Insights Unveiled in the Latest Publications from Mada Edge

Achraf Othman
Mada Qatar Assistive Technology Center
Al Nasr Tower B, Al Corniche Road, Doha, Qatar
aothman@mada.org.qa

Abstract—Mada Qatar Assistive Center Qatar's recent compilation of research outcomes, "Insights Unveiled in the Latest Publications from Mada Edge," provides a comprehensive exploration of the advancements and challenges in digital accessibility and inclusion. The collection spans various topics, each focusing on different aspects of technology's role in facilitating a more inclusive environment for individuals with disabilities.

Keywords- Mada Edge, Digital Accessibility, Assistive Technology.

1.   Introduction

Digital technologies have heralded a new era of opportunities and challenges in accessibility and inclusion. As the world becomes increasingly interconnected through the internet and various digital platforms, ensuring these spaces are accessible to everyone, including people with disabilities, has never been more critical. The Mada Center Qatar, a beacon of innovation and advocacy in the field of digital accessibility, has been at the forefront of research aimed at dismantling barriers and fostering an inclusive digital environment for all individuals. The present paper presents an overview of the latest publications of Mada Edge, the research unit of Mada Qatar Assistive Technology Center.

2.   Digital Accessibility and Artificial Intelligence

The paper "Digital Accessibility in the Era of Artificial Intelligence—Bibliometric Analysis and Systematic Review" explores the crucial role of artificial intelligence (AI) in advancing digital accessibility for individuals with disabilities, such as visual, auditory, motor, or cognitive impairments [1]. Conducting a comprehensive review of academic articles from 2018 to 2023, this study sifted through 3,706 articles from five scholarly databases, including ACM Digital Library, IEEE Xplore, ScienceDirect, Scopus, and Springer, ultimately focusing on 43 articles that offer significant insights into AI applications for enhancing digital accessibility. The research introduces a classification framework categorizing the findings into applications, challenges, AI methodologies, and adherence to accessibility standards. The findings underscore a significant emphasis on AI solutions for visual impairments while identifying a notable gap in research for other disabilities such as speech and hearing impairments, autism spectrum disorder, neurological disorders, and motor impairments. This discrepancy suggests a need for a more inclusive research approach to provide equitable support across all disability communities. Furthermore, the paper highlights non-compliance with established accessibility standards in current systems, calling for a paradigm shift in designing AI-driven solutions to ensure comprehensive support for people with disabilities. This study emphasizes the imperative of incorporating accessible AI technologies to avoid exclusion and discrimination,

advocating for a holistic approach to digital accessibility that accommodates the varied needs of individuals with disabilities.

3.   Is the Metaverse Accessible?

The paper "Accessible Metaverse: A Theoretical Framework for Accessibility and Inclusion in the Metaverse" explores the potential of the Metaverse to enhance digital accessibility for people with disabilities [2]. Through qualitative analysis and expert opinions from various fields, the paper examines the Metaverse's current inclusivity, its design principles, and the challenges and opportunities it presents regarding accessibility. The research identifies significant advancements in incorporating assistive technologies into the Metaverse. Yet, it also highlights notable gaps, particularly in achieving interoperability across different virtual environments and integrating assistive technologies at the foundational level.

The study proposes a comprehensive framework for future research and policy interventions to promote inclusivity within the Metaverse. This framework emphasizes technological innovation, user-centric design, universal access, and global standards for accessibility. It underscores the importance of involving individuals with disabilities in the design process to ensure the Metaverse is built with accessibility at its core.

The paper contributes to the ongoing discourse on digital accessibility in the Metaverse, offering insights into its complexities and a roadmap for future exploration and development. It argues for a multifaceted approach incorporating technological advancements, ethical considerations, legal compliance, and continuous research to create an inclusive and accessible digital realm for all individuals.

4.   Collaborative Play for Autistic Children

Under the auspices of the QRDI-QNRF-funded project titled "Multisensory Tangible Technologies for Inclusive Collaborative Play between Children with Autism Spectrum Disorder and their neurotypical Peers," we have successfully published two papers. These publications lay a solid foundation for the experimental phase of the project, offering valuable insights into the development and application of multisensory tangible technologies to facilitate inclusive play.

The research paper titled "The what, where, who, why, which, and how of collaborative play involving autistic children in an educational context: a contextual inquiry" delves into the intricacies of collaborative play among autistic children within educational settings [3]. Given the pivotal role of play in child development and its educational significance, this study aims to unravel the dynamics, methodologies, challenges, and technological barriers affecting collaborative play among autistic children. Conducted in two distinct environments—an inclusive international school and a center for children with disabilities in Qatar—this study leveraged a mixed-method approach, incorporating 45 interviews with therapists, teachers, and parents alongside 48 observational sessions with autistic children. Through inductive reasoning and thematic analysis, the research identified six principal themes, encapsulated as the '5W-H'—who, where, what, why, which, and how—detailing the actors, locations, tools, purposes, senses, and processes involved in collaborative play. Additionally, the observations revealed four central themes focused on the nature and potential of collaborative activities. These findings are instrumental in informing future research and educational practices, offering deep insights into enhancing collaborative play and, consequently, the learning experiences of

autistic children.

The systematic literature review on the "Co-design of Technology Involving Autistic Children" underscores the significance of involving autistic children in co-designing technologies tailored to their needs [4]. This involvement ensures that the resulting products are not only accessible but also optimally beneficial to this diverse group. The study meticulously analyzed 2482 papers from six significant databases, with 82 fulfilling the criteria for in-depth analysis. It highlights the complexity of engaging autistic children, who may have a wide range of communication abilities, including those who are minimally verbal or non-verbal. The review categorizes the findings into four main themes: advancements in co-design goals and outcomes, factors influencing participant selection, fundamental co-design techniques, and strategies for overcoming co-design challenges. It brings to light the critical need for inclusive practices and equitable support in the co-design process, advocating for the adaptation of technologies and methodologies to meet the varied needs of autistic children effectively. This approach enriches the design process and ensures the development of more relevant and impactful technological solutions.

References

1. Chemnad, K., Othman, A.: Digital accessibility in the era of artificial intelligence—Bibliometric analysis and systematic review. Front. Artif. Intell. 7, (2024). https://doi.org/10.3389/frai.2024.1349668.
2. Othman, A., Chemnad, K., Hassanien, A.E., Tlili, A., Zhang, C.Y., Al-Thani, D., Altınay, F., Chalghoumi, H., S. Al-Khalifa, H., Obeid, M., Jemni, M., Al-Hadhrami, T., Altınay, Z.: Accessible Metaverse: A Theoretical Framework for Accessibility and Inclusion in the Metaverse. Multimodal Technol. Interact. 8, 21 (2024). https://doi.org/10.3390/mti8030021.
3. Hijab, M.H.F., Khattab, S., Al Aswadi, N., Neves, J., Qaraqe, M., Othman, A., Alsulaiti, N., Al-Thani, D.: The what, where, who, why, which, and how of collaborative play involving autistic children in educational context: a contextual inquiry. Front. Educ. 9, (2024). https://doi.org/10.3389/feduc.2024.1273757.
4. Hijab, M.H.F., Banire, B., Neves, J., Qaraqe, M., Othman, A., Al-Thani, D.: Co-design of Technology Involving Autistic Children: A Systematic Literature Review. Int. J. Human–Computer Interact. 0, 1–19 (2023). https://doi.org/10.1080/10447318.2023.2266248.