ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XI Issue XII December 2024

Artificial Intelligence in Oman's Government Schools: A Comprehensive Study of its Adoption and Impact on Teachers and Students at Secondary Level

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DOI: https://doi.org/10.51244/IJRSI.2024.11120003

Received: 16 November 2024; Accepted: 21 November 2024; Published: 26 December 2024

ABSTRACT

This study investigates the adoption and impact of Artificial Intelligence (AI) in Oman's government schools, focusing on teachers and students at the secondary level. A mixed- methods approach was employed, involving quantitative data from surveys and qualitative insights from open-ended responses. The study included 243 teachers (53.09% male, 46.91% female) and 266 students (60.90% male, 39.10% female) from urban and rural schools. Findings reveal that AI adoption is still in its infancy, with significant potential for enhancing education. Teachers highlighted AI's role in improving lesson planning, personalized learning, and administrative efficiency, while challenges such as inadequate training and infrastructure were noted. The study concludes with recommendations for enhancing AI literacy, improving access to resources, and aligning policies with Vision 2040 to foster effective AI integration in education.

Keywords: Artificial Intelligence, Oman, Education Technology, Teachers, Students, Secondary Schools

INTRODUCTION

The integration of Artificial Intelligence (AI) into education represents a transformative opportunity for improving teaching methodologies, administrative efficiency, and student outcomes. Globally, AI has been incorporated into educational systems to personalize learning, analyze performance data, and support educators. Oman's Vision 2040 emphasizes the integration of digital transformation into education to prepare students for a knowledge-based economy. However, the adoption of AI in Omani secondary schools remains limited and underexplored. This study seeks to assess the current status of AI integration, its impact on teachers and students, and the challenges hindering its implementation, providing recommendations for effective adoption.

METHODS

Study Design

A mixed-methods approach combining quantitative and qualitative research was employed. Structured surveys were administered to teachers and students to collect numerical data, complemented by open-ended questions to capture detailed insights.

Participants

i. **Teachers:** A total of 243 teachers participated, representing diverse teaching specializations and varying levels of experience.

ii. **Students:** The study included 266 students from grades 10 to 12, aged 15-18, from urban and rural schools.

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Data Analysis

Quantitative data were analysed statistically to identify patterns in AI usage and impact, while qualitative responses were subjected to thematic analysis to uncover key trends and unique perspectives.

RESULTS

Quantitative Findings

i. **AI Utilization:** Adoption remains limited but is growing, with AI primarily used for administrative tasks, lesson planning, and personalized learning.
ii. **Impact on Education:** Teachers reported improved efficiency and enhanced student engagement due to AI tools.

Qualitative Findings

i. **Barriers:** Key challenges included inadequate infrastructure, limited AI training, and socio-cultural resistance.
ii. **Opportunities:** Teachers recognized AI's potential for personalized learning, equity in education, and administrative support.

