



NAVIGATING THE AI FRONTIER IN EDUCATION: COMPARATIVE ANALYSES OF EXPERIENCES AND PERCEPTIONS AMONG P-12 AND HIGHER EDUCATION STAKEHOLDERS

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Abstract - The integration of generative Artificial Intelligence (AI) technologies in education has brought significant changes, with new and emerging tools like ChatGPT becoming increasingly prevalent. This study uses the technology acceptance model as a theoretical framework and investigates the usage and perceptions of generative AI tools among high school students, undergraduate pre-service teachers, and graduate in-service teachers and school administrators across P-12 and higher education settings. The research aims to understand how these different groups utilize AI, their views on its benefits and challenges, and the ethical considerations involved. This study addresses the gap in existing literature by exploring AI usage and perceptions along the continuum of high school students, pre- and in-service teachers and administrators across both P-12 and higher education settings, thereby emphasizing the interconnectedness of these educational environments. AI tools have the potential to personalize learning experiences, provide real-time feedback, and offer time-saving solutions. However, they also pose challenges related to data privacy, algorithmic bias, and transparency. Through surveys and policy analysis, the authors identify trends and differences in AI adoption and usage between P-12 and higher education environments. The results indicate similarities in the positive perceptions of AI's impact on learning across both domains, but also highlight distinct approaches to AI integration, with P-12 focusing more on specific educational tools and higher education emphasizing AI literacy and policy experimentation. Both P-12 and university students are using AI tools at high rates and perceive them positively, even in environments where AI use is restricted. However, faculty across both domains report inadequate training, a need for better guidance, and concerns about AI. While P-12 education is focused on adopting AI tools for specific purposes like tutoring and personalized learning, higher education emphasizes the need for training in large language models (LLMs) and AI literacy. Our findings suggest that AI policy development in education should consider the continuum between P-12 and higher education. Education faculty should adapt their teaching methods and curriculum to leverage the rates of use among their students to also prepare AI-ready pre- and in-service teachers who can navigate and influence AI policy effectively. School administrators should assess the current state of AI usage and perceptions in their schools to make informed decisions on AI integration to support in-service teachers and students. This study emphasizes the need for continuous research on AI's educational impacts and the importance of equipping future educators with the skills to leverage AI to enhance learning and ensure educational equity.

Keywords: Artificial Intelligence (AI), Educational Technology, Teacher Education, AI Literacy, Educational Policy, Professional Development

I. INTRODUCTION

The introduction of Artificial Intelligence (AI) tools in education has garnered significant attention in recent years, with numerous studies exploring their impact across different educational contexts. However, the current literature on AI in education predominantly focuses on either the P-12 landscape or the higher education landscape, often treating these domains as separate entities. This bifurcation is evident in surveys of students, instructors, and

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administrators which tend to be directed at one of these two groups rather than considering the continuum between them (Zawacki-Richter et al., 2019; Holmes et al., 2019). This study seeks to bridge this gap by examining AI usage and perceptions across both P-12 and higher education settings -- specifically high school students, pre- and in-service teachers, and administrators -- thereby highlighting the interconnected nature of these educational landscapes. This approach not only extends current understanding but also provides actionable insights for integrating AI tools in ways that align with the evolving needs of educators and students across the spectrum. Our research includes data collection from two surveys created by the research team and a comprehensive review of comparable surveys by other authors and existing related AI policy documents.

This study is guided by the following research questions: (1) How do perceptions and usage of AI tools differ between P-12 and higher education settings? (2) What are the common challenges and benefits perceived by students, teachers, and administrators in these environments?

Recent research indicates that high school students are increasingly engaging with AI tools for academic purposes at high rates (Impact Research, 2024; Schiel et al., 2023). This widespread usage highlights the importance for pre-service teachers, in-service teachers, and administrators to prepare for a classroom environment where AI tools are already deeply embedded in students' learning practices. To ensure that future educators are adequately equipped, it is essential to focus on making them AI-ready so that they can effectively integrate these tools into the teaching and learning process. By doing so, educators will be better positioned to harness the potential of AI to enhance educational outcomes and meet the evolving needs of their students.

Additional research has highlighted the transformative potential of AI in enhancing educational experiences. In P-12 settings, AI is increasingly being used by educators to streamline tasks such as grading, lesson planning, and administrative duties, enhancing overall work efficiency and allowing teachers to focus more on student interaction and instruction (Holmes, Bialik, & Fadel, 2019). AI tools are also increasingly being adopted by teachers for personalized learning and tutoring, offering tailored educational experiences that can address individual student needs (Chen et al, 2020; Lucki et al, 2016). These applications of AI have the potential to improve learning outcomes and promote educational equity by providing targeted support to students who may require additional assistance. However, the integration of AI in P-12 education also presents challenges, including concerns about data privacy, algorithmic bias, and the need for teacher training to effectively implement these technologies (Williamson et al., 2020; Roshanaei et al., 2023).

In higher education, the focus on AI integration often centers on developing AI literacy among faculty and students, with an emphasis on the critical engagement with AI tools and their ethical implications (Chiu, 2021; Zhai et al., 2021). Though universities are increasingly incorporating AI into curricula, not only to enhance learning but also to prepare students for a workforce that is becoming increasingly reliant on AI technologies, there is more work needed in this area (Homes et al., 2019; Tiware, 2023). This work involves rethinking assignments and assessments to foster AI literacy and ensure that students can navigate an AI-driven world.

