ImpactingEducation
JOURNAL ON TRANSFORMING PROFESSIONAL PRACTICE

Navigating New Frontier:

AI's Transformation of Dissertation Research and Writing in an Educational Leadership Doctoral Program

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ABSTRACT

The landscape of generative AI in Education Doctorate (EdD) programs is multifaceted and rapidly evolving, demonstrating a significant impact on educational methodologies and student engagement. In the Molloy University EdD program, AI is leveraged extensively for a range of purposes, from assessment tools like Perusall to advanced platforms like Roshi.ai. These technologies not only streamline the assessment process but also offer a personalized learning experience. Furthermore, AI's role in assisting student research is pivotal, providing sophisticated data analysis, trend prediction, and comprehensive literature review capabilities. The use of AI for writing assistance further exemplifies its utility in enhancing academic rigor and student productivity. This integration of AI tools within the EdD curriculum represents a forward-thinking approach, preparing educators and leaders to harness the power of AI in their future professional practices.

KEYWORDS

Artificial Intelligence in education, doctoral research practices, cognitive apprenticeship model, AI-driven academic writing, ethical use of AI in academia, educational leadership development

With the advent of artificial intelligence (AI) tools, there has been a profound impact on the process of research and writing in dissertations within Molloy University's Doctoral Program in Educational Leadership for Diverse Learning Communities. These tools have revolutionized how students are engaging with text, how they are developing their research questions, enhancing writing processes, and have led to the adaptation of coursework to incorporate these advanced tools.

The Molloy Educational Leadership for Diverse Learning Communities (EdD) program is designed to prepare a wide array of educational professionals—including teachers, school administrators, and future professors—for pivotal instructional leadership roles that emphasize diversity, social justice, and equity. With its comprehensive, rigorous, and research-based curriculum, the program accommodates the varied needs of our students by offering flexible hybrid and online pathways allowing them to earn their EdD in a manner that best suits their lifestyles and commitments. Reflecting our commitment to inclusivity, many of our students come from diverse backgrounds, including adult learners who are re-engaging with academic programs after extensive periods in professional practice, enriching our learning community with their varied perspectives and experiences. However, the diversity of our student body also means that research and writing tasks can pose unique challenges, necessitating tailored support and resources to ensure all students can successfully navigate their academic journey.

The transformative role of AI in the dissertation research and writing process within Molloy University's Doctoral Program in Educational Leadership for Diverse Learning Communities over the past year has been significant. Tools such as Grammarly, Perusall, SciSpace, ChatGPT, and Scholar AI have changed the way research questions are formulated, literature is reviewed, data is analyzed, and dissertation projects are managed in our program. The Molloy EdD program has evolved to incorporate AI technologies, spotlighting the necessary pedagogical shifts for effective integration and improved academic workflow. In this essay, we explore the pivotal roles of AI tools in doctoral programs, focusing on the critical skills and knowledge that both educators and students must acquire to excel in AI-enhanced research and writing. We delve into the significant effects of AI proficiency on the professional practices of education doctorate graduates, highlighting how it has reshaped the competencies of scholarly practitioners. This discussion is crucial for expanding the conversation around the preparation of future educational leaders, providing academic authors and practitioners with tangible examples of AI's influence on academic processes. By illustrating the ways AI has advanced educational research and writing, we aim to demonstrate how AI equips future educational leaders with the capabilities to leverage these technologies in their careers, enabling them to effectively address the challenges of the evolving educational environment.

This journal is supported by the Carnegie Project on the Education Doctorate: A Knowledge Forum on the EdD (CPED) cpedinitiative.org

impactinged.pitt.edu
Vol.10 No.1 (2025)

ISSN 2472-5889 (online)
DOI 10.5195/ie.2025.477

HISTORICAL CONTEXT AND EVOLUTION OF AI IN ACADEMIA

The journey of AI into the academic sphere began with its foundational theories in the mid-20th century, initially explored by pioneers such as Alan Turing, who questioned whether machines could think (Turing, 1950). From its conceptual beginnings, AI has evolved dramatically, becoming an integral part of various sectors, including education. In academia, AI's integration has transitioned from simple automated tasks to complex processes that involve generative thinking and deep learning, fundamentally altering the educational landscape.

