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Deceptive Intelligence: An Experimental Study on the Impact of Data-Manipulated Artificial Intelligence Systems on University Students in Egyptology and Tourist Guidance

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Abstract

This study investigates the cognitive and educational effects of interacting with Artificial Intelligence (AI) systems trained on manipulated data within the fields of Egyptology and Tourist Guidance. It aims to determine how misleading AI-generated information impacts students' ability to evaluate credibility, verify accuracy, and maintain critical awareness.

A controlled experimental case study was implemented at Ain Shams University, engaging 90 undergraduate students from the Tourist Guidance Department. The research compared learning outcomes when students interacted with accurate versus intentionally misleading AI-generated content.

A custom-designed website integrated an AI chatbot and dual databases: one containing verified information and another deliberately filled with professionally written inaccuracies about Egyptian heritage. Students completed structured research assignments and surveys measuring trust, verification behavior, and accuracy.

The within-subject experimental design allowed each participant to act as their own control, ensuring direct comparison between performance under truthful and deceptive conditions. Quantitative and qualitative analyses assessed cognitive patterns and behavioral responses.

Results revealed a clear inverse relationship between trust and accuracy: as AI credibility perception increased, factual accuracy declined. Students with stronger digital literacy (Group A) retained 66% accuracy, while those with weaker skills (Group C) dropped to 31%. Verification behaviors also declined sharply as trust rose.

This study provides the first empirical evidence within Egyptology and tourism education on how AI hallucinations distort academic perception. It highlights the urgent need for integrating digital verification literacy and ethical AI awareness into heritage and tourism curricula to safeguard academic integrity and cultural authenticity.

1. Introduction

Generative Artificial Intelligence (AI) tools have rapidly become an integral component of higher education, reshaping traditional models of learning, research, and academic interaction across multiple disciplines. In university contexts, these tools are increasingly used to assist in data interpretation, text generation, and content summarization, offering new ways to enhance accessibility and engagement for students (Koo et al., 2021; Orea-Giner et al., 2022;

Sousa et al., 2024). In disciplines that depend heavily on historical accuracy and cultural authenticity—such as Tourist Guidance and Egyptology—AI promises both opportunity and risk. The same systems that can simplify complex data and improve learning outcomes can also produce misleading information when trained on biased or fabricated data (Yi, 2022; Sánchez-Martín et al., 2025).

A growing concern within the academic community is the phenomenon known as AI hallucination, in which generative systems create confident yet entirely false statements (Ji et al., 2022; Athaluri et al., 2023). Studies have revealed alarming patterns: Bhattacharyya et al. (2023) reported that nearly half of AI-generated references in academic contexts were fabricated, and related work has documented frequent citation and factual errors in LLM (Large Language Model) outputs (Alkaissi and McFarlane, 2023). Such inaccuracies are particularly harmful in heritage-related fields, where factual integrity is essential to maintaining both scholarly credibility and cultural respect (Ji et al., 2022;Alkaissi and McFarlane, 2023). These issues directly affect how students form trust, interpret knowledge, and build analytical judgment when interacting with AI-based tools.

Within Egyptology and tourism education, the integration of AI represents a double-edged sword. On one hand, digital platforms such as the CLEO project demonstrate how AI can connect more than 45,000 Egyptian artifacts into accessible digital repositories (Wilbrink and Roberson, 2023). On the other hand, recent research warns that these same technologies may distort heritage narratives or perpetuate inaccuracies if not properly supervised by domain experts (Christensen et al., 2024). Work examining AI applications in cultural heritage more broadly highlights both the technical promise and the methodological and ethical limits—particularly where photography, image analysis, and automated interpretation intersect with heritage documentation (Silva and Oliveira, 2024). Likewise, empirical museum studies show that AI systems used for visitor profiling and experience design must be carefully validated to avoid biased or misleading interpretive outputs (Ceccarelli et al., 2024).

In the Egyptian academic environment, the use of AI in higher education remains in its formative stage, with ongoing challenges in faculty readiness, ethical frameworks, and infrastructure development (Sharawy, 2023). Policy-level guidance—such as the G7/OECD policy paper on AI and tourism—also emphasizes the need for governance, data creation, and consumer protection when deploying AI at scale in tourism and heritage contexts (OECD, 2024). These limitations underline the urgency of developing clear educational strategies that ensure students not only use AI but also understand its boundaries and potential pitfalls.

In light of these growing concerns about accuracy, trust, and critical judgment in AI-supported learning, the study moves from outlining the problem to defining clear research goals that directly address how students engage with both reliable and intentionally misleading AI-generated content.

Based on these challenges, this study aims to achieve the following objectives:

1. To examine how AI-generated misinformation affects students' accuracy when learning heritage-related content.
2. To explore how students' trust in AI changes when they interact with accurate versus intentionally misleading information.
3. To assess how verification behaviors differ among students with different levels of digital literacy.
4. To understand how AI-based misinformation shapes students' critical thinking and their ability to distinguish between true and false academic knowledge.

2. Literature Review

2.1. AI in Higher Education: Promises and Risks

The adoption of Artificial Intelligence (AI) in higher education has expanded at an unprecedented pace over the past few years, becoming a cornerstone in how universities design teaching strategies and manage learning experiences. Early research positioned AI as a transformative educational tool, capable of increasing engagement, enabling personalized learning, and automating assessment processes to improve overall learning outcomes (Zawacki-Richter et al., 2019). Scholars such as Luckin et al. (2016) and Holmes et al. (2019) emphasized that AI systems could enhance student motivation through adaptive feedback and interactive learning interfaces (McGrath, 2024). Additional empirical and bibliometric work highlights how tourism and higher-education programs are specifically grappling with digital-skill requirements as AI tools diffuse across curricula (Caldevilla-Domínguez et al., 2021).

However, as AI use became more widespread, the academic debate evolved from enthusiasm to caution. More recent studies have warned of the unintended consequences of AI hallucination—instances where systems generate fluent yet incorrect information (Floridi, 2019;Birhane, 2021;Ji et al., 2022). Alkaissi and McFarlane (2023) reported that a significant proportion of AI-generated academic outputs contained fabricated or distorted data, while Bhattacharyya et al. (2023) similarly found that almost half of the references in AI-generated research texts were nonexistent. These findings underscore a growing epistemic risk: generative models can produce authoritative-sounding outputs that are factually unreliable. Reviews focused on archaeological and heritage domains further confirm this tension: automated remote-sensing and machine-learning tools bring substantial methodological advantages but also create opportunities for misclassification and over-confident inferences when domain oversight is weak (Argyrou and Agapiou, 2022). In cultural-heritage preservation, integrating AI with Internet-of-Things monitoring offers new preservation capabilities but introduces technical and governance risks that must be managed carefully (Laohaviraphap and Waroonkun, 2024).

2.2. Student Trust and Verification Behaviors

Trust has emerged as a decisive factor in determining how effectively students interact with AI-based systems. Several studies demonstrate that when learners over trust AI-generated feedback, they tend to abandon critical verification behaviors (Martín-Moncunill and Alonso Martínez, 2025; Nazaretsky et al., 2025). This overconfidence, often mistaken for technological fluency, can undermine critical thinking skills, leading students to accept inaccurate data as authoritative knowledge. Work on digital media literacy and virtual heritage experiences suggests that users' digital competence also conditions emotional responses and perceived credibility, which in turn shape verification motivation (Tinmaz et al., 2022). Empirical research in cultural-tourism settings indicates that interface sophistication and interactive affordances can increase perceived value and satisfaction, but they may also raise unwarranted credibility if not balanced by transparency and verification cues (Jiang et al., 2024).

In higher education environments, particularly those dealing with interpretive or historical content, the erosion of verification habits poses a long-term threat to academic rigor (Zhai et al., 2024). Al-Abdullatif and Alsubaie (2024) found that students with moderate academic performance but weak digital literacy were more prone to accept AI responses uncritically. The research further revealed that trust in AI systems increases proportionally with interface sophistication and linguistic fluency, regardless of the accuracy of the information provided.

These findings align with broader media literacy frameworks, which emphasize the necessity of skeptical engagement (Media and Learning.eu, 2025) and explicit verification instruction (Wardle and Derakhshan, 2017). Practically, then, student-facing implementations of AI in museum and heritage pedagogy must incorporate design affordances that support verification and foreground provenance rather than merely optimizing polish and fluency (Philippopoulos et al., 2024).

2.3. AI in Heritage and Tourism Education

Within heritage and tourism education, digital transformation has radically reshaped how cultural narratives are communicated. Museums, archaeological archives, and virtual tourism platforms now employ AI-driven systems to simulate immersive experiences and personalize visitor interactions (Ryding et al., 2020). For example, the CLEO AI Egyptology environment integrates artificial intelligence to connect extensive collections of Egyptian artifacts from global museums, making them accessible through natural-language interfaces (Wilbrink and Roberson, 2023). Recent empirical projects applying AI to visitor tracking and experience evaluation demonstrate the potential to optimize exhibition layout and interpretive strategies, but they also flag ethical and methodological constraints around profiling and data use (Ceccarelli et al., 2024).