The two surveys created by the researchers -- one targeting P-12 in-service teachers and administrators and the other focusing on undergraduate university students who are pre-service teachers -- combined with the review of surveys which includes high school student usage, seek to illuminate the interconnectedness of the P-12 and higher education landscapes. By examining AI usage in both directions, the authors emphasize the continuum between these educational domains. This approach challenges the traditional siloed perspective and emphasizes the need for AI policies that are informed by practices and experiences across the educational spectrum (Kitsara, 2022; Seldon & Abidoye, 2018).

The authors reviewed both other published and unpublished survey reports, along with published AI policy guidelines for educators, and relevant articles on the adoption of AI in educational settings. They analyzed data from six national surveys: the June 2023 ACT survey on high school students' use and perceptions of AI (Shiel, Bobek, & Schneiders, 2023); a 2023 Tyton Partners survey targeting college faculty and students, with a follow-up in spring 2024 (Tyton Partners, 2024); an April 2024 survey of college instructors and administrators conducted by Amazon Web Services in collaboration with the Chronicle of Higher Education (Amazon Web Services & Chronicle of Higher Education, 2024); a May 2024 Impact Research survey covering K-12 teachers, students aged 12-18, undergraduates, and parents of K-12 students (Impact Research, 2024); and a February/March 2024 Ithaca S.R. survey focused on postsecondary instructors (Ithaca S.R., 2024).

By placing our survey results within the broader context of existing research, this study highlights the need for a holistic approach to AI integration across the education spectrum, one that recognizes the interconnectedness of P-12 and higher education landscapes and fosters collaborations across these domains to advance educational equality and innovation.

II. THEORETICAL FRAMEWORK

This research looks through the lens of the Technology Acceptance Model (TAM) and perceived usefulness and Digital Divide Theory. The TAM model can help explain and predict how educators across P-12 and higher education settings accept and use AI technologies. TAM's constructs of perceived usefulness and attitudes toward technology can be adapted to understand the motivations and barriers faced by educators in integrating AI into their practice (Davis, 1989). To influence how P-12 educators and higher education teacher preparation faculty will integrate AI tools and policies, understanding their perceived usefulness, attitudes towards and actual use behaviors of AI tools will be necessary. The data from our surveys in combination with a review of similar surveys and AI policies provides the necessary data around perceived usefulness and predict ways in which educators may implement AI tools and policies.

Digital Divide Theory explores how inequalities in technology access contribute to broader societal inequities. It complements the Technology Acceptance Model (TAM) by adding a layer that focuses on how external, resource-related factors impact perceived usefulness and ease of use. The digital divide refers to the gap between those who have ready access to technology (and related resources like the internet, devices, and AI tools) and those who do not. This lens allows a more thorough examination of how socio-economic factors, access to resources, and technology infrastructure influence AI adoption and perceptions in education.

We hypothesize that a rapid surge in AI usage has occurred across all groups, indicating a wave of novice AI users in K-12 education. By understanding this landscape, pre-service and in-service teachers, school administrators, faculty, and policymakers can better prepare for and support these individuals.

III. LITERATURE REVIEW

The integration of AI into educational practice has been an increasingly popular subject of academic inquiry, with much literature covering its potential to change teaching and learning processes. This literature review synthesizes existing research about AI in education, with a particular focus on the benefits, challenges, and new themes emerging in its usage within both P-12 and higher education contexts.

The literature reveals a growing interest in AI's potential to transform education, particularly in personalized learning and administrative efficiency (Chen et al., 2020; Holmes et al., 2019). However, there is a paucity of research that directly compares AI adoption between P-12 and higher education settings. Previous studies have highlighted the benefits of AI in isolated contexts, but a holistic understanding of AI's impact across the educational continuum is lacking (Luckin et al., 2016; Williamson et al., 2020). This study seeks to fill this gap by providing a comparative analysis that informs both policy and practice.

Holmes, Bialik, and Fadel (2019) and Rudolph (2023) highlighted that AI can personalize educational experiences on the basis of the differing needs of students, provide real-time feedback, and adjust according to the speed of each learner. AI, therefore, could enhance learning outcomes through providing more personalized support to students within a diverse classroom environment of learners at differing levels of ability and preexisting knowledge.

Apart from personalized learning, AI has been at the forefront of making school administration more effective. Cherukuri et al. (2021) and Seldon and Abidoye (2018) outline how AI tools could be easily used in automating routine administrative duties to enable educators to concentrate more on instructional activities. According to the authors, through reducing the administrative burden for teachers and administrators, AI will help optimize the educational process and will make it more efficient and better respond to students' needs.

While there are bright prospects associated with the potential benefits of AI in education, a number of studies raise concern about several challenges and ethical considerations in using this technology. Williamson, Eynon, and Potter (2020) and Seldon and Abidoye (2018), remark on issues related to privacy concerns, bias in algorithms, and the broader impact of AI on society. These studies call for the addressing of these ethical issues at a time when AI is increasingly being embedded within educational settings, so that AI work is responsible and fair.

Roshanaei, Olivares, and Rangel Lopez (2023) go deeper into issues of fairness in AI access with regard to the digital divide affecting under-resourced schools and economically disadvantaged students. They argue that, although AI has the potential to promote educational equity with the help of personalized supports of students, access disparities to AI technologies may further intensify inequalities. In their work, they call for action to make sure all learners, irrespective of their socio-economic background, benefit from AI-enhanced learning tools.

A second critical point arising from the literature relates to the readiness of educators to integrate AI into their practices. Zhai, Chu, and Chen (2021) and Zawacki-Richter et al. (2019) point out the insufficient training and support provided to educators, which becomes a barrier to effectively implementing AI in the classroom. These studies observe that if adequate professional development is lacking, educators may not be able to utilize the full potential of AI tools; this would have less than desirable results for students.

