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An Examination of the Use of AI (Artificial Intelligence) Technology as Experienced by Scholarly Practitioners in an Educational Doctorate Program

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ABSTRACT

This study examined the applications and perceptions of AI tools in doctoral studies, focusing on their efficacy in enhancing research effectiveness. A survey found that most participants used AI tools in their doctoral studies (63%), with the majority of those users reporting some positive impact from their usage. The most indicated uses of AI were proofreading, researching scholarly articles for literature reviews, and the organization and structure of research. Future research may include a larger sample size and examine instruments for alignment with the program practices and curriculum to best capture responses that indicate participants' program-specific use of AI tools. The study concluded that AI tools have not yet been integrated into research within doctoral studies, and 47% of participants did not find them conducive to effectively communicating research findings in their doctoral work.

KEYWORDS

article dissertation, dissertation, Carnegie Project on the Education Doctorate (CPED), scholarly practitioner

Across university campuses nationally, there are increasing concerns about the implications of artificial intelligence (AI) and the challenges and opportunities its generative capacity has introduced to education (Coley et al., 2023). Adopting technologies like spellcheck, online databases, and classroom learning management systems has set a standard for the accepted use of technologies for learning purposes. Under this same premise, universities are beginning to determine the role of newly accessible AI technologies as educational tools.

While many higher education institutions are focused on how to combat the use of AI technologies, others are examining policy revisions around the use of technologies and introducing ways that students can use these tools as assets that help them develop and apply skills to their work (Gillani et al., 2023). With the publicly accessible nature of generative AI, schools may want to consider how restrictions on the use of these programs serve to prepare doctoral candidates with the language, creative problem-solving, or skills necessary to leverage technology in responsible, learning-forward models (Gillani et al., 2023). For educational institutions to be aware of these developments, be inclusive of them, and promote the use of these technologies, this study first conducted a systematic literature review using the following research question: How does generative AI affect dissertation writing risks and benefits? Second, to better understand educational doctoral students' AI comprehension and use, a survey (Appendix A) and personal interviews (Appendix B), were assessed and coded to determine common themes.

What is AI?

Artificial Intelligence (AI) refers to computer systems that can perform tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation (Chandra et al., 2022). Common tools might include Grammarly, ChatGPT, citation software like Mendeley or Zotero, and websites like Quillbot and TheLiterature.com. These types of AI programs, often referred to as Large Language Models (LLMs), vary greatly, are changing daily, and are evolving to include generative content based on user prompting.

Since LLMs are trained on massive data sets, they are called large. LLMs use transformer models, a type of neural network (Cloudflare, 2024). LLMs are computer software given enough

examples to recognize and interpret human language or other complex data. Many LLMs are trained on thousands or millions of gigabytes of Internet text. LLM programmers may use a more curated data set because sample quality affects natural language learning.

Artificial intelligence-generated content (AIGC) is the use of generative AI algorithms to assist or replace humans in creating personalized high-quality content ranging from texts, summaries, data analyses, citations, images, and graphs based on user inputs (Cao et al., 2023; Wang et al., 2023). One of the most popular AI interfaces is ChatGPT, a neural network that functions by learning to perform tasks by analyzing existing examples like Wikipedia, articles, and other internet sources (Coley et al., 2023). While search engines like Google sort through internet data to find matches for the information requested by a user, ChatGPT produces what it determines to be a plausible or appropriate response to the request regardless of whether it exists within its data sources, which may result in fabricated content (Coley et al., 2023). Upon the public release of ChatGPT, questions of opportunities and challenges specifically regarding plagiarism emerged in the academic community.

Opportunities and Challenges of AI

AI may offer benefits for users including generating references, outlines for projects, test questions, discussion prompts, and spelling and grammar suggestions (Monika et al., 2023). For example, an autoethnographic investigation explored Schwenke's utilization of ChatGPT version 3.5 for writing their master's thesis (Schwenke et al., 2023). The results suggested that ongoing outcome verification was needed to ensure accurate and relevant content to the research questions. The study suggested that a thesis's creation still depends on the learner's practical involvement and ability to apply their learning to produce credible and high-quality research (Schwenke et al., 2023). Generative AI software like ChatGPT has raised significant concerns for higher education institutions including plagiarism, authentication, and academic integrity (Crawford et al., 2023). However, some researchers posit that by integrating these AI tools into courses, educators may be able to teach students the ethical use of such tools (Crawford et al., 2023). While students may be able to employ AI-generated content in formal academic writing and research, human involvement and vetting were still required beyond creating input demands (Schwenke et al., 2023), Furthermore, ethical guidelines provided by instructors may support more effective use as well as address the concerns of plagiarism (Crawford et al., 2023).