The journey of AI into the realm of education began amidst a landscape of both intrigue and apprehension. Initially, when AI started to make inroads into educational settings, there was significant anxiety among educators and administrators (Chan, 2023). Concerns centered around the potential for AI to replace human teachers, the implications for student privacy, and the accessibility of advanced technologies for all students. This unease was compounded by a lack of understanding about how AI systems work and their potential impact on the educational process. At Molloy University, there was much discussion on how AI usage among students, particularly students in writing-heavy programs, such as the doctoral program, would be governed.

Despite these initial fears, the trajectory of AI integration into education has shifted significantly towards more widespread acceptance and implementation, particularly in higher education. This transition was facilitated by a growing recognition of the benefits AI could bring to educational settings, including personalized learning experiences, enhanced administrative efficiency, and more robust research tools. As educators and institutions gained a clearer understanding of AI's capabilities and limitations, the focus shifted from anxiety to opportunity.

Higher education institutions began to embrace AI as a critical component of their strategic educational tools. This acceptance was driven by the need to stay competitive in a rapidly changing educational landscape and by the possibilities for enhancing student engagement and outcomes. Universities and colleges started to deploy AI in various forms, such as learning management systems that use AI to provide personalized feedback to students, and AI-driven analytics to predict student performance and improve retention rates.

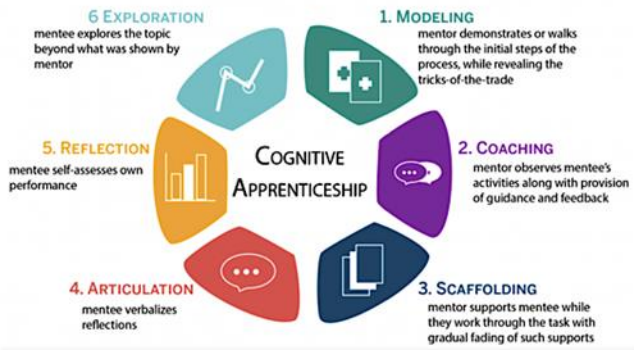
AI's adoption in educational settings, particularly in advanced studies like Molloy's EdD program, reflects a shift from traditional pedagogical methods to more dynamic and interactive approaches. The Molloy EdD program's embrace of AI tools underscores a commitment to leveraging technology to facilitate a more engaged and personalized learning experience. These tools not only assist in administrative and evaluative tasks but also enhance the pedagogical process by enabling customized learning paths and insightful academic research.

THE COGNITIVE APPRENTICESHIP MODEL AND AI PEDAGOGICAL ASSISTANTS

In the Molloy EdD program, some of our faculty in their teaching actively engage with the Cognitive Apprenticeship Model (Collins et al., 1991), which espouses constructivist thinking, to guide students into becoming academic writers and researchers. The Cognitive Apprenticeship Model extends traditional apprenticeship methods to intellectual skills, making thinking visible to the learners. It involves teaching processes that experts use to handle complex tasks, guiding learners through several stages: modeling, scaffolding, fading, and coaching. This approach emphasizes the importance of situated learning and is structured to occur in a context that reflects the use of knowledge in real-life tasks. The model is particularly effective in teaching complex cognitive skills that require navigating ambiguous situations, as it not only involves explicit teaching of the tacit knowledge that underpins expert performance but also provides a systematic approach to mastering these skills through observed practice.

The Cognitive Apprenticeship model includes six pedagogical approaches, which help students shift from gaining knowledge and skills through modeling, coaching, and scaffolding to more active and critical application of newly acquired competencies through articulation, reflection, and exploration. (See Figure 1 for more details.)