Such concerns finds echoes in broader discourses about the role of AI within teacher preparation programs. According to the literature, more attention must be paid to AI literacy at universities and teacher education programs so that teachers-in-training leave their institutions more prepared to deal with AI technologies for implementation in classrooms. Holmes et al. (2019) and Zawacki-Richter et al. (2019) argue for a far more integrated, cohesive approach for AI education, whereby teacher preparation programs reconfigure what they teach in response to the burgeoning development in AI, turning out teachers who are ready for AI.

Existing studies have tended to look at what is happening across the P-12 and higher education sites in isolation; individual work for one or the other domain is common. Such a bifurcation is well reflected in studies that individually survey students and educators in one education stream or the other, with less focus on the continuum between the two educational contexts affiliated with the P-12 and higher education structures. Although some research in the area reflected this rift between educational landscapes—for instance, the studies by Zawacki-Richter et al. (2019) and those by Holmes et al. (2019)—it still took more recent kinds of research, such as the one by this article's authors to bring their interrelation to the forefront.

More generally, knowledge of the use of AI and its perceptions in P-12 and higher education settings may help unify these otherwise separate domains. From the authors' point of view, the development of AI policy will have to treat a continuum between P-12 and higher education, with shared challenges and opportunities between the two. The approach thus defies traditional perspectives and by necessity allows for greater insight into AI policies across educational settings.

This raises a rather nuanced view from the literature on the potential benefits and challenges facing AI in education. While AI has much to contribute to both personalized learning and administrative efficiency, it has worrying ethical implications and demands serious support to teachers using it in an educational setting. There is a need for a holistic approach to AI integration that connects P-12 and higher education, working together to close the current and future digital divide that affects equitable access to AI technologies. As the role of AI in educational institutions is further studied, this should be done with a critical lens: AI should function in a way that enables, but not hinders, educational equity and effectiveness.

IV. METHODOLOGY

In this mixed methods study, the researchers used both qualitative and quantitative methods for a more comprehensive understanding of the research problem. To identify trends in the use of and attitudes toward AI tools in education, the authors conducted their own survey aimed at pre-service teachers in higher education preparation programs as well as P-12 in-service teachers and administrators. The research team also analyzed published and unpublished survey reports, published AI policy guidance for educators, and articles about the adoption of AI tools in educational settings.

The survey methodology was selected to capture a broad range of perspectives from different educational stakeholders. This approach allowed for the collection of quantitative data that could be analyzed to identify trends and differences in AI adoption. Descriptive statistics were employed to summarize the data, while thematic analysis was used to interpret qualitative responses. This mixed-method approach ensured that the findings were both comprehensive and robust, offering insights that are directly applicable to educational policy and practice.

Because existing published higher education survey reports did not treat undergraduate teacher education students as a distinct demographic, in the fall of 2023, the authors created a survey for those students that sought to gauge their experiences with and attitudes toward AI tools like ChatGPT. Our survey asked about pre-service teachers' usage and perception on AI tools in their college classes but also in their P-12 teaching placements.

To complement this pre-serve teacher survey, the authors created a second survey for P-12 teachers and administrators. The questions were nearly identical for both groups; the P-12 teachers and administrators -- many of whom are enrolled in post-graduate degree or certificate programs -- were also asked how they were using AI tools in their university work.

Our surveys were strategically crafted to mirror the questions used in the ACT survey of high school students. They targeted pre-service teachers enrolled in teacher education programs at institutions of higher education and in-service teachers and school administrators across the nation. To ensure a broad and representative sample, the authors collaborated with various institutions of higher education and supporting educational organizations. These partnerships enabled us to reach a diverse group of participants across different geographic regions and institutional types. The survey was administered using the Survey Monkey platform, chosen for its user-friendly interface and advanced data collection capabilities. Invitations to participate in the survey were distributed through multiple channels, accompanied by incentives to encourage maximum response rates. The survey was accessible online, allowing participants to complete it at their convenience. Data collection spanned eleven months,

from November 2023 to July 2024. This extended timeframe ensured that the authors could capture responses from participants across different academic terms and stages in their teacher education programs. Upon the data collection period's conclusion, the responses were compiled and subjected to analysis. The alignment of our survey questions with those of the ACT survey facilitated direct comparisons, allowing us to draw meaningful insights into the similarities and differences across the spectrum of pre-service teachers, in-service teachers and administrators and high school students in their educational perspectives.

The authors then examined the results from six published national surveys: The ACT survey of high school students' use and impressions of AI (June 2023); a 2023 Tyton Partners survey of college faculty and students and a spring 2024 follow-up survey by the same organization; an April 2024 survey of college instructors and administrators conducted by Amazon Web Services in collaboration with the *Chronicle of Higher Education*; a May 2024 Impact Research survey of K-12 teachers, students aged 12-18, undergraduates, and parents of K-12 students; and a February/March 2024 Ithaca S+R survey of postsecondary instructors.

In addition to comparing results from the surveys, the authors also examined P-12 AI policy guidance issued by the U.S. Department of Education as well as from several individual states. These policies typically provide specific recommendations on the integration of AI tools in classrooms, addressing areas such as data privacy, teacher training, and ethical considerations related to AI use in P-12 settings. This level of centralized guidance ensures that schools are equipped with a framework to implement AI effectively and responsibly. However, comparable centralized guidance does not exist for higher education. In universities, AI policies tend to be more decentralized, often developed at the institutional or departmental level, leading to a wide variance in how AI tools are adopted and regulated. As a result, higher education institutions may lack the standardized support that P-12 schools receive, which can contribute to inconsistencies in how AI is integrated into teaching, learning, and administrative processes. This gap highlights the need for more cohesive policy frameworks at the higher education level to ensure that AI integration is aligned with both educational objectives and ethical standards.