AI in Education

Integrating AI into education has yielded attention from researchers and practitioners. Three primary areas include the following: (a) enhancing personalized learning experiences, (b) augmenting teaching and learning processes, and (c) facilitating research and knowledge discovery. The literature suggests AI systems can differentiate and meet the diverse needs of students from kindergarten to postsecondary institutions to improve personalized learning. Algorithms may analyze student performance data to personalize learning experiences based on strengths and weaknesses and include any accommodations (Siemens & Gasevic, 2012). More recent research suggests that AI-based adaptive learning platforms may significantly improve student engagement and outcomes, especially in science, technology, engineering, and math STEM disciplines (Zhu et al., 2022).

AI tools like virtual learning assistants or tutors have been employed as supplemental support for students to augment the teaching and learning process. Some researchers suggest AI tutors may enable students to receive early assessment via feedback from ChatGPT, identify areas of growth, and foster a sense of connection to supplement existing peer and teacher connections (Crawford et al., 2023). These tools use natural language processing and machine learning algorithms to provide feedback, answer students' questions, and facilitate interactive learning experiences for key concepts in the curricula (VanLehn, 2011). While AI may be used to supplement instruction, some studies' findings stress that ChatGPT cannot replace the teacher's role and may have lower rates of student satisfaction than tutoring with a teacher or peer (Ahmed, 2023).

Higher Education Policies Regarding AI

While there is no governing body for higher education AI policies, leaving institutions to create their own, educators may need to establish their own AI integration policies for students' coursework and dissertations. Existing research indicates teacher acceptance (Chen et al., 2009; Sánchez-Prieto et al., 2017), self-efficacy (Joo et al., 2018), perceptions (Nikou & Economides, 2017), and feelings and attitudes (Teo et al, 2008) toward adopting digital technologies are all key factors in determining if technology is integrated into curricula and learning experiences. Furthermore, studies indicate teachers' attitudes towards the adoption of AI technologies determine whether they will be used to support teaching activities and the degree to which the technologies and actual teaching practice are integrated (Becker et al., 2017; Edwards et al., 2018; Wang et al., 2021).

Doctoral Students Using AI

Doctoral students may benefit from AI programs that summarize, paraphrase, and generate dissertation content. However, these AI tools present new challenges and opportunities for educators and doctoral students. With their research and academic experience, doctoral students may use these tools more. This distinction highlights educational research's evolution and AI tool adoption.

With such a variety of AI products entering the market, there are numerous ways that students could use AI within their doctoral programs. A study surveying PhD research scholars across different institutions in the Vellore District of Tamil Nadu indicated that 89% of the surveyed academics used AI at some point in their research. The study revealed the most popular uses of AI were for citation management, plagiarism detection, and proofreading. Despite expressing reservations about possible abuse of AI in research, 83% of the participants reported AI technology improved the effectiveness of their study (Monika et al., 2023).

A mixed methods explanatory sequential study explored 98 students' literacy and attitudes toward using AI in dissertation writing (Harsyah, 2024). The students were from the English study program at Universitas Jambi, Indonesia. Descriptive and inferential statistics analysis of participants' survey responses determined that students employed artificial intelligence across all chapters of their dissertations, with a notable emphasis on the literature review segment. Students self-reported using various forms of artificial

intelligence, including Perflexity, ChatGPT, Grammarly, Quillbot, Research Rabbit, and Humanta, in their dissertation writing processes. Participants indicated the integration of artificial intelligence was generally smooth, as these tools offered user-friendly interfaces, the main challenges they encountered were primarily in selecting appropriate keywords (Harsyah, 2024).

Exploring specific AI programs being used by students may help determine ways that AI is being integrated. One such study examined doctoral students' use of ChatGPT in the context of dissertation writing among students at Dhaka University, Bangladesh, focusing on science education dissertations (Anik et al., 2023). The study consisted of four participants, two of which used ChatGPT as an AI-assisted tool in drafting their dissertations while the other two did not use any AI tools. Findings revealed that ChatGPT served as a valuable tool for enhancing various aspects of dissertation writing, offering benefits such as providing new perspectives, facilitating effective comparisons, generating quick responses, and improving the comprehensibility of research (Anik et al., 2023). The study also highlighted the importance of cautious use due to ChatGPT's limitations, emphasizing the need for researchers to exercise discretion and verify the accuracy of the information provided by the AI tool. Doctoral students likely need guidance to use such tools to understand the extent of AI's capacity and how to employ the tool accurately and ethically in academic work. Despite slow literature searches and occasional inaccuracies, participants said the AI's novel insights and interpretations improved their research findings.

Additionally, participants reported improvements in writing implications and conclusion sections with the assistance of ChatGPT, citing increased cohesion, coherence, and expanded content (Anik et al., 2023). While they acknowledged the AI's valuable contributions, participants also emphasized the importance of critical evaluation and double-checking of AI-generated content to ensure accuracy and reliability. Overall, the study underscored the potential of AI technologies like ChatGPT to augment various phases of thesis writing while emphasizing the complementary relationship between technical support and the ability and skills of humans to build connections in scholarly research.

