

TVET and Artificial Intelligence: The Readiness of Pupils with Special Educational Needs in the Blind Category**Uvathi Mariappan¹, Saravana A/L Rajalingam¹, Talha Binti Taufik², Norkhairul Azlina Binti Din³, Ganesan A/L Arumugam¹, Arnee Zulia Bt Zainol⁴, Mohd Saleh Abbas⁵**¹*Kolej Matrikulasi Pulau Pinang*²*Institut Pendidikan Guru Kampus Perlis*³*Kolej Matrikulasi Perlis*⁴*Kolej Matrikulasi Kedah*⁵*MILA University, Nilai, Negeri Sembilan, Malaysia***Abstract**

This review article examines the intersection of Technical and Vocational Education and Training (TVET) and artificial intelligence (AI) concerning the readiness of pupils with special educational needs, particularly those who are blind. The integration of AI into TVET presents opportunities to enhance learning outcomes and facilitate independence among blind students. However, understanding the current level of readiness among these pupils, as well as the barriers and facilitators to effective learning, is essential. This article synthesizes existing literature on AI applications in TVET for blind students, identifies gaps in readiness, and proposes strategies to enhance their educational experiences.

1. Introduction

The rapid advancement of artificial intelligence (AI) is reshaping various sectors, including education. Technical and Vocational Education and Training (TVET) programs aim to equip students with practical skills and knowledge necessary for the workforce. For pupils with special educational needs, particularly those who are blind, the integration of AI technologies can provide tailored educational experiences that enhance their learning outcomes and independence (Zhang & Lu, 2020). However, to effectively implement AI in TVET settings for blind students, it is crucial to assess their readiness, including their skills, knowledge, and attitudes toward using AI tools. This article reviews the literature on the readiness of blind pupils in TVET to engage with AI technologies, highlighting the challenges and opportunities that exist.

2. Understanding TVET for Blind Students**2.1 Definition and Importance of TVET**

Technical and Vocational Education and Training (TVET) refers to education and training programs that equip individuals with the skills needed for specific occupations or industries (UNESCO, 2016). TVET is particularly important for individuals with disabilities, as it fosters employability and independence by providing practical skills relevant to the labor market (Schneider & Preckel, 2017). For blind students, TVET can offer pathways to meaningful employment and opportunities to participate fully in society.

2.2 The Role of AI in TVET

Artificial intelligence can significantly enhance TVET by personalizing learning experiences, automating assessments, and providing adaptive technologies that cater to individual needs (Al-Azawei et al., 2019). For blind students, AI tools such as screen readers, navigation aids, and smart assistants can improve access to educational materials and support their learning in various vocational contexts. Understanding how AI can be integrated into TVET programs is essential for preparing blind students for success in their chosen fields.

3. Readiness of Blind Students for AI Integration**3.1 Current Levels of Readiness**

The readiness of pupils with special educational needs, particularly those who are blind, to engage with AI in TVET settings varies widely. Some studies indicate that while certain blind students demonstrate a strong interest in technology, others may lack the necessary skills or confidence to utilize AI tools effectively (Liu et al., 2021). Assessing the current level of readiness among these pupils is critical for identifying areas that require targeted support and intervention.

3.2 Skills and Knowledge Assessment

Effective integration of AI in TVET requires blind students to possess specific skills and knowledge related to technology use. Research has shown that many blind students are proficient in using assistive technologies, yet there is a gap in their familiarity with AI applications (Zhang & Lu, 2020). Regular assessments of students' technological skills can help educators identify their strengths and weaknesses, allowing for more personalized and effective instructional strategies.

4. Barriers to Readiness**4.1 Lack of Access to Technology**

One significant barrier to the readiness of blind students in engaging with AI in TVET is the lack of access to appropriate technologies. Many educational institutions may not have the resources to provide AI-driven tools and assistive technologies necessary for blind students to thrive (Hwang et al., 2021). This lack of access can hinder their ability to engage with the curriculum and limit their opportunities for skill development.

4.2 Insufficient Training for Educators

The readiness of blind students to use AI in TVET is also influenced by the training and preparedness of their educators. Teachers who lack knowledge and skills in AI applications may struggle to effectively support their students, resulting in a missed opportunity for enhancing learning experiences (Al-Azawei et al., 2019). Providing professional development for educators is essential for fostering an environment where blind students can confidently engage with AI technologies.

4.3 Attitudinal Barriers

Attitudinal barriers, both from educators and peers, can also impact the readiness of blind students to engage with AI in TVET settings. Misconceptions about the capabilities of blind individuals may lead to low expectations and reduced opportunities for

participation in technology-enhanced learning (Liu et al., 2021). Addressing these attitudinal barriers through awareness and training initiatives is crucial for promoting an inclusive learning environment.