Figure 1. Approaches to the Cognitive Apprenticeship Model



Note. Kurt, S. (2021, January 30). Cognitive apprenticeship. Educational Technology. https://educationaltechnology.net/cognitive-apprenticeship/

Integrating AI Tools with the Cognitive Apprenticeship Model

In the context of doctoral dissertation writing, integrating AI tools can greatly reinforce the principles of the Cognitive Apprenticeship Mode (Collins et al., 1991). These tools help make the invisible elements of writing and research processes visible to students, who can observe and mirror these practices in their work. For example, tools such as Scholar AI can model deep research techniques, showing students how to traverse vast databases, synthesize information, and generate insights. Similarly, Grammarly can demonstrate real-time feedback on writing, offering suggestions that align with the norms of academic writing, thus acting as a form of scaffolding. As students' skills improve, the support from these tools can be gradually reduced (fading), enabling students to take more control of their research and writing processes.

AI tools are particularly adept at providing a type of interaction that mirrors the mentoring relationship found in traditional apprenticeships. These digital tools offer continuous feedback and facilitate a learning process where revision and improvement are part of building competence in writing and research. The iterative feedback from AI simulates the coaching stage of the Cognitive

Apprenticeship Model, allowing students to refine their drafts more effectively and develop a better understanding of academic writing standards. Moreover, AI tools can adapt to the individual learner's pace, providing personalized scaffolding that supports their unique learning trajectory.

Perusall

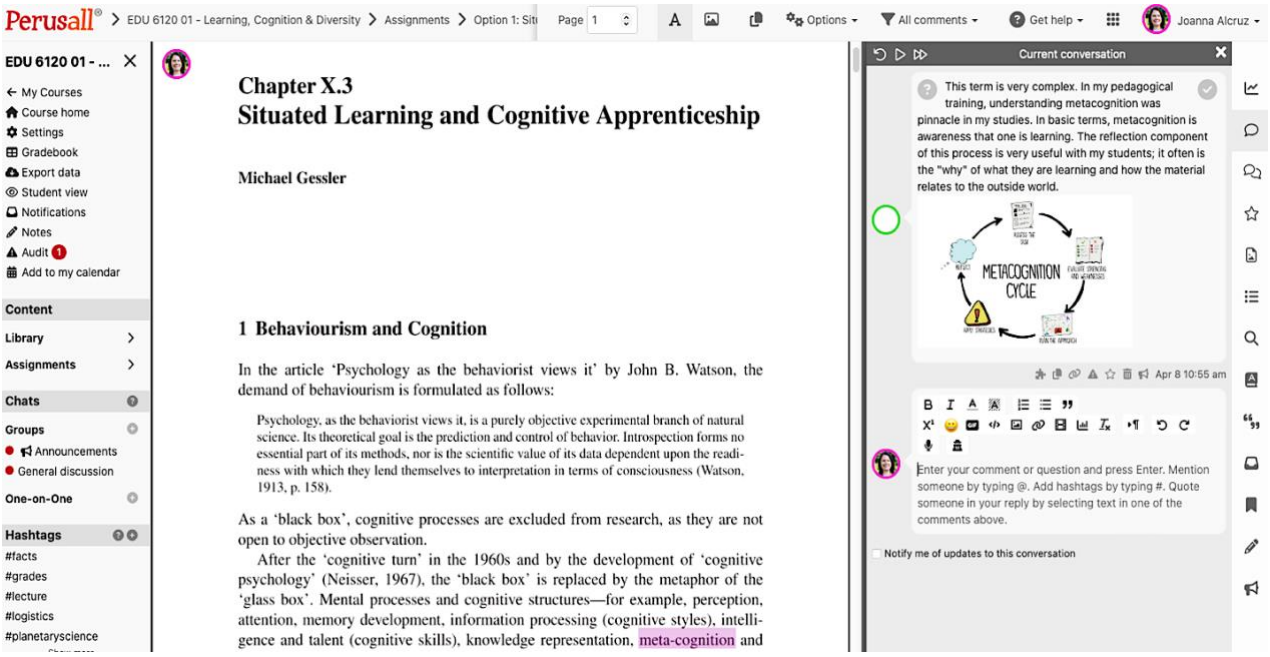
One powerful pedagogical tool used in the Molloy EdD is Perusall, an innovative AI-powered platform designed to transform the way students engage with reading materials, particularly in rigorous academic settings like doctoral programs. Developed to enhance the learning experience through a social and interactive framework, Perusall allows doctoral students to interact with their reading materials in a more engaging and collaborative manner.