Research Gap and Purpose

To develop a more robust understanding of the applications of AI tools in dissertation writing, a case study with scholarly practitioners, or those who work in schools as educational leaders and engage in research via doctoral programs, in an Educational Doctorate program was conducted (Chiu, 2023). The following research questions were posed: (1) To what extent are scholarly practitioners integrating AI tools in drafting their dissertations? (2) How do scholarly practitioners perceive the integration of AI tools by universities to better support education students in their dissertation work? and (3) What challenges and limitations do scholarly practitioners perceive regarding AI use in the context of dissertation work for students in education programs? This study intends to add to the expanding body of research by examining the experiences of doctorate students through the lens of the findings of the literature review. It also intends to offer additional guidance to educational stakeholders in navigating the use of AI in doctoral programming and deepen the understanding of how scholarly practitioners use AI in their dissertations and how academic institutions might support the appropriate and moral application of AI programs in doctoral programs. This study also intends to further the understanding of how AI use is perceived by educational doctoral students in particular, as they are poised to influence the future use of AI in teaching practice and educational leadership roles.

METHODS

This case study examined the use of AI within the dissertation process of scholarly practitioners in a Carnigie Project on the Educational Doctorate (CPED), program in the Pacific Northwest (Creswell, 2013). CPED represents 145+ educational institutions in a collaborative network, member institutions create rigorous, real-world EdD programs that equip graduates with the skills and knowledge to improve education. The participating university was chosen due to its practicality and accessibility in capturing a representative sample from the target population. Additionally, the choice of this university allowed for the inclusion of participants who were readily available and willing to participate in the study that met the determined definition of scholarly practitioners.

Context

Scholarly practitioners from one three-year, cohort-based Education Doctorate (EdD) program in the Pacific Northwest were invited to participate in this study to better understand how, if at all, scholarly practitioners utilize AI in their doctoral studies. The participating university follows the guiding principles of CPED (n.d.) with emphasis on Principle 3, which states: Provides opportunities for candidates to develop and demonstrate collaboration and communication skills to work with diverse communities and to build partnerships (para. 10)

The study included students who were in all three cohort years of a three-year doctoral program, which ensured representation from various stages of the program. Students in this program are primarily scholarly practitioners, or those continuing to work full-time in education as teachers, administrators, directors of higher education, and educational leaders while pursuing their doctorate (Chiu, 2023). In general, they all have master's degrees and have about 17 years of experience in education on average when they begin the program. Participants in this program complete coursework in the first two years and work on their dissertations in the third.

Phase 1: Surveys

Survey Instrument

The main instrument used for this study was the Artificial Intelligence in Writing questionnaire (AIWQ-40) (Monika et al., 2023). This instrument included 40 items that fall into five different domains: (1) Role of AI tools in academic writing (9 items), (2) Effectiveness of AI tools in content generation (12 items), (3) Significance of AI tools in paraphrasing (8 items, (4) Importance of AI tools in academic reference and citation (3 items), and (5) Significance of AI tools in proofreading and grammar correction (8 items). All items were on a five-point Likert scale from Strongly Disagree (1) to Strongly Agree (5). The authors of the instrument carefully developed the instrument to collect evidence of reliability and validity, determining high internal reliability (Cronbach's alpha = 0.868) and significant ($p < .05$) inter-item correlations (Monika et al., 2023).

Survey Participants

Scholarly practitioners across all three cohorts were invited to participate in this study, and 19 of the 30 possible students participated in the survey, with a response rate of 63%. Table 1 demonstrates the majority of the participants were from the third-year cohort (52%), who were finishing their dissertation and about to graduate, and the remaining students were in the second or first-year cohorts. Also shown are the age ranges of the participants representing an even distribution of participants between 30-39 and 40-49, and the smallest group reporting being 50-59 at 16%.

Table 1. Demographics of Participants

Demographic	%
Age Range	
Age 30-39	42%
Age 40-49	42%
Age 50-59	16%
Year in Program	
Year 1	16%
Year 2	31%
Year 3	53%

Note. Participants for Survey (N=19), and Interviews (N=3)

Phase 2: Interviews

Interview Instrument

A semi-structured interview protocol was developed to further examine the personal experiences of participants in the study who had self-identified as using at least one AI program within the work of their dissertation. Interview questions aimed to further examine and contributed to answering the study RQs. Sample interview questions can be found in Table 2 below.

Table 2. Sample Interview Questions with Matching RQ

Interview Question	RQ Answered
In what ways do you believe the use of AI enhanced your doctoral studies?	RQ1
How do you perceive the future implications and applications of AI in education?	RQ2
How might doctoral programming better leverage AI within curricula?	RQ3

Interview Participants

Interview participants consisted of students enrolled in the EdD program at the selected university and included three purposefully selected participants from the survey results indicating those students used AI during their doctoral program. The study included students who were in all three cohort years of a three-year doctoral program. Purposeful interview questions were designed to gather in-depth insights into the participants' experiences and perspectives regarding the use of AI within their dissertation process. The interviews were conducted in a one-on-one format, allowing for a personalized and comprehensive exploration of the topic.

