

## **The Impact of AI as a Mediational Tool on Academic and Creative Writing of Qatari EFL University Students: An Exploratory Study**

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### **Abstract**

This study investigates the impact of generative Artificial Intelligence (AI) tools, such as ChatGPT and Grammarly, on the academic and creative writing performance of Qatari EFL university

students. Anchored in *Sociocultural Theory* (SCT), the research adopts a sequential explanatory mixed-methods design involving 120 undergraduate EFL students across two major Qatari universities. Participants completed both traditional and AI-assisted writing tasks, which were evaluated using an SCT-aligned rubric. Quantitative findings reveal significant improvements in overall writing performance with AI use, particularly in creativity, lexical sophistication, and coherence. Qualitative data from student and instructor interviews indicate that AI tools served as semiotic mediators, supporting idea generation, stylistic experimentation, and real-time feedback. However, concerns about voice dilution and over-reliance were also reported. Theoretically, the study reconceptualizes AI as a mediational artifact operating within learners' Zones of Proximal Development (ZPD), fostering internalization and agency. Pedagogically, it highlights the value of integrating reflective AI use into L2 writing curricula in Qatar, while advocating for process-based assessment models that reward creativity and learner autonomy. The study contributes to SLA literature by situating AI use within a theory-driven framework and by addressing contextual gaps in Gulf-based research. It concludes that AI, when used dialogically, can enhance both performance and creative engagement in EFL writing-repositioning AI not as a threat to authorship but as a catalyst for linguistic development in monolingual, assessment-focused contexts.

### **Keywords**

Artificial intelligence, EFL writing, creativity, sociocultural theory, Qatar, SLA, higher education.

## **1. Introduction**

### **1.1. Background and Context**

The rapid emergence and proliferation of generative Artificial Intelligence (AI) technologies have significantly redefined the landscape of higher education and second language

acquisition (SLA), particularly in the domains of academic writing and creativity. Tools such as ChatGPT, GrammarlyGO, and Quillbot are increasingly being integrated into student writing processes, enabling real-time feedback, enhanced fluency, and error correction. While such technologies offer novel opportunities for language learning, they simultaneously raise critical questions regarding originality, overreliance, authorship, and pedagogical relevance – especially in monolingual English as a Foreign Language (EFL) contexts such as Qatar (Fadlelmula & Qadhi, 2024; Malik et al., 2025).

Within the broader framework of Qatar's National Vision 2030, digital transformation is positioned as a cornerstone of educational reform, emphasizing the incorporation of AI-driven learning tools in classroom settings. Higher education institutions in Qatar, including national universities and branch campuses, are progressively experimenting with these technologies as part of broader e-learning strategies (Abulibdeh et al., 2025). However, while institutional adoption is accelerating, empirical investigations into how Qatari students actually engage with generative AI for academic and creative writing remain remarkably scarce.

## **1.2. AI and the Evolving Landscape of Academic Writing**

The use of AI-assisted writing tools has restructured the writing process from a solitary act of composition to a dialogic interaction between human cognition and machine learning algorithms. Recent literature indicates that these tools can enhance lexical diversity, syntactic complexity, and genre awareness, especially among L2 learners (Al-Othman, 2024). However, critics have raised concerns about the erosion of students' cognitive investment, the decline of metacognitive monitoring skills, and ethical questions regarding the legitimacy of AI-generated content (Arashiro, 2025; Morimoto, 2025; Torres, 2025).

For L2 learners in monolingual contexts like Qatar – where English is taught predominantly through formal education – the tension between dependency and empowerment is particularly salient. There is a growing need to interrogate whether AI tools foster genuine language development or simply mask linguistic deficiencies through surface-level correction. Moreover, given the cultural and academic specificity of writing genres in the Qatari higher education system, there is little consensus on how generative AI supports or hinders genre-specific conventions and creative expression in students' writing tasks.

### **1.3. Research Gap in the Qatari Context**

Despite the growing global scholarship on AI in education, the Qatari context remains underexplored. Existing studies in the Gulf region tend to focus on digital literacy, teacher perceptions of AI, or administrative-level adoption policies (Panwar, 2024; Alaeddine, 2025; Chandra, 2025). Few, if any, studies have conducted empirical investigations into the direct impact of generative AI tools on the actual performance of Qatari students in academic or creative writing tasks. Furthermore, the implications of such tools on language creativity, a core component of advanced language proficiency, are virtually absent in the regional literature.

Given the unique sociolinguistic environment of Qatar – characterized by Arabic-English bilingualism, high-stakes English language assessment regimes, and a growing reliance on educational technologies – there is an urgent need for SLA research grounded in authentic learner performance. This study therefore seeks to fill a significant empirical and pedagogical gap by evaluating the role of AI in shaping student output, creativity, and academic agency within the Qatari higher education landscape.

### **1.4. Research Purpose and Objectives**

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The primary objective of this study is to empirically investigate the impact of generative AI tools on the academic writing quality and creative expression of Qatari university students. It examines students' writing performance under two conditions: traditional (non-AI) writing tasks and AI-assisted writing tasks. In doing so, it also explores students' and instructors' perceptions of the affordances and limitations of AI-mediated writing practices. The study is guided by the following research questions:

1. To what extent does the use of AI tools influence the quality (accuracy, coherence, lexical richness) of Qatari students' written assignments?
2. How does AI assistance affect students' creativity and originality in written tasks?
3. What are students' and instructors' perceptions of the pedagogical value and challenges of using AI in writing classrooms?

### **1.5. Significance of the Study**

This research is among the first to offer empirical evidence on the pedagogical impact of AI tools in the context of Qatari higher education. It contributes to the theoretical discourse on second language writing by applying a **Sociocultural Theory (SCT)** lens to examine how AI serves as a mediational tool within learners' Zones of Proximal Development (ZPD). Unlike traditional digital tools, generative AI engages learners in dynamic interaction, potentially enabling self-regulation and co-construction of knowledge (Lantolf & Poehner, 2014; Lantolf, Poehner, & Thorne, 2020).

Pedagogically, this study provides practical recommendations for EFL instructors, curriculum designers, and policymakers on how to integrate AI in ways that foster linguistic autonomy, critical thinking, and ethical writing practices. It also responds to the pressing

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institutional need for evidence-based AI integration strategies, especially as Qatar aims to balance innovation with academic integrity in its education sector.

