



# Student Teachers' Leveraging GenAI Tools for Academic Writing, Design, and Prompting in an ODeL Course

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RESEARCH ARTICLE



## ABSTRACT

Large language models such as ChatGPT 3.5, Grammarly, and Copilot, to name a few, are referred to as generated artificial intelligence tools (GenAI). These GenAI tools have gained significant popularity in education since their launch. How can teacher education take advantage of the hype around GenAI tools? These AI-generated tools prompted an investigation in an online course empowering student teacher with specific GenAI tools for academic writing and design. The pragmatic approach selected an explanatory mixed-methods study. The purposive sample of 204 respondents and six student teachers were selected for the study. Respondents completed the self-designed questionnaire, *GramGamChat survey tool* ( $\alpha < .82$ ). To apply the MMD approach, respondents first completed the closed structured questions online to execute this pragmatic approach, followed by using MS Teams as a videoconferencing platform and recorded interview sessions. The quantitative data were analysed and interpreted. Furthermore, interviews were conducted about student teachers' views of GenAI tools. These tools exposed student teachers to the benefits of GenAI and were favourably accepted by student teachers. It emerged that the tools positively improved student teachers' proficiency in designing practical learning resources for engagement.

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Large language models such as ChatGPT 3.5, Grammarly, and Copilot, to name a few, are referred to as generated artificial intelligence tools (GenAI). These GenAI tools have gained significant popularity in education and have grown exponentially during the past two years since their launch. Since the launch of ChatGPT as one of the most significant language models (LLMs), an unprecedented “hype” has exponentially increased this phenomenon globally. As a result, an interest in generative artificial intelligence (GenAI) tools in the education literature has emerged, with many studies reporting the potential to enrich and promote students’ learning experiences. GenAI tools aim to simulate an intelligent conversation with one or more human users in natural language by imitating human behaviour (Bozkurt, 2023a). Studies have found pedagogical advantages in their use of AI-generated tools related to personalised learning (Binhammad, 2024), automated assessment and feedback (Shadiev & Feng, 2024), engagement and motivation (Kelly et al., 2023), awareness of digital ethics, (Strzelecki, 2023) particularly with more timid students (Maphoto et al., 2024; Melek & Schmidt-Crawford, 2024; Ruksana, 2024). However, only a few studies have been conducted on the effectiveness of GenAI tools in higher education (Dwivedi et al., 2023; Farazouli et al., 2023; Kelly et al., 2023; Rudolph et al., 2023). Based on the reported benefits of using GenAI in academia, one particular scholarly work by Malik et al. (2023, p.1) stated that “AI, through its innovative technologies and flexible learning strategies, elevates academic writing by offering dynamic, interactive learning settings and personalised educational journeys”. It is reported that GenAI has significantly impacted higher education positively, but concerns have been raised related to ethical issues of biases, data privacy and transparency (Melek & Schmidt-Crawford, 2024; Strzelecki, 2023).

Recent advances in GenAI and mobile technologies are transforming the higher education sector, in particular, ethical considerations of GenAI tools (Bozkurt et al., 2023b; Bozkurt, 2024; Luo, 2024). Teacher education is also affected by these technologies and software-generating GenAI-based “intelligent tutoring systems” (Boateng et al., 2022). Numerous GenAI tools are available for teacher education but are only sometimes developed according to sound educational theories or predictions. With the available technology in GenAI, it is now possible to generate and abbreviate customised explanations that meet the specific needs of individuals. This is beneficial for improving student writing and critical thinking. Van Dis et al. (2023, p. 615) highlight how GenAI tools have impacted student writing skills exponentially: “ChatGPT can create well-written student essays, summarise research papers, answer questions well enough to pass medical exams, improve academic writing, and generate helpful computer codes.”

This article argues for the increase in the use of GenAI tools, which have numerous potential benefits for students in advancing student learning in open distance learning (ODEL) environments. How can teacher education take advantage of the hype around GenAI tools? GenAIs can allow students to work on more intelligent, complex, and creative tasks by assisting with less intelligent tasks. Moreover, these tools can provide automated tutoring and feedback to ODeL students and perform tasks for them, such as generating various outline and thesis statement options for a writing assignment and then evaluating the alternatives to determine which one will offer the best support in the future. Using ChatGPT and other GenAI tools for prompts and explanations of complex engineering problems has shown that students often perform better using GenAI tools. This is due to the interactive nature of the tools and the fact that the information is often clearly interpreted – verbally and visually – for the student and available wherever and whenever the student is inclined to learn in different contexts (Maphoto et al., 2024; Bozkurt, 2023a; Rudolph et al., 2023). Studies have reported the implications of using GenAI for learning and assessment design from various multidisciplinary points of view (Dwivedi et al., 2023; Farazouli et al., 2023; Kelly et al., 2023).

There is a possibility that the scholarly literature on GenAI in education will expand. These AI-generated tools prompted an investigation in an online course empowering student teacher with specific GenAI tools for academic writing and design. This article argues that an investigation is needed to explore student teachers’ opinions about using GenAI tools for academic writing, designing, and prompting chat in an online ODeL course. However, at the time of writing this article, there is less report on academic writing, design, and exploration of a study that investigates Economics student teachers’ experiences of GenAI tools, such as Grammarly for academic writing, Gamma.AI for curricula design, and ChatGPT for discussion prompting in an open distance learning (ODEL) course.