Interview Analysis

The data obtained from the interviews were transcribed verbatim and analyzed using thematic analysis. The thematic analysis allowed for the identification of recurring patterns and themes within the data, thereby providing a comprehensive understanding of the participants' experiences with AI in their dissertation process. Thematic analysis is a qualitative research method appropriate for this study as it aims to identify and analyze patterns, themes, and meanings within a data set. First-cycle coding uses In-Vivo coding, a systematic coding method that involves closely examining the data and assigning descriptive codes to segments of text (Saldaña, 2021). This coding method was used because it is particularly suited for uncovering the participants' perspectives and experiences, as it captures the essence of their language and expressions regarding AI usage and understanding.

RESULTS

RQ1: The Extent of AI Tool Integration in Dissertation Writing

Survey Results

To answer the first research question, regarding how and the extent to which scholarly practitioners utilize AI tools in their research, we examined the survey data. Before launching into the survey, where these ideas would be elaborated on, we first asked participants to define what AI means to them (prior to learning more about AI through the latter survey questions) and describe their beliefs about the use of AI in doctoral studies. Table 3 shows the themes that arose in students' definitions of AI.

Table 3. Themes of Student Definitions of AI

Themes of Student Definitions of AI	N (%)	Codes	Exemplar Quote
Computer generated intelligence	58	Computer, generated, non-human, robot	"To me, artificial intelligence means robots and generative text."
Using input to create output	16	Input, output, answering questions	"Artificial Intelligence is a database of information that can be used to make decisions based on user input. AI "learns" each time it is used and becomes more effective at making decisions based on user input."
Support resource	26	Resource, tool, supports you, extends abilities, increases productivity, futuristic	"Resources and tools that support you to extend your abilities or skill set."

Table 4 describes the themes that arose in students' beliefs about the use of AI in doctoral studies. The participants' beliefs about the use of AI in their studies varied widely from preventing the use of AI entirely to heavily using AI across a wealth of areas in their studies with high frequency.

Table 4. Themes of Student Beliefs of AI in Doctoral Studies

Themes of Student Beliefs of AI	N (%)	Codes	Exemplar Quote
Disagree with using AI	21	Ethics, unethical, violation, integrity, cheating, disagree with using AI, no place in doctoral studies, rigor	"I disagree with using AI to help write materials that are published or graded. It feels to me like cheating--not doing your own thinking and writing."
Undecided	26	I do not use it, undecided, depends, human use	"I am a bit undecided. AI could help with research and with finding appropriate articles/journals. However, I do not think a doctoral student should be used to write informally or formally."
Agree with using AI	53	Tool to help, helpful, beneficial, synthesizing, summarizing, potential, assistive, integrate, innovative	"It is new and unfamiliar, but I believe that it has a huge potential to be beneficial studies when used appropriately."

Following these initial questions, the first part of the survey asked the 19 scholarly practitioners to rate, on a scale of 1 to 100, the extent to which they agreed with the following statements about using AI in their doctoral studies. For each item, there was a great deal of variation, with scores ranging from 0 to 100 for each item, and multiple 0s generally skewed the means downward, therefore median should also be interpreted in Table 5 below. About 37% of the students reported having not used any AI tools in their doctoral studies. Of those that had used such tools, most reported some positive impact, with 12 students (63%) ranking it at least 50 or higher. What was striking was that the majority of students (79%) would like to learn how to use AI tools more productively in their doctoral studies. Six of the scholarly practitioners (32%) believe AI tools should not be used at all as a part of doctoral studies.

Table 5. Survey Items for AI Use in Doctoral Studies

Survey Item	n	Min.	Max.	Median	*M (SD)*
I have used AI tools in my doctoral studies.	19	0	100	60.00	43.47 (38.34)
Using AI tools in my doctoral studies has positively impacted my work.	14	0	100	71.50	64.21 (26.94)
I would like to learn how to use AI tools more productively in my doctoral studies.	16	0	100	89.50	78.88 (27.17)
AI tools should not be used as part of doctoral studies.	13	0	100	32.00	39.15 (33.80)

Note. n = 19. Survey items were on a 0 to 100 slider scale from Strongly Disagree (0) to Strongly Agree (100).

Next, all 40 items on the AIWQ-40 were averaged to create an overall score for each of the 19 doctoral student participants, with an overall average of 2.65 (*SD* = 1.11). Across all participants, this is about exactly halfway across the 5-point Likert scale – with an average score of a little less than Neutral (3). The range was quite wide with two individuals scoring an average of 1.00 (i.e., an answer of Strongly Disagree to every single item), and one individual scoring 4.41 (i.e., answers of Agree or Strongly Agree to every single item). Amongst the 19 participants, 12 (63%) had overall scores less than 3 and could be categorized as AI non-users, while 7 (37%) had overall scores greater than 3 and could be categorized as AI users.

Next, these overall scores were disaggregated by program year and age. Because of the very small sample size, these results must be interpreted very cautiously. A one-way analysis of variance (ANOVA) revealed statistically significant differences, $F(2, 16) = 7.93$, $p = .004$, between the three cohorts, with the newest cohort (Year 1) the most AI use, and Year 3 reporting significantly less use of AI than the other two cohorts (Year 1 and Year 2). There were not any statistically significant differences by age, as seen in Table 6 below.

