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The effectiveness of using ChatGPT as a reference source in supporting students' academic courses: an experimental study

Research – English Summary

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Abstract

The study aims to evaluate the effectiveness of using generative artificial intelligence (ChatGPT) technology as a reference source in supporting the learning of the "Specialized Sources and References" course among fourth-year students in the Libraries and Information Division, Department of Documents, Libraries and Information, Faculty of Arabic Language, Al-Azhar University, Assiut Branch. The study seeks to analyze the extent to which students rely on ChatGPT technology in searching for concepts and reference information, and to compare the content it provides with traditional sources Measuring the impact of its use on developing skills to distinguish between types of sources and references, , identifying the most prominent challenges they face, and proposing mechanisms to employ it effectively in academic specialization. The study followed the experimental approach, and the study sample included (60) students, including (30 students) for the experimental group, which used ChatGPT technology as an auxiliary source in studying the course included in the training program, and the control group (30 students) relied on traditional paper and digital sources, and the data was collected using a controlled questionnaire that was applied before and after, while the results revealed a noticeable improvement in the performance of the experimental group after using ChatGPT The degree of approval of the tool's effectiveness in enhancing comparison skills between sources in terms of reliability and validity increased from (43.3%) to (73.3%), and the arithmetic mean improved from (2.17) to (2.67). The results showed a positive trend towards integrating the tool into curricula, and the effectiveness of training workshops in raising the efficiency of use. The study recommended integrating ChatGPT technology and artificial intelligence tools into courses of a reference and research nature. Organize regular training programs for students and faculty on the proper academic use of artificial intelligence technologies.

Keywords
ChatGPT, Generative Artificial Intelligence, Reference resources, Library and Information Students.

1. Research Overview and Methodology

The study utilized an experimental approach to measure how AI impacts student learning in the "Specialized Sources and References" course.

1.1 Study Population and Sample

The research was conducted at the Al-Azhar University branch in Assiut, involving a total of 121 students. From this population, a representative sample of 60 students was selected and divided into two equal groups:

Group	Size	Methodology
Experimental Group	30 Students	Used ChatGPT as a primary supportive reference source during the study period.
Control Group	30 Students	Relied on traditional paper and digital sources (books, notes, traditional databases).

1.2 Procedures

- **Timeline:** The experiment lasted four weeks during the second semester of the 2024–2025 academic year (March and April).
- **Tools:** The researcher employed pre-tests and post-tests to measure knowledge levels, alongside a verified survey (questionnaire) and structured observation to track student interactions with the AI.
- **Evaluation Metrics:** Data was analyzed using the T-Test and the SPSS statistical package to determine the significance of performance differences.

2. Key Objectives and Hypotheses

The study aimed to answer several critical questions regarding the intersection of AI and library science education:

- **Skill Development:** Measuring the effectiveness of ChatGPT in developing skills required to distinguish between different types of sources and references.
- **Quality Comparison:** Comparing the accuracy and quality of information provided by ChatGPT against traditional, approved university references.
- **Student Adoption:** Identifying the extent to which students rely on ChatGPT for defining concepts and specialized scientific content.
- **Challenges:** Monitoring the obstacles students face, such as technical issues or content bias.

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3. Analysis of Findings

The results indicate a transformative potential for ChatGPT in the academic environment, provided it is used as a "helper" rather than a total replacement.

3.1 Performance Improvements

The experimental group showed a significant statistical advantage over the control group in post-test results:

- **Reliability and Validity:** Approval ratings regarding the tool's effectiveness in enhancing comparison skills between sources (in terms of reliability) rose from **43.3% to 73.3%**.
- **Arithmetic Mean:** The overall performance mean improved from **2.17 to 2.67** following the integration of ChatGPT.
- **Source Discrimination:** Students using AI were better able to categorize and utilize specialized references.

3.2 Information Quality

The study found that ChatGPT provides high-quality reference information that often matches or even exceeds the speed and accessibility of traditional paper and digital sources, particularly for defining complex concepts and providing scientific explanations.

3.3 Student Attitudes

The results revealed a positive trend among students toward the integration of AI. Students reported that the tool facilitated easier access to information and enhanced their critical thinking when comparing AI outputs with traditional textbooks.

4. Challenges and Obstacles

Despite the benefits, the study identified several hurdles that impact the effectiveness of AI in a library science context:

- **Language Barriers:** Challenges related to the accuracy of Arabic language outputs compared to English.
- **Information Bias:** Potential for the AI to provide biased content or "hallucinations" that require rigorous verification.
- **Technical Deficiencies:** Weaknesses in the digital infrastructure of some educational environments and a lack of clear academic policies regarding AI use.
- **Skill Gaps:** Some students struggled with "prompt engineering"—formulating the right questions to extract accurate academic data.

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5. Strategic Recommendations

The study provides a roadmap for educational institutions looking to modernize their curricula:

- **Curriculum Integration:** Formally integrate ChatGPT and similar AI tools into courses that are reference-heavy or research-oriented.
- **Mandatory Training:** Organize regular workshops for both students and faculty members to ensure the "sound academic use" of AI.
- **Infrastructure Support:** Strengthen the technological infrastructure of colleges to allow for seamless AI integration.
- **Verification Mechanisms:** Develop clear mechanisms for students to verify AI-generated information against approved academic sources.

6. Key Definitions as Per the Source

- **ChatGPT:** A linguistic model developed by OpenAI using Generative AI (GPT architecture). It is a cognitive tool capable of producing coherent text based on diverse inputs, used for summarizing, defining concepts, and generating scientific explanations.
- **Artificial Intelligence (AI):** Systems or machines that simulate human intelligence to perform tasks and can iteratively improve themselves based on the information they collect.
- **Effectiveness:** The degree to which a specific tool (in this case, ChatGPT) achieves the educational goals set within a curriculum, measured through behavioral and academic changes in the student.
- **"Not a Replacement":** The study emphasizes that ChatGPT should be viewed as a supportive assistant (*Not a replacement* - ODLIS, 2023) rather than a substitute for human critical thinking or primary source material.

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