The methodology and data analysis methods are well-suited to address the research questions. The combination of quantitative and qualitative approaches, along with the comparative analysis, provides a comprehensive understanding of the complex and interconnected issues related to AI integration in education. This approach ensures that the study's findings are robust, relevant, and applicable to both P-12 and higher education contexts.

V. FINDINGS

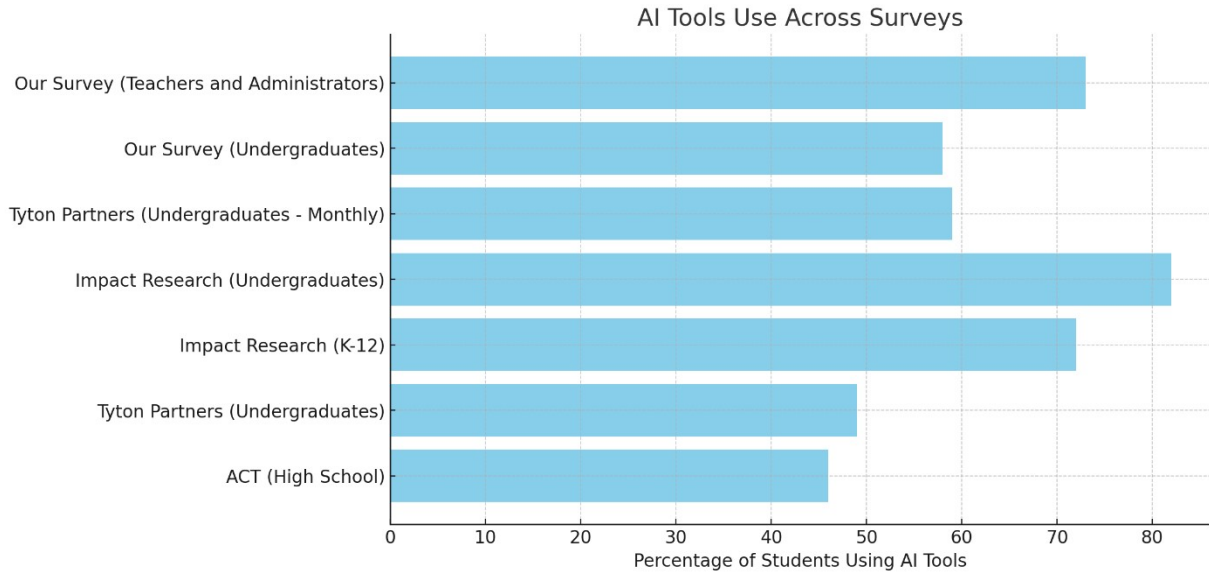
By reviewing published survey results in combination with our own survey results, the authors were able to identify several trends in the use of and attitudes toward AI. These trends point *mostly* to similarities among P-12 and undergraduate students and among P-12 and higher education faculty, although the authors also identified a few nuanced differences. When the authors moved beyond surveys to examine other surveys, policy recommendations and research about AI use in both domains, the authors discovered more pronounced differences in terms of how educators are using AI.

Similarities

Survey results indicated quite a bit of alignment between the P-12 and university students' experience with AI: in both domains, students use AI at high rates, have positive views of how AI tools affect their learning, and use AI tools even when banned. Moreover, in both domains there is evidence that students experience or perceive equity and accessibility barriers related to AI tools.

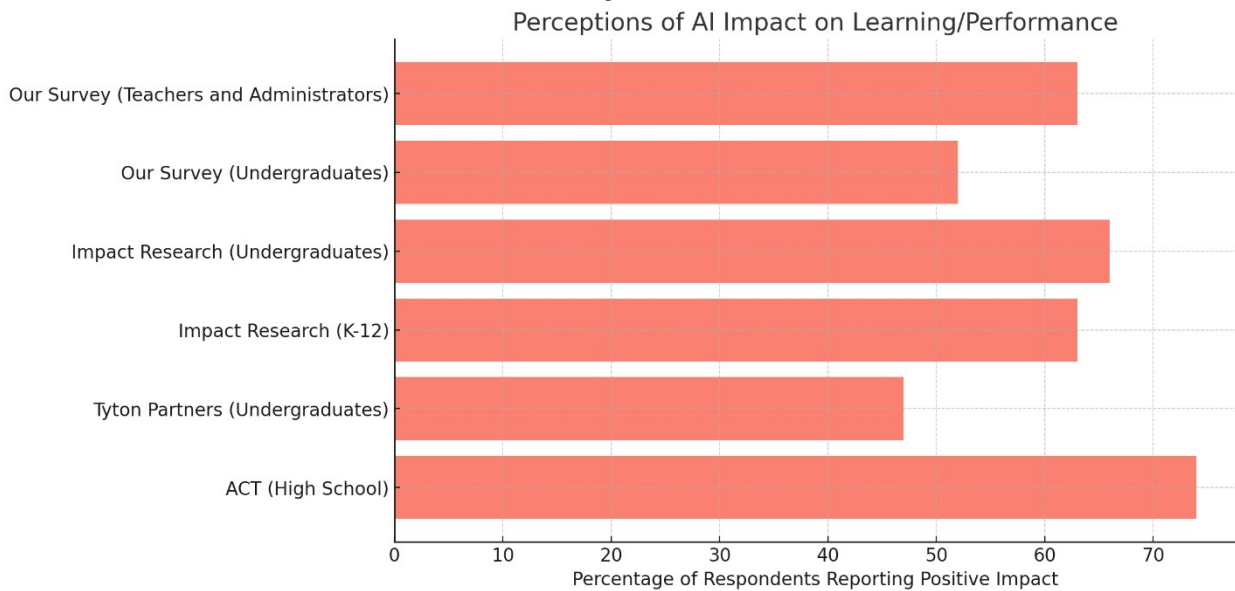
Figure 1 shows AI tool usage among students is high and has shown significant growth over the past year, with various surveys indicating that students across educational levels are embracing these technologies for academic purposes. The ACT survey reports that 46% of high school students use AI tools, primarily for subjects like language arts and social studies (Schiel et al., 2023). Similarly, Tyton Partners found that nearly half of undergraduates engaged with AI tools, with this figure climbing to 59% for monthly usage by spring 2024 (Tyton Partners, 2024). Impact Research further supports these findings, showing that 72% of K-12 students and 82% of undergraduates use AI chatbots for schoolwork (Impact Research, 2024). These statistics reveal a pervasive adoption of AI technologies, indicating that students are integrating these tools into their academic routines at a rapid pace. The widespread use across both K-12 and higher education stresses the need for educational institutions to support and guide students in using AI effectively and ethically.