Table 6. ANOVA Scores by Program Year and Age

Demographic	n	*M (SD)*
Cohort		
Year 1	3	3.97 (0.42)
Year 2	6	3.12 (0.75)
Year 3	10	1.97* (0.95)
Age		
30-39	8	2.79 (1.09)
40-49	8	2.80 (1.24)
50-59	3	1.86 (0.73)
Total	19	2.65 (1.11)

Note. Average scores were on a Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

To better understand the specific ways in which students are using AI in their doctoral studies, we dive into the individual survey items on the AIWQ-40 (Monika et al., 2023). The role of AI tools in the Academic Writing Domain was examined using the following nine items in Table 7 below. Participants were evenly split in affirming

Table 7. Survey Items for the Role of AI Tools in the Academic Writing Domain

Survey Item	Percent Disagree	Percent Agree	*M (SD)*
AI tools have contributed to improving the overall academic rigor of my work.	42%	47%	2.84 (1.39)
AI tools have improved my efficiency in conducting literature reviews	43%	43%	2.79 (1.48)
AI tools have improved the quality of my academic writing	32%	37%	3.16 (1.43)
Using AI tools has expedited the process of data analysis in my research.	48%	27%	2.53 (1.43)
Using AI tools has expanded the scope of my research ideas	58%	27%	2.37 (1.46)
AI tools have increased my confidence in meeting publication requirements.	58%	22%	2.32 (1.42)
AI tools have increased creativity in my research work.	58%	22%	2.32 (1.42)
AI tools have assisted in identifying potential journals for publication.	63%	16%	2.26 (1.33)
I feel more confident in conducting statistical analyses with AI-powered tools.	58%	10%	2.16 (1.21)

Note. n = 19. Average scores were on a Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

(43%) and dissenting (43%) that AI tools had improved their efficacy in conducting literature reviews. Nearly 37% of participants' use of AI tools had improved the quality of their academic writing and most participants (47%) had agreed that AI tools increased the overall academic rigor of their work. Despite these assertions, participants disagreed with the remainder of the survey items in this domain.

The second domain of the survey examines the effectiveness of AI tools in content generation. Overall, 42% of participants agreed AI tools were user-friendly and easy to navigate, while most participants (48%) disagreed that AI tools increased the impact of their research, facilitated the identification of relevant research sources, helped in generating better research findings and avoided plagiarism in their work. Furthermore, 63% of participants disagreed with AI tools' ability to facilitate the integration of diverse research perspectives, as shown in Table 8. The overwhelming consensus from participants was that AI tool efficacy in content generation was lacking.

Table 8. Survey Items for Effectiveness of AI Tools in the Content Generation Domain

Survey Item	Percent Disagree	Percent Agree	*M (SD)*
I find AI tools user-friendly and easy to navigate.	32%	42%	3.00 (1.20)
I trust the suggestions and recommendations provided by AI tools.	37%	37%	2.74 (1.24)
AI tools have contributed to increasing the impact of my research.	48%	37%	2.53 (1.35)
AI tools like ChatGPT have facilitated the identification of relevant research sources.	48%	31%	2.53 (1.39)
AI tools have helped in generating better research findings.	48%	26%	2.42 (1.26)
I believe AI tools have positively influenced my decision-making in research.	47%	26%	2.42 (1.39)
AI tools have increased creativity in my research work.	58%	26%	2.32 (1.25)
AI tools have helped in avoiding plagiarism in my academic work.	48%	21%	2.42 (1.17)
I believe AI tools have simplified the process of formatting manuscripts.	47%	16%	2.42 (1.07)
AI tools have helped in generating insightful visual representations of data.	53%	16%	2.32 (1.11)
AI tools have facilitated the integration of diverse research perspectives.	63%	16%	2.16 (1.12)

Note. n = 19. Average scores were on a Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

The third domain of the survey examines the effectiveness of AI tools for paraphrasing. While 48% of participants stated that AI tools did not help in paraphrasing and summarizing research content effectively, many participants agreed that AI tools have enhanced the organization and structure of their research papers (48%), the overall quality of their research (47%), and have positively impacted their research productivity (47%). The data, shown in Table 9, suggests respondents do not believe AI tools supported them in increasing the speed of initial draft creation, suggesting relevant keywords for their research, or made collaboration with co-authors more efficient. Overall, 53% of participants disagreed that AI tools improved their ability to present complex data with 26% remaining neutral, and 21% of participants agreeing the tools improved their abilities.