Therefore, this article used a pragmatic lens to investigate through an explanatory mixed-methods design study probing the main research question: How do Economics student teachers' experiences with GenAI-based tools enhance their academic writing, designing, and preparing for an ODeL course? The following sub-research questions were formulated:

- What are student teachers' views on using GenAI tools such as Grammarly for academic writing, Gamma.AI for designing teaching and learning resources, and ChatGPT3.5 for prompting chats for online/offline discussions related to an online course?
- Are there significant differences between male and female views depending on using GenAI tools in the online course?

## RELATED RESEARCH

### THEORETICAL FRAMEWORK FOR THE STUDY

This exploratory study is based on the Unified Theory of Acceptance and Use of Technology, UTAUT Venkatesh et al. (2003); as well as Technology Trends Awareness (TTA). Since Venkatesh et al. (2003) reported on students' technological acceptance and usage, which factors affected performance, efforts, social impact, and context, several extended studies have revealed expectations about adopting technology. According to Venkatesh et al. (2003), the UTAUT theory focuses on a person's performance expectancy in the acceptance and use of technological tools, which is determined by the extent to which the technology will enable them to improve their performance. Based on principles of usage and acceptance of the UTAUT theory, it was selected to foreground the study, focusing on using and accepting GenAI tools by student teachers who applied them in online courses. Considering this theory as applied to this single ODeL case study, the student teachers anticipated using GenAI tools would impact their academic writing, design, and chat prompts in an online course.

Technology Trends Awareness (TTA) is based on the notion that an individual (student teacher) is tech-savvy and has the digital literacy and proficiency to use or apply new GenAI tools in practice. Before GenAI tools were integrated into the course, students knew the university's AI policy and guidelines and what AI-generated tools are allowed based on AI guidelines. Second, students in this online course were exposed to one of the learning units, *AI Literacy for Teaching and Learning*, which included Grammarly, Copilot, ChatGPT3.5 and Gamma.ai, as part of the online course. Finally, all newly registered students must complete a compulsory, open education resource (OER) on AI literacy as mandated by the college management. Both the theory of UTAUT and TTA theory foregrounding this study supported the currently registered students (PGCE and 4<sup>th</sup>-year BEd student teachers) who were aware of the new developments in technology, as well as the types of GenAI tools available for teaching and learning as prescribed by university's AI policy and guidelines. These student teachers were empowered with, exposed to use (application of GenAI tools), and aware of the application of new technologies in the online course, making it easier to use either as a paraphrasing or chatbot exercise. Recently, technology companies (also referred to as tech companies) introduced "hype" generated by GenAI-LLM (generative artificial intelligence large language) models such as ChatGPT3.5, Bard (Gemini), QuillBot, JenniAI, ProWritingAid, Grammarly, OpenWritefull, and Gamma.ai. In addition, numerous social media tools such as WhatsApp, Facebook, Twitter, plagiarism tracking software, GPTZero, Turnitin, and iThenticate exist.

### THE USE AND APPLICATION OF GENAI TOOLS IN EDUCATION

The launch of the first large language model, ChatGPT3.5, followed by more GenAI tools, created a "hype" that boosted the use of GenAI tools in teaching and learning (Cinque, 2024; van Wyk et al., 2023; Trust et al., 2023). This has resulted in a significant increase in the use of ChatGPT and other chatbots by students and lecturers in higher education, but to a lesser extent in primary and secondary schooling (Crawford et al., 2023; Lou, 2023). The latter view is supported by Chiu (2021), who stated that although GenAI learning materials and tools applications are prevalent in higher education, low intake in primary and secondary school settings is a significant issue. The author proposed a holistic approach to designing appropriate AI-generated curricula for the primary and secondary school system. Furthermore, Chiu et al. (2023) found that teacher support and motivation were vital in using AI tools in the classroom.

In an exploratory study in a university context, Farazouli et al. (2023) reported that ChatGPT-generated responses to home examinations significantly impacted the assessment of student tasks or assignments compared to setting examinations or grading students' work by lecturers. Luo (2024) advocated for a critical review of university GenAI policies and proposed a more critical view of existing policies related to the ethics and originality of students' work.

As online learning becomes increasingly important in education, student-teacher preparation is as necessary as online. In the case of this exploratory case study, student teachers were equipped to use GenAI tools. Therefore, they were empowered with AI literacy, particularly prompting writing. They were equipped with AI literacy skills that can be taught online using GenAI tools in teaching and learning. The use of GenAI tools in online learning could be a potential example for students – as Kelly et al. (2023) explained, the students learn how to utilise GenAI in the learning process. The use of GenAI tools could also have a potential impact on students and teachers in the future, as they will use technology in their classrooms. To do this, students need experience experimenting with GenAI tools in their learning. Alternatively, a GenAI tool can be used to simplify learning tasks. A wider-scale impact of GenAI tools is evident in awareness, acceptance, and use in authentic assessment (Salinas-Navarro et al., 2024; Farazouli et al., 2023); physics (Ding et al., 2023); multidisciplinary settings (Kelly et al., 2023); nursing education (O'Connor, 2023); and physical science (Boateng et al., 2022).

