts to use generative AI for teaching and learning purposes—which is relevant to the speed at which institutional policies can catch up with student use. In a computational perspective, using ChatGPT to brainstorm, draft, or revise on their own, college students who described ChatGPT as "too good to be true" still reported high use rates for the tool, as did Baek, Tate, and Warschauer (2024). Based on 121 studies reviewed in a PRISMA-guided systematic review, published in the journal *Frontiers in Education* Chardonnens (2025), the researcher concluded that active learning strategies like project-based learning and formative assessment contributed to greater engagement for Generation Z, and that AI-based formative assessment tools that were adaptive to a student's pace showed measurable improvements in test performance, however, over time the researchers warn, overly relying on AI feedback without any teacher-led discussion was linked to reduced self-regulation.

2.3 Technology Acceptance and Adoption

A parallel (but related) research stream takes existing technology-acceptance models to offer an understanding of why some students and institutions are more willing to adopt AI than others. In a review published in the journal *Heliyon*, which analysed 50 studies using the UTAUT2 framework, Acosta-Enriquez et al. (2024) highlighted that student decisions to adopt this technology are primarily driven by the expected benefits (performance expectancy and hedonic motivation) and that perceived ease of use and social influence were still present as significant factors. The same review pointed to the persistent barriers of distrust and lack of AI literacy, especially in fields outside STEM. Complementary studies based on the original Technology Acceptance Model (TAM) have also arrived at the same findings and have indicated that, despite the significant shift in the capabilities of AI tools during the last decade since the Davis (1989) model was proposed, perceived usefulness and ease of use still remain as a significant mediator between students' willingness to use AI tools in their coursework.

2.4 Ethical and Institutional Challenges

Binns (2018) set the groundwork for fairness in machine learning that has been adopted directly by education-based scholarship, highlighting situations where students from specific socio-economic backgrounds were disadvantaged by the use of AI-based grading systems, which were trained on biased datasets. In their systematic review that included both the PRISMA screening method and grounded-theory coding, Zhu, Sun and Yang (2025) identified the following risks of AI in the field of education: technology level risks (privacy invasion, data leakage, algorithmic bias and 'black box' opacity), education level risks (homogenised teaching, deviation from the educational goals, academic misconduct), and society level risks (narrowing of the digital divide, lack of accountability). Academic integrity concerns are very prominent in this body of work, as Gustilo, Ong, and Lapinid (2024) discussed in the *International Journal for Educational Integrity* how algorithmically-driven writing tools raise questions about existing definitions of authorship and how many institutions had yet to update their assessment policy to account for how students were using these tools. This literature is not against the use of AI, but it also consistently holds that the use of AI without the required governance and training and without critical-literacy instruction will inevitably cause harm.

3. Theoretical Background

Theories on how Generation Z is reacting to AI-supported learning and the mixed results reported in the literature are explained by four theoretical frameworks. Prensky's (2001) digital-native framework proposes that people who have been exposed to digital technology all their lives have different ways of processing information, preferring parallel, fast-paced, and information that is visually rich over sequential, text-based. Subsequent empirical studies both confirmed and challenged this assertion; Chardonnens (2025) noted that students in her sample of Gen Z students read less content in a linear fashion than earlier studies of older students had theorized, instead preferring to navigate between hyperlinks or modules. The framework is not so much a fixed psychological characteristic as a description of learned habits which can be accommodated or not accommodated by AI systems.

Self-Determination Theory by Deci & Ryan (1985) holds that the three basic psychological needs (autonomy, competence, and relatedness) are most closely aligned to strong motivation. This framework is also instrumental in explaining a common theme in

the AI-in-education literature — that the benefits of personalisation are not limited to its "AI-powered" nature, but can be realized by enabling the learner to regain a sense of autonomy and competence in the learning process that is lost during a traditional, one-size-fits-all approach. The literature reviewed above also indicates that AI-based formative assessment systems that adjust difficulty level to the learner's current competence and provide immediate, specific feedback are acting as competence-support mechanisms in the terms of Self-Determination Theory, which is part of their positive effects.