Figure 1



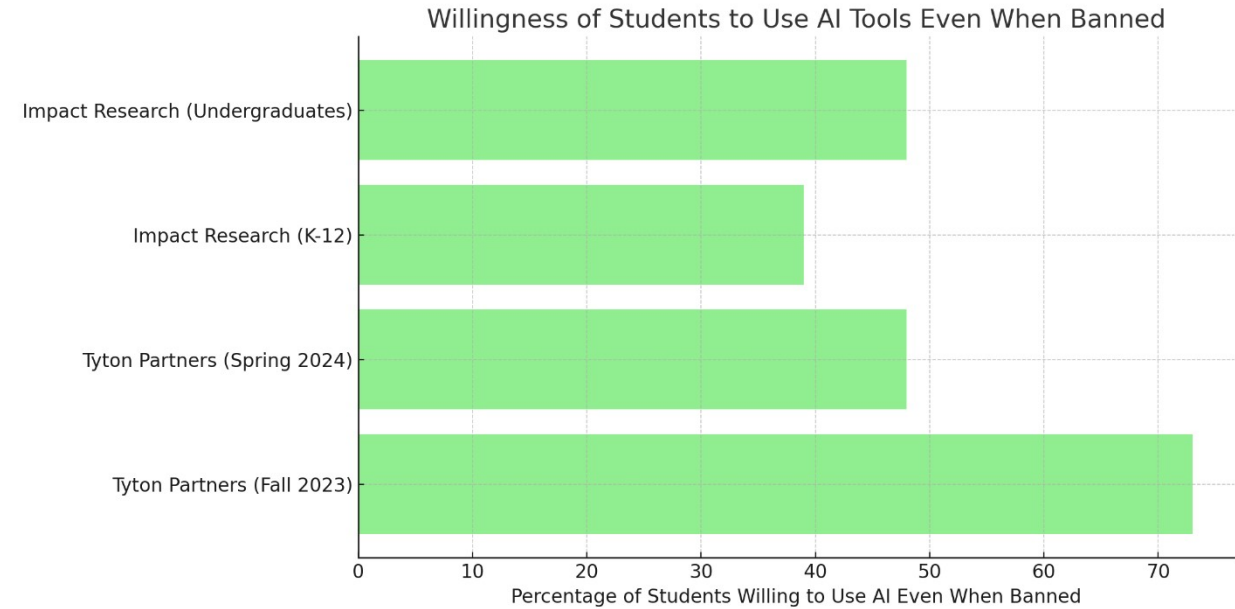
Students at all levels report positive attitudes toward AI. Figure 2 shows the perception of AI's impact on learning among students is generally positive, as reflected in the surveys conducted across different educational levels. The ACT survey of high school students reveals that 74% believe AI will enhance their academic performance, though fewer expect improvements in creativity and critical thinking. These perceptions are echoed in higher education, where the Tyton Partners survey in fall 2023 indicated that 47% of undergraduates viewed AI positively, a sentiment that rose to 66% by spring 2024 according to Impact Research (Impact Research, 2024; Tyton Partners, 2023). The positive sentiment from the undergraduate students in our survey was only slightly lower, with 52% seeing a positive benefit. This upward trend suggests an increasing recognition of AI's educational benefits. While definitions of what constitutes a "positive impact" may vary, the consistent increase in positive responses points to a growing acceptance of AI as a valuable tool in the learning process. The findings highlight a shared optimism among students regarding AI's potential to enhance learning outcomes, despite ongoing debates about its impact on creativity and critical thinking.