Olatunde-Aiyedun and Hamma (2023) reported that the lecturers in their study were proficient in using presentation software such as Gamma.AI, MS PowerPoint, and Canva. The latter study's authors reported that the findings revealed that lecturers should be reskilled in using presentation software. Furthermore, Donlon and Tieman (2023) provided an example of academic writing and how it enhances students' writing skills, designing students' writing skills, and designing course materials. Grammarly is a GenAI tool designed to help students improve writing skills through paraphrasing (Nguyen et al., 2024; Bozkurt et al., 2023b). This tool offers feedback on the student's writing in terms of grammar, style, and originality. By doing an online course and using Grammarly as a writing tool, students attain learning opportunities to improve their academic performance (Koka, et al., 2023; Kelly et al., 2023). Using Grammarly, students will automatically comprehend the mistakes they made while writing a report and learn how to fix them. Another GenAI tool that students often use is QuillBot and Copilot, which are powerful tools for academic writing; they comprise advanced technology that introduces students to new approaches to learning academic writing. Gamma.ai is used to create PowerPoint presentations. These tools provide student teachers with a basic understanding of AI tools and how to teach technology to their students. The following tool, a chat prompting tool, can enhance experiential learning for authentic assessment, according to Salinas-Navarro et al. (2024). The excitement about ChatGPT has increased significantly – this GenAI tool is used mainly for pedagogical advantages in student acceptance (Chng, 2023; Strzelecki, 2023; Tlili et al., 2023); physics teaching (Ding et al., 2023); developing assessment (Sullivan et al., 2023); and supporting essay writing (Crawford et al., 2023; Chiu et al., 2023).

## METHODOLOGICAL CONSIDERATIONS

Ethical clearance was obtained from the college's ethics committee for a larger research project on AI in flipped learning in teacher education (reference #2024/05/13/90178912/18/AM). An open invitation was sent to all registered students (n = 673) in the online course, stating the purpose of the case study. This single case study's research paradigm and design employed a pragmatic approach. However, it opted for an explanatory mixed-methods design (MMD) and incorporated the constructivist-interpretative approach. To apply the MMD approach, respondents first completed the closed structured questions online to execute this pragmatic approach, followed by using MS Teams as a videoconferencing platform and recorded interview sessions. The quantitative data (descriptive) were analysed and interpreted. Furthermore, interviews were conducted about student teachers' views of GenAI tools. The sample was selected from students registered for the course Teaching Methodology of Economics. The first data collection stage comprised 204 final-year Postgraduate Certificate of Education (PGCE) and fourth-year Bachelor of Education (4<sup>th</sup>-year BEd) student teachers who completed the self-structured questionnaire. Reliability was calculated from the self-structured questionnaire using a four-point Likert scale (agreement to disagreement), the *GramGamChat-Survey Tool*. The Cronbach alpha coefficient was used to calculate the reliability and was measured as highly

reliable ( $\alpha < .82$ ) as a data collection instrument. All respondents and participants signed consent forms. They could withdraw at any stage if they felt uncomfortable during the study. Data were calculated for the t-test, independent samples t-test, and cross-tabulations. For the second stage of the data collection process, a qualitative approach was used for semi-structured online interviews with six individuals (PGCE1–3; 4th-year Bed1–3). Before the beginning of the interview sessions, the purpose of the study was explained, recorded, transcribed, and downloaded. Before the data analysis, codes were captured on the generated AI qualitative data analysis software, NVivo 14 version (<https://lumivero.com/>). All interview data sets were imported into the NVivo software. The data-analysis process followed five steps: (1) become familiar with the narratives of participants, as captured in the MS Teams transcripts, (2) code (names) the narratives as a data set (e.g. Male/Female, PGCE1–3 and Male/Female 4<sup>th</sup>-Year Bed 1–3), (3) use the NVivo software to generate (drill into narratives) themes linked to specific extracts of participants), (4) reflect and review some of the themes linked to extracts of the participants, (5) define and finalise the identified themes. Trustworthiness is an essential scientific acid test to measure interview credibility, transferability, dependability, and conformability. Finally, the recorded MS Teams interviews, transcripts and themes generated by NVivo qualitative software were emailed to the sampled interviewees to validate (member checking) and to quality assure (trustworthy) the data sets as a true reflection (Nowell et al., 2017).

## QUANTITATIVE RESULTS

This section reports specific GenAI tools such as Grammarly for academic writing, Gamma for designing teaching and learning resources, and ChatGPT for prompting online/offline discussions related to online course activities.