Table 9. Survey Items for Significance of AI Tools in the Paraphrasing Domain

Survey Item	Percent Disagree	Percent Agree	*M (SD)*
AI tools like Grammarly and Quillbot have enhanced the organization and structure of my research papers.	27%	48%	3.00 (1.30)
I feel AI tools have enhanced the overall quality of my research output.	42%	47%	2.84 (1.39)
I believe AI tools have positively impacted my research productivity.	43%	47%	2.79 (1.44)
AI tools have helped in paraphrasing and summarizing research content effectively.	48%	42%	2.63 (1.46)
AI tools have increased the speed of initial draft creation in my research.	42%	37%	2.63 (1.42)
I find AI tools helpful in suggesting relevant keywords for my research.	43%	31%	2.63 (1.34)
AI tools have improved my ability to present complex data effectively.	53%	21%	2.32 (1.20)
AI tools have made collaboration with co-authors more efficient.	48%	5%	2.26 (0.99)

Note. n = 19. Average scores were on a Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

A common use of AI tools is to detect spelling and grammar issues quickly and accurately. This reduces such mistakes, improves clarity and quality, and reduces the amount of time authors spend proofreading. In addition to these traditional spell-check style features, AI also offers paraphrasing suggestions and can evaluate elements like vocabulary diversity (Monika et al., 2023). As demonstrated in Table 10, participants favorably indicated AI tools had helped them reduce the time required for proofreading and editing, and 63% of the participants indicated they trust the accuracy of grammar and spell check functions in AI tools. Regarding AI tools like Grammarly specifically, 48% of respondents agreed these reduced errors in their academic writing and 47% agreed they improved the clarity and coherence of their research papers. Participants were evenly split with 37% assenting and 37% dissenting that AI tools had facilitated the communication of their research findings, while many respondents (47%) indicated AI tools did not facilitate better communication of their research findings.

Formatting and citing academic references are a critical part of academic writing. Learning and applying American Psychological Association (APA) can be a challenge in addition to being time-consuming. AI citation tools may address this issue by generating APA citations automatically based on input from a source. Of the respondents, 42% expressed they disagreed with feeling more confident using AI tools, as shown in Table 11. Asking about AI citation tools like Mendeley and Zotero revealed that 37% of respondents did not feel more confident citing sources or managing references and citations correctly.

Interview results

To better understand these survey results, the interviews sought to better understand how these scholarly practitioners utilized AI, revealing that scholarly practitioners in education utilize various AI tools for different purposes in their dissertation work. As indicated by one participant the most common tools mentioned included Grammarly, "I use... spell check and Grammarly," for spell-checking

Table 10. Survey Items for Significance of AI Tools in the Proof Reading and Grammar Correction Domain

Survey Item	Percent Disagree	Percent Agree	*M (SD)*
I trust the accuracy of grammar and spell check features in AI tools.	21%	63%	3.47 (1.35)
I believe AI tools have reduced the time required for proofreading and editing.	32%	58%	3.26 (1.49)
AI tools like Grammarly have reduced errors in my academic writing.	32%	48%	3.32 (1.49)
AI tools have helped in enhancing the readability of my research papers.	37%	48%	3.00 (1.49)
AI tools have improved the clarity and coherence of my research papers using Grammarly.	37%	47%	3.16 (1.54)
Using AI tools has improved the overall structure of my research manuscripts.	47%	37%	2.84 (1.54)
AI tools have facilitated better communication of my research findings.	37%	37%	2.84 (1.50)

Note. n = 19. Average scores were on a Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

Table 11. Survey Items for Importance of AI Tools in Academic Reference & Citation Domain

Survey Item	Percent Disagree	Percent Agree	*M (SD)*
I feel more confident in citing sources accurately due to AI tools.	42%	22%	2.63 (1.30)
I feel more confident in citing sources accurately due to AI tools like Mendeley and Zotero.	37%	21%	2.63 (1.21)
AI tools like Zotero have helped in managing references and citations effectively.	37%	21%	2.37 (1.20)

Note. n = 19. Average scores were on a Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

and proofreading, Scholarship for generating flashcards from research studies, and ChatGPT for synonyms, simplifying complex concepts, and seeking explanations. Participants also mentioned the use of AI tools for researching scholarly articles quickly and efficiently.

Participants indicated that their use of AI tools, particularly ChatGPT, had positively impacted their research processes, “I asked it like what are some words that you think you could get rid of and make this more concise,” and “I’ll use Grammarly spell check.” It was indicated that AI facilitated the creation of matrices for organizing research data and improved understanding of complex concepts. Additionally, AI tools have enhanced efficiency by reducing the need for external editing and proofreading assistance.

While participants acknowledged the potential of AI tools in refining their doctoral studies and research processes, ethical concerns regarding appropriate use and the need for training on proper use were raised. Participants expressed the importance of clear guidelines, “agreements between the student and the course and I guess the instructor that I guess it yeah it could be a valuable tool,” and parameters from universities to ensure the ethical and responsible use of AI tools.

RQ2: Perceptions of the Integration of AI Tools to Support Dissertation Work

The second research question sought to understand scholarly practitioners’ perceptions regarding the potential integration and application of AI tools by universities to better support students in education in their studies.