At its core, Perusall allows for community-based annotation of texts with insightful questions, comments, and explanations, turning a traditional solitary reading assignment into an active learning experience (Adams & Wilson, 2020). It uses AI to analyze the content of the texts and predict which parts might cause difficulties or require deeper discussion. This functionality helps in scaffolding the reading process, guiding students through complex research materials by clarifying, questioning, and elaborating on key points.

Perusall extends its capabilities beyond just prompting discussion by incorporating a sophisticated algorithm that encourages peer-to-peer learning. As students annotate texts, they can see comments from other students, respond to them, and engage in discussions, using emojis, real-time reactions, and other ways of commenting/annotating. These social media-like features foster a community environment where doctoral students can collaboratively dissect, understand, and critique research papers, which is particularly valuable in developing critical thinking and deep analytical skills necessary for high-level academic work (see Figure 2). Doctoral students using this AI-driven collaborative tool consistently report engaging more with text, reading texts more deeply and meaningfully, and gaining insights from community discussion. One doctoral student reported to us: "Perusall makes an article into a class project!"

Additionally, for doctoral students, who often deal with dense and complex academic writings, Perusall proves to be an essential tool. It assists in breaking down scholarly articles and research papers into more digestible segments, highlighting crucial arguments and data while prompting students to think critically about the content. By facilitating easier navigation through challenging materials, Perusall ensures that students are not just passive recipients of information but active participants in constructing knowledge. Perusall's AI-driven insights help to identify common themes and queries among students, allowing instructors to understand where students struggle and what interests them. This insight is invaluable for doctoral program instructors who aim to tailor their teaching strategies to meet the specific needs of their students effectively. It also enables instructors to provide targeted feedback and support, aligning with the educational goals of fostering independence and depth in research skills among doctoral candidates. Perusall acts much like a digital tutor that is available around the clock. Its algorithm is tailored to anticipate common problems and questions that might arise from the text and provides preemptive explanations and context to smooth over these potential stumbling blocks. This preemptive assistance helps maintain a steady flow of study and comprehension without the frequent disruptions that tough scholarly texts might pose.

Figure 2. Sample Perusall Interface



Note. Screenshot of the Perusall platform interface from EDU 6120 Learning, Cognition & Diversity, delivered via Perusall, Molloy University, [2024]. Reproduced with permission.

Perusall's ability to adapt to individual user interactions and learn from them allows it to offer more personalized assistance over time. As students interact with the system, it fine-tunes its responses and prompts to better suit each student's learning style and pace, making it an invaluable tool for doctoral students engaged in extensive and often solitary research work. Perusall exemplifies how AI can be seamlessly integrated into the academic workflow to enhance understanding and engagement with complex research materials. By leveraging AI to foster active learning and community interaction, Perusall not only enhances the reading experience for doctoral students but also significantly contributes to their overall academic development and success in navigating the demands of doctoral research.

SciSpace

For some Molloy doctoral students, finding connected research, organized by themes can help them visualize the dimensions of their research topic. For that area, some students use SciSpace, an AI-powered research assistant, into their academic endeavors. Developed by Typeset, SciSpace represents a significant advancement in the domain of academic research, providing a suite of tools designed to enhance the research experience by simplifying the digestion and analysis of complex scientific literature.