Figure 2



High rates of adoption and positive feelings appear to go hand-in-hand with a willingness to use AI tools even when teachers or administrators ban them. Figure 3 highlights that despite institutional restrictions, a substantial number of students are willing to use AI tools even when prohibited, highlighting a gap between policy and practice. The fall 2023 Tyton Partners survey found that 73% of AI users and 46% of non-users at the college

level indicated they might use AI tools regardless of bans. This inclination increased in spring 2024, with 48% of students likely to use AI against institutional rules (Tyton Partners, 2024). Impact Research's Spring 2024 survey corroborates this trend, showing that 39% of K-12 students and 48% of undergraduates have used AI tools without their teachers' permission (Impact Research, 2024). This data suggests a strong desire among students to leverage AI technologies, even at the risk of violating policies, indicating a potential disconnect between educational guidelines and student behavior. These findings call for a reevaluation of current policies and an exploration of how AI can be effectively integrated into curricula to align with student needs and expectations.



Although most students perceive AI as positive for their education, they experience or perceive equity and accessibility barriers related to AI tools in varied ways. For example, students with composite ACT scores in the top quartile used AI tools at a higher rate (53%) compared to those in the bottom quartile (36%). Moreover, 31% of the students in the bottom quarter but only 8% of the students in the top quarter said they did not use AI tools because they lacked access, a difference that very likely aligns with the income and race-based digital divide (U.S. Department of Education, 2022). The Impact Research study found a large gap in AI use between K-12 children in families with incomes below \$50,000 and those above: 63% vs. 76%. On the other hand, black and Hispanic students used AI for school purposes at a higher rate than white students, and male students were more like than female students to use AI. Similar patterns were found for undergraduates. The national surveys of undergraduates do not ask about access to AI, but in our survey 7% of the respondents indicated that they lacked that access.

None of these national studies disaggregate students by subgroups related to areas of study, but our survey of pre-service education students found similar results. Fifty-eight percent of our undergraduate respondents had used AI tools. Of all students, 37% reported that they had used AI tools for college assignments, and 11% were heavy users (once a week or more). Around 49% believed that both their “creativity” and their “critical thinking” would benefit from using AI tools, with 53% reporting that they believed their “overall performance in school” would improve because of using AI tools. Given that our survey captured responses from November 2023 to July 2024, our results line up very closely with those from the other studies mentioned here. However, the authors believe that our pre-service education students are in a unique position compared to the students surveyed in those other studies because they are simultaneously taking classes at college and conducting student teaching in a K-12 environment. Thus, they straddle the student/teacher role, complicating their relationship to AI tools.

Differences

Although K-12 and undergraduate students are similar in their experiences with and attitudes toward AI, faculty at the P-12 and university levels are more skeptical that AI will positively affect learning. Impact Research found that K-12 students and teachers used AI at similar rates, but that teachers were less “confident” users, especially those older than 45. Fewer teachers compared to students viewed AI favorably, with 59% of teachers versus 70% of students holding a positive opinion. Additionally, twice as many teachers (31%) viewed AI unfavorably compared to students (15%). Similarly, only 48% of teachers believed AI has had a “positive impact on

their users,” as opposed to 63% of students. The AWS study found that 55% of college faculty believed AI presented higher education with an opportunity to improve how it operates, although 72% also felt that it presented a “threat,” with 75% believing AI would have a negative impact on teaching. Fifty percent prohibited the use of AI tools on assignments, and 72% predicted that AI would result in students having weaker academic skills. Ithaca S+R’s large study found that 72% of college instructors have experimented with using AI for teaching purposes, but that 42% still prohibit its use by students. Only 35% of faculty in the Ithaca S+R survey predicted that AI would have a “positive effect on instructional practices” in their field. Overall teachers have a more negative attitude toward AI than do students.

Our surveys indicated that among the 73% of in-service teachers and administrators who had utilized AI tools, 17% employed them for college assignments, while 92% used them for teaching or administrative tasks. The pre-service teacher undergraduates lagged their professional peers, with only 50% of AI users having used the tools for teaching purposes. However, similar percentages of pre-service undergraduate students, in-service teachers, and administrators believed AI had positive effects on creativity and critical thinking.

P-12 and university faculty both report a lack of training about AI, a desire for greater guidance in this area, and concerns about AI. Recent studies highlight that many educators feel unprepared to integrate AI technologies effectively into their curricula and express a strong need for professional development and support in this rapidly evolving field (Cai et al., 2023; Jwaifell et al., 2023). Fifty-six percent of K-12 teachers in the Impact Research study indicated that they wanted professional development on AI, while The Ithaca S+R study revealed that only 32% of college faculty had confidence in their ability to use AI tools for teaching activities. Surveys and studies reveal more similarities than differences in how students and faculty perceive and use AI in educational settings. Both groups tend to see the potential benefits of AI in enhancing learning and teaching, but they also share concerns about ethical implications and the accuracy of AI applications (Cai et al., 2023; Nwosisi et al., 2023).

Looking beyond survey reports, however, it appears that there are at least two important differences in the approaches P-12 and university educators are taking to AI integration and adoption. First, P-12 educational settings are increasingly adopting AI tools developed by technology companies for specific educational purposes, such as tutoring and personalized learning (Holmes et al., 2019; Zawacki-Richter et al., 2019). These AI applications are designed to enhance learning outcomes by tailoring educational experiences for students. In contrast, institutions of higher education tend to focus more on training faculty and students in the use of large language models (LLMs) and other AI technologies, emphasizing the development of AI literacy and critical engagement with AI tools (Chiu, 2021; Zhai et al., 2021). Furthermore, P-12 environments emphasize the use of AI for personalized learning through AI “tutors,” while higher education places greater emphasis on rethinking assignments to develop students’ AI literacy and make them “AI-proof” (Luckin et al., 2016). Arguably, there is a third difference as well: P-12 policy tends to be prescriptive and descriptive, providing educators with AI products and clear implementation guidelines. In contrast, university policy is often more aspirational, offering faculty access to LLMs and encouraging experimental approaches to AI integration (Williamson et al., 2020; Kitsara, 2022).