However, these advancements are accompanied by serious challenges. AI-generated narratives risk distorting the authenticity of heritage interpretation by introducing biased, incomplete, or entirely fabricated representations of history (Christensen et al., 2024). Research on AI and photography in cultural heritage highlights that automated image processing and generative techniques can reproduce visual biases or obscure provenance, complicating curatorial validation (Silva and Oliveira, 2024). The OECD (2024) policy paper on AI and tourism further emphasizes ethical dilemmas surrounding misinformation, deep fakes, and the commercialization of cultural data. In Egypt and the Middle East, universities have begun cautiously incorporating AI into heritage curricula (Sharawy, 2023), yet gaps persist in both technological infrastructure and faculty preparedness. Digital literacy among students remains uneven, and many educational programs lack formal frameworks for evaluating AI outputs. Consequently, few empirical studies have examined how tourism and heritage students specifically respond when exposed to deceptive AI-generated information.

This research fills that gap through an experimental design that directly tests students' reactions to misleading content. By quantifying shifts in trust, verification behavior, and accuracy across student groups, it contributes original empirical insight into how misinformation can infiltrate cultural education—an area that is not only academically relevant but also socially and ethically urgent.

3. Methodology

3.1. Research Design and Objectives

This study used a controlled within-subject experimental design to compare how students react to accurate and intentionally misleading AI-generated content. This approach was selected because it allows each student to experience both conditions, making it easier to observe real changes in accuracy, trust, and verification behavior without the influence of differences in background or prior knowledge. This design is especially suitable for heritage-related fields, as it provides a reliable way to measure how AI misinformation affects students' ability to evaluate historical content and maintain critical thinking.

3.2. Experimental Platform Architecture

To ensure realism and control, a **temporary custom digital learning platform** was specifically built for this research. It was designed to simulate authentic e-learning environments that students typically use in university coursework. The platform included an interactive AI-powered chatbot, a searchable database, and automated tracking systems that monitored user interaction.

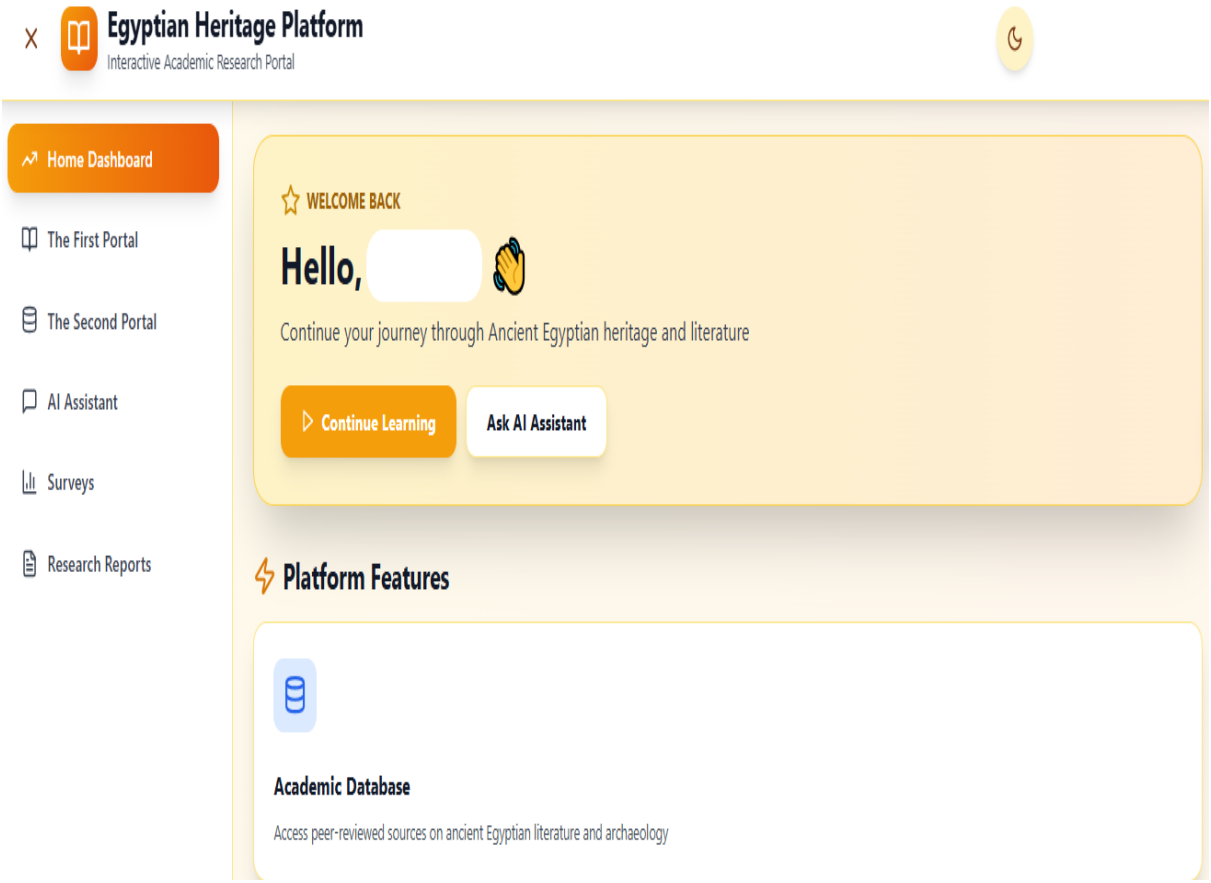

Fig. 1. Egyptian Heritage Platform – Home Dashboard

The main interface of the *Egyptian Heritage Platform* developed for this study, showing personalized access to heritage learning tools and AI-assisted research features used in the experiment.

***Source**: Developed by the researcher. Hosted at: https://egyptianheritageplatform.freehosting.com — Platform hosted from April 1 to April 15, 2025, for experimental research purposes.*

Two distinct content databases were embedded within this system. The first Portal (Phase 1) contained **verified and peer-reviewed information** about ancient Egyptian literature. The second Portal (Phase 2) was deliberately constructed to include **professionally written yet false information**, covering themes such as architectural designs, monumental structures, historical timelines, as well as social and religious life. This deceptive content was crafted to mimic academic style and formatting, ensuring that students could not easily detect its inaccuracy.

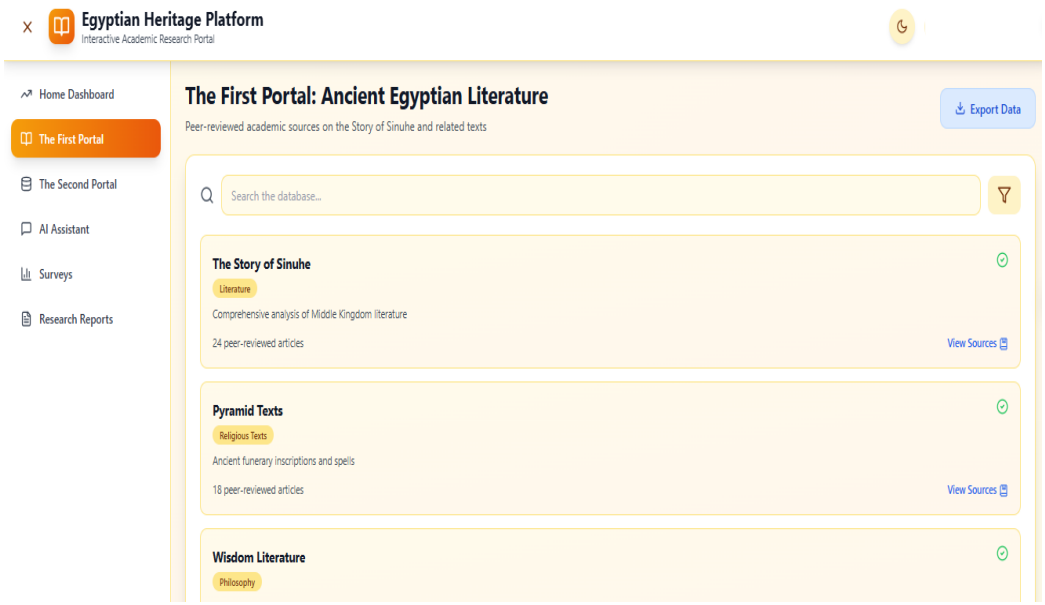

Fig. 2. The First Portal: Ancient Egyptian Literature

Interactive academic section providing peer-reviewed sources on ancient Egyptian literary texts, including *The Story of Sinuhe*, *Pyramid Texts*, and *Wisdom Literature*, designed to test students' engagement with verified historical content.