Moreover, the study offers nuanced insights into how AI mediates the writing process in monolingual learning environments, thus contributing to global conversations about the future of SLA and language pedagogy in an era of AI ubiquity. The findings will be of particular relevance to journals focused on language teaching research, applied linguistics, and technology-enhanced SLA.

## **2. Theoretical Framework**

### **2.1. Rationale for Sociocultural Theory in SLA Contexts**

Sociocultural Theory (SCT), rooted in the work of Vygotsky (1978), has emerged as a powerful lens through which second language acquisition (SLA) can be conceptualized as a socially mediated, interaction-driven process rather than an exclusively cognitive or individual endeavor. In the context of L2 writing, SCT emphasizes the role of external mediating tools – both material and symbolic – in facilitating learners' development within their Zone of Proximal Development (ZPD), defined as the gap between what a learner can do independently and what they can accomplish with appropriate guidance (Lantolf & Poehner, 2014; Lantolf, Poehner, & Thorne, 2020).

This theoretical perspective is particularly apt for understanding the pedagogical implications of AI-based writing tools in Qatari higher education settings. In a monolingual Arabic-speaking context where English is largely taught through institutionalized instruction, AI technologies may serve as “mediational means” that scaffold learners’ writing performance,

enhance self-regulation, and co-construct linguistic competence. These affordances align directly with SCT's core principle that learning is fundamentally a mediated, socially situated activity.

The present study thus positions generative AI not merely as a technological aid, but as a dynamic sociocultural artifact that interacts with learners' developmental trajectories. In this sense, AI tools function as *semiotic agents* capable of transforming how Qatari EFL learners engage with the writing process, receive feedback, and reflect on their linguistic output.

## 2.2. Mediation and the AI-Writing Interface

Central to SCT is the concept of mediation – the process by which learners' cognitive development is shaped by interaction with cultural tools, symbolic systems, and more knowledgeable others (Vygotsky, 1978, as interpreted by Infante & Poehner, 2022). In traditional SLA environments, such mediation occurs through teacher scaffolding, peer collaboration, or instructional materials. In AI-mediated writing contexts, however, learners interact with intelligent systems that provide instantaneous lexical suggestions, syntactic corrections, coherence-enhancing revisions, and even content generation.

This interaction constitutes a new form of technologically mediated dialogue, wherein the AI serves as a digital “more capable other” that supports learners in real-time. In the Qatari context – where large class sizes, limited individualized feedback, and exam-oriented curricula often constrain writing instruction – such affordances can fill critical pedagogical gaps. AI mediation may help students internalize genre-specific conventions, reformulate syntactic structures, and elevate their written output to academic standards, especially in high-stakes assessment settings.

However, the use of AI also raises important theoretical concerns. SCT does not advocate for unidirectional assistance; rather, it emphasizes *reciprocal mediation*, where tools and learners

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co-evolve. If AI use results in passive dependency – where students accept suggestions without cognitive engagement – then the mediation ceases to be developmental. This distinction is critical for understanding the dual nature of AI tools: as either scaffolds for linguistic growth or shortcuts that inhibit internalization (Guo & Wang, 2023; Moorhouse & Kohnke, 2024; Poláková & Ivenz, 2024; Song & Song, 2023).

### **2.3. The Zone of Proximal Development and Feedback Responsiveness**

SCT's notion of the **Zone of Proximal Development (ZPD)** is instrumental in evaluating how AI affects students' responsiveness to feedback and their progression toward autonomous writing. In a traditional classroom, formative feedback is delayed and often generalized (Thompson, 2013). Generative AI tools disrupt this model by providing immediate, personalized feedback, which may dynamically align with each student's evolving ZPD.

For example, when a Qatari university student uses ChatGPT to revise a draft essay, they receive real-time suggestions on vocabulary enhancement, sentence structure, and argument coherence. This immediacy may enable students to iteratively refine their drafts, internalize error patterns, and engage in self-regulated learning. From an SCT perspective, such iterative dialogue mirrors the interactive scaffolding that a teacher might offer in a one-on-one setting (Lantolf, Poehner, & Thorne, 2020).

Yet this feedback loop is only beneficial when learners actively negotiate with the tool's suggestions, rather than uncritically accept them. Hence, AI's effectiveness as a mediational agent within the ZPD is contingent upon students' meta-awareness, digital literacy, and intentionality – factors which are often unevenly distributed across Qatari student populations depending on their educational backgrounds and technological exposure.

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## **2.4. Internalization and the Development of Creative Competence**

A further component of SCT relevant to this study is the process of internalization (Vygotsky, 1978), whereby external, socially mediated activity becomes part of the learner's internal psychological repertoire. Applied to writing, this means that with appropriate scaffolding, learners gradually assume control over discourse structuring, stylistic choices, and creative elaboration.

In the context of this study, creative writing tasks are used to measure how students internalize and transfer knowledge acquired through AI assistance into their independent compositions. If AI tools genuinely mediate cognitive development, one would expect to see greater lexical diversity, syntactic variety, and thematic originality in AI-supported writing – even when students are later required to write without such tools. This aligns with SCT's assertion that true learning is demonstrated by independent performance following scaffolded interaction (Lantolf, Poehner, & Thorne, 2020).

Conversely, a lack of performance transfer – where students' traditional writing remains stagnant despite AI-assisted improvements – may indicate superficial reliance rather than developmental growth. The study thus interrogates whether AI-mediated creativity reflects genuine internalization or mere surface-level enhancement, a distinction that has direct implications for language pedagogy in Qatar.

## **2.5. Implications of SCT for Language Pedagogy in Qatar**

Applying SCT to the Qatari higher education context reveals a complex pedagogical landscape. On one hand, AI tools can function as powerful mediators in contexts where teacher feedback is limited, student anxiety is high, and assessment stakes are significant. They can offer

individualized support that is rarely available in overcrowded classrooms or standardized curricula.

On the other hand, SCT cautions against overreliance on external mediation that does not promote learner autonomy. Instructors must therefore be equipped to guide students in conscious appropriation of AI tools – not simply as correction mechanisms, but as thinking partners that stimulate linguistic reflection and strategic language use. This entails explicit instruction in how to critically engage with AI outputs, evaluate their appropriateness, and adapt them to context-specific writing tasks.

