Pusat Asasi



ASiD COLLOQUIUM SERIES 2025

EXTENDED ABSTRACT BOOK

CENTRE OF FOUNDATION STUDIES
UNIVERSITI TEKNOLOGI MARA
CAWANGAN SELANGOR KAMPUS DENGKIL

Empowering All Abilities: Innovation in Inclusive Remote Education

Zazaleena Zakariah[1], Nawal Abdul Razak[2]*, Juhaida Ismail[3], Rozeleenda Abdul Rahman[4], Prasanna Ramakrishnan[5]

[1,2] Centre of Foundation Studies, Universiti Teknologi MARA, Cawangan Selangor, Kampus Dengkil, 43800 Dengkil, Selangor, Malaysia
[3,4] Fakulti Sains Komputer dan Matematik, Universiti Teknologi MARA, Cawangan Pahang, Kampus Raub, 27600 Raub, Pahang, Malaysia
[5] Fakulti Sains Komputer dan Matematik, Universiti Teknologi MARA Shah Alam, Selangor, Malaysia

*nawal@uitm.edu.my

ABSTRACT

This project seeks to transform the landscape of remote education by creating an inclusive digital learning environment that accommodates the diverse needs of students with disabilities. Its core objective is to improve accessibility, usability, and learner engagement through the implementation of assistive technologies and customizable tools. By addressing the unique challenges faced by students with visual, cognitive, physical, and learning disabilities, the initiative strives to deliver a more equitable and empowering educational experience. The platform incorporates inclusive features such as adjustable font sizes, text-to-speech capabilities, screen reader compatibility, and alternative input methods, allowing all learners to meaningfully engage with digital content. Additionally, interactive multimedia resources and adaptive learning pathways are designed to enhance motivation and support individualized learning. Beyond enhancing academic outcomes and boosting self-confidence, the project aims to eliminate physical and technological barriers that may limit participation in remote learning. It encourages learner independence and promotes the use of universal design principles within digital education systems. Setting a new standard for accessibility, this initiative also raises awareness about the importance of inclusive educational practices. In the future, the platform will be integrated into existing university learning management systems to ensure long-term usability, offering seamless access to inclusive tools and contributing to a more equitable learning ecosystem.

Keywords: Inclusive Remote Classrooms; Online Learning; E-learning; Learners with Disabilities; Special Need Learners

1. INTRODUCTION

The shift towards digital learning has underscored the urgent need for inclusive remote education platforms that accommodate learners of all abilities. Many conventional learning management systems lack usability and essential assistive tools, creating significant accessibility barriers for students with disabilities. To address these challenges, this initiative aims to revolutionize online education by integrating assistive technologies and applying universal design principles. Grounded in the Universal Design for Learning (UDL) framework (Al-Azawei et al, 2022) the platform offers features such as text-to-speech functionality, screen readers, and customizable interfaces to support learners with visual, physical, and cognitive impairments. Research highlights the positive impact of adaptive learning tools in increasing motivation and engagement among students with disabilities (Yang & Taele, 2025). The

platform also includes interactive multimedia elements and personalized learning paths to encourage active participation, aligning with learner-centered and technology-enabled educational models (Wells, 2024). By removing technological and educational barriers, this project seeks to enhance academic achievement, foster greater learner independence, and build self-confidence among students with diverse needs. Moreover, it promotes best practices in accessibility and sets a new standard for inclusivity in online education, contributing to a more equitable and supportive digital learning environment (Saborío-Taylor & Rojas-Ramírez, 2024).

2. METHODOLOGY

This study utilized a structured approach to design and evaluate inclusive features for remote learning platforms tailored to students with disabilities. It began with expert interviews involving specialists in pedagogy and educational technology, identifying key barriers faced by learners with visual, auditory, cognitive, and physical impairments. From these insights, nine enhancement features were proposed, including audio assistance, multimodal delivery, and structured content access. A prototype was developed and tested by 48 students with disabilities to assess usability and effectiveness. A ranking analysis identified the most impactful features. The study offers a practical, evidence-based framework to promote accessibility and equity in remote education.