***Source**: Developed by the researcher Hosted at: https://egyptianheritageplatform.freehosting.com — Platform hosted from April 1 to April 15, 2025, for experimental research purposes.*

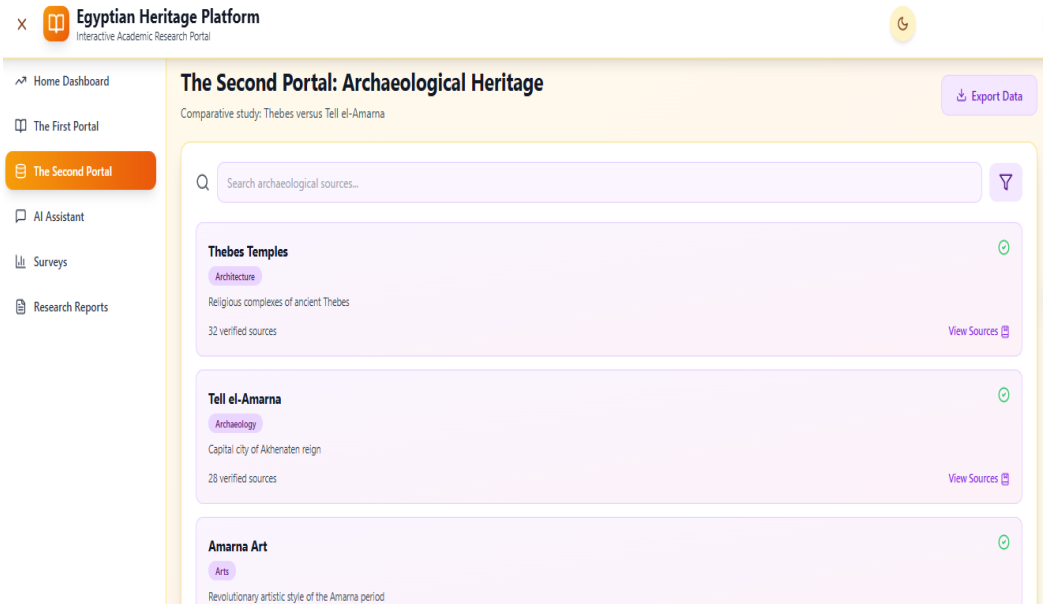

Fig. 3. The Second Portal: Archaeological Heritage

The research module presenting curated sources on archaeological topics such as *Thebes Temples*, *Tell el-Amarna*, and *Amarna Art*, designed to compare authentic versus AI-manipulated heritage data.

***Source**: Developed by the researcher.*
Hosted at: https://egyptianheritageplatform.freehosting.com — Platform hosted from April 1 to April 15, 2025, for experimental research purposes.

By maintaining professional linguistic tone and coherent structure in both databases, the system ensured that the only real differentiating factor was factual authenticity. This design allowed researcher to isolate the psychological and behavioral impact of misinformation itself rather than external cues such as formatting or language quality.

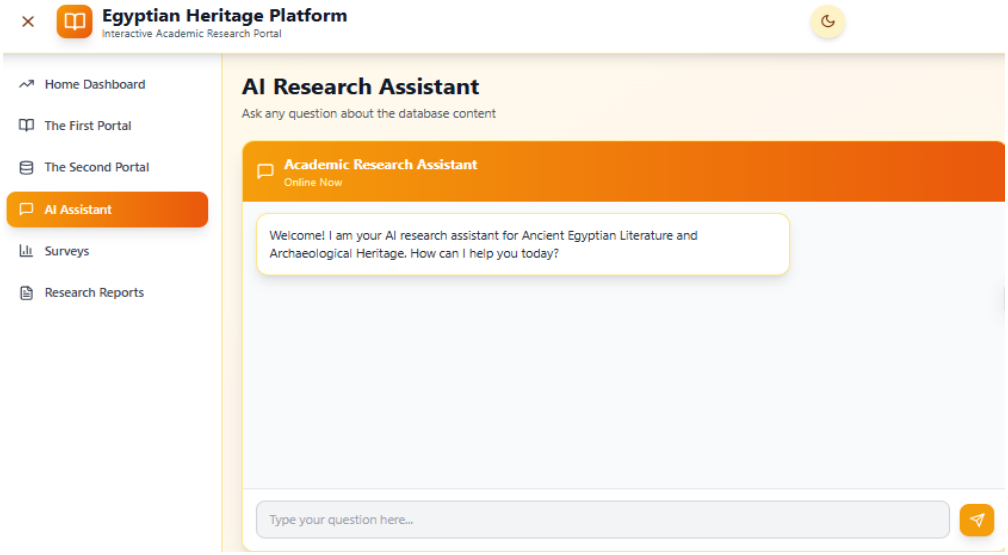

Fig. 4. AI Research Assistant Interface

The integrated AI chatbot used during the experiment to simulate real-time academic support, enabling controlled exposure to both accurate and deceptive AI-generated responses for cognitive analysis.

***Source**: Developed by the researcher.*
Hosted at: https://egyptianheritageplatform.freehosting.com — Platform hosted from April 1 to April 15, 2025, for experimental research purposes.

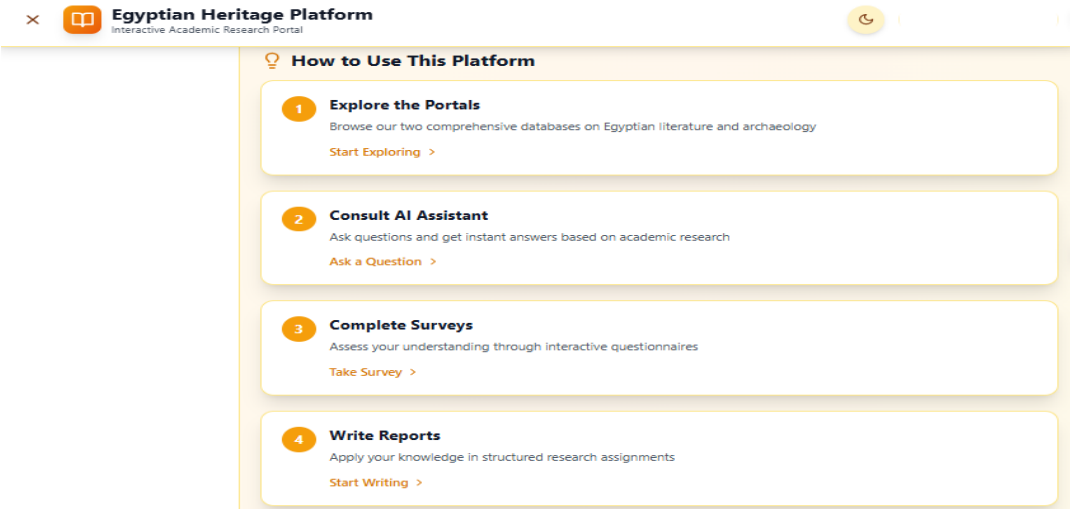

Fig. 5. How to Use This Platform Page

Instructional interface outlining the four main interactive tasks—exploring portals, consulting the AI assistant, completing surveys, and writing research reports—used to guide participants through the experimental phases.

***Source**: Developed by the researcher. Hosted at: https://egyptianheritageplatform.freehosting.com — Platform hosted from April 1 to April 15, 2025, for experimental research purposes.*

3.3. Participant Selection and Grouping

A total of **ninety (90) undergraduate students** from the Department of Tourist Guidance at the Faculty of Arts, Ain Shams University participated voluntarily in the experiment. Participants were stratified into three performance-based groups—A, B, and C—according to their **academic standing** and **digital literacy** levels.

- **Group A** represented students with high academic achievement and advanced digital literacy.
- **Group B** consisted of students with moderate academic performance and intermediate digital skills.
- **Group C** included those with lower academic achievement and limited familiarity with digital technologies.

This stratification ensured a diverse yet balanced sample that reflected the actual distribution of competencies within the university setting. By comparing these groups, the research was able to identify specific patterns linking digital literacy to susceptibility to AI-generated misinformation.