SciSpace distinguishes itself by offering more than just traditional research assistance. It employs advanced AI algorithms to decode intricate research papers, transforming the way doctoral candidates interact with scientific publications. The platform offers real-time explanations and reduces technical jargon, thus democratizing access to scientific knowledge and fostering an interactive learning environment. This is particularly beneficial for Molloy's diverse student body, which includes those returning to academia after significant professional experiences, as it allows them to bridge knowledge gaps more efficiently.

One of the standout features of SciSpace is its Copilot tool, which integrates directly into the students' workflows through a Chrome extension. This tool is instrumental for doctoral students as it summarizes research articles in real time while browsing online databases, significantly saving time and effort. Copilot enables students to upload documents for data extraction, ask detailed questions about specific paragraphs or sections, and receive concise explanations directly in their workflow. This seamless integration ensures that students can maintain focus on their research without being bogged down by the often daunting volume of information.

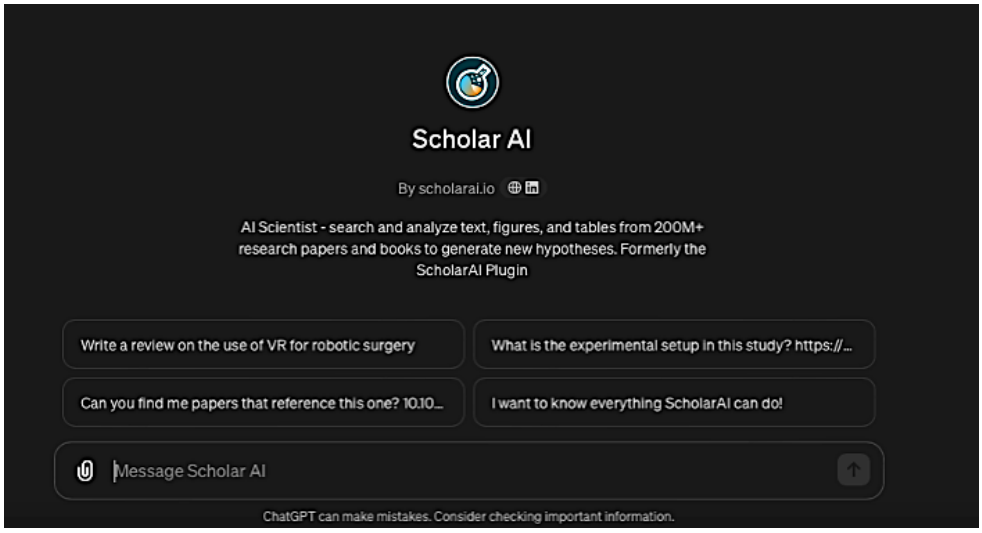
Faculty have demoed how SciSpace enhances the research process through features like instant explanations of texts, mathematical equations, and tables. It can translate academic jargon and complex paragraphs into clear, understandable terms, which is invaluable for students working to develop their dissertation research questions or to refine their methodologies; the ability to clip unfamiliar equations or data sets to understand their implications further empowers students to tackle advanced topics with confidence.

Additionally, SciSpace offers organizational tools such as the ability to save articles and PDFs in a personal library, note-taking capabilities, and options for highlighting and annotating texts. These features support Molloy's doctoral students in creating a structured and efficient research process, accommodating their individual schedules and learning preferences. SciSpace has become an integral part of the research toolkit for doctoral students at Molloy University, streamlining the exploration of scientific literature and enabling a deeper, more accessible engagement with complex research topics. By integrating SciSpace into their academic routine, students are better equipped to navigate the challenges of doctoral research, ensuring they are well-prepared to contribute meaningful insights to their fields of study.