Moreover, SCT underscores the importance of dialogic feedback, where learners are not passive recipients but active co-constructors of knowledge. AI tools, while not human interlocutors, can simulate aspects of dialogic interaction – provided students are taught to interact with them reflectively. In Qatar's English education system, this pedagogical orientation is still emerging, making this study's contribution both timely and contextually grounded.

### **3. Literature Review**

#### **3.1. Generative AI and Second Language Writing**

Recent advancements in generative artificial intelligence (AI), particularly large language models (LLMs) such as ChatGPT, have significantly influenced second language (L2) writing practices. These tools are increasingly used by learners to brainstorm ideas, generate draft content, refine grammar and vocabulary, and enhance overall textual cohesion. Several studies underscore AI's potential to support language acquisition through scaffolding mechanisms that mirror traditional forms of instruction (Yasmin, Fatima, & Irshad, 2025). This aligns with the notion of

external mediation in Sociocultural Theory (SCT), where tools serve as agents of cognitive development.

For instance, Swargiary (2024) and Bacon & Kraus (2025) found that university-level EFL learners using ChatGPT demonstrated greater fluency and syntactic variety in writing tasks compared to peers without AI assistance. However, they also noted reduced evidence of metacognitive planning and self-regulation among AI users. Similarly, Boudouaia, Mouas, and Kouider (2024) and Taj and Khan (2024) observed that while Grammarly improved students' grammatical accuracy and lexical precision, it diminished their engagement with the revision process. These findings suggest a paradox in AI use: enhanced surface-level output may coincide with weakened internal processing, echoing concerns in SCT about the quality of mediation and its impact on internalization.

### **3.2. AI and Creativity in L2 Writing**

AI's role in fostering or limiting creativity in L2 writing remains contentious. Creative language use entails not only linguistic competence but also originality, expression, and the ability to synthesize diverse ideas – capacities that are central to higher-order cognitive development. Some scholars argue that AI tools, by offering real-time suggestions and models of creative writing, can inspire learners to experiment with genres and rhetorical styles (Woo & Guo, 2023). Others warn that AI-generated text may lead to homogenization and formulaic writing, especially if students replicate outputs without critical engagement (Ziar, 2025).

In SLA research, creativity is often associated with learner agency, risk-taking, and the capacity to push beyond standard discourse conventions. From an SCT perspective, these outcomes require learners to actively co-construct meaning with mediational tools. Yet a study by

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Alnaeem (2025) suggested that students often treat AI tools as authoritative sources rather than dialogic partners, which may inhibit their creative autonomy. This risk is especially pronounced in contexts where learners are conditioned to prioritize accuracy over exploration – a common trend in exam-driven EFL systems like those in the Gulf.

### **3.3. Feedback, Self-Regulation, and ZPD in AI-Supported Writing**

Feedback has long been a cornerstone of L2 writing pedagogy. Traditional feedback, however, is often delayed and generalized, reducing its developmental value. In contrast, AI tools offer immediate, context-specific feedback on grammar, coherence, and even tone. Research shows that such immediacy can enhance learners' responsiveness and motivation (Swargiary, 2024; Bacon & Kraus, 2025; Teng & Huang, 2025). These affordances align with SCT's concept of the Zone of Proximal Development (ZPD), where learning is maximized through timely and calibrated assistance (Pham, 2025).

Yet the quality of learner engagement with AI feedback varies widely. Mekheimer (2025) report that while intermediate-level students benefited from Grammarly's error correction suggestions, advanced learners found the feedback superficial and unnuanced. Moreover, the absence of explanatory feedback in most AI tools limits learners' opportunities to understand underlying grammatical principles, thus impeding internalization. This distinction is critical in SCT-based pedagogies, which view learning as a process of *appropriating* and *transforming* external assistance into self-regulated performance.

In the Qatari context, where L2 writing instruction often struggles to provide individualized formative feedback due to large class sizes and assessment pressures, AI tools present both opportunity and risk. On one hand, they can bridge feedback gaps and promote independent

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editing. On the other, they may foster overdependence unless teachers explicitly guide students on how to reflect on, question, and adapt AI feedback to their specific writing goals.

### **3.4. AI Integration in Gulf and Qatari Higher Education**

In the Gulf region, digital transformation in education has gained considerable momentum, especially following the COVID-19 pandemic. Qatar has invested in e-learning infrastructures and smart classroom technologies as part of its broader commitment to educational innovation. However, research on the pedagogical integration of AI tools remains in its infancy.

Several regional studies explored AI from the lens of policy adoption and instructor readiness. For instance, Hamana (2024) explored Qatar University students' attitudes toward using ChatGPT in education and found that while Qatari university faculty expressed optimism about AI's instructional potential, they also cited a lack of institutional guidelines and training for ethical, pedagogically sound use. Jansen (2021) emphasized the need for contextualized policies that balance innovation with academic integrity, particularly in writing-heavy disciplines. Nonetheless, these studies do not empirically evaluate the impact of AI on actual student performance, nor do they address creativity or internalization – key constructs in SLA and SCT.

In broader Gulf studies, AI is typically discussed within the framework of **digital literacy** or **plagiarism prevention**. While important, such concerns neglect the more nuanced question of how AI tools mediate **language development**. To date, no study has systematically examined how AI affects the writing performance, creativity, and developmental trajectories of Qatari EFL learners in higher education (Jansen, 2021; Hamana, 2024). This gap is particularly concerning given the rising prevalence of AI use among students, often without adequate instructional guidance or reflective engagement.

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### 3.5. Theoretical Engagement with AI in SLA: A Need for SCT Perspective

Most empirical studies on AI in L2 contexts adopt a techno-functional perspective, focusing on performance metrics such as grammar accuracy, writing scores, or lexical diversity (Boudouaia, Mouas, & Kouider, 2024; Taj & Khan, 2024). While these indicators are valuable, they often lack theoretical grounding and fail to explore the processual dimensions of learning. Very few studies have employed **Sociocultural Theory** to analyze AI-mediated writing development.

An exception is the work of Liu, Hou, Tu, Wang, and Hwang (2021), who call for an SCT-informed approach to AI feedback, emphasizing the need to distinguish between mere correction and dialogic mediation. Similarly, Bacon and Kraus, (2025) advocate for a reconceptualization of AI as a participant in learner development rather than a static tool. These scholars stress that effective mediation requires learners to be cognitively and metacognitively engaged with the feedback process.