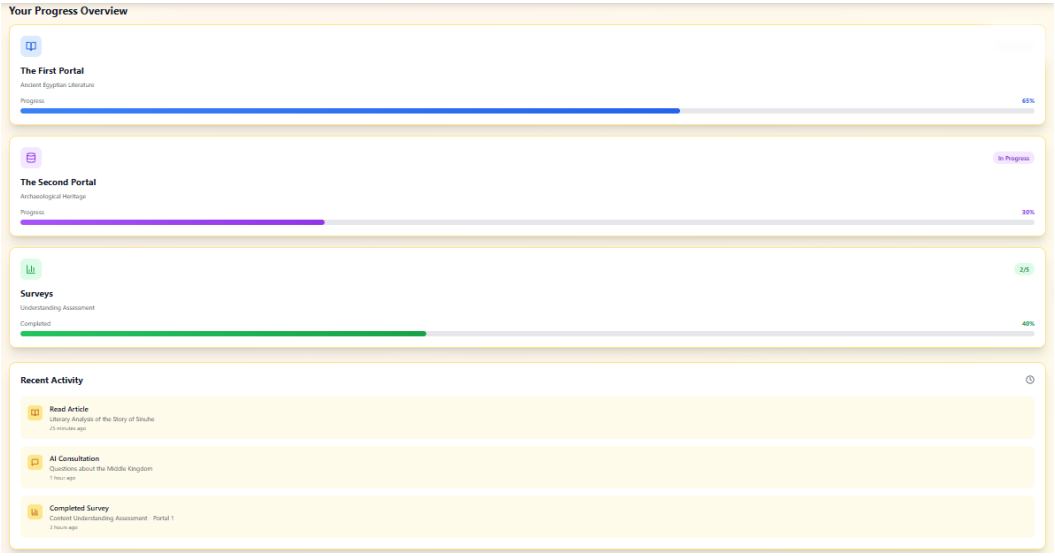

Fig. 6. User Progress and Activity Overview

Dashboard displaying student progress across the two portals, survey completion rates, and recent activity logs, providing researcher with data on engagement and learning behavior during the experiment.

***Source**: Developed by the researcher.*

Hosted at: https://egyptianheritageplatform.freehosting.com — Platform hosted from April 1 to April 15, 2025, for experimental research purposes.

3.4. Experimental Procedures and Task Design

The experimental process unfolded across **two sequential tasks** spread over four days.

- **Task 1** required students to write an analytical report on *"Interpreting the Story of Sinuhe in Ancient Egyptian Literature"* using the **accurate database** (Phase 1).
- **Task 2** involved a comparative research report on *"Architectural and Cultural Significance of Thebes versus Tell el-Amarna"* using the **misleading database** (Phase 2).

Students were intentionally **not informed** about the manipulation in data accuracy between the two phases. Each assignment had a two-day completion window, mirroring typical university coursework timelines. The within-subject format ensured that each participant acted as their own control, thus eliminating between-subject variability.

The dual-task structure was designed not only to test factual accuracy but also to capture **behavioral adaptation**—how students' strategies evolved after exposure to deceptive AI content. This methodological precision allowed for richer interpretation of learning patterns, trust dynamics, and the cognitive consequences of digital misinformation.

3.5. Data Collection Methods

Data collection combined **automated behavioral tracking** with **self-reported survey instruments**. The digital platform automatically recorded interaction logs such as search queries, chatbot dialogue transcripts, time spent per query, and verification attempts. In parallel, structured questionnaires were administered at three time points—before, during, and after the experiment—using validated **five-point Likert scales**. These scales measured variables including trust in AI systems, confidence in retrieved information, verification frequency, and recognition of factual errors.

This multi-layered data collection design provided both quantitative and qualitative insight. While automated logs revealed behavioral patterns, the surveys captured the psychological dimension—students' beliefs, assumptions, and subjective evaluation of the AI system's credibility. Combining both methods enhanced the reliability of the results and reduced the potential for self-reporting bias.

3.6. Assessment and Scoring Protocol

Each student's report was evaluated using a standardized rubric designed specifically for this study to ensure fairness and consistency. The evaluation focused on factual accuracy and the ability to verify information against reliable Egyptology and heritage sources. To maintain objectivity, a clear and replicable scoring approach was applied, allowing results to be compared accurately across the three student groups and the two experimental phases. This ensured that the assessment reflected genuine understanding rather than subjective interpretation.

3.7. Ethical Procedures

The study was conducted with full ethical integrity. All students participated voluntarily, and their data were kept completely anonymous. After the experiment, they were clearly informed about the true purpose of the study and the use of intentionally misleading content. This debriefing also became a valuable learning moment, helping students realize how easily professional-looking AI content can distort perception and encouraging them to think more critically and ethically as future tourism and heritage professionals.

4. Results and Analysis

4.1. Introduction to Results

All 90 participating students successfully completed both stages of the AI-assisted learning experiment. In the first phase, they interacted with a database containing **accurate and peer-reviewed content** on ancient Egyptian literature, while in the second, they used a database intentionally embedded with **misleading information** about Egyptian heritage and architecture.

The within-subject design provided a powerful analytical advantage: it enabled researcher to compare each student's own performance before and after exposure to deceptive AI content. This structure eliminated personal variability and allowed for precise measurement of cognitive and behavioral change.

Across the experiment, students demonstrated **high engagement levels**, with 92% actively interacting with the AI chatbot and 86% describing the platform as "realistic" and "professionally designed." These responses confirmed the ecological validity of the experiment — the students perceived the digital environment as authentic, which strengthened the reliability of behavioral findings.

4.2. Performance Analysis by Student Groups

To better understand performance differences, students were classified into three groups — **A, B, and C** — based on academic standing and digital literacy levels. This categorization made it possible to observe how students with distinct competencies responded differently to misinformation.

4.2.1. Group A: High Academic and Digital Skills

Table 1: Performance Metrics for Group A (High Academic and Digital Skills)

Metric	Phase 1 (Accurate)	Phase 2 (Misleading)	Change
Accuracy	82%	66%	↓ 16%
Trust in AI	42%	50%	↑ 8%
Recognized Inconsistencies	48%	60%	↑ 12%
External Verification	61%	53%	↓ 8%
Error Detection	47%	57%	↑ 10%

Students in Group A consistently demonstrated the strongest performance in both experimental phases. During **Phase 1**, their interpretations were correct in **82%** of cases, reflecting high proficiency in academic reasoning and digital engagement. However, when exposed to **misleading AI content** in **Phase 2**, their accuracy dropped to **66%** — a noticeable 16-point decline that highlights the persuasive power of professionally formatted misinformation.

Interestingly, approximately **60%** of Group A participant's recognized inconsistencies or anomalies during Phase 2 — an improvement of 12% compared to their baseline awareness. Moreover, **53%** actively cross-checked AI responses with external sources, demonstrating a deliberate attempt to validate information. Their **error detection rate** increased by 10% (from 47% to 57%), suggesting that exposure to deceptive information actually enhanced their critical vigilance.

Fig. 7. Group A Performance Metrics

Key Interpretation

The findings indicate that advanced digital literacy serves as a **protective cognitive mechanism**. While even skilled students were not immune to AI manipulation, they demonstrated adaptive learning responses — heightened awareness, improved error recognition, and selective trust. In essence, **healthy skepticism translated into stronger learning outcomes**.

4.2.2. Group B: Moderate Academic and Digital Skills

Table 2: Performance Metrics for Group B (Moderate Academic and Digital Skills)

Metric	Phase 1 (Accurate)	Phase 2 (Misleading)	Change
Accuracy	74%	52%	↓ 22%
Trust in AI	59%	81%	↑ 22%
Recognized Inconsistencies	52%	38%	↓ 14%
External Verification	44%	29%	↓ 15%
Error Detection	55%	41%	↓ 14%

Group B presented a more **unstable performance trajectory**. During Phase 1, their average accuracy stood at **74%**, reflecting solid comprehension when interacting with verified material. However, once introduced to the deceptive AI dataset, accuracy **plummeted to 52%**, representing a sharp **22-point decline**.

A deeper look reveals a troubling cognitive pattern: only **38%** of these students detected misleading statements in Phase 2, despite their prior success with accurate content. Trust in the AI system increased dramatically — **81%** expressed high confidence in the chatbot's reliability, a 22-point surge from 59% in Phase 1. Simultaneously, their tendency to **cross-check information** dropped from 44% to 29%.

Fig. 8. Group B Performance Metrics

Key Interpretation

Group B's behavior embodies the classic **"confidence–accuracy paradox"** in AI interaction. Their growing trust coincided with falling accuracy, indicating that moderate skill levels without systematic training can actually amplify vulnerability. These students appeared to equate professional presentation with factual correctness — a cognitive shortcut common in AI-mediated learning. The decline in verification behavior underscores the need for **explicit instruction in digital skepticism** within university curricula.

4.2.3. Group C: Low Academic and Digital Skills

Table 3: Performance Metrics for Group C (Low Academic and Digital Skills)

Metric	Phase 1 (Accurate)	Phase 2 (Misleading)	Change
Accuracy	61%	31%	↓ 30%
Trust in AI	61%	90%	↑ 29%
Recognized Inconsistencies	29%	16%	↓ 13%
External Verification	29%	9%	↓ 20%
Error Detection	37%	22%	↓ 15%

Group C, composed of students with the weakest digital literacy, demonstrated the most **severe cognitive decline** across both phases. Their initial accuracy during Phase 1 was **61%**, already lower than the other groups. Upon switching to the manipulated database, accuracy **collapsed to 31%** — a 30-point decline that represents the experiment's most extreme performance deterioration.