Scholar AI

Normal Scholar AI, a custom version of ChatGPT oriented towards academic and scholarly contexts, is an advanced AI platform designed specifically to support academic research and writing processes. It is particularly beneficial for doctoral students and educational professionals. This AI technology serves as a crucial tool in an academic environment where the demands of doctoral research and writing can be overwhelming due to the complexity and breadth of required knowledge (see Figure 3).

Figure 3. Scholar AI Interface and Features



*Note. Scholar AI. (n.d.). Scholar AI. **https://scholarai.io***

For Molloy doctoral students, Scholar AI simplifies the daunting tasks of navigating extensive literature, synthesizing diverse data, and developing complex ideas into well-structured dissertations. One of its key features is the automated literature review capability, which scans through thousands of documents rapidly, summarizing relevant information. This not only saves significant time but also ensures comprehensive coverage of existing research, potentially revealing crucial studies that could influence the direction of a student's research. Additionally, Scholar AI aids in data analysis and visualization, providing students with tools to easily interpret complex data sets and present findings in understandable formats.

Scholar AI can assist in refining research questions by analyzing existing literature and identifying gaps in the field. This guidance is invaluable as it helps students formulate precise and impactful questions that define the scope of their projects. The platform also enhances the quality of academic writing by offering real-time feedback on grammar, style, and consistency, essential for maintaining the professional standard expected in doctoral dissertations.

Beyond aiding students, Scholar AI extends its capabilities to professors, acting as an AI teaching assistant that enhances educational delivery. It assists in course preparation by providing up-to-date research articles, summaries, and potential discussion topics based on the latest trends in the field. For student assessment, Scholar AI analyzes written submissions to gauge understanding and engagement, enabling professors to customize their feedback and teaching strategies accordingly.

In seminar settings, Scholar AI can stimulate richer discussion by posing insightful questions and prompts based on the course material. This not only fosters a deeper engagement among students but also encourages critical thinking and debate. Additionally, the AI tool tracks individual student progress, pinpointing areas of difficulty and suggesting targeted resources or assignments to enhance learning outcomes.

In the Molloy EdD program, Scholar AI embodies a significant evolution in the use of AI technology within higher education. It provides Molloy doctoral students with a set of streamlined tools that make research and writing processes more efficient and less burdensome. Additionally, for the faculty, it offers supportive features that improve instructional methods and facilitate a more personalized learning experience.

Grammarly

As mentioned before, many of the Molloy doctoral students report finding academic writing to be difficult. The doctoral program at Molloy integrates the use of Grammarly into the doctoral curriculum. Grammarly, a sophisticated writing enhancement tool powered by advanced AI, has become an indispensable asset for doctoral students at Molloy University, particularly those who are non-native English speakers or who struggle with academic writing. This tool supports students through various stages of their writing process, from initial drafts to the final submission of their dissertations, by ensuring clarity, correctness, and sophistication in their use of language.

For doctoral students, especially in a diverse academic community like Molloy University, mastering the nuances of academic writing in English can be a formidable challenge. Grammarly addresses this by providing real-time grammatical correction, punctuation, style, and vocabulary suggestions, which are crucial for students to express their research findings clearly and effectively. The AI-driven tool goes beyond basic spell-check functions offered by typical word processors by analyzing the context and nuances of language usage, making it an excellent aid for those who might not be native speakers or who may have gaps in their understanding of academic writing conventions.

Grammarly's features are particularly beneficial for improving the readability of complex academic texts, which is a common requirement in doctoral-level writing. It offers suggestions to enhance sentence structure, which can be pivotal for constructing logical and persuasive arguments—a core aspect of dissertation writing. Moreover, the tool includes a tone detector, which helps students ensure that their writing adheres to the formal tone typically expected in scholarly communication.

The integration of Grammarly into the writing process at Molloy University has shown significant benefits in terms of boosting the confidence of doctoral candidates. Students who might previously have felt hindered by their linguistic capabilities find that Grammarly acts as a supportive co-writer, guiding them through the intricacies of English grammar and style. This support is not just about correcting mistakes; it's about learning and adopting better writing habits over time.