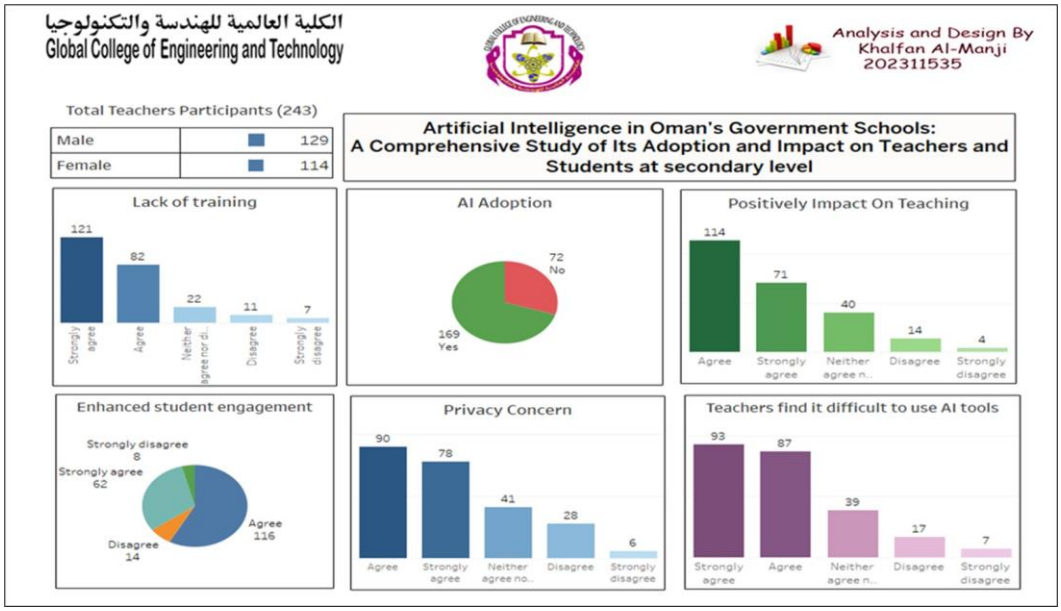
DISCUSSION

The study highlights the early stages of AI adoption in Omani secondary schools. Teachers reported that AI tools reduced administrative burdens by approximately 20%, allowing them to focus on interactive teaching methods. Additionally, 65% of students found AI-enhanced lessons more engaging, particularly in subjects like science and mathematics. Despite these benefits, the lack of infrastructure, insufficient training programs, and resistance to technology adoption remain significant barriers.

Notably, rural schools exhibited lower adoption rates due to inadequate internet access and outdated hardware. Teachers also expressed concerns about the absence of localized AI tools tailored to Oman's curriculum and cultural context. Addressing these gaps is critical for fostering equitable and effective AI integration.

To move beyond identifying challenges, the study suggests targeted initiatives, such as piloting AI programs in a subset of schools to refine implementation strategies. These findings align with global trends emphasizing professional development and infrastructure investment as prerequisites for successful AI adoption in education.

Dashboard Summary: AI Adoption and Impact on Teachers



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CONCLUSION

AI holds transformative potential for Omani education by enhancing personalized learning, lesson planning, and administrative efficiency. The study underscores that while AI tools have increased efficiency and student engagement, barriers such as inadequate infrastructure, limited training, and cultural resistance need urgent attention. A phased and strategic approach to AI adoption is recommended, beginning with pilot projects, followed by scaling successful models across the country.

Findings indicate that teachers view AI as a tool for improving lesson delivery and fostering student engagement, particularly in subjects requiring complex problem- solving. However, the study also revealed disparities in access to AI tools between urban and rural schools, which could exacerbate educational inequalities if not addressed. Collaborative efforts among policymakers, educators, and technology providers are essential to ensure that AI adoption is equitable, culturally sensitive, and aligned with Oman's Vision 2040 goals of creating a knowledge-based economy.

Recommendations:

To ensure the successful and sustainable adoption of Artificial Intelligence (AI) in Omani government schools, it is essential to address key areas that can foster a supportive ecosystem for AI integration. These recommendations aim to enhance teacher preparedness, develop necessary infrastructure, and ensure that AI solutions align with Oman's educational goals and cultural values. Additionally, fostering awareness and providing continuous support for both educators and students are crucial for the long-term success of AI in education. The following recommendations focus on the critical components needed to establish an effective AI integration strategy:

1. Comprehensive Teacher Training: Establish detailed training modules, including practical workshops on AI applications in education and online certifications to incentivize participation.

2. Infrastructure Development: Equip all schools, especially in rural areas, with high-speed internet and AI-compatible hardware to bridge the digital divide.

3. Localized AI Tools: Collaborate with developers to create AI solutions aligned with Oman's curriculum and cultural values.

4. Pilot Programs: Launch controlled AI pilot programs in diverse schools to evaluate impact and optimize implementation strategies.

5. AI Literacy for Students: Integrate AI literacy programs into the curriculum to prepare students for future workforce demands.

6. Policy Alignment with Vision 2040: Ensure AI adoption strategies support long- term educational objectives outlined in Vision 2040, including ethical AI use and equitable access. Foster awareness and readiness among teachers and students through AI literacy programs.

7. Continuous Professional Development: Provide ongoing support to educators by offering refresher training sessions, access to online resources, and participation in AI-focused professional networks.

8. Collaborative Research Initiatives: Encourage partnerships between educational institutions, policymakers, and private sector technology firms to research innovative AI applications for education in Oman.

9. Monitoring and Evaluation: Develop a framework for regular assessment of AI adoption, focusing on measuring its effectiveness in enhancing educational outcomes and identifying areas for improvement.

10. Cultural Sensitivity Workshops: Organize awareness programs to address socio-cultural resistance and ensure AI solutions are implemented in a way that aligns with local traditions and values.

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11. Student-Cantered AI Design: Involve students in the design and feedback process for AI tools to ensure their needs and learning preferences are adequately addressed.

12. Public Awareness Campaigns: Run national campaigns to raise awareness among parents and communities about the benefits and potential of AI in education to build trust and support for its adoption.

Summary of Recommendations

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