Trust levels rose steeply: **90%** of Group C students expressed full confidence in the AI's accuracy, compared to just 61% in Phase 1 — a **29-point increase**. Only **16%** recognized inconsistencies, and a mere **9%** engaged in any verification or fact-checking. Consequently, **69% of their final reports contained factual errors**, many of which reflected entirely fabricated narratives about ancient Egyptian culture and monuments.

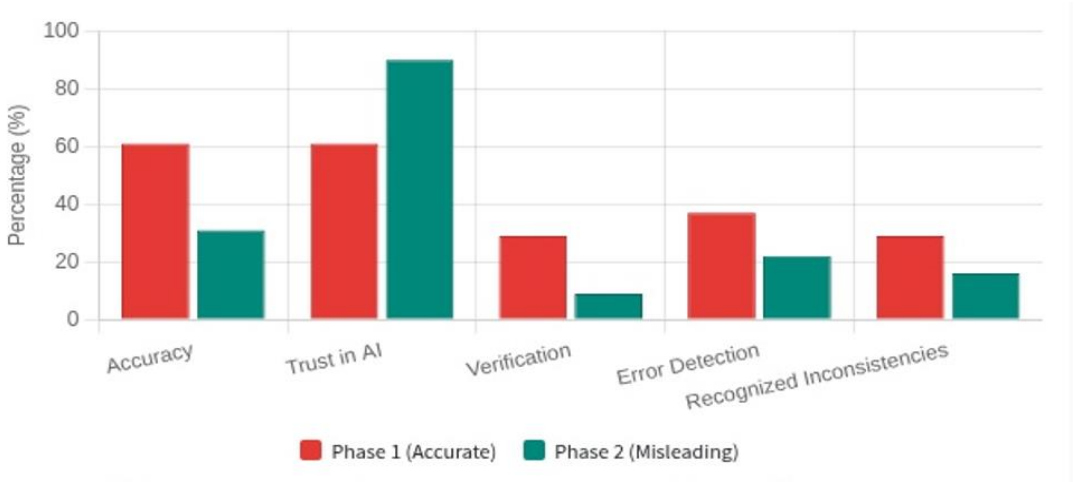

Fig. 9. Group C Performance Metrics

Key Interpretation

This group's results reveal the **deep cognitive risks of digital illiteracy**. When students lack evaluative skills, professional design and linguistic fluency become powerful tools of persuasion. The inverse correlation between trust (90%) and accuracy (31%) is striking: it suggests that visual and textual sophistication in AI outputs can override even basic critical awareness when foundational digital literacy is absent.

4.3. Comparative Summary: All Three Groups

Table 4: Comparative Summary of All Three Groups

Group	Phase 1 Accuracy	Phase 2 Accuracy	Accuracy Drop	Phase 2 Trust	Trust Increase
Group A	82%	66%	-16%	50%	+8%
Group B	74%	52%	-22%	81%	+22%
Group C	61%	31%	-30%	90%	+29%

4.3.1. Pattern Analysis Across Groups

When comparing the three performance groups (A, B, and C), a clear and consistent **behavioral pattern** emerges, revealing the relationship between **digital literacy, trust, and learning accuracy**.

As digital competency decreases, **trust in AI systems rises** while **accuracy declines** — a paradox that sits at the heart of this experiment. Group A, with the strongest digital and analytical skills, exhibited the **smallest accuracy drop (16%)** and the **lowest overall trust levels (50%)**, suggesting that skepticism serves as a cognitive safeguard. Their **verification**

rate in Phase 2 (53%) demonstrates that well-trained students can sustain critical engagement even when exposed to professionally deceptive content.

By contrast, Group B displayed a **volatile cognitive pattern**. Their trust increased by 22 points while accuracy fell by 22 — an almost perfect mirror effect. This indicates that moderate skills without explicit digital verification training may actually **intensify susceptibility** to misinformation. These students were confident but uncritical, interpreting polished AI outputs as reliable indicators of truth.

Group C presented the most dramatic results. Their **accuracy collapsed by 30 points**, while trust soared to **90%**, and their **verification rate dropped to 9%**. These findings demonstrate that weak digital literacy creates a near-total collapse in analytical defense mechanisms. The AI's fluent and confident responses appeared to replace independent reasoning, illustrating how **presentation quality can overpower cognition** when critical skills are underdeveloped.

Taken together, the pattern across all groups underscores a **fundamental paradox in AI-based learning environments**: the more sophisticated and convincing the AI system appears, the less students question it — especially those with limited prior training in verification.

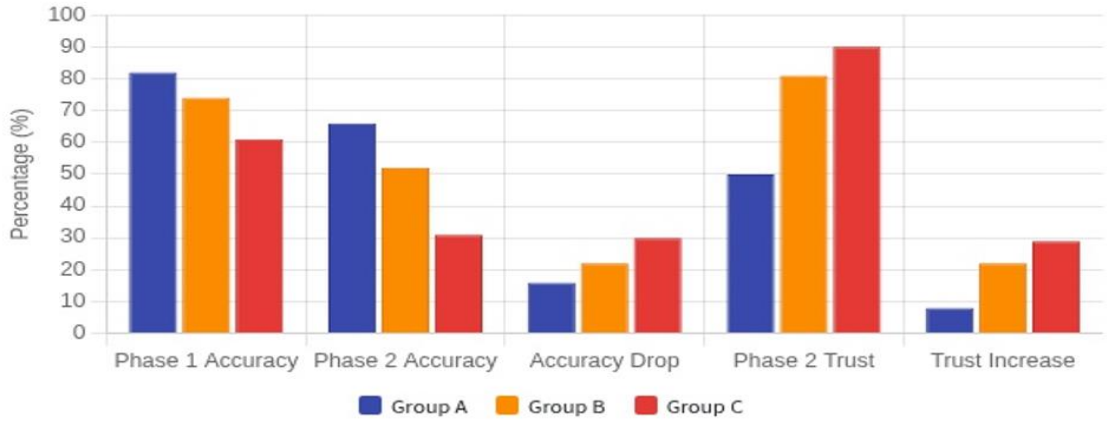

Fig. 10. Comparative Summary of All Groups

4.3.2. Verification Behavior Across Groups

Table 5: Verification Behavior Across Groups

Group	Phase 1 Verification	Phase 2 Verification	Decline
Group A	61%	53%	-8%
Group B	44%	29%	-15%
Group C	29%	9%	-20%

The behavioral data on verification attempts reinforces the same pattern of cognitive divergence. Across all groups, verification practices **declined progressively** as the AI system appeared more authoritative. For Group A, the reduction was modest—only **8 points**—showing a relatively stable habit of cross-checking. However, for Group B, verification dropped **15 points**, and for Group C, the fall was catastrophic at **20 points**.

This data suggests that **AI authority suppresses verification behaviors**. Students with limited digital literacy are more likely to assume that well-presented information is inherently correct, while stronger students retain the instinct to question. The experiment thus exposes an important psychological mechanism: professional formatting and academic tone do not simply encourage passive acceptance — they **actively inhibit cognitive vigilance**.

Even among the most skilled learners (Group A), the 8-point decline signals that the impact of AI credibility is universal. While training can mitigate the effect, it cannot eliminate it entirely. This has deep implications for how universities must **teach digital skepticism as a skill**, rather than assuming it develops naturally.

4.3.3. Error Detection and Critical Awareness

Table 6: Error Detection and Critical Awareness Across Groups

Group	Phase 1 Detection	Phase 2 Detection	Change
Group A	47%	57%	↑ 10%
Group B	55%	41%	↓ 14%
Group C	37%	22%	↓ 15%

Group A's **improved error detection rate (from 47% to 57%)** is particularly revealing. It shows that well-prepared students not only maintain skepticism but can become more alert after exposure to misinformation. This indicates the formation of what can be called **cognitive resilience** — the ability to strengthen analytical skills under deceptive conditions.

In contrast, Groups B and C demonstrated notable regression. Their error detection declined by **14 points and 15 points respectively**, meaning that once the AI system adopted a professional tone and coherent structure, it effectively **overrode their natural caution**. Many students accepted false statements about Egyptian monuments, rituals, and chronology as authentic simply because the AI presented them confidently.

Interestingly, Group B initially began with a slightly higher detection rate (55%) than Group A (47%) during Phase 1, but this reversed after misinformation exposure (41% vs. 57%). This inversion highlights a crucial insight: **awareness without systematic training is fragile**. Students may initially recognize the importance of fact-checking but still fall into cognitive complacency when faced with authoritative digital outputs.

These patterns confirm that consistent, structured training in critical verification — not just awareness — is what builds lasting resistance to deceptive AI content. Without it, even well-intentioned learners become vulnerable to the persuasive illusion of technological accuracy.