5. Opportunities for Enhancing Readiness

5.1 Integration of AI in the Curriculum

Incorporating AI into the TVET curriculum can create engaging and relevant learning experiences for blind students. AI-driven tools can provide personalized learning paths, allowing students to progress at their own pace and access materials that suit their learning preferences (Zhang & Lu, 2020). By integrating AI technologies into TVET programs, educators can enhance the educational experience for blind students and better prepare them for the workforce.

5.2 Collaborative Learning Environments

Creating collaborative learning environments can foster peer support and enhance the readiness of blind students in using AI. Group projects and collaborative activities that incorporate AI technologies can help students develop their skills while learning from one another (Hwang et al., 2021). These collaborative experiences can also build confidence and promote a positive attitude toward technology use.

6. Best Practices for Implementation

6.1 Professional Development for Educators

To support the successful integration of AI in TVET for blind students, professional development programs for educators should focus on enhancing their knowledge and skills related to AI applications. Training should include hands-on experiences with AI tools, as well as strategies for effectively teaching blind students (Al-Azawei et al., 2019). By equipping educators with the necessary competencies, they can better support their students' readiness to engage with AI technologies.

6.2 Accessible Resources and Technologies

Ensuring that educational institutions provide accessible resources and technologies is essential for promoting the readiness of blind students in using AI. Schools should invest in AI-driven tools and assistive technologies that cater specifically to the needs of visually impaired learners (Liu et al., 2021). By creating an accessible learning environment, educators can facilitate greater engagement and success for blind students in TVET programs.

6.3 Engaging Stakeholders

Engaging stakeholders, including parents, community organizations, and industry partners, can enhance the readiness of blind students for AI integration in TVET. Collaborative efforts can provide additional resources, mentorship, and real-world experiences that contribute to students' learning and development (Zhang & Lu, 2020). Involving a broader network of support can create a more comprehensive approach to preparing blind students for the workforce.

7. Case Studies and Examples

7.1 Successful Implementation of AI in TVET

Examining case studies of successful AI integration in TVET can provide valuable insights for educators. For instance, some vocational programs have implemented AI-driven tools that assist blind students in developing technical skills relevant to their chosen fields (Hwang et al., 2021). These successful implementations serve as models for other institutions seeking to enhance their programs and support visually impaired learners.

7.2 Best Practices from Leading Institutions

Highlighting best practices from leading institutions that effectively integrate AI in TVET for blind students can inform other educators and policymakers. These practices may include curriculum adaptations, training initiatives, and partnerships with technology providers (Liu et al., 2021). By learning from these examples, educators can develop more effective strategies for enhancing the readiness of blind students in TVET programs.

8. Conclusion

The readiness of pupils with special educational needs in the blind category to engage with artificial intelligence in Technical and Vocational Education and Training is crucial for fostering their independence and employability. While there are significant barriers to readiness, including lack of access to technology and insufficient training for educators, there are also opportunities to enhance learning experiences through the integration of AI in the curriculum. By investing in professional development, creating accessible learning environments, and engaging stakeholders, educational institutions can better prepare blind students for success in their chosen vocational fields. Ultimately, a concerted effort is needed to ensure that AI technologies are effectively leveraged to benefit visually impaired learners in TVET.

References

1. Al-Azawei, A., Serenelli, F., & Lundqvist, K. (2019). Usability and Accessibility of E-Learning Platforms: A Review of the Literature. *Educational Technology & Society*, 22(1), 54-65.
2. Hwang, G. J., Wang, S. Y., & Wu, P. H. (2021). Exploring Teachers' Knowledge and Skills in AI-Enhanced Learning Environments. *Journal of Educational Technology & Society*, 24(1), 95-108.
3. Liu, M., Wang, L., & Chen, H. (2021). The Role of Artificial Intelligence in Inclusive Education: Opportunities and Challenges. *International Journal of Inclusive Education*, 25(8), 866-878.
4. Schneider, M., & Preckel, F. (2017). The Importance of Vocational Education for People with Disabilities: Current Challenges and Future Directions. *International Journal of Inclusive Education*, 21(1), 11-27.
5. UNESCO. (2016). *Technical and Vocational Education and Training (TVET) for the Sustainable Development Goals (SDGs)*. Retrieved from [UNESCO website](https://www.unesco.org/en/tvetsdgs).
6. Zhang, X., & Lu, X. (2020). Applications of Artificial Intelligence in Education for Students with Disabilities: A Review. *Journal of Special Education Technology*, 35(2), 81-94.