This study builds on such calls by positioning AI tools as potential *semiotic mediators* within learners' ZPDs and evaluating their role in fostering internalization and creative competence. It thereby responds to the urgent need for *theory-informed, empirically grounded*, and *contextually relevant* research on AI in SLA – particularly in under-researched regions such as Qatar.

### 3.6. Gaps and Justification for the Present Study

Based on the literature reviewed, several key gaps are evident:

- **Empirical gap:** Few studies have examined the **performance-based impact** of AI tools on academic and creative writing tasks among EFL learners in Qatar.

- **Contextual gap:** Gulf-region studies tend to be descriptive or policy-focused, with minimal attention to learner behavior, language development, or creativity in writing.
- **Theoretical gap:** Most existing research lacks a robust theoretical foundation and fails to conceptualize AI as a **mediational agent** within the ZPD.
- **Pedagogical gap:** Instructors often lack clear frameworks for integrating AI into writing instruction in ways that promote autonomy, creativity, and ethical use.

Additionally, this study addresses all four gaps by:

- Empirically evaluating AI's impact on writing performance and creativity using both quantitative and qualitative data.
- Focusing on Qatari university students in real-world classroom settings.
- Employing Sociocultural Theory as an analytical lens.
- Providing context-specific recommendations for pedagogy, assessment, and curriculum development in Qatar.

#### 4. Methodology

##### 4.1. Research Design

This study adopts a **sequential explanatory mixed-methods design** (Creswell & Plano Clark, 2018; Lee, 2019; Tashakkori, Johnson, & Teddlie, 2020), combining quantitative and qualitative data to explore the impact of generative AI tools on Qatari university students' academic and creative writing. The design was selected to capture both measurable performance outcomes and deeper insights into learner and teacher experiences – consistent with the developmental and dialogic emphases of *Sociocultural Theory (SCT)*.

The **quantitative phase** focused on comparing student performance on AI-assisted versus traditional writing tasks, while the **qualitative phase** examined how students and instructors perceived the role of AI in mediating writing development. This integration allowed for triangulation of data and provided contextualized understanding of AI's mediational potential in L2 writing classrooms in Qatar.

#### **4.2. Research Setting and Participants**

The study was conducted across two major universities in Qatar: one national institution and one international branch campus. Both universities offer English for Academic Purposes (EAP) courses and have increasingly incorporated digital tools in their instructional practices. A total of 120 undergraduate students (aged 18–24) participated in the study, drawn from English-medium foundation and content-based courses. Participants were selected using **stratified purposive sampling** to ensure representation across gender, English proficiency levels (CEFR B1 to C1), and academic majors (English, Business, Engineering). Additionally, 6 experienced EFL instructors were recruited for semi-structured interviews to enrich the qualitative phase. **Table 1** below provides an overview of participant demographics.

**Table 1**

*Participant Demographics and Institutional Contexts*

<b>Participant Group</b>	<b>N</b>	<b>Gender (M/F)</b>	<b>Proficiency Range</b>	<b>Institutions Involved</b>
Foundation EAP Students	60	27/33	B1–B2	Univ. A & Univ. B
Undergraduate Students	60	32/28	B2–C1	Univ. A & Univ. B
EFL Instructors	6	3/3	N/A	Univ. A & Univ. B

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### 4.3. Data Collection Procedures

#### 4.3.1. Writing Tasks and Performance Evaluation

Participants completed two timed writing tasks spaced two weeks apart:

- **Task 1 (Traditional Writing Task):** A 300-word argumentative or narrative essay without access to AI tools.
- **Task 2 (AI-Assisted Writing Task):** A similar-length task, where students were instructed to use AI tools (e.g., ChatGPT, Grammarly) during the planning, drafting, or revision stages.

Both tasks were evaluated using a validated rubric adapted from IELTS Task 2 criteria and enriched with creativity-oriented dimensions drawn from recent SLA literature (Woo & Guo, 2023). **Table 2** provides an outline of the rubric used for scoring.

**Table 2**

*Writing Assessment Rubric Dimensions (AI and Traditional Tasks)*

Dimension	Description	Max Score
Coherence & Cohesion	Logical sequencing, paragraph unity, transitions	5
Lexical Resource	Range, appropriateness, and sophistication of vocabulary	5
Grammatical Accuracy	Sentence structure, verb forms, punctuation	5
Task Achievement	Relevance, clarity, completeness of ideas	5
Creativity & Originality	Use of figurative language, thematic novelty, and stylistic experimentation	5

Each script was independently rated by **two trained raters**, and **inter-rater reliability** was calculated using **Cohen's Kappa**, which achieved a value of  $\kappa = .87$ , indicating strong agreement.

#### **4.3.2. Semi-Structured Interviews**

To explore learner and teacher perceptions, qualitative data were gathered through semi-structured interviews conducted in English. A total of 24 students (randomly selected across proficiency bands) and 6 instructors participated. Questions addressed the following:

- Experiences using AI tools for writing.
- Perceived effects on language development and creativity.
- Concerns about authenticity, overreliance, or academic integrity.

Interviews lasted 30–45 minutes and were audio-recorded, transcribed verbatim, and analyzed thematically using NVivo 14.

#### **4.4. Ethical Considerations**

Ethical approval was obtained from both institutions' Institutional Review Boards (IRBs). Participants were informed of their right to withdraw at any time and assured of anonymity. For the AI-assisted task, students were instructed to indicate which tools they used and for which stages (e.g., planning, drafting, editing), to ensure transparency and mitigate academic integrity concerns.

#### **4.5. Data Analysis**

##### **4.5.1. Quantitative Analysis**

Scores from the two writing tasks were compared using:

- **Paired-sample t-tests:** To assess mean differences between AI-assisted and traditional performance.
- **One-way ANOVA:** To analyze differences across proficiency levels.

- **Effect size (Cohen's d):** To measure magnitude of improvement.
- **Correlation analysis:** Between creativity scores and total task scores.

Descriptive statistics (means and standard deviations) were generated for all rubric categories, and findings are visualized in Section 5.

#### 4.5.2. Qualitative Analysis

Interview transcripts were analyzed inductively using **Thematic Analysis** (Georgiou, 2024; Roseveare, 2023; Braun & Clarke, 2022; Forbes, 2022; Braun & Clarke, 2021), guided by SCT constructs: *mediation, ZPD, internalization, and agency*. Codes were reviewed by two researchers and triangulated with quantitative findings. Emergent themes were visualized in Section 5 (see **Table 5**) and include “AI as Scaffold,” “Loss of Voice,” and “Creative Empowerment vs. Dependence.”