4.3.4. Summary Interpretation Across Groups

A broad interpretation of the combined results reveals a **progressive cognitive divergence** between the three groups.

- **Group A** exhibited the strongest resilience, maintaining high accuracy and even improving in error detection.
- **Group B** displayed unstable trust-accuracy dynamics — as trust rose sharply, performance fell proportionally.

- **Group C** showed a complete collapse in verification and factual integrity, with the largest trust surge and steepest accuracy drop.

The **inverse relationship** between trust and accuracy — consistent across all groups — forms one of the study's central findings. The more confident and professional the AI's responses appeared, the less critical engagement occurred, especially among lower-skill participants. This pattern suggests that AI's **linguistic fluency and visual polish act as cognitive amplifiers**, increasing users' confidence while simultaneously decreasing analytical scrutiny.

In educational contexts, this is profoundly significant. The findings illustrate that **misinformation in AI-driven learning** does not merely lead to factual errors; it reshapes cognitive habits and learning behaviors. Students begin to internalize a **false sense of certainty**, mistaking technological sophistication for epistemic authority.

Therefore, integrating **digital verification literacy** into heritage and tourism education is no longer optional — it is an urgent necessity. Teaching students how to question, cross-check, and verify digital sources must become as essential as teaching content knowledge itself. Without this safeguard, AI-generated misinformation could easily infiltrate cultural education and, over time, distort the interpretation of heritage narratives that are central to Egyptian identity and global understanding of ancient civilization.

5. Discussion

The experimental findings of this study offer valuable insights into how AI-generated misinformation reshapes students' learning behavior, trust, and cognitive evaluation within academic contexts — particularly in disciplines grounded in historical authenticity, such as Egyptology and Tourist Guidance. The results clearly demonstrate that exposure to manipulated digital content has measurable psychological and educational consequences that extend beyond mere factual misunderstanding.

Students with weaker digital literacy exhibited a dramatically higher vulnerability to deceptive AI outputs. For instance, 90% of Group C expressed complete confidence in the accuracy of fabricated information, even when it directly contradicted established Egyptology facts. This result is deeply concerning, as it underscores the extent to which technological authority can override critical reasoning in educational environments (Schei et al. 2024; Stöhr et al., 2024).

Verification behaviors also declined substantially across all groups. Group A's verification dropped from 61% to 53%, Group B's from 44% to 29%, and Group C's from 29% to 9%. These progressive declines align with the findings of Wardle and Derakhshan (2017) and with empirical work showing that repeated exposure to convincing misinformation reduces the cognitive incentive to check sources (Wineburg and McGrew, 2019). In this study, that confusion manifested as misplaced confidence and passive acceptance of AI-generated content.

Group A maintained the highest resilience, with 66% accuracy and a 10% improvement in error detection (from 47% to 57%), demonstrating that proper digital training cultivates cognitive resistance under pressure (Wang et al., 2025). This finding provides empirical confirmation that digital literacy is not merely a technical skill — it is a form of epistemic discipline that protects learners from algorithmic persuasion (Deng et al., 2024; Viberg et al., 2024).

Within the field of tourism and heritage education, these findings carry significant professional implications. A concerning 88% of Group C described the deceptive AI platform

as “more professional and credible” than human instruction, despite 69% of their work containing factual inaccuracies about ancient Egypt. This highlights a fundamental danger: as AI tools grow more sophisticated, students may begin to conflate presentation quality with truth, blurring the boundaries between accurate knowledge and fabricated narratives (Hughes et al., 2021; Sivathanu et al., 2024).

The inverse correlation between trust and accuracy observed in Groups B and C (−22 and −30 points, respectively) mirrors findings showing that detailed, fluent explanations from deceptive systems increase perceived credibility (Danry et al., 2024) and parallels broader evidence that students often overt rust polished AI outputs (Stöhr et al., 2024; Schei et al., 2024). This psychological mechanism — where explanation equals credibility — suggests that educators must explicitly teach students to separate eloquence from evidence (Wineburg and McGrew, 2019).

Furthermore, the cascading error rates (69% in Group C, 52% in Group B) indicate a critical weakness in existing educational frameworks. Without systematic verification habits, students risk internalizing inaccuracies that may persist into their professional practice — a particularly troubling prospect in tourism and heritage sectors where misinformation can distort cultural representation (Stroebel, 2023; Sivathanu et al., 2024).

Current digital literacy curricula often focus on tool usage rather than critical reasoning. This research argues for a paradigm shift: universities must embed verification literacy as a core learning outcome. Such training should involve deliberate exposure to false or ambiguous AI content, encouraging students to engage in cross-referencing, lateral reading, and ethical evaluation — approaches with demonstrated efficacy in improving detection skills (Wineburg and McGrew, 2019; Schei et al., 2024).

Moreover, heritage education demands additional nuance. Ethical awareness and cognitive skepticism must be treated as essential competencies in AI-mediated disciplines (Tinmaz et al., 2022; Yan et al., 2023). In heritage and Egyptology, this is not only a matter of academic integrity but of cultural preservation — ensuring that digital systems do not distort or appropriate ancient narratives for algorithmic convenience. Technical countermeasures (deepfake detection, provenance tracking) are necessary but insufficient without parallel pedagogical training (Juefei-Xu et al., 2021; Hughes et al., 2021).

Beyond classroom implications, the findings raise broader ethical concerns. If AI systems can shape belief structures within controlled educational settings, their unchecked use in tourism promotion, museum interpretation, or heritage storytelling could have global cultural repercussions (Stroebel, 2023;Sivathanu et al., 2024). Therefore, integration must be governed by clear verification practices, transparent provenance, and domain-expert oversight.

The study therefore contributes not just empirical data but also a strategic warning: universities, museums, and heritage organizations must move from passive AI adoption to critical AI integration, guided by transparency, verification, and cultural ethics (Viberg et al., 2024; Deng et al., 2024). AI should not replace human expertise but serve as a catalyst for critical reflection and deeper understanding.

6. Recommendations

6.1. Core Research Conclusions

The study revealed that AI-generated misinformation has a strong psychological and cognitive effect on learners. Students in Groups B and C kept high confidence levels (81% and 90%) even when exposed to false information, showing that professional formatting and

fluent language can easily override logical reasoning. The sharp accuracy drops—16 points in Group A, 22 in Group B, and 30 in Group C—prove that appearance often persuades more than truth.

Digital literacy clearly acted as a protective factor. Group A maintained 66% accuracy, with 53% still verifying information and a 10% rise in error detection. These results show that digital literacy strengthens alertness and critical thinking. Students trained to verify sources are less likely to be deceived by professional-looking AI content.

Finally, trust rose while verification declined—trust increased 22 points in Group B and 29 in Group C, while verification fell 15 and 20 points. This inverse pattern shows that when AI appears authoritative, students stop questioning its accuracy. Education must therefore rebuild habits of verification and skepticism toward digital sources.

6.2. Applied Educational Implications

Universities should make **digital verification literacy** a formal learning outcome, especially in tourism, heritage, and Egyptology programs. The large accuracy declines in Groups B and C show that current teaching methods leave students vulnerable. Students need structured practice in judging credibility, spotting AI hallucinations, and checking historical data.

AI should be reframed not as an information authority but as a **training tool** that develops verification and reasoning skills. Group A's progress—53% verification and better error detection—proves that critical engagement can be taught. Educators can design assignments where students must critique AI responses, document inconsistencies, and reflect on their findings.

Clear **academic integrity policies** must guide the ethical use of AI-generated content. The 90% trust rate in Group C despite 69% errors shows confusion between professional style and factual accuracy. Institutions should require transparency when using AI tools and enforce verification documentation in coursework.

Faculty also need support. Instructor-led training should teach how to supervise AI use effectively, model fact-checking behavior, and debrief students after AI-based activities. Well-trained educators can directly reduce over-trust and help students maintain a balanced view of AI.

Finally, **national digital literacy initiatives** should become an educational priority. The fast behavioral shifts—within just four days—show how quickly AI can influence learning. Policymakers must ensure that all tourism and heritage programs include measurable digital skepticism and ethical AI awareness as part of academic standards.

6.3. Future Research Directions

Future research should explore how AI misinformation affects other disciplines such as archaeology, linguistics, and museum studies. Long-term studies are needed to track how repeated exposure changes reasoning and memory.

Further work should classify misinformation types—factual, interpretive, linguistic, and visual—to see which causes the most confusion. Comparing AI tools with different accuracy and transparency levels could also clarify how trust develops.

Finally, new educational models that teach **active error detection** show strong promise. Group A's 10-point improvement proves that deliberate practice builds cognitive resilience. Future studies should design digital tools that encourage verification (Driscoll, 2025)—AI

systems that highlight uncertain data or promote cross-checking—to turn misinformation risk into an opportunity for deeper learning.