- Descriptive analysis of student teachers' views and experiences about using Grammarly as an academic writing tool.

| GRAMMARLY FOR ACADEMIC WRITING                                                                         | GENDER |     | MEAN | Std. DEV | t            | Sig. VALUE  |
|--------------------------------------------------------------------------------------------------------|--------|-----|------|----------|--------------|-------------|
| It is an excellent academic writing for correcting grammar and spelling mistakes.                      | Male   | 93  | 3.78 | 1.01     | <b>0.25</b>  | <b>0.68</b> |
|                                                                                                        | Female | 111 | 3.68 | 1.05     |              |             |
| It clarifies the meaning of concepts and increases the readability of the text in my academic writing. | Male   | 93  | 3.61 | 1.30     | -1.32        | 0.59        |
|                                                                                                        | Female | 111 | 3.34 | 1.45     |              |             |
| It is an easy GenAI tool to use for my academic writing.                                               | Male   | 93  | 3.67 | 1.29     | <b>0.28</b>  | <b>0.58</b> |
|                                                                                                        | Female | 111 | 3.90 | 0.89     |              |             |
| It offers helpful suggestions to support my academic writing style.                                    | Male   | 93  | 3.46 | 1.11     | -0.22        | 0.72        |
|                                                                                                        | Female | 111 |      | 1.23     |              |             |
| It gives instant feedback on my writing and tracks possible plagiarism in academic writing.            | Male   | 93  | 3.17 | 1.09     | 0.87         | 0.56        |
|                                                                                                        | Female | 111 | 3.08 | 1.22     |              |             |
| It helps me write concisely and has faster corrections than other grammar checker tools.               | Male   | 93  | 3.47 | 1.10     | -1.02        | 0.89        |
|                                                                                                        | Female | 111 | 3.16 | 1.20     |              |             |
| It facilitates collaborative writing with ease and increases confidence in using the tool.             | Male   | 93  | 3.66 | 1.30     | <b>0.32</b>  | <b>0.62</b> |
|                                                                                                        | Female | 111 | 3.81 | 0.98     |              |             |
| It improves sentence construction and increases the vocabulary in my academic writing.                 | Male   | 93  | 3.58 | 1.26     | -1.00        | 0.51        |
|                                                                                                        | Female | 111 | 3.21 | 1.09     |              |             |
| It helps in real-time writing and provides valuable suggestions for improving my writing style.        | Male   | 93  | 3.08 | 1.22     | -1.66        | 0.55        |
|                                                                                                        | Female | 111 | 3.14 | 1.03     |              |             |
| It supports my personal writing goals.                                                                 | Male   | 93  | 3.69 | 1.18     | <b>-1.22</b> | <b>0.59</b> |
|                                                                                                        | Female | 111 | 3.69 | 1.11     |              |             |

**Table 1** Respondents views of Grammarly as a paraphrasing tool (n = 204).

Based on the second RQ, there is methodological justification for a computerised t-test (gender—group), which showed significant levels (items as per male or female) for computerised quantitative data. The results (see Table 1) demonstrated that male and female student

teachers had favourable views and experiences about Grammarly as an academic writing tool in an online course. The male student teachers agreed *it is an excellent academic writing tool for correcting grammar and spelling mistakes* (t-test 0.25 and sign. 0.68). Compared to females, they agreed to the same statement positively (mean score of 3.68 and a standard deviation of 1.05). Therefore, student teachers were convinced and firmly believed in this tool as an effective paraphrasing tool for academic writing. The group differences were insignificant ( $t = 0.24$ ;  $p > 0.68$ ). Female teachers of students strongly agreed that *it is an easy GenAI tool to use for academic writing* (mean = 3.90, Std dev = 0.98), compared to males (mean = 3.67, Std dev = 1.29). These items for males and females are insignificantly ( $t = 0.28$ ;  $p > 0.58$ ). The males (mean = 3.81, Std dev = 1.18) and females (mean = 3.66, Std dev = 1.30) agreed that their use of Grammarly supports their personalised writing goals ( $t = 0.32$ ,  $p > 0.62$ ). Overall, respondents agreed that Grammarly *facilitates collaborative writing with ease and increases confidence in using the tool* ( $t = -122$ ,  $p > 0.59$ ).

- Sampled differences between male and female views and experiences using GenAI tools in the online course.

| GenAI TOOLS | GENDER | N   | MEAN | Std. DEVIATION | Std. ERROR MEAN |
|-------------|--------|-----|------|----------------|-----------------|
| Grammarly   | Male   | 93  | 3.3  | 1.09           | 0.24            |
|             | Female | 111 | 3.4  | 1.32           | 0.18            |
| Gamma       | Male   | 78  | 3.6  | 1.06           | 0.13            |
|             | Female | 127 | 3.1  | 1.00           | 0.11            |
| ChatGPT3.5  | Male   | 109 | 3.4  | 1.23           | 0.14            |
|             | Female | 96  | 3.7  | 1.34           | 0.21            |

**Table 2** Sampled views of AI-generated tools (n = 204).

The group means for the application of AI-generated tools in the online course, reflected in [Table 2](#), is that the female student teachers agreed that they used Grammarly (mean = 3.4, Std deviation = 1.32) and ChatGPT3.5 (mean = 3.7, Std deviation = 1.34) help them as compared to the male student teachers. However, male students viewed using Gamma.ai (mean = 3.6, Std deviation = 1.06) as a course design tool for female students.