Survey Results

Within the survey participants were mainly asked about their use of AI tools. In an open-ended question, respondents shared two ways universities could support the use of AI in doctoral programming. Among the responses, one participant emphasized the crucial role of access to AI resources in facilitating the use and integration of AI tools in doctoral work, “I would love it if [the university] and other schools actually helped support students by giving us access to AI via subscriptions.” This participant articulated a desire for universities to take proactive steps to support student use of AI tools by providing access to AI technologies through institutional subscriptions. This finding aligned with results from the survey that indicated most participants (53%) wished to have access to AI tools provided for the purpose of synthesizing, summarizing, assistive research, integration, and innovative within their program. Many AI tools contain financial barriers or offer advanced features requiring premium subscription options, by removing the financial burden students may be more likely to employ these AI tools in their work.

Another participant shared their experience leveraging AI in their doctoral work through Grammarly. While they indicated an overall positive experience with employing Grammarly, the participant also expressed a broader interest in applying AI tools to their work beyond spelling and grammar assistance, “Grammarly was game-changing for me! I am curious about AI’s other uses though…” These findings from Item 14 responses reflect an interest in applying AI tools to support doctoral work. As universities and academic institutions continue to embrace digital evolution, addressing the expressed needs and curiosities of students regarding AI integration may help foster a conducive environment for continued research and application of AI.

Interview Results

Interviews with participants further indicated that AI tools could provide valuable support in areas such as generating examples, providing feedback on writing style, and assisting with literature reviews. AI tools have the potential to save time and help students refine their writing skills and research processes. To better leverage AI within doctoral programming curricula, participants suggested various strategies including incorporating AI-generated examples for discussion and critique, encouraging students to use AI tools for writing assistance and research exploration, and developing competencies related to effectively using AI for research within the curriculum. For example, one participant noted: We can get to a bunch of examples hyper quick and then have discussions about those. Because I think the more, we can outsource those kinds of things so that we spend more time talking as a group. Participants also expressed the need for ongoing training and support for professors and instructors to effectively utilize AI tools in the classroom including providing resources and support for faculty to understand and incorporate AI tools into their teaching practices. Overall, the findings suggest that the integration and application of AI

tools in universities can be improved to better support students in their dissertation work.

Participants also again highlighted concerns about the misuse of AI tools, particularly concerning plagiarism. The importance of clear guidelines and agreements between students and instructors regarding the appropriate use of AI tools to avoid plagiarism was emphasized. By addressing concerns about plagiarism, providing training and support for faculty, and incorporating AI tools into the curriculum, universities can harness the potential of AI to enhance the research process and support students in their academic journey.

RQ3: Perceptions of Challenges and Limitations of AI Use in Doctoral Programs

Survey Results

As AI tools improve and develop distinct functions, areas of growth emerge. An open-ended survey item allowed participants to elaborate on their responses, identify what support they desired, and how doctoral programs may better provide that support. Participants indicated two key challenges: (1) a lack of AI tool access to research and (2) falsely generated reference materials. One participant shared:

> I think there is a long way to go, but the AI tools that help with grammar and spelling are great to use. I think the others, Bard/Gemini and ChatGPT, will be more helpful in the long run. Once they have better access to research and can synthesize it, it will be amazing.

This participant refers to limited access to AI tools like ChatGPT to existing research. Currently, as of 2024, these AI tools are limited to their internal neural network of data and cannot access databases like ERIC, ProQuest, or the worldwide web in general. Perhaps similarly related, one participant indicated AI tools had generated false article sources:

> I had many struggles during my literature review where I would find citations for articles only to learn they were falsely generated by AI. It was incredibly frustrating and only made more work as I would spend hours looking for what I thought would be a great resource only to learn it was not real.

Regardless of the cause of the AI tool's generation of fictional references, this output acts as a limitation for AI use in writing literature reviews. Furthermore, as the participant above indicated, this output was identified as a time-consuming challenge in that it inhibited the work of this participant.

Interview Results

When seeking to understand this research, interviews were conducted with three participants who self-selected at the end of the survey. The Questions are shown in Appendix B. Participants expressed concerns about the ethical considerations of using AI to develop original work. They questioned the appropriate use of AI and how to cite AI-generated content. The need for clear guidelines and agreements between students and instructors regarding the use of AI tools was emphasized, for example: "just knowing from a student perspective like what is appropriate use or what's not appropriate use and you know like how you would even cite something that is generated by AI."

Another prominent finding carried over from the interviews, which echoed the existing research, was the concern regarding plagiarism using AI and highlighted the need for guidance on appropriate use, understanding the limitations of AI, and learning from how others use AI in their doctoral studies. The participants noted limitations in the capabilities of AI tools and expressed a lack of trust in the accuracy and reliability of AI tools. They mentioned that AI-generated content may lack depth and require extensive proofreading, "I'm kind of constantly having to check that it's not doing … AI hallucination, that it's not just kind of hallucinating things." Participants emphasized the importance of raising awareness about AI tools and their potential applications in doctoral studies and called for open discussions and ongoing conversations about the expectations and implications of using AI in the research process.

