

Optimizing Instructional Message Design for Autism Intervention: Leveraging Multimedia Learning and Video-Based Strategies

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Abstract: This literature review examines the role of instructional message design