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THE ROLE OF EMERGING TECHNOLOGIES IN SUPPORTING INCLUSIVE EDUCATION FOR STUDENTS WITH SPECIAL EDUCATIONAL NEEDS AND DISABILITIES

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INTRODUCTION

The rapid development of emergent technologies like AI, virtual reality, and online platforms is transforming higher education. These **tools** challenge traditional teaching methods and demand a critical reassessment of **their impact on student engagement, academic performance, and teaching practices**. Especially after the COVID-19 pandemic, integrating digital tools has become **essential** for creating interactive and inclusive learning environments.(Mendoza et al., 2024)

SPECIAL EDUCATIONAL NEEDS AND DISABILITIES (SEND)

The term ***Special Educational Needs and Disabilities (SEND)*** is widely used in educational policy and research to describe children and young people who experience barriers to learning due to cognitive, physical, sensory, emotional, or behavioral differences.

According to the UK Department for Education (2015), a child has SEND if they have a learning difficulty or disability that requires special educational provision.

INCLUSIVE EDUCATION

The emphasis on inclusion in education reflects a dedication to fundamental values such as **fairness, social justice, ethical responsibility, respect for diversity**, and fostering mutual cultural understanding. Inclusive education promotes the **recognition and equal treatment of all individuals** (Booth & Ainscow, 2011).

CURRENT GAPS AND NEEDS IN INCLUSIVE EDUCATION

- **Insufficient Professional Development**
  Teachers often lack access to high-quality training on inclusive pedagogies. Many report feeling underprepared to teach students with diverse needs. Florian & Rouse (2021).
- **Policy-Practice Disconnect**
  There is a gap between inclusive education policies and actual classroom implementation. Teachers may support inclusion ideologically but lack the tools to enact it meaningfully. Booth & Ainscow (2016), Rix et al. (2019).
- **Lack of Research-Informed Practice**
  While research on inclusion is growing, it is not always effectively translated into school practice. More work is needed to bridge the gap between academic theory and real-world application. Sharma, Loreman & Forlin (2019).
- **Equity Issues Across Regions**
  Inclusive education is implemented unevenly across countries and even within regions. Some systems are more advanced, while others lack basic supports. European Agency (2022), Mittler (2019).

EMERGING TECHNOLOGIES

What is an "emergent technology"?

The term "emergent technology" refers to a **new or developing technology** that is either in its early stages or expected to appear soon, potentially causing significant disruption to current systems, industries, or practices. These technologies are often driven by scientific and engineering progress and are typically characterized by their **novelty, fast-paced development, and substantial social and economic influence.** (Mendoza et al., 2024)

EMERGING TECHNOLOGIES

Artificial Intelligence (AI):

AI technologies, including machine learning and natural language processing, are enabling increasingly personalized and efficient services across sectors such as healthcare and education (Topol, 2019; Holmes et al., 2019).

Blockchain:

Blockchain technology is gradually finding its way into school education, enhancing transparency and security in educational data management. In Japan, several private schools have adopted blockchain-based systems to monitor student attendance and track academic progress, creating secure digital student profiles accessible to both educators and parents (Yano et al., 2021). Similarly, in Europe, the **Blockcerts** initiative was piloted in schools in Malta and Finland, using decentralized platforms to issue and verify school certificates and assessment reports.

Augmented Reality (AR) / Virtual Reality (VR): Augmented and virtual reality (AR/VR) technologies have significantly transformed education and training by providing immersive experiences that enhance learning outcomes and learner engagement (Tan et al., 2022).

HOW EMERGING TECHNOLOGIES CAN HELP

Artificial Intelligence (AI)

AI adapts instruction to the student's individual needs

Speech-to-text and immersive readers assist with **dyslexia** and **ADHD** (Yano, Hashimoto, & Suzuki, 2021)

Assistive Technologies

AAC tools and **eye-tracking devices** enable communication

Support for **students with physical or communicative impairments** (Tobii Dynavox, n.d.)

AR & VR Technologies

AR/VR provide **immersive**, multisensory environments for learning

Social/emotional skill practice in a **safe, virtual environment**

Gamified Learning Platforms

Gamification enhances **motivation** and **engagement**

Ideal for **attention issues** and **repetitive learning**

🎮 *Example: TeachTown (ABA-based for autism)*

CHALLENGES

- **Digital divide – unequal access to technology and the internet**
  → Students with SEND often lack adequate equipment or internet access
  (Al-Azawei et al., 2023; European Agency, 2022)
- **Insufficient teacher training**
  → Many educators are not adequately trained in using assistive technologies
  (Flanagan & Scherer, 2021; Schuck et al., 2020)
- **Inaccessible digital platforms**
  → Many tools do not comply with accessibility standards such as WCAG or UDL
  (Al-Azawei et al., 2023)
- **Institutional resistance to innovation**
  → Schools often lack the willingness or infrastructure to implement new approaches
  (UNESCO, 2021; Holmes et al., 2022)
- **Privacy and ethical concerns**
  → Data security and ethical issues regarding sensitive student information
  (Holmes et al., 2022)

FINAL THOUGHTS

Emerging technologies have significant potential to foster inclusive education when pedagogically embedded
(Holmes et al., 2022; Schuck et al., 2020)

Effective inclusion requires universal design and personalized approaches tailored to individual learning profiles
(Al-Azawei et al., 2023; UNESCO, 2021)

Successful implementation depends on multi-stakeholder collaboration, involving educators, technologists, families, and policy-makers
(European Agency, 2022; Flanagan & Scherer, 2021)

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Thank you for your time!