Federal, state, and institutional policies play a critical role in shaping how AI tools are adopted, monitored, and used ethically across educational environments. While there is no specific centralized AI policy for education at the federal level, the U.S. Department of Education’s National Education Technology Plan sets overarching guidelines for technology integration. It focuses on preparing students for a technology-driven world by emphasizing digital literacy and equity (U.S. Department of Education, n.d.). However, explicit mention of AI in this context remains limited. The federal government emphasizes protecting students’ personal information in AI systems that use machine learning models or collect performance data. The federal focus is on increasing access to technological tools, including AI, but many policy documents highlight the need for better professional development for in-service teachers and equitable access to AI tools.

States like California and New York have been at the forefront of educational technology policy development, including AI (California Department of Education, n.d.; New York State Education Department, n.d.). The California State Department of Education has begun integrating AI into its educational technology frameworks, particularly around personalized learning and data analytics. In New York, the Smart Schools Bond Act focuses on bringing advanced technology into classrooms, which includes AI-driven tools to enhance learning outcomes.

In contrast to the structured policies in P-12 education, higher education institutions tend to adopt decentralized, institution-specific policies regarding AI integration (American Council on Education, n.d.). Higher education institutions often lack a unified national framework, leading to inconsistencies in AI adoption across universities. Faculty members are often left to decide how and when AI should be integrated into coursework and assessments.

Policies that govern its integration are still developing, with P-12 education benefiting from more structured guidance than higher education. As AI continues to play a transformative role in education, there is a

critical need for cohesive policies that address teacher training, ethical use, and equitable access across all educational levels.

VI. DISCUSSION

The integration of AI technologies across educational settings must be viewed as a continuum, linking the experiences of high school students, pre-service teachers, in-service teachers, and administrators. High school students, who are increasingly adopting AI tools for academic purposes, serve as a foundational indicator of how AI will continue to shape learning behaviors as these students transition into higher education and beyond. Pre-service teachers, often simultaneously navigating AI as both learners and future educators, represent a critical juncture in the continuum where their exposure to AI tools prepares them to be more effective in their future teaching roles. In-service teachers, on the other hand, face the challenge of integrating AI into their existing teaching practices while adapting to evolving technologies. Administrators play a key role in overseeing this continuum by shaping policies and providing professional development opportunities that support both pre-service and in-service teachers in leveraging AI for personalized learning and classroom management. Viewing these roles as interconnected parts of an educational continuum emphasizes the need for cohesive policies and training programs that address the evolving AI landscape at every level of education, ensuring that both students and educators are well-prepared for the future.

The findings from this study offer valuable insights into the adoption and perceptions of AI tools among students and educators in P-12 and higher education contexts. A key takeaway from the results is the significant similarity in AI usage patterns across both levels, with high rates of adoption among students and generally positive attitudes toward the benefits of AI for academic purposes. Students in both P-12 and higher education frequently use AI tools, even when such usage is prohibited by their institutions, pointing to a gap between educational policies and actual student behavior. This trend aligns with the literature, which indicates that students see AI as a valuable tool for enhancing their academic performance, despite ongoing debates about its impact on creativity and critical thinking (Holmes et al., 2019; Impact Research, 2024).

However, equity and accessibility barriers remain a prominent concern, particularly for students from lower-income backgrounds or those in marginalized communities. Our findings reflect the broader issue of the digital divide, as seen in prior studies that identify disparities in AI access among students based on socio-economic status (Roshanaei et al., 2023). Interestingly, this study found that while AI usage is high, students who lack access to the necessary resources, such as high-performing devices or stable internet, may be unable to fully leverage these tools. This illustrates the need for policy interventions to ensure equitable access to AI technologies.

A notable difference emerged in the perspectives of educators compared to students. While students generally viewed AI as a positive influence on their learning, educators, particularly those older than 45, expressed greater skepticism about AI's role in education. Faculty at both the P-12 and higher education levels were more likely to view AI as a threat to traditional learning practices and expressed concerns about its potential to weaken students' academic skills, aligning with previous research that highlights educator apprehension about AI's long-term effects (Williamson et al., 2020). This discrepancy between student and educator perspectives suggests a need for targeted efforts to bridge this gap, particularly through professional development and training that equips educators with the skills and confidence to integrate AI tools effectively.

Furthermore, the decentralized nature of AI policy in higher education, compared to the more structured guidelines in P-12 schools, appears to contribute to inconsistencies in AI integration across institutions (Swaak, 2024, Massachusetts Institute of Technology, n.d., University of Michigan, n.d.). While P-12 systems are beginning to adopt AI for personalized learning, higher education institutions focus more on developing AI literacy and critical engagement with tools such as large language models (Chiu, 2021). These differences highlight the importance of context-specific approaches to AI adoption, which consider the unique needs and challenges of each educational level.

Theoretical implications of this study tie back to the Technology Acceptance Model (TAM), as both students and educators in this study exhibited varying degrees of perceived usefulness and ease of use in relation to AI tools. While students have embraced AI largely due to its perceived usefulness in enhancing academic outcomes, educators' hesitancy may reflect concerns about the ease of use and long-term pedagogical implications, which further emphasizes the need for training and support in this area.