The findings from these research questions suggest that while AI tools can support students in their dissertation work, some challenges and limitations must be addressed. Clear guidelines, training, and ongoing support are needed to ensure the ethical and effective use of AI tools. Additionally, fostering critical thinking skills and maintaining a balance between AI assistance and students' cognitive engagement are essential.

DISCUSSION

The findings from this study offer valuable insights into the applications and perceptions of AI tools within doctoral studies, particularly focusing on their efficacy in enhancing research effectiveness. Through a comprehensive examination of survey data and qualitative interviews, this discussion section seeks to delve into the multifaceted roles of AI tools in academic writing, content generation, and the broader research process.

Link to the Literature

While there is scant research on AI use by scholarly practitioners, this study served to expand on the findings from international studies like Harsyah (2024) and Monika et al. (2023) within the context of scholarly practitioners in the United States. In relation to how scholarly practitioners integrated AI tools in their dissertations, the survey found most participants surveyed used AI tools in their doctoral studies (63%). Of those participants, most (63%) also reported some positive impact from their usage of AI tools in their work. These results align with Monika et al. (2023) which found most academics (89%) surveyed using the AIWQ-40 reported AI tools increased efficacy in the writing process. Within this study, the most popular uses of AI were in proofreading, researching scholarly articles for literature reviews, and the organization and structure of research. These findings align with Anik et al. (2023) wherein scholarly practitioners reported improvements in cohesion, coherence, and richer descriptions of content using ChatGPT to author their doctoral dissertations. While the use of AI citation tools to cite sources accurately (21%) and manage references effectively (21%) according to the AIWQ-40 in this study was lower in comparison to participants in the Monika et al. (2023) study with 66% and 25%, respectively.

While the literature notes plagiarism as a large concern surrounding generative AI tool use, participants from this study suggested that courses on ethical AI use may appropriately address these concerns rather than prohibiting AI technology in research.

This participant-generated response is consistent with recommendations from Crawford et al. (2023) which posit ethical guidance from faculty may address plagiarism concerns while simultaneously developing skills in applying AI tools in doctoral research. Reflecting the guiding principles of CPED, scholarly practitioners' ideals regarding the ethical use of AI could include

> The use of practical research and applied theories as tools for change because they understand the importance of equity and social justice. They disseminate their work in multiple ways, and they have an obligation to resolve problems of practice by collaborating with key stakeholders, including the university, the educational institution, the community, and individuals (CPED, 2024).

Limitations & Future Research

This study, utilizing a case study design, investigated the experiences of scholarly practitioners at only one EdD program, which may limit the generalizability of the findings to other populations or settings. Furthermore, the small sample size (n = 19) acts as a limitation and may not represent the larger population of scholarly practitioners. Additionally, the reliance on self-reported data from the participants may introduce biases or subjective interpretations. Future research may include a larger sample size and examine instruments for alignment with the program practices and curriculum to best capture responses that indicate program-specific use of AI tools by participants.

Recommendations

With the continued development of AI tools aimed at educational use, the results of this study indicate steps that universities could consider implementing to ensure equitable access to programs. In examining current uses of AI, one related survey finding was the existence of trust using grammar and spell check features in AI programming, with participants indicating existing trust in such programs positively (63%). By providing student subscriptions to AI tools or premium tool features, universities may increase equitable access to such technology. Furthermore, institutions may integrate these subscriptions into courses where students are taught how to use/leverage AI tools specifically for their doctoral research and do so ethically – thus addressing the issues of plagiarism and concerns from the field.

Recommendations expressed by participants indicated the need for universities to provide guidance addressing plagiarism concerns with clear policies that reflected expectations and explanations of proper use of AI, as explained by one interview participant, "my only query would be is it allowed, if it's not, it's not ever talked about." By creating clear use policies, universities could mitigate potential issues of plagiarism and citation rules for both students and faculty. With policies in place, universities might create resources for students and faculty around programs deemed appropriate for use.

The desire expressed by participants for offering training and support to optimize AI tool integration in doctoral programs indicates an opportunity for universities to incorporate such training into the curriculum. Participants shared varied ideas about training on AI tools during interviews, "As an emergent learner with AI I would I was like a crash course, to begin with," and "What are some tools out there," were some such suggestions. Universities are poised to lead the way AI programs are experienced by students, ensuring equitable access, with clear guidance that ensures ethical use, and proper training for both students and faculty.

CONCLUSION

This study concluded that AI tools have not yet been integrated into research within doctoral studies. While these tools are commonly employed for tasks such as spell-checking, proofreading, and paraphrasing, 47% of participants did not find them conducive to effectively communicating research findings in their doctoral work. Additionally, concerns regarding ethical usage, lack of confidence, and reliability of AI-generated content were raised by participants who echo the concerns from the existing research (Crawford et al., 2023). The study highlighted the desire of participants to address challenges and limitations to ensure the ethical and effective use of AI tools while maintaining critical thinking skills and cognitive engagement among students. As educational leaders, universities are poised to guide the ways that AI could be integrated into doctoral programs, from practical applications and assignments to ethical considerations and the need for clear guidelines and training.

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