#### 4.6. Trustworthiness and Rigor

- **Credibility:** Data triangulation (writing scores + interviews)
- **Dependability:** Transparent coding processes and audit trails
- **Transferability:** Thick descriptions of participants and setting
- **Confirmability:** Inter-rater reliability for both writing scores and qualitative coding

The mixed-methods design supports empirical generalizability while honoring the sociocultural complexity of writing development in the Qatari EFL context.

#### 4.7. Limitations of Methodology

While robust in design, this study is subject to certain limitations:

- Use of self-reported AI engagement may not capture depth of tool usage.
- Creativity remains difficult to operationalize and evaluate objectively.

- Results may not generalize beyond Qatari institutions with similar English-medium instruction.

These limitations are acknowledged in Section 7 and considered in the design of future research recommendations.

## 5. Data Analysis and Results

This section presents the findings from both the **quantitative** (writing performance analysis) and **qualitative** (interviews) phases of the study. Data are organized to answer the research questions concerning the impact of generative AI on Qatari students' academic writing performance, creative expression, and their perceptions of AI's pedagogical role.

### 5.1. Quantitative Findings

#### 5.1.1. Descriptive Statistics

**Table 3** presents the mean scores and standard deviations for both the traditional and AI-assisted writing tasks across all five rubric dimensions. Participants demonstrated significantly higher performance in the AI-assisted task, particularly in the dimensions of *lexical resource*, *task achievement*, and *creativity*.

**Table 3**

*Descriptive Statistics for Writing Performance across Conditions (N = 120)*

Rubric Dimension	Traditional Writing	AI-Assisted Writing	Mean Difference
	M (SD)	M (SD)	
Coherence & Cohesion	3.27 (0.61)	3.89 (0.53)	+0.62
Lexical Resource	3.04 (0.77)	4.12 (0.60)	+1.08
Grammatical Accuracy	3.41 (0.69)	4.07 (0.66)	+0.66

Rubric Dimension	Traditional Writing	AI-Assisted Writing	Mean Difference
Task Achievement	3.10 (0.72)	4.06 (0.63)	+0.96
Creativity & Originality	2.81 (0.88)	4.03 (0.71)	+1.22
<b>Total Score</b>	<b>15.63 (2.61)</b>	<b>20.17 (2.14)</b>	<b>+4.54</b>

As shown in **Table 3**, all rubric categories showed marked improvement under AI-assisted conditions, with the most substantial gains observed in Creativity & Originality and Lexical Resource.

### 5.1.2. Paired-Sample T-Test Results

**Table 4** demonstrates a series of **paired-sample t-tests** conducted to determine whether the observed differences in performance were statistically significant.

**Table 4**

*Paired-Sample T-Test Results for Traditional vs. AI-Assisted Writing*

Rubric Dimension	t	df	p-value	Effect Size (Cohen's d)
Coherence & Cohesion	6.71	119	< .001	0.71
Lexical Resource	11.02	119	< .001	1.14
Grammatical Accuracy	7.89	119	< .001	0.82
Task Achievement	9.67	119	< .001	1.02
Creativity & Originality	13.33	119	< .001	1.30

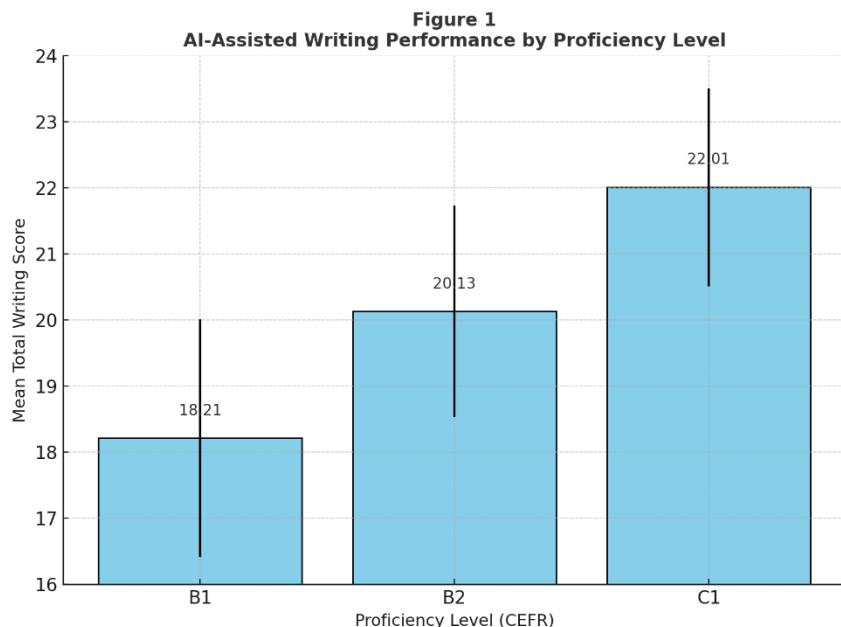
All results were statistically significant at **p < .001**, with large effect sizes. The dimension of **Creativity & Originality** yielded the highest effect size (**d = 1.30**), underscoring the substantial impact of AI assistance on students' ability to produce original and stylistically rich text.

### 5.1.3. Performance by Proficiency Level

To examine how AI tools benefited students across different English proficiency levels, a **one-way ANOVA** was conducted. **Figure 1** illustrates AI-Assisted Writing Performance by Proficiency Level (CEFR Bands: B1, B2, C1).

**Figure 1**

*Comparing mean total writing scores (AI-assisted) across B1, B2, C1 levels)*



**Note:** C1 students showed highest gains, but improvements were observed at all levels.

The results showed a significant main effect for proficiency level:  $F(2, 117) = 5.98, p = .003$ . Post-hoc comparisons (Tukey HSD) revealed that C1 students significantly outperformed B1 students in AI-assisted tasks ( $p = .002$ ), though improvements were evident across all levels. This suggests that while AI tools benefit all learners, more proficient students leverage them more effectively. In brief, as **Figure 1** illustrates, writing performance increases with proficiency with C1 students achieving the highest mean scores.