The third framework, Self-Regulated Learning Theory by Zimmerman (2002), seems to be the most influential perspective on the tension between the positive and negative aspects of AI in this literature. Zimmerman's model of learning is a cycle of forethought, performance, and self-reflection in which learners plan, execute, and evaluate. AI can help in all three stages: by assisting students with study planning, monitoring their progress with learning analytics, and providing feedback for reflection; however, the same tools can negatively impact the process if they are merely providing answers without the student having to plan or evaluate. This is the theoretical underpinning of the "over-reliance" risk that is empirically described in some of the above mentioned reviews.

The Unified Theory of Acceptance and Use of Technology (UTAUT2) by Venkatesh, Morris, Davis, & Davis (2003) is the fourth theory that emerged, and it has been expanded to include performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit as the key factors influencing the adoption of technology. In higher education, UTAUT2 can account for the limited success of institutional AI projects focused solely on functionality, as they are not successful unless students are "hedonic" to use them and find it "socially normal". Applied to higher education, UTAUT2 can explain why many institutions' AI initiatives that aim for functional use only do not succeed as well as they should: adoption is not only contingent on whether AI tools demonstrably help improve grades, but also if students find them enjoyable and socially normal to use (hedonic motivation and social influence).

Together, these four frameworks present a unified design principle; instead of being four independent checklists, they suggest that the implementation of AI serves best for Generation Z learners when it reinforces a sense of control and competence (Self-Determination Theory), respects and works with their non-linear information habits (digital-native theory), is explicitly scaffolded to enhance and extend the planning-monitoring-reflecting cycle of self-regulated

learning, and is introduced in a way that feels socially unremarkable and genuinely useful to use rather than imposed from above (UTAUT2).

4. Research Methodology

This paper adopts a conceptual, narrative-integrative literature review methodology rather than an original empirical study, which is an appropriate and well-established design for synthesising a fast-moving, cross-disciplinary evidence base and for connecting theory to practice in a way that a single primary study cannot. No new data were collected from students or institutions; instead, the paper draws on, compares, and synthesises findings already published and peer-reviewed in the sources discussed above.

The review process followed four broad stages. First, the search was initially concentrated on journals indexed in Scopus and Web of Science, along with ABDC A- and B-ranked journals, using combinations of the keywords "artificial intelligence", "generative AI", "personalized learning", "adaptive learning", "Generation Z", "higher education", and "self-regulated learning". Second, the scope was then narrowed to peer-reviewed journal articles and systematic reviews published between January 2015 and mid-2026, so as to capture both the pre-ChatGPT period (up to 2021), when intelligent tutoring and adaptive learning research dominated, that followed ChatGPT's emergence from 2022 onwards. Third, empirical studies were given lower priority compared to systematic reviews and meta-analyses, since the latter tend to produce conclusions that are more stable and less bound to a particular context — a quality considered important for a synthesis paper of this kind. The findings were grouped thematically under four areas: personalized and adaptive learning, generative AI and engagement, technology acceptance, and ethics and governance. These themes were set against the four theoretical frameworks discussed earlier, in order to highlight where empirical evidence and theory align and where gaps remain. It should be acknowledged that this approach carries clear limitations, which are addressed explicitly below.

Such a review is much less methodologically rigorous than a PRISMA-registered systematic review with dual screening, and it also does not involve generating any primary data regarding how a particular cohort of students perceives AI-assisted learning. Moreover, there is a certain bias in using only English-language literature from databases such as Scopus and Web of Science indexed sources, as a lot of research produced in institutions of the Global South is usually absent in these sources. For these reasons, the recommendations presented in the following part should be viewed as pilot suggestions based on the existing evidence, but not as proven ones for any specific institution.

5. Discussion: Strategies, Pedagogies, Challenges, and Implications

5.1 Strategies and Pedagogies

It is evident from the literature is that the most educational value is gained from AI not as an adjunct but as an integral part of an active learning environment. Flipped classrooms, in which students interact with AI-generated or AI-compiled information prior to the class and spend class time discussing and applying what they have learned, correspond naturally with the Generation Z tendency toward interactive and self-paced learning documented by Chardonnens (2025) and Seemiller and Grace (2019). Another approach that benefits in much the same way is project-based learning; at least three reviews cite double-digit percentage increases in engagement associated with using AI tools to assist, rather than replace, project research and development. Another frequently cited good idea is AI-supported formative assessment, in which students receive instantaneous and adaptive feedback as they complete practice problems or draft writing. The very instant feedback and confirmation of competence that such an approach provides is just what Self-Determination Theory would predict would keep students motivated. Yet another extension of that principle is gamification, with its AI-adjusted level curves and progress reporting. A more recent innovation in education that has been receiving attention is explicit prompt-literacy training: instead of assuming that AI prompts are being used inappropriately, some programs are teaching students to challenge, verify, and rework AI-produced materials as a legitimate research tool.