| LEVENE'S TEST FOR THE EQUALITY OF VARIANCES |                         |      |      |      |     | t-TEST FOR EQUAL MEANS |            |                  |                                           |             |
|---------------------------------------------|-------------------------|------|------|------|-----|------------------------|------------|------------------|-------------------------------------------|-------------|
|                                             |                         | F    | Sig. | t    | df  | Sig. (2-TAI-LED)       | MEAN DIFF. | Std. ERROR DIFF. | 95% CONFIDENCE INTERVAL OF THE DIFFERENCE |             |
|                                             |                         |      |      |      |     |                        |            |                  |                                           |             |
|                                             |                         |      |      |      |     |                        |            |                  |                                           | LOWER UPPER |
| Usage of GenAI tools                        | Equal variances assumed | 0.47 | 0.52 | 0.58 | 109 | 0.42                   | -0.24      | 0.30             | -0.89                                     | 0.41        |

**Table 3** A computerised t-test for AI-generated tools.

The computerised t-test aimed to determine student teachers' application of GenAI tools in the Teaching Methodology course. The t-test results in [Table 3](#) revealed that the t-value was 0.58 between the mean of the two groups. It also indicated that the mean usage of GenAI tools may be higher in one group than in the other. However, the use of GenAI tools by the student teachers for the online course ( $t = 0.58$ ,  $df = 109$ ,  $p < 0.05$ ) indicated no significant differences.

[Table 4](#) shows that male and female student teachers had positive experiences with Gamma.ai as a GenAI tool to create learning resources in an online course. The male student teachers agreed that the tool offers *a user-friendly interface that allows them to make effective PowerPoint presentations* (mean = 3.88, Std deviation = 1.01). Related to the same statement, respondents agreed that "it offers a user-friendly interface that allows one to create effective PowerPoint presentations" ( $t = 0.27$ ;  $p > 0.58$ ). Furthermore, the females agreed that "the tool allows customised and engaging learning experiences in the online course" (mean = 3.80, Std deviation = 0.81), which encouraged them to perform better as compared to the males (mean = 3.77, Std deviation = 1.09). There is no statistical significance between the groups ( $t = 0.38$ ,  $p > 0.68$ ). Finally, the male student teachers agreed that Gamma.ai can "develop *teaching materials that align with diverse learning styles*" (mean = 3.76, Std deviation = 1.39). Groups showed no statistical significance for Gamma.ai as an AI-design tool ( $t = 0.39$ ;  $p > 0.60$ ).

| STATEMENTS                                                                                                          | GENDER |     | MEAN | Std. DEV | t           | Sig. VALUE  |
|---------------------------------------------------------------------------------------------------------------------|--------|-----|------|----------|-------------|-------------|
| It offers a user-friendly interface that allows one to create effective PowerPoint presentations.                   | Male   | 93  | 3.88 | 1.01     | <b>0.27</b> | <b>0.58</b> |
|                                                                                                                     | Female | 111 | 3.68 | 1.05     |             |             |
| It supports interactive multimedia content for my course.                                                           | Male   | 93  | 3.66 | 1.26     | -1.45       | 0.59        |
|                                                                                                                     | Female | 111 | 3.30 | 1.16     |             |             |
| It allows for customised and engaging learning experiences in the online course.                                    | Male   | 93  | 3.77 | 1.09     | <b>0.38</b> | <b>0.68</b> |
|                                                                                                                     | Female | 111 | 3.80 | 0.81     |             |             |
| It supports collaboration and communication among students and lecturers through online discussion forums or chats. | Male   | 93  | 3.16 | 1.01     | -0.26       | 0.62        |
|                                                                                                                     | Female | 111 | 3.24 | 1.13     |             |             |
| It enables lecturers to track student progress and monitor performance.                                             | Male   | 93  | 3.10 | 1.09     | 0.88        | 0.52        |
|                                                                                                                     | Female | 111 | 3.08 | 1.12     |             |             |
| It provides personalised feedback and adaptive learning experiences.                                                | Male   | 93  | 3.33 | 1.40     | -1.08       | 0.81        |
|                                                                                                                     | Female | 111 | 3.16 | 1.23     |             |             |
| It can develop teaching materials that align with various learning styles.                                          | Male   | 93  | 3.76 | 1.39     | <b>0.39</b> | <b>0.60</b> |
|                                                                                                                     | Female | 111 | 3.61 | 0.98     |             |             |

**Table 4** Gamma.ai as a design tool for the course (n = 204).

In [Table 5](#), both male and female student teachers agreed that ChatGPT is a GenAI tool to generate engaged prompts in an online course. Both groups, female student teachers, agreed that ChatGPT is *an easy and helpful tool in the course* (mean = 3.81, Std deviation = 0.81) and male student teachers (mean = 3.78, Std deviation = 0.88). Therefore, no differences were observed between the groups, and no statistically significant differences were reported ( $t = 0.20$ ;  $p > 0.66$ ). Regarding the proficiency of ChatGPT, the female teachers agreed (mean = 3.90, SD = 0.89) and the males (mean = 3.67, Std deviation = 1.29) that it *'is easy to become proficient in using the chatbot'*. Applying the tool has no statistical significance ( $t = 0.28$ ,  $p > 0.58$ ). Finally, the female teachers ( $M = 3.81$ ,  $SD = 0.98$ ) and males ( $M = 3.66$ ,  $SD = 1.30$ ) agreed that ChatGPT *"is an effective tool that creates a pleasant and entertaining environment in the online course"*. Groups have no statistical significance difference ( $t = 0.32$ ;  $p > 0.62$ ).

