Literature Review Outline

Subject : Utilising and adapting IoT technology in secondary education in developing countries/Saudi

Introduction

The Internet of Things (IoT) is a vital technology that has just come into its own and has the potential to revolutionize many facets of society. The sector of education, particularly secondary school, is one area where the IoT has the potential to make a significant difference.

Utilizing and Adopting IoT technology in secondary education in Saudi Arabia presents both challenges and opportunities. The educational system in Saudi Arabia is swiftly adopting new technology to raise the standard of instruction and promote student learning (Alharbi et al., 2019). However, in developing countries like Saudi, there is a gap in IoT utilization by HEIs for e-learning, according to recent academic research, but according to data, IoT use in higher education is still in its early stages (Madni et al., 2022).

Search Methodology

The essential elements of a search strategy are locating pertinent databases; utilizing keywords and topic headers; applying Boolean operators (AND, OR, NOT); utilizing truncation and wildcards; looking for secondary sources literature; and maintaining a search log. Use keywords and subject headers to make sure the material is completely covered. To intelligently combine search words, use Boolean operators. To find variants of your terms, search using truncation and wildcards.

Body

- Overview of IoT:
  The phenomenon known as the Internet of Things describes a vast, interconnected network of devices that are linked together and engage in communication with one another with the Internet, the primary goal of the Internet of Things (IoT) idea is to turn ordinary devices into intelligent, autonomous appliances that can be controlled online at any time and from any location (Sreekanthav et al., 2020).

- Overview IoT technologies in Education :
  The monitoring of student physiological data alongside the estimation of their attention and involvement are two areas where IoT sensors and devices are used (Yeh et al., 2020).

  IoT technology may be employed to gather and utilize data in order to improve educational outcomes, assist in the achievement of learning objectives, and promote operational efficiency in schools (Suduc et al., 2018).

  IoT items may be integrated in schools as instructional tools and end products to support successful efficient instruction and practical learning (Fidai et al., 2019).

By utilizing less energy, the use of IoT in the creation of a smart educational system can reduce energy consumption (Vinayachandra & Krishna Prasad, 2020).

IoT has a beneficial effect on Saudi Arabia's higher education facilities and educational system (Abed et al., 2019).

- factors influencing the adoption of the IoT technologies for secondary education:
  Students showed less interest in digital learning, together with a high e-learning cost is another reason why they are less inclined to use it frequently (Saputra et al., 2020).

  For the implementation of IoT-based E-Learning in high education, the researchers emphasized organizational impacting variables such as infrastructure preparedness, financial restrictions, training, and online monitoring (Madni et al., 2022).

  The most important factor in determining whether to accept any IoT services or solutions is attitude and a digital mentality (May Amy et al., 2020).

  Adoption of the IoT is affected by unfavorable considerations such as privacy and security threats, interoperability issues, dependability issues, inadequate infrastructure, underqualified IT staff (Tripathi & Pandit, 2019).

- IoT Adoption in Education :
  STEM topics like physics, informatics, and electronics may be taught using IoT sensor data, enabling students to comprehend and increase awareness of aquatic ecosystems (Tziortzioti et al., 2019).

  Two approaches are used to integrate IoT into engineering education: one includes introducing students to IoT using a case study work, and the other involves adding IoT expertise into experimental and practical courses (Alharbi, 2020).

  STEM learning processes may be improved with the use of the Internet of Things (IoT), a new technological platform (Kusmin, 2019).

- Importance role of IoT in Education = (Advantages of IoT in the Education Sector):
  IoT can expand the geographic reach of education, enabling students in rural areas to obtain high-quality education (Vinayachandra & Krishna Prasad, 2020).

  Concerningly, female students in Saudi Arabia absent substantially more school than male pupils, which raises questions about the country's high absenteeism rates (Sideridis & Alamri, 2023).

- Challenges of adopting IoT in Saudi for education:

IoT acceptance and prospective applications are still limited, particularly in developing countries, even though a number of educational institutions have implemented IoT on their campuses (Al-Emran et al., 2019).

Adoption of technology poses several challenges, including managing complex digital data, guaranteeing data security and dependability, dealing with the complexity of new technologies, assuring access to technology, and responding to changing demands (Mohammadian, 2019).

Safdar et al. (2019) highlights challenges and issues related to IoT in education, such as financial resources, complexity, ethics, trust, privacy, quality, and data security. Implementing IoT in education requires specialized technical expertise and resources, while addressing these issues is crucial for effective and responsible implementation.

The MoE and Civil Defense have tightened laws that put pressure on schools to achieve infrastructure, health, and safety requirements, creating obstacles for the education sector, 40% of the private schools in Riyadh break these rules, necessitating their transfer or liquidation (Knight Frank Research Reports, 2021).

Conclusion

- The Internet of Things has the potential to improve the learning experience of Saudi secondary school pupils.
- There exist numerous challenges that require addressing, including the requirement for sufficient infrastructure, professional development for educators, and student involvement.
- Further research is needed to understand factors influencing successful IoT technology implementation and adoption in Saudi Arabia's secondary education, including student learning outcomes and teachers' role in facilitating technology utilization.

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