7. Conclusion

This study explored how AI-generated misinformation affects student learning, trust, and critical thinking in higher education—specifically within the disciplines of Egyptology and Tourist Guidance. Through a controlled experimental design involving 90 students divided into three skill-based groups, the research revealed how deceptive AI content can reshape cognition and perception in digital learning.

Three main patterns emerged. First, factual accuracy declined sharply across all groups—16 points in Group A, 22 in Group B, and 30 in Group C—showing that professional language and presentation often override factual reasoning. Second, trust increased dramatically as accuracy dropped, revealing a clear inverse relationship. Third, verification behavior collapsed, with Group C showing the most severe decline (29% → 9%). Together, these findings highlight how surface credibility can distort analytical judgment when digital skepticism is weak.

Group A's results demonstrated that digital literacy acts as a strong defense. Their 66% accuracy, 53% verification rate, and 10% improvement in error detection show that training can build resistance to misinformation. In contrast, Groups B and C—less digitally skilled—became overconfident and less critical, proving that technical fluency alone is not enough without critical evaluation habits.

The findings confirm that AI-generated misinformation represents a modern educational risk. Unlike traditional misinformation, it mimics human writing convincingly, masking factual errors under fluent expression and design. The fact that 88% of Group C students found the system "professional" despite major inaccuracies illustrates this illusion of authority.

These results underline the urgent need for systematic training in verification and ethical AI use. Students must learn to question, cross-check, and reflect before trusting digital information. Education should reframe AI from a source of truth into a learning partner that teaches critical evaluation and digital responsibility.

Ultimately, this research highlights a key paradox: the more advanced AI becomes, the less students question it. Preserving academic integrity and cultural authenticity—especially in heritage and tourism education—requires turning AI from a passive source of knowledge into an active tool for critical learning and ethical awareness.

References

Al-Abdullatif AM, Alsubaie MA. (2024). ChatGPT in Learning: Assessing Students' Use Intentions through the Lens of Perceived Value and the Influence of AI Literacy. *Behavioral Sciences*, 14(9):845. https://doi.org/10.3390/bs14090845

Alkaissi, H., & McFarlane, S. I. (2023). Artificial hallucinations in ChatGPT: Implications in scientific writing. *Cureus*, 15(2). https://doi.org/10.7759/cureus.35179

Ana Elisa Sousa & Paula Cardoso & Francisco Dias. (2024). The Use of Artificial Intelligence Systems in Tourism and Hospitality: The Tourists' Perspective, Administrative Sciences, *MDPI*, vol. 14(8), pages 1-23, August.

Argyrou, A., & Agapiou, A. (2022). A review of artificial intelligence and remote sensing for archaeological research. *Remote Sensing*, 14(23), 6000. https://doi.org/10.3390/rs14236000

Athaluri SA, Manthena SV, Kesapragada VSRKM, Yarlagadda V, Dave T, Duddumpudi RTS. (2023). Exploring the Boundaries of Reality: Investigating the Phenomenon of Artificial Intelligence Hallucination in Scientific Writing Through ChatGPT References. *Cureus*. 2023 Apr 11;15(4):e37432. doi: 10.7759/cureus.37432. PMID: 37182055; PMCID: PMC10173677. https://pubmed.ncbi.nlm.nih.gov/37182055/

Bhattacharyya M, Miller VM, Bhattacharyya D, Miller LE. (2023). High Rates of Fabricated and Inaccurate References in ChatGPT-Generated Medical Content. *Cureus*. 2023 May 19;15(5):e39238. doi: 10.7759/cureus.39238. PMID: 37337480; PMCID: PMC10277170. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10277170/

Birhane, A. (2021). Algorithmic injustice: A relational ethics approach to algorithmic systems. *Philosophy & Technology*, 34, 1-25. https://doi.org/10.1007/s13347-021-00470-5

Caldevilla-Domínguez, D., Martínez-Sala, A.-M., & Barrientos-Báez, A. (2021). Tourism and ICT: Bibliometric study on digital literacy in higher education. *Education Sciences*, 11(4), 172. https://doi.org/10.3390/educsci11040172

Ceccarelli, S., Cesta, A., Cortellessa, G., De Benedictis, R., Fracasso, F., Leopardi, L., Ligios, L., Lombardi, E., Malatesta, S. G., Oddi, A., Pagano, A., Palombini, A., Romagna, G., Sanzari, M., & Schaerf, M. (2024). Evaluating visitors' experience in museum: Comparing artificial intelligence and multi-partitioned analysis. *Digital Applications in Archaeology and Cultural Heritage*, 33, e00340. https://doi.org/10.1016/j.daach.2024.e00340

Christensen, J., Hansen, J.M., & Wilson, P. (2024). Understanding the role and impact of Generative Artificial Intelligence (AI) hallucination within consumers' tourism decision-making processes. *Current Issues in Tourism*, 28, 545 - 560.

Danry, V., Pataranutaporn, P., Groh, M., Epstein, Z., & Maes, P. (2024). Deceptive AI systems that give explanations are more convincing than honest AI systems and can amplify belief in misinformation. ArXiv, abs/2408.00024.

Deng, R., Jiang, M., Yu, X., Lu, Y., & Liu, S. (2024). Does ChatGPT enhance student learning? A systematic review and meta-analysis of experimental studies. *Computers & Education*. Advance online publication. https://doi.org/10.1016/j.compedu.2024.105224

Driscoll, P. (2025). A tool to teach students about AI misinformation and generative conversational AI responses. arXiv. https://arxiv.org/pdf/2504.13859.pdf

Floridi, L. (2019). Translating Principles into Practices of Digital Ethics: Five Risks of Being Unethical. *Philosophy & Technology*, 32, 185 - 193. https://doi.org/10.1038/s42256-019-0058-3

Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. Centre for Curriculum Redesign.

Hughes, R. T., Zhu, L., & Bednarz, T. (2021). Generative adversarial networks–enabled human–artificial intelligence collaborative applications for creative and design industries: A systematic review of current approaches and trends. *Frontiers in Artificial Intelligence*, 4, Article 604234. https://doi.org/10.3389/frai.2021.604234

Ji, Z., Lee, N., Frieske, R., Yu, T., Su, D., Xu, Y., Ishii, E., Bang, Y., Chen, D., Dai, W., Madotto, A., & Fung, P. (2022). Survey of Hallucination in Natural Language Generation. *ACM Computing Surveys*, 55, 1 - 38. https://doi.org/10.1145/3571730

Jiang, S., Zhang, Z., Xu, H., & Pan, Y. (2024). What influences users' continuous behavioral intention in cultural heritage virtual tourism: Integrating experience economy theory and SOR model. *Sustainability*, 16(23), 10231. https://doi.org/10.3390/su162310231

Juefei-Xu, F., Wang, R., Huang, Y., Guo, Q., Ma, L., & Liu, Y. (2021). Countering Malicious DeepFakes: Survey, Battleground, and Horizon. *International Journal of Computer Vision*, 130, 1678 - 1734.

Koo, C., Xiang, Z., Gretzel, U., & Sigala, M. (2021). Artificial intelligence (AI) and robotics in travel, hospitality and leisure. *Electronic Markets*, 31, 473–476. https://doi.org/10.1007/s12525-021-00494-z

Laohaviraphap, N., & Waroonkun, T. (2024). Integrating artificial intelligence and the Internet of Things in cultural heritage preservation: A systematic review of risk management and environmental monitoring strategies. *Buildings*, 14(12), 3979. https://doi.org/10.3390/buildings14123979

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence Unleashed: An argument for AI in Education. Pearson / UCL Knowledge Lab.

Martín-Moncunill, D., & Alonso Martínez, D. (2025). Students' Trust in AI and Their Verification Strategies: A Case Study at Camilo José Cela University. Education Sciences. 15(10), 1307. https://doi.org/10.3390/educsci15101307

McGrath, C. (2024). Generative AI chatbots in higher education: A review of an emerging research area. Higher Education, 88, 601–622. https://doi.org/10.1007/s10734-024-01288-w

Media & Learning.eu. (2025). Media literacy in an AI age: What we can learn from the evidence. Retrieved March 2025 from https://media-and-learning.eu/subject/media-literacy/media-literacy-in-an-ai-age-what-we-can-learn-from-the-evidence/

Nazaretsky, Tanya & Mejia-Domenzain, Paola & Swamy, Vinitra & Frej, Jibril & Käser, Tanja. (2025). The Critical Role of Trust in Adopting AI-Powered Educational Technology for Learning: An Instrument for Measuring Student Perceptions. Computers and Education: *Artificial Intelligence*. 8. 100368. 10.1016/j.caeai.2025.100368.