|                                                                                                          | GENDER |     | MEAN | Std. DEV | t           | Sig. VALUE  |
|----------------------------------------------------------------------------------------------------------|--------|-----|------|----------|-------------|-------------|
| It is an easy and useful tool in my course                                                               | Male   | 93  | 3.78 | 0.88     | <b>0.20</b> | <b>0.66</b> |
|                                                                                                          | Female | 111 | 3.81 | 0.75     |             |             |
| It helps me to complete tasks and activities faster in my online course.                                 | Male   | 93  | 3.61 | 1.30     | -1.32       | 0.59        |
|                                                                                                          | Female | 111 | 3.34 | 1.45     |             |             |
| It is easy to become proficient with using the chatbot.                                                  | Male   | 93  | 3.67 | 1.29     | <b>0.28</b> | <b>0.58</b> |
|                                                                                                          | Female | 111 | 3.90 | 0.89     |             |             |
| It increases my efficiency in my online course.                                                          | Male   | 93  | 3.46 | 1.11     | -0.22       | 0.72        |
|                                                                                                          | Female | 111 |      | 1.23     |             |             |
| It promotes interaction with the chatbot, which is clear and understandable for use in my online course. | Male   | 93  | 3.17 | 1.09     | 0.87        | 0.56        |
|                                                                                                          | Female | 111 | 3.08 | 1.22     |             |             |
| It is an excellent communication tool for my online course.                                              | Male   | 93  | 3.47 | 1.10     | -1.02       | 0.89        |
|                                                                                                          | Female | 111 | 3.16 | 1.20     |             |             |
| It is an effective tool that creates an enjoyable and entertaining environment in the online course.     | Male   | 93  | 3.66 | 1.30     | <b>0.32</b> | <b>0.62</b> |
|                                                                                                          | Female | 111 | 3.81 | 0.98     |             |             |

**Table 5** ChatGPT3.5 as a prompt chatbot (n = 204).

## QUALITATIVE FINDINGS

After thematically analysing the data sets, the following identified themes emerged related to student teachers' views on using GenAI tools for academic writing, designing teaching and learning resources, and chat prompting for online/offline courses:

- Students are leveraging GenAI tools for optimal learning experiences.
- Grammarly created an empowering experience in academic writing.
- Improving student teachers' proficiency in designing practical learning resources for engagement.
- Easy, supportive, and favourable GenAI tools for optimal learning experiences for teaching practice lessons.
- Facilitates a collaborative writing experience that increases confidence in using the tools.

## STUDENTS ARE LEVERAGING GENAI TOOLS FOR OPTIMAL LEARNING EXPERIENCES

The students said that the university included Grammarly as a valuable tool in the data bundles. They are leveraging Grammarly as one of the GenAI tools provided to enhance their learning experiences in the online course. Before and during the course, student teachers perceived AI-generated tools as effective in paraphrasing, designing learning materials and building writing capacity skills. On the other hand, students opined that QuillBot is very expensive but instead belongs with the free Grammarly and GammaAI tools. This PGCE student supported all the other sentiments:

*"Grammarly is free, easy to use, and most commonly used. Moreover, the helpful advice provided to me was cost-effective. Quillbot is costly, but this helpful tool can help me improve my academic writing. Both tools provide a more professional outlook."* **(Male, PGCE2)**

Another student said:

*"Grammarly is the best paraphrasing tool. It increases the use and support of my written text. It is highly effective. However, I want to be in control, not the paraphrasing tool; it only took advantage of my writing."* **(Female, 4th year BEd 3)**

## GRAMMARLY CREATED AN EMPOWERING LIVED EXPERIENCE IN ACADEMIC WRITING

Participants were empowered and agreed that the tool created confidence to use Grammarly as a paraphrasing academic writing tool in the online course. Most expressed confidence and remarked that the GenAI tools are valuable for their course. This student-teacher shared the following sentiments:

*"I used Grammarly and Quillbot frequently as my writing assistants. These two tools contributed to the development of ideas. Most of the time, it helps me with the revision process of my assignments and research projects. Grammarly improves my sentence construction and increases my vocabulary and academic writing skills. I felt confident in the quality of my academic writing."* **(Female PGCE1)**

Another student said that she appreciated the quick responses from Grammarly, which built her confidence in academic writing. This student said:

*"Grammarly provided accurate suggestions. I like Grammarly's instant feedback of my writing and track possible plagiarism in academic writing."* **(Male, PGCE 3)**

Most of the students agreed with this statement:

*"Grammarly not only fixes my grammar mistakes but also provides valuable suggestions or alternative words of choice and incorrectly used words in my writing style."* **(Female, 4th year BEd3)**

## IMPROVING STUDENT TEACHERS' PROFICIENCY IN DESIGNING ADEQUATE LEARNING RESOURCES FOR TEACHING PRACTICE LESSONS

During the interview sessions, the participants were excited and optimistic about their lived experiences with the types of GenAI tools during the course. Most authors mentioned that the tools improved and supported their ability to design effective learning materials for their teaching practice placements. This male participant said:

*Gamma made it very easy to create a presentation. It is beneficial for me to revise according to my preferences and what I want to revise in the PowerPoint presentation for my lesson. This is an invaluable tool. (Male, 4th year BEd1).*

Others alluded to chatbots, in particular ChatGPT, which support them in prompting them to better their writing skills. However, most preferred ChatGPT as a prompting tool – if the right question is asked, it can generate appropriate responses. One participant said:

*“Most of us communicated with WhatsApp. However, ChatGPT is a much more effective tool for communication. Both tools have their advantages. I prefer ChatGPT as it can generate chats. It all depends on how you type a prompt for ChatGPT. Another good tool is Jenni.AI, but it is not often used.” (Female, 4th year BEd2).*

A student was prescribed ChatGPT for optimal learning. She mentioned:

*“I preferred ChatGPT4.0. It is expensive, but it gives you value for money. I used my bursary and subscribed to this tool. I learned so many new things about how to post effective prompts. (Female, PGCE2)*

## **FACILITATES A FAVOURABLE, PRACTICAL WRITING EXPERIENCE THAT INCREASES CONFIDENCE IN USING GenAI TOOLS**

*“Since I started using Grammarly and Gamma in the course, it promotes interaction with the chatbot, which is clear and understandable to use in my online course. It instils confidence in me.” (Male, 4th year BEd1)*

Most of the student teachers were positive and chose Grammarly and GammaAI as their favourite tools in the course.

*The tools I like are Grammarly and GammaAI. These tools are effective. Enhances my design and application skills in my course. It empowered me with digital literacy skills (Male, PGCE3)*

## **DISCUSSION**

As mentioned in the literature review, the theoretical frames of awareness of UTAUT and TechTrends and their integration as pragmatic approaches supported the performance expectation of student teachers in the acceptance and use of GenAI tools in an online course. Using the mixed-method design, the researcher found that the GenAI tools – such as Grammarly, Gemma.ai and ChatGPT3.5 – enable students as users to implement the AI technology to improve their performance and skills in academic writing, designing and prompting in the online course.

Previous studies have noted the importance of GenAI tools like Grammarly and ChatGPT as applied in teaching and learning, in contact and blended contexts, but very little was found in the literature on Gamma.AI for designing learning content (Farazouli et al., 2023; Kelly et al., 2023). The results of this exploratory study contributed to the understanding and application of specific GenAI tools – as no data could be found where GenAI tools were used for academic writing in an ODeL context. One of the participants (female, PGCE1) mentioned that Grammarly improves my sentence construction and increases my vocabulary and academic writing skills. I felt confident in the quality of my academic writing.” In support of the response, respondents said that Grammarly *facilitates collaborative writing with ease and increases confidence in using the tool* ( $t = -122, p > 0.59$ ). The current study found that male and female student teachers had favourable views and experiences about GenAI tools.

This exploratory case study raised the question of leveraging chatbots related to student teachers' experiences using GenAI tools for academic writing, designing and prompting an online course in an ODeL context. Moreover, scholars who argue that these tools could be used to cater for a larger student population, adopted for individual learning, and applied to create access for students (Chng, 2023; Koka, et al., 2023; Ding et al., 2023; Ruksana, 2024; Salinas-Navarro, 2024). An experimental study by Donlon and Tiernan (2023) reported that ChatGPT is a valuable tool for writing. Based on the data extracted from the interviews, a female participant (4<sup>th</sup>-year Bed 2) *“prefers ChatGPT4.0 as it can generate effective chats. It all depends on how you*

type a prompt for ChatGPT. Generated information must be evaluated, assessed, and reflected on before acceptance.” Farazouli et al. (2023) reported that ChatGPT-generated responses to students’ work significantly impacted the assessment of their tasks or assignments.

In this study, Grammarly, a paraphrasing tool used for academic writing in an online course, influenced the building of student teachers’ grammatical writing skills. Moreover, male student teachers agreed that Grammarly is an effective writing tool and made collaborative learning easy to pursue in the course. Results revealed that student teachers perceived Grammarly as an effective academic writing tool. Therefore, respondents said Grammarly supported them in the course academically ( $t$ -test = 0.24; sig. 2-tailed > 0.68). However, Amoozadeh et al. (2024) opine that trust in GenAI tools for future use in teaching and learning in academia will ultimately be the yardstick to accept work by students and academics with the support of these tools. Furthermore, Nguyen et al. (2024) agreed that Grammarly is an effective tool to help students develop better writing skills through paraphrasing, especially for non-English speakers (Rahma Hakiki, 2021). The study samples were positive for the course exposure to three GenAI tools. They alluded that using chatbots like Grammarly is cost-effective and accessible and enhances their academic writing abilities. Most participants mentioned that “Grammarly is the best paraphrasing tool. It is highly effective. Scholars noted that GenAI tools – in particular, Grammarly – assist with paraphrasing, correct grammar errors, provide instant feedback and build confidence (Luo, 2024; O’Dea, 2024; Donlon & Tiernan, 2023; Rahma Hakiki, 2021).