3. RESULTS AND DISCUSSION

This study provides a detailed evaluation of an inclusive remote learning platform designed for students with disabilities. The research was conducted in three phases: descriptive, ranking, and thematic analysis, ensuring that the platform's features met the diverse needs of learners. In the descriptive analysis, feedback from 48 participants showed strong support (95-100%) for features like audio assistance, open access to materials, multimodal content delivery, micro submissions, and easy navigation links. These features significantly improved usability and accessibility, particularly for students with visual, cognitive, and physical impairments. The ranking analysis used the mean rank method to prioritize features based on user preferences, with the highest-ranked elements including direct links to organized content, online appointment scheduling with educators, and continuous access to learning resources. Thematic analysis identified four key themes: (1) improving accessibility and inclusivity through customizable tools and assistive technologies, (2) enhancing task management with progress tracking and structured submissions, (3) optimizing communication via timely notifications and appointment systems, and (4) refining user experience with a clean, professional interface. The findings led to the development of a model grounded in Universal Design for Learning (UDL) principles, promoting equitable access, engagement, and success for all learners by addressing diverse needs through flexible, inclusive

UDL PRINCIPLES	***ENHANCEMENT ELEMENTS IN INCLUSIVE REMOTE CLASSROOMS FOR LEARNERS WITH DISABILITIES***	***FEATURES BASED ON THE ENHANCEMENT ELEMENTS***
ENGAGEMENT: *The variety of ways learners are engaged or motivated to learn*	*Access to all learning materials should be kept available throughout the term*	• ***Open access*** *Open access to all learning materials (notes, teaching videos, assignments, quizzes, etc.)*
	Breaking assignments/projects up into smaller tasks with multiple deadlines (submission by chapter/topic)	• ***Micro submission*** *Submission by chapter/topic/segment for assignments/projects*
	Custom pacing guides for students who have fallen behind with work	• ***Feedback and discussion*** *Lecturers provide feedback for each chapter/topic/segment for assignments/project submission before giving marks/grades*
	Access to discussion room for lecturer-student and peer-peer discussion	• ***Discussion room*** *Lecturer-student and peer discussion like a chat room*
	Pre-arrange discussion session with lecturer (consultation/tutor)	• ***Online appointment booking*** *Pre-arrange discussion session with lecturer for consultation or tutor*
REPRESENTATION: *The variety of ways that learners perceive and comprehend content that is shared with them*	*Use of both visual and auditory forms of presenting information*	• ***Visual and auditory*** *Visual and auditory (can be clicked on when they need to listen) forms of presenting information*
	Direct link to a folder that contains learning materials based on chapter/topic	• ***Direct link*** *Direct link to a folder that contains all learning materials (notes, teaching videos, assignments, quizzes, etc.)*
ACTION AND EXPRESSION: *The variety of ways that learners can navigate the learning experience and share what they know*	*Allow verbal replies through online discussion or a forum*	• ***Verbal feedback/verbal chatroom*** *Verbal reply through online discussion or forum*

design as shown in Figure 1.

4. CONCLUSION

The findings from descriptive, ranking, and thematic analyses validate the effectiveness of an inclusive remote education model that supports learners of all abilities. Grounded in the Universal Design for Learning (UDL) framework, the model integrates essential features such as open content access, multimodal delivery, structured task management, and adaptive communication tools. These elements significantly improve accessibility, engagement, and learning personalization for students with diverse needs. The strong user consensus and prioritization of features highlights its practical value. Consistent with recent studies, this model promotes equitable, barrier-free digital learning environments and presents a scalable solution to enhance academic outcomes across varied educational settings. Looking ahead, the model is designed for seamless integration into existing university learning management systems, with the potential for AI-driven personalization, automated support tools, and intelligent content adaptation to further enhance the inclusivity and efficiency of remote education platforms.

ACKNOWLEDGEMENT

We sincerely thank Universiti Teknologi MARA (UiTM) Cawangan Selangor for supporting our research through the UCS Grant (DUCS) [File No: 600-UITMSEL (PI 5/4)(119/2022)]. Our deepest appreciation goes to UiTM for providing the platform to realize the full potential of this research.

REFERENCES

Al-Azawei, A., Serenelli, F., & Lundqvist, K. (2022). Universal Design for Learning (UDL): A content analysis of peer-reviewed journal papers from 2012 to 2020. *Journal of Computers in Education*, 9(1), 1–28. https://doi.org/10.1007/s40692-021-00189-w

Saborío-Taylor, S., & Rojas-Ramírez, F. (2024). Universal Design for Learning and artificial intelligence in the digital era: Fostering inclusion and autonomous learning. International *Journal of Professional Development, Learners and Learning*, 6(2), ep2408. https://doi.org/10.30935/ijpdll/14260

Wells, M. B. (2024). Enhancing accessibility and learning outcomes in higher education: The role of Universal Design for Learning in digital formats. *Journal Plus Education*, 36(1). https://doi.org/10.46788/jpe.2024.v36i1.01

Yang, C., & Taele, P. (2025). AI for accessible education: Personalized audio-based learning for blind students. ArXiv preprint, *ArXiv*:2504.17117. https://doi.org/10.48550/arXiv.2504.17117