#### 5.1.4. Correlation between Creativity and Total Score

A Pearson correlation analysis revealed a strong positive relationship between Creativity and Originality and overall AI-assisted writing performance ( $r = .82$ ,  $p < .001$ ), indicating that students who produced more creative texts also scored higher overall. This supports the hypothesis that AI-mediated creativity may be a developmental marker, especially in SCT terms of internalization and autonomous performance.

#### 5.2. Qualitative Findings

Thematic analysis of the 24 student and 6 instructor interviews yielded three major themes and two sub-themes. These themes are presented in **Table 5** and discussed below.

**Table 5**

*Emergent Themes from Interview Data (N = 30)*

Theme	Sub-Themes	Participant Type	Frequency
AI as Scaffold for Development	Instant feedback; Reduced anxiety	Students & Instructors	28
Tension Between Support & Control	Loss of voice; Uncritical use	Students	23
Creativity as Empowerment	Idea expansion; Style experimentation	Students	19

As **Table 5** illustrates, the three themes can be discussed as follows:

#### Theme 1: AI as Scaffold for Development

Most participants described AI tools as supportive and confidence-boosting, particularly during initial planning and revision stages. Students reported using ChatGPT to clarify prompts and generate outlines, while Grammarly helped them polish sentence-level errors. For example,

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student 12 reported “I used to get stuck in the introduction part. With ChatGPT, I get some ideas and then rewrite in my own words. It helps me start.” Meanwhile, instructors acknowledged AI’s role in reducing cognitive overload and increasing student motivation, especially for low-proficiency learners.

### **Theme 2: Tension Between Support and Control**

Despite these benefits, many students expressed concern that AI outputs sometimes overshadowed their own voice or encouraged passive acceptance of suggestions. For instance, student 7 stated “sometimes I feel like it’s writing *for* me instead of *with* me.” This theme reflects a key concern in SCT mediation must foster active internalization, not uncritical dependence. Instructors echoed this concern, noting that students needed explicit training in reflective AI use to ensure developmental gains.

### **Theme 3: Creativity as Empowerment**

A striking finding was that students felt more empowered to experiment creatively when supported by AI. They reported using figurative language, rhetorical questions, and varied sentence structures with more confidence in AI-assisted drafts. For example, student 21 reported “I tried writing like a short story for the first time. AI gave me a structure, but I made it personal.” Likewise, instructors noted that AI-assisted tasks often had more vivid imagery and better cohesion, suggesting that creativity was not merely a byproduct of automation but a co-constructed process facilitated by the tool.

### **5.3. Summary of Key Findings**

In sum, **Table 6** presents a synthesized summary of the study’s key findings, organized according to the three guiding research questions. The table integrates both quantitative and

qualitative results to provide a holistic account of how generative AI tools impacted the writing performance and creativity of Qatari university students

**Table 6**

*A synthesized summary of the study's key findings*

Research Question	Key Finding
RQ1: Impact on writing performance	Statistically significant improvement across all dimensions; greatest gains in creativity and lexical resource (Table 3 & 4)
RQ2: Effect on creativity	Strong correlation between creativity scores and overall performance ( $r = .82$ ); students report enhanced expressive confidence ( <b>Figure 1</b> ; <b>Table 5</b> )
RQ3: Perceptions of pedagogical value	Mixed: AI seen as scaffold and motivator but also a potential threat to authorship and critical reflection ( <b>Table 5</b> )

## 6. Discussion

This section interprets the findings of the study in light of *Sociocultural Theory (SCT)* and prior literature, addressing the three research questions related to the impact of generative AI on the writing performance, creativity, and pedagogical perceptions of Qatari university students. The discussion is structured thematically around SCT constructs – *mediation*, *ZPD*, *internalization*, and *agency* – to elucidate how AI tools function as semiotic mediators within EFL writing development in the Qatari context.

The significant improvements in students' writing scores across all rubric dimensions (see **Table 3**) confirm the mediational potential of AI tools in academic writing tasks. These findings

resonate with *SCT's core tenet* that learning is fundamentally mediated through interaction with cultural and technological artifacts (Lantolf & Poehner, 2014; Lantolf, Poehner, & Thorne, 2020).

AI-assisted compositions exhibited greater lexical sophistication, syntactic variation, and thematic coherence, particularly among higher-proficiency students (see **Figure 1**). This aligns with prior studies (e.g., Swargiary, 2024; Bacon & Kraus, 2025; Teng & Huang, 2025; Yasmin, Fatima, & Irshad, 2025) and expands them by demonstrating that such mediation is not only functional but developmentally meaningful when it is aligned with the learner's current proficiency level and learning goals (Pham, 2025).

Notably, the strongest performance gains were in *Creativity & Originality* (see **Table 4**), suggesting that AI tools did not merely support mechanistic improvements but also stimulated higher-order cognitive engagement. This extends SCT applications into creative dimensions of L2 writing, an area that has received limited theoretical attention in SLA. AI tools, particularly generative ones like ChatGPT, may act as catalysts for what Vygotsky (1978) termed "**creative recombination**" – the learner's ability to rework and personalize external input (Huang & Mizumoto, 2025).

A key strength of AI tools in this study was their ability to provide instant, context-sensitive feedback, thus creating a dynamic scaffold within the learner's *Zone of Proximal Development* (*ZPD*). The paired-sample t-tests demonstrated that this scaffold allowed students to perform at levels beyond their traditional capabilities, especially in task achievement and coherence.

From an SCT perspective, such real-time, dialogic interaction simulates the kind of responsive mediation traditionally associated with a teacher or more capable peer. However, as the qualitative interviews revealed (see **Table 5**), this dynamic is only beneficial when students

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actively engage with AI feedback. Students who critically revised AI suggestions and adapted them to their intended message demonstrated stronger performance and reported greater satisfaction.

By contrast, students who accepted AI outputs uncritically reported a sense of detachment or "loss of voice" – a finding that highlights the risk of over-scaffolding, where mediation overshadows the learner's own agency. This paradox aligns with concerns raised in SCT-based AI research (e.g., Bacon & Kraus, 2025), suggesting that the quality of mediation is as important as its availability.

One of the most theoretically significant findings of this study is the observed *transfer of creativity* from AI-assisted to AI-free writing environments. While this transfer was not quantitatively tested in this iteration, instructor feedback and post-task interviews suggested that students exposed to AI support began to experiment more confidently with stylistic elements, rhetorical devices, and organizational strategies in subsequent traditional tasks. This observation aligns with SCT's concept of *internalization* – whereby learners gradually appropriate external tools and practices into their own cognitive repertoire. When AI is used dialogically, rather than mechanically, it appears to function as a zone of creativity development, enabling learners to internalize new textual patterns, genre expectations, and lexical-semantic associations.