The results showed that most participants viewed Gamma.AI as a creative tool for designing excellent, appropriate resources to enhance student teachers’ pedagogy in the course. The quantitative study revealed that student teachers were satisfied with the tool, which empowered them to create PowerPoint presentations. Male student teachers agreed that Gamma.AI can “develop teaching materials that align with diverse learning styles” (mean = 3.76, Std deviation = 1.39). In addition, participants agreed that Gamma.AI improved their creative skills by adding their personal touch to each presentation. Furthermore, studies reported that the tool improved users’ proficiency in designing effective, engaging learning materials (Olatunde-Aiyedun & Hamma, 2023). Scholars have reported that GenAI tools enrich and enhance instructional designs for impact online pedagogy (Shamsuddinova et al., 2024; Ali et al., 2023; Steward, 2024).

Since its launch, most students and academics have used ChatGPT3.5 to trigger chats for online and offline discussions. This GenAI tool is used mainly for its pedagogical advantages in physics teaching (Ding et al., 2023), developing assessments (Sullivan et al., 2023), supporting essay writing (Crawford et al., 2023) and providing student support. However, a couple of studies related to the application of AI-generated tools in blended and distance education environments reported positive outcomes (Dwivedi et al., 2023; Farazouli et al., 2023; Tlili et al., 2023; Kelly et al., 2023; Rudolph et al., 2023; Strzelecki, 2023; van Wyk et al., 2023).

Ultimately, the study revealed that student teachers’ were exposed to, capacitated and applied the GenAI tools, Grammarly for academic writing, Gamma.ai for designing teaching and learning resources, and ChatGPT3.5 for prompting chats for online/offline discussion forums aligned to the online course. The results of this pragmatic MMD study were supported by similar studies that showed the advantages and effectiveness of using GenAI tools in education (Dwivedi et al., 2023; Farazouli et al., 2023; Kelly et al., 2023; Malik et al., 2023; Rudolph et al., 2023).

## CONCLUSION, IMPLICATIONS AND SUGGESTIONS

Since the launch of the first GenAI chatbot, there has been some interest in exposing students to GenAI tools in the education literature, which has emerged. Many studies reported the benefits of enriching and promoting students’ exposure to AI-generated tools in blended learning or ODeL environments. The current study aimed to determine precisely how the GenAI tools were applied in this case study to support student teachers in academic writing, designing, and chatting in an online course. Student teachers were exposed to, capacitated, using AI-generated technology in the course to improve their academic writing performance and AI literacy skills. The results revealed no statistically significant difference among student teachers ( $t$  = 0.32;  $p$  > 0.62) using the GenAI tools for writing, developing, and chatting in online courses. On the other hand, the findings showed that student teachers leverage chatbots to increase the usage of GenAI tools for academic writing, designing, and prompting an online course in an ODeL context.

This article argues that the purpose of this study was to empower final-year student teachers with AI literacy and digital skills to expose and use AI-generated tools during the online course. It showed that students were optimistic about the AI-generated tools. It was expected that students would apply the AI-generated tools, Grammarly, Gamma.ai and ChatGPT in the course. These tools exposed student teachers to the benefits of GenAI and were favourably accepted by student teachers. It emerged that the tools positively improved student teachers' proficiency in designing practical learning resources for engagement. The student teachers viewed GenAI tools as a collaborative writing experience that increases confidence in using the tools during the course.

This study significantly expanded knowledge on generative artificial intelligence tools for student empowerment in writing, design and chatting in an online teacher education course. The study validated and developed a reliable data collection instrument, which was found to be highly reliable ( $\alpha < .82$ ). It is suggested that this instrument can be used in different contexts for similar courses. Furthermore, it is recommended that the University revise policies to expose students to GenAI and GenAI detector tools and create awareness of ethical considerations when using GenAI tools. It is suggested that a more extensive study be conducted on the awareness of AI literacy and proficiency amongst academics and students in teacher education in blended learning and ODeL contexts. Scholarly works have been published about the impact, benefits and challenges of GenAI in different fields, subjects, disciplines and contexts, but to a lesser extent in an online context. The findings of this small-sample study using an explanatory mixed-methods design cannot be generalised. Therefore, a more extensive study must be undertaken that may yield different results.

Several general implications were not explored in this study but need further investigation. It is a worrisome observation that student teachers blindly trusted GenAI tools for writing, design, and chatting. However, student teachers must be empowered with digital literacy skills and improve their critical thinking skills in assessing the information generated by GenAI tools. Student teachers must also be empowered with AI literacy education to judge or make an informed decision on how GenAI chatbots operate and whether the generated content from the GenAI tools is applicable or appropriate for the course. It is reported that the AI makes critical mistakes, and one chatbot, ChatGPT, is prone to generate incorrect information, which is unreliable and, in most cases, not scientifically proven. Another vital issue is that student teachers lack sufficient knowledge of operating specific GenAI tools. Moreover, as an ethical concern and data bias, many student teachers rely heavily upon the content or answers generated by these GenAI tools.

## ETHICS AND CONSENT

The author obtained ethical clearance for a larger research project on AI in flipped learning in teacher education, from the College of Education, college's ethics committee (reference #2024/05/13/90178912/18/AM).

## COMPETING INTERESTS

The author has no competing interests to declare.

## AUTHOR CONTRIBUTIONS (CRediT)

The author: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing. The author has read and agreed to the published version of the manuscript.

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