For doctoral students whose primary focus must be on the content and quality of their research, Grammarly alleviates the cognitive load associated with proofreading and editing their texts for grammatical accuracy. This allows them to dedicate more attention to refining their research, developing their arguments, and engaging deeply with their subject matter. As a result, students can produce dissertations that are not only substantial in content but also polished and professional in presentation.

Grammarly has proven to be a valuable tool for Molloy University’s doctoral students, especially those who face challenges with English proficiency. By enhancing their writing skills, Grammarly helps level the playing field, ensuring that all students, regardless of their linguistic background, have the opportunity to succeed and excel in their academic endeavors. This contributes significantly to the overall goal of fostering a supportive and inclusive academic environment where every student can thrive.

CONCLUSIONS

The faculty of the Education Doctorate (EdD) program at Molloy University has proactively embraced AI tools as both pedagogical aids and support mechanisms for doctoral students. This strategic adoption stems from a recognition of the transformative potential of AI in enhancing academic practices and supporting diverse student needs, especially in complex areas such as research and writing.

The decision to integrate AI tools like Scholar AI, Grammarly, and Perusall into the curriculum reflects a broader commitment to utilizing technology to enrich learning outcomes and streamline the research and writing processes. These tools are carefully selected and curated to ensure they complement the educational objectives of the EdD program, providing students with sophisticated resources that enhance their capabilities as emerging scholars and researchers.

Molloy’s culture around the use of AI is grounded in transparency and integrity. Faculty members educate students on the appropriate and ethical use of AI tools, ensuring that they understand not just how to use these technologies effectively, but

also the importance of maintaining academic honesty. An essential component of this education involves the proper citation of AI tools in their academic work. When AI platforms like Scholar AI contribute to literature reviews or data analysis, students are instructed to acknowledge these contributions explicitly in their dissertations and other scholarly outputs. This practice of citing AI tools is crucial, as it maintains the scholarly rigor of their work and upholds the academic standards of the university.

Students are taught to treat AI tools as they would any other source of information — as valuable inputs that need to be critically evaluated and appropriately credited. This approach not only fosters a responsible use of technology but also encourages a deeper understanding of the material, as students must engage thoroughly with the content to determine how best to integrate and attribute AI-generated insights.

In addition to fostering an environment of academic integrity through the appropriate citation of AI tools, the Molloy EdD faculty also emphasizes the ethical dimensions of using AI in research and writing. This includes educating students about the potential biases that may exist within AI algorithms, which often stem from the datasets on which these tools are trained. Recognizing and understanding these biases is critical, as it impacts the reliability and validity of the research findings derived from AI analyses. Students are taught to critically assess the output from AI tools, considering how underlying data biases might influence their research conclusions and ensuring that these insights are balanced with other scholarly sources.

The faculty addresses the issue of plagiarism in the context of AI use, a concern that is becoming increasingly pertinent as AI capabilities expand. Students are reminded that while AI can greatly assist in the process of generating content, the ultimate responsibility for ensuring that the work is original and properly attributed lies with the individual scholar. They are instructed on how to use AI as a support tool rather than a source, which involves transforming AI-generated content into original analyses and arguments that reflect their unique perspective and scholarly voice. This careful approach to using AI not only helps prevent academic dishonesty but also encourages students to develop their independent critical thinking and writing skills, essential for their growth as scholars.

By embracing AI tools within their pedagogical strategies and supporting the ethical use of these technologies, the Molloy EdD faculty is not only enhancing the educational experience but also preparing doctoral candidates for a future where AI plays a significant role in academia and beyond. Doctoral students report academic research and writing as formidable tasks and are often reasons for doctoral program dropouts (Wollast, et al, 2018). This forward-thinking strategy ensures that Molloy graduates are not only proficient in their disciplines but also adept at leveraging technology to foster academic and professional excellence.

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