Importantly, this finding challenges deficit-based views that AI fosters laziness or plagiarism. On the contrary, the most substantial creative gains in this study came from students who used AI to *ideate, refine, and transform* content rather than simply copy it. In doing so, they exhibited *agency, reflection, and voice* – all hallmarks of developmental learning in SCT.

The study's findings offer several novel pedagogical implications specific to Qatari higher education:

1. **Bridging Feedback Gaps:** In large EFL classes where teacher feedback is delayed or limited, AI tools can offer real-time formative support, enabling students to revise iteratively and independently.
2. **Scaffolding Creative Expression:** Creativity in writing is often underdeveloped in standardized curricula. AI can scaffold creativity by modeling diverse rhetorical moves and encouraging risk-taking within a supported environment.
3. **Promoting Reflective AI Use:** The qualitative data highlight the need to explicitly teach students how to reflect on, critique, and adapt AI feedback, rather than consume it uncritically. This could be achieved through guided "AI-reflection logs" or peer-review workshops comparing AI suggestions with human ones.
4. **Equity of Access:** The performance disparities across proficiency levels (Figure 1) suggest that more proficient learners benefit more from AI. Targeted digital literacy interventions may be necessary to ensure equitable benefit, particularly for B1 and B2 learners.
5. **Reframing Assessment:** Current writing assessments often penalize AI use. This study suggests that when AI is used reflectively, it enhances rather than diminishes authorship. Institutions should therefore consider revising assessment policies to reward process-based writing and creative transformation, not just final products.

Theoretically, this study makes three key contributions to SCT-informed SLA research:

- It **extends SCT into AI-mediated writing contexts**, demonstrating that AI tools can function as developmental scaffolds when used reflectively.

- It empirically validates SCT constructs – such as ZPD, mediation, and internalization – through mixed-methods data grounded in Qatari classrooms.
- It introduces the concept of "AI as a creativity co-agent", expanding traditional SCT notions of mediation from error correction and feedback to stylistic innovation and genre exploration.

This reimagining of SCT in the digital age contributes to ongoing debates about the role of automation in human language development and challenges both dystopian and utopian narratives of AI in education.

This study addresses critical contextual gaps in the literature by situating its inquiry in real-world Qatari higher education classrooms. While much of the AI-in-education discourse is shaped by Global North perspectives, this study foregrounds the unique challenges and opportunities within Gulf ELT systems:

- **Monolingual Classrooms:** Unlike multilingual Western contexts, Qatari EFL classrooms are predominantly Arabic-speaking. AI tools offer exposure to naturalistic L2 input that might otherwise be absent.
- **Assessment-Centric Cultures:** Students often prioritize grades over linguistic development. AI tools, when used strategically, can foster a shift from performance to process orientation.
- **Policy Vacuums:** As institutional policies on AI use are still evolving in Qatar, this study provides empirical evidence to inform balanced, context-sensitive policy decisions.

## 7. Conclusion

This study examined the impact of generative Artificial Intelligence (AI) tools – such as ChatGPT and Grammarly – on the writing performance and creative development of Qatari university students. Anchored in **Sociocultural Theory (SCT)**, the study employed a **sequential explanatory mixed-methods design**, combining statistical analysis of writing tasks with rich qualitative data from student and instructor interviews. Findings revealed that:

- Students achieved significantly higher writing scores across all dimensions – including grammatical accuracy, coherence, and especially creativity – when using AI tools (see **Tables 3 and 4**).
- The impact of AI was more pronounced among higher-proficiency learners (see **Figure 1**), although gains were observed across all levels.
- Learners perceived AI tools as confidence-boosting scaffolds, especially when engaged reflectively and dialogically.
- Instructors reported observing increased creativity, autonomy, and engagement when students were encouraged to personalize and critique AI-generated content (see **Table 5**).
- Crucially, the theoretical constructs of ZPD, mediation, internalization, and agency were validated in the context of AI-mediated writing – offering novel evidence for how digital tools can function as developmental agents in L2 learning.

This research makes several original contributions to the fields of Second Language Acquisition (SLA) and Applied Linguistics, particularly through its application of *Sociocultural Theory* in a novel domain:

1. **AI as Mediational Artifact:** It reconceptualizes generative AI tools as semiotic mediators that can operate within a learner's ZPD to promote writing development – not merely correct errors.
2. **Creativity within SCT:** It introduces the underexplored concept of creative internalization – where learners, through interaction with AI, begin to adopt and adapt new stylistic, rhetorical, and linguistic forms.
3. **Contextual Theory Building:** It validates SCT within a Qatari monolingual EFL context, offering a theoretically grounded response to calls for localized SLA models in the Global South.
4. **Bridging SLA and AI Research:** While most existing AI-in-education research is atheoretical or techno-functional, this study provides a theory-informed account of AI's role in language development, setting a foundation for future SCT-AI research.

The findings offer several key recommendations for EFL instructors, curriculum designers, and educational policymakers in Qatar and the wider Gulf region:

### **1. Integrate AI as a Developmental Tool**

AI tools should be formally incorporated into EAP and writing curricula, not as shortcut mechanisms, but as pedagogical mediators. Teachers should guide students in how to use AI for:

- Brainstorming and ideation
- Vocabulary expansion
- Genre modeling
- Revision and reflection

This integration can make writing more engaging, personal, and developmentally productive.

## **2. Scaffold Reflective AI Use**

Institutions must move beyond punitive or avoidance-based responses to AI use. Instead, they should:

- Develop AI-use literacy modules focused on critical thinking, originality, and ethical use.
- Encourage students to maintain AI writing journals, in which they document how and why they used AI and what they changed afterward.
- Emphasize dialogue over replication, reinforcing that the AI is a partner – not a ghostwriter.

## **3. Rethink Assessment Practices**

Standard writing rubrics should be revised to include dimensions such as:

- Creative risk-taking
- Textual adaptation and transformation
- AI-supported reflection

Additionally, task-based assessments could require students to compare AI suggestions with their own versions, making the process visible and assessable.