VII. IMPLICATIONS

Implications for Policy

The findings highlight the importance of developing cohesive and comprehensive AI policies across both P-12 and higher education sectors. For P-12 schools, the focus should continue to be on adopting AI tools that enhance personalized learning and address individual student needs. Policies should provide clear guidelines on how AI can be integrated into the classroom while ensuring that data privacy and ethical considerations are prioritized. In higher education, there is an urgent need for more centralized guidance to support the development of AI literacy

among both faculty and students. Universities should work toward creating consistent policies that outline the ethical use of AI tools in both teaching and research.

Additionally, addressing the digital divide must be a priority in AI policy development. Equity barriers in AI access, as identified in this study, highlight the need for targeted funding and resources to ensure that students from lower-income backgrounds have the same opportunities to benefit from AI-enhanced learning. Policymakers should focus on expanding access to AI technologies in underserved schools and rural areas through initiatives that provide the necessary infrastructure and devices.

Implications for Educator Training

There is a clear need for enhanced professional development programs that equip educators with the skills and knowledge to effectively integrate AI tools into their teaching. Training programs should focus not only on the technical aspects of using AI tools but also on fostering a deeper understanding of AI's ethical implications and its potential to enhance learning. Educators, particularly those who are more skeptical about AI's impact, need structured support that helps them navigate the challenges of AI integration while embracing its benefits.

Pre-service teacher programs should also prioritize AI literacy, ensuring that future educators are prepared to engage critically with AI tools and can model responsible AI usage for their students. Continuous learning opportunities for in-service teachers, such as workshops and peer mentorship programs, would further support the ongoing development of AI competencies.

Implications for Instructional Practices

The study's findings suggest that instructional practices need to evolve to integrate AI in ways that align with students' growing reliance on these tools. Instructors should be encouraged to rethink traditional assignments and assessments to incorporate AI tools effectively, ensuring that students can leverage AI without compromising academic integrity. Critical engagement with AI tools, such as teaching students how to use large language models responsibly, should become a core component of the curriculum in both P-12 and higher education settings.

Implications for Research

Further research is needed to explore the long-term impacts of AI integration on both student learning outcomes and teaching practices. Longitudinal studies could provide valuable insights into how AI tools influence student performance over time and whether concerns about weakened academic skills are substantiated. Research should also examine the effectiveness of different AI tools across various educational contexts, identifying which tools are most beneficial for personalized learning versus critical thinking development.

Additionally, more research is needed on how AI tools can be adapted to bridge the digital divide. Future studies should investigate how different implementation strategies affect students from diverse socio-economic backgrounds, with a focus on creating AI tools that are accessible, affordable, and equitable.

Implications for Equity

Addressing the equity barriers identified in this study is essential for ensuring that AI enhances educational opportunities for all students. Policies and practices should focus on making AI tools more accessible to underrepresented student groups, ensuring that AI technology serves as a tool for closing, rather than widening, the digital divide. Educators and policymakers must work together to create inclusive AI environments that provide all students, regardless of background, with the tools and skills they need to succeed in an AI-driven world.

Actionable Recommendations

The alignment of trends in AI use and attitudes between P-12 and higher education settings, specifically teacher preparation programs, suggests that AI practices and policy development in each landscape must consider the other. For faculty in university teacher preparation programs, this means aligning teaching methods course design and curricula with the emerging AI landscape to train AI-ready pre- and in-service teachers who are equipped to integrate AI technologies into their future classrooms effectively (Holmes et al., 2019; Zawacki-Richter et al., 2019). In-service teachers should begin to seek out ways to use AI tools for personalized learning and real-time feedback (Cherukuri et al., 2021; Tiwari, 2023). For P-12 school administrators, this entails assessing the current state of AI usage and challenges within their teaching staff, enabling them to tailor continuous learning opportunities and develop AI policies that support effective integration (Darling-Hammond et al., 2020).

VIII. CONCLUSION

The integration of Artificial Intelligence (AI) tools in education is rapidly transforming both P-12 and higher education landscapes. This study amplifies the widespread adoption of AI among students, who view these tools as valuable resources for enhancing their academic performance. Students across educational levels, including high school and undergraduate pre-service teachers, are increasingly incorporating AI tools into their academic routines, despite institutional restrictions. This highlights a growing recognition of AI's potential to personalize learning experiences, streamline academic processes, and provide real-time feedback.

However, the study also brings attention to the disparities in access to AI technologies, particularly for students from lower-income backgrounds and under-resourced schools. This digital divide poses a significant barrier to equitable education, restricting some students' ability to fully leverage AI tools for learning. Similarly, educators—especially those older or less familiar with AI—express skepticism about the role of AI in education, citing concerns about its ethical implications, potential to weaken critical thinking skills, and lack of adequate training and support.

The findings suggest that, while students are eager to embrace AI, faculty members and administrators must work collaboratively to create policies and training programs that facilitate responsible AI use. This includes providing educators with professional development opportunities to improve their AI literacy, promoting ethical guidelines for AI use, and addressing equity concerns to ensure that all students benefit from these tools.

In addition to addressing immediate concerns, the study also highlights the need for continuous research on AI's long-term impact on education. Future research should explore how AI integration influences student learning outcomes over time and assess the effectiveness of various AI tools in different educational contexts. By fostering a more equitable, informed, and collaborative approach to AI in education, stakeholders can ensure that these technologies serve as powerful tools for enhancing both teaching and learning across the educational spectrum.

The successful integration of AI into education will require a multifaceted approach—one that promotes equity, enhances AI literacy, and supports the ethical use of AI tools. By equipping educators and students with the skills to navigate this evolving landscape, educational institutions can ensure that AI technology not only enhances learning outcomes but also contributes to a more inclusive and effective educational system.

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