OECD (2024). "Artificial Intelligence and tourism: G7/OECD policy paper", OECD Tourism Papers, No. 2024/02, OECD Publishing, Paris, https://doi.org/10.1787/3f9a4d8d-en.

Orea-Giner A, Muñoz-Mazón A, Villacé-Molinero T, Fuentes-Moraleda L. (2022). Cultural tourist and user experience with artificial intelligence: a holistic perspective from the Industry 5.0 approach. *Journal of Tourism Futures*, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JTF-04-2022-0115

Philippopoulos, P. I., Drivas, I. C., Tselikas, N. D., Koutrakis, K. N., Melidi, E., & Kouis, D. (2024). A holistic approach for enhancing museum performance and visitor experience. *Sensors*, 24(3), 966. https://doi.org/10.3390/s24030966

Ryding, K.C., Spence, J., Løvlie, A.S., & Benford, S. (2020). Interpersonalizing Intimate Museum Experiences. International Journal of Human–*Computer Interaction*, 37, 1151 - 1172.

Sánchez-Martín, J.-M., Guillén-Peñafiel, R., & Hernández-Carretero, A.-M. (2025). Artificial Intelligence in Heritage Tourism: Innovation, Accessibility, and Sustainability in the Digital Age. *Heritage*, 8(10), 428. https://doi.org/10.3390/heritage8100428

Schei, O. M., Møgelvang, A., & Ludvigsen, K. (2024). Perceptions and use of AI chatbots among students in higher education: A scoping review of empirical studies. *Education Sciences*, 14(8), 922. https://doi.org/10.3390/educsci14080922

Sharawy, F. S. (2023).The Use of Artificial Intelligence in Higher Education: A Study on Faculty Perspectives in Universities in Egypt [Master's Thesis, the American University in Cairo]. AUC Knowledge Fountain. https://fount.aucegypt.edu/etds/2095

Silva, C., & Oliveira, L. (2024). Artificial intelligence at the interface between cultural heritage and photography: A systematic literature review. *Heritage*, 7(7), 3799–3820. https://doi.org/10.3390/heritage7070180

Sivathanu, B., Pillai, R., Mahtta, M., & Gunasekaran, A. (2024). All that glitters is not gold: A study of tourists' visit intention by watching deepfake destination videos. *Journal of Tourism Futures*, 10(2), 218–236. https://doi.org/10.1108/JTF-03-2022-0102

Stöhr, C., Ou, A. W., & Malmström, H. (2024). Perceptions and usage of AI chatbots among students in higher education across genders, academic levels and fields of study. Computers & Education: *Artificial Intelligence*, 7, Article 100259. https://doi.org/10.1016/j.caeai.2024.100259

Stroebel, L., Llewellyn, M., Hartley, T., Ip, T. S., & Ahmed, M. (2023). A systematic literature review on the effectiveness of deepfake detection techniques. *Journal of Cyber Security Technology*, 7(2), 83–113. https://doi.org/10.1080/23742917.2023.2192888

Tınmaz, H., Lee, Y., Fanea-ıvanovici, M., & Baber, H. (2022). A systematic review on digital literacy. *Smart Learning Environments*, 9, Article 21. https://doi.org/10.1186/s40561-022-00204-y

Viberg, O., Cukurova, M., Feldman-Maggor, Y., Alexandron, G., Shirai, S., Kanemune, S., Wasson, B., Tømte, C., Spikol, D., Milrad, M., Coelho, R., & Kizilcec, R. F. (2024). What explains teachers' trust in AI in education across six countries? *International Journal of Artificial Intelligence in Education* 35, 1288–1316. https://doi.org/10.1007/s40593-024-00433-x

Wang, F., Li, N., Cheung, A.C., & Wong, G.K. (2025). In GenAI we trust: An investigation of university students' reliance on and resistance to generative AI in language learning. *International Journal of Educational Technology in Higher Education*, 22(1), Article 76. https://doi.org/10.1186/s41239-025-00547-9

Wardle, C., & Derakhshan, H. (2017). Information disorder: Toward an interdisciplinary framework for research and policy making. Council of Europe Report. https://rm.coe.int/information-disorder-report-november-2017/1680764666

Wilbrink, H., & Roberson, J. A. (2023). CLEO: The Artificial Intelligence Egyptology Platform. In R. Lucarelli & J. A. Roberson (Eds.), Ancient Egypt, New Technology (pp. 592–604). Brill. (Chapter/pdf available via Brill / Digital Egyptology project pages). https://digitalegyptology.org/ai/projects/

Wineburg, S., & McGrew, S. (2019). Lateral Reading and the Nature of Expertise: Reading Less and Learning More When Evaluating Digital Information. Teachers College Record: *The Voice of Scholarship in Education*, 121(11), 1-40. https://doi.org/10.1177/016146811912101102

Yan, L., Sha, L., Zhao, L., Li, Y., Maldonado, R.M., Chen, G., Li, X., Jin, Y., & Gašević, D. (2023). Practical and ethical challenges of large language models in education: A systematic scoping review. *Br. J. Educ. Technol.*, 55, 90-112. arXiv preprint. https://arxiv.org/abs/2303.13379

Yi, X., Fu, X., Lin, V. S., & Xiao, H. (2021). Integrating Authenticity, Well-being, and Memorability in Heritage Tourism: A Two-Site Investigation. *Journal of Travel Research*, 61(2), 378-393. https://doi.org/10.1177/0047287520987624 (Original work published 2022)

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—where are the educators? *International Journal of Educational Technology in Higher Education*, 16, Article 39. https://doi.org/10.1186/s41239-019-0171-0

Zhai, C., Wibowo, S. & Li, L.D. (2024). The effects of over-reliance on AI dialogue systems on students' cognitive abilities: a systematic review. Smart Learn. Environ. 11, 28 (2024). https://doi.org/10.1186/s40561-024-00316-7

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الذَّكاءُ المُضَلِّلُ: دراسةٌ تجريبيةٌ حول تأثيرِ أنظمةِ الذكاءِ الاصطناعيّ المُتلاعَبِ ببياناتِها على طلابِ تخصّصَي علمِ المصرياتِ والإرشادِ السياحيّ

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معلومات المقالة

الكلمات المفتاحية
المعلومات المضللة؛ التحقق الرقمي؛ تعليم التراث؛ الثقافة الرقمية؛ الأصالة الثقافية؛ النزاهة الأكاديمية؛ التفكير النقدي.

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الملخص

تتناول هذه الدراسة التأثيرات المعرفية والتعليمية الناتجة عن تفاعل طلاب الجامعات مع أنظمة الذكاء الاصطناعي التي تُنتج محتوى قائمًا على بيانات مُعدّلة أو مُضلِّلة، في سياق تخصّصي علم المصريات والإرشاد السياحي. وتركّز على تحليل كيفية تأثير المعلومات المولَّدة آليًا في وعي الطلاب وقدرتهم على تقييم مصداقية المصادر والتحقق من دقة المعلومات والحفاظ على التفكير النقدي في بيئات التعلم الرقمية.

أُجريت الدراسة كبحث تجريبي مضبوطة الحالة في جامعة عين شمس، بمشاركة تسعين طالبًا من قسم الإرشاد السياحي، حيث تمت مقارنة نتائج التعلم عند تفاعلهم مع محتوى دقيق وآخر صيغ عمدًا بمعلومات مضللة من نظام ذكاء اصطناعي. ولتحقيق ذلك، صُمّم موقع إلكتروني خاص يدمج روبوت محادثة ذكي مع قاعدتي بيانات: الأولى تضم معلومات موثقة، والثانية تحتوي على بيانات غير دقيقة بأسلوب احترافي حول التراث المصري القديم. أنجز الطلاب مهام بحثية واستبيانات لقياس الثقة وسلوكيات التحقق ودقة الأداء الأكاديمي.

اعتمد التصميم التجريبي الداخلي على جعل كل مشارك مجموعة ضابطة لنفسه، مما أتاح مقارنة مباشرة بين أدائه عند التعامل مع معلومات صحيحة وأخرى مضللة، مع تطبيق تحليلات كمية ونوعية لتتبع الأنماط المعرفية والاستجابات السلوكية.

أظهرت النتائج علاقة عكسية بين الثقة والدقة؛ فكلما ارتفع إدراك الطلاب لمصداقية النظام انخفضت دقتهم. إذ بلغت دقة المجموعة (A) ذات المهارات الرقمية العالية ٦٦%، مقابل ٣١% للمجموعة (C) الأقل مهارة. وتبرز الدراسة كأول دليل تجريبي في علم المصريات والتعليم السياحي يوضح أثر "هلوسات الذكاء الاصطناعي" على الإدراك الأكاديمي، مؤكدة ضرورة دمج مهارات التحقق الرقمي والوعي الأخلاقي ضمن مناهج التراث والسياحة لضمان النزاهة الأكاديمية وحماية الأصالة الثقافية.