## **4. Ensure Equitable Access**

While advanced learners benefited more from AI tools, low-proficiency learners also showed improvement. However, to prevent widening performance gaps, institutions should:

- Provide targeted AI-literacy training for B1/B2 learners
- Embed tutorials within learning management systems (LMS)
- Offer AI-supported writing clinics or drop-in labs

This study arrives at a pivotal moment in Qatar's educational reform trajectory, where digital transformation and internationalization are key national goals. Institutions across Qatar are currently revisiting their policies on plagiarism, originality, and digital tool usage. This research supports the adoption of policy frameworks that:

- Recognize the legitimate developmental role of AI in language learning
- Differentiate between productive mediation and unauthorized delegation
- Encourage transparency in AI use, such as AI usage declarations or learning reflections

Ultimately, institutional policies must balance innovation with academic integrity, not suppress AI use, but shape it into an instrument of higher-order learning.

While the study is robust in design and contributes meaningfully to theory and practice, several limitations are acknowledged:

- **Short-Term Focus:** The study only measured immediate outcomes. Long-term internalization and retention were not assessed.
- **Self-Reported AI Use:** Although triangulated with writing outputs, students' accounts of AI interaction lacked verification through real-time tracking.
- **Creativity Measurement:** While rubric-based assessments and interviews provided insight into creativity, future research may benefit from incorporating linguistic creativity indices or genre innovation markers.

This study lays the foundation for a sustained research agenda on AI and SLA in Qatar and the Gulf. Suggested future directions include:

1. **Longitudinal Studies** tracking whether AI-mediated creativity persists or declines over time.
2. **Comparative Designs** exploring differences between L1 and L2 English users in their AI engagement patterns.
3. **AI as Dialogue Partner** studies that analyze student–AI chat transcripts to assess the quality of dialogic interaction.
4. **Teacher-AI Co-Mediation Models** investigating how teacher feedback and AI can synergize rather than compete.

Future studies might also explore **discipline-specific writing** (e.g., scientific vs. literary genres) and how AI mediation differs across rhetorical contexts.

This study demonstrates that AI tools, when used reflectively and pedagogically, can foster not only more accurate writing but also more imaginative, confident, and autonomous language use among Qatari EFL learners. Through the lens of *Sociocultural Theory*, AI becomes more than a tool – it becomes a co-constructor of linguistic identity and creative agency.

In a region where language learning is often framed by assessment and structure, AI offers a bridge to a more dialogic, exploratory, and learner-centered approach to writing. Qatar's educational institutions are uniquely positioned to lead in this transformation – provided they embrace innovation not as a threat, but as a partner in the ongoing journey of language development.

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## Appendices

### Appendix A

#### Writing Assessment Rubric (AI-Assisted and Traditional Tasks)

Dimension	1 – Limited	2 – Basic	3 – Competent	4 – Proficient	5 – Exceptional
Task Achievement	Off-topic; lacks clarity	Partially addresses task	Addresses task with minor lapses	Fully addresses task	Fully addresses task with originality
Coherence & Cohesion	Disjointed; illogical	Basic structure; weak flow	Organized but transitions weak	Logical and coherent	Seamless flow and transitions
Lexical Resource	Limited vocabulary	Basic range; some repetition	Adequate range and precision	Varied and appropriate	Rich, precise, and varied
Grammatical Accuracy	Frequent major errors	Errors occasionally impede meaning	Minor errors present	Accurate with few lapses	Near-native grammatical control
Creativity & Originality	None evident; formulaic	Limited expression	Some creative attempt	Evidence of voice/style	Highly creative; original style
Total Score	out of 25 points				

## Appendix B

### Student Interview Protocol

#### Introduction

Thank you for participating in this interview. Your responses will help us understand how generative AI tools like ChatGPT and Grammarly affect your writing experience. Your responses will remain confidential.

#### Questions

1. How did you feel when completing the writing task without AI assistance?
2. How did the AI-assisted writing process feel different?
3. What kind of AI tools did you use, and how did you use them?
4. Did AI help you improve your vocabulary, grammar, or creativity? How?
5. Did you ever feel that AI took over your voice or ideas?
6. Would you prefer to write with or without AI support in future courses? Why?
7. What advice would you give your instructors about integrating AI tools in writing classes?

#### Closing Prompt:

Is there anything else you'd like to share about your experience using AI in writing?

## Appendix C

### Instructor Interview Protocol

#### Introduction

This interview seeks to understand your observations regarding students' use of AI tools in writing classes and its effect on their development as writers.

#### Questions

1. Have your students been using AI tools in their writing tasks? If so, how?
2. What changes – positive or negative – have you observed in their writing?
3. Have you noticed any differences in creativity or originality?
4. How do you feel about the use of AI in academic writing?
5. What are your main concerns regarding AI use in the classroom?
6. What kinds of support or training do students need to use AI effectively?
7. How should institutional policies address AI use in assessment and instruction?

#### Closing Prompt:

Do you think AI can be a developmental tool in writing pedagogy? Why or why not?

## Appendix D

### Sample AI Prompts Used by Students During Writing Tasks

Student Use Case	Prompt Example
Brainstorming ideas	“Give me 3 main arguments for the benefits of online education in Qatar.”
Structuring paragraphs	“How should I organize a 5-paragraph essay on climate change impacts in the Gulf?”
Improving vocabulary	“Suggest better vocabulary for this sentence: ‘This idea is very good and nice.’”
Grammar checking	“Please correct grammar and punctuation in this paragraph.”
Enhancing creativity	“Rewrite this story with more imagery and creative metaphors.”

## **Appendix E**

### **Ethics Statement and Consent Form Summary**

#### **Ethics Approval:**

This study was reviewed and approved by the Institutional Research Ethics Committee of UKM-Qatar, Qatar. Approval Code: [IRB/2025-14-QA]

#### **Informed Consent Procedures:**

Participants were informed of the study's purpose, procedures, risks, and their rights (including the right to withdraw without penalty). Written consent was obtained prior to data collection.

#### **Confidentiality:**

All participant data were anonymized using unique codes. Only the researcher had access to raw data, which was stored securely in encrypted files.

#### **Voluntary Participation:**

Participation was entirely voluntary, and no incentives were given that could affect responses or consent quality.

#### **Use of AI Tools Disclosure:**

Students were informed that they could use or avoid AI tools in the study, and their choices would not affect grades or instructor judgment.