5.2 Challenges

These approaches face challenges that are equally crucial in the literature and are not considered mere footnotes. Academic integrity poses a clear risk; according to Gustilo et al. (2024), there remain many educational institutions whose policies about the assessment of algorithmically assisted written works and related disclosure practices remain unclear, putting both students and teachers in actual doubt about the line between ethical behavior and academic dishonesty. The second problem is over-reliance, and one can argue that it is actually the most important pedagogical issue, since it hits the cycle of self-regulation described by Zimmerman (2002): several reviews demonstrate that over-reliance on AI to structure thoughts results in short-term improvements in performance and reduced independent planning and monitoring of progress. The third challenge, the one of algorithmic bias, also

deserves attention, especially given documented instances of AI-based grading and recommendations being consistently disadvantageous to certain social or ethnic groups of students (Binns, 2018). This becomes even more dangerous when AI tools are used without prior audits of fairness by educational institutions. Finally, data privacy and uneven distribution of access to AI technologies should be mentioned, as it does not guarantee equal treatment for all students in higher education institutions: some do not have money for expensive subscriptions and others lack the means to assess the introduced technology properly.

5.3 Implications for Practice and Policy

For Institutions, the practical implication is that it is not enough to simply let individual educators make their own decisions about using AI; there has to be scaffolding at the institutional level, including explicit assessment guidelines, norms, and a training on how to reimagine tasks to either intentionally incorporate or explicitly avoid the use of AI. As a practical design test for curriculum designers, the above theoretical synthesis implies that, before using an AI tool, one should consider whether it supports or undermines student autonomy, competence, and self-regulatory cycle, or whether it serves a role that is merely distracting tasks that were once performing valuable cognitive work. The ethics literature suggests that the proliferation of AI tools within the classroom has already started, and that the issue is not about whether students will use them, but how they will use them. The ethics literature argues that the question is not whether students will be using AI tools in their class, but how. There's no need to consider AI as an existential threat; it's just as much a problem as any other educational technology has been and will require deliberate instructional design, in an unprecedented way to the pace of adoption.

6. Conclusion and Future Scope

Generation Z has not created circumstances that make integration of artificial intelligence in higher education so important, yet it is Generation Z that will have the greatest experience of its impact, at the point where their learning styles, attentional tendencies and academic identities are formed. However, neither of two simple narratives dominating the public discussion can be proved by the literature reviewed in this paper. While there is no evidence that artificial intelligence integration would automatically ensure an individualized experience and thus better learning for everyone or that it would somehow destroy students' ability to think. On the contrary, what is revealed from the literature reviewed is that certain approaches based on autonomy, competence and self-

regulation cycle indeed bring real learning results while others cause serious problems in the same areas.

Four theoretical frameworks – digital-native theory, Self-Determination Theory, Self-Regulated Learning Theory, and UTAUT2 – suggest one coherent pattern that could be used as a practical guide for future decisions in this area: those technologies and approaches that are designed with Generation Z in mind, return their sense of control over learning and have true institutional support tend to work well and achieve the intended purpose, whereas those that fail to take into account those criteria tend to lead to negative effects. In particular, flipped and project-based classrooms, formative assessment using AI, gamification of the learning process and prompt-literacy training all meet this pattern and appear several times in the literature reviewed in terms of their efficiency when accompanied with necessary measures.

The following are three aspects for future research suggested by the current literature review that is somewhat lacking in them. First, longitudinal studies are required to identify the long-term consequences of increased student engagement and performance brought about by the use of AI tools, particularly the possible decrease in independent self-regulation. Second, more research should be conducted in the countries other than North America, Europe and East Asia to check if similar findings could be observed in institutions with a different infrastructure, financial situation and cultural attitudes towards teaching and academic integrity. Finally, additional research is needed regarding the issues of designing and governing such projects including the development of bias audit frameworks for algorithms and evaluation of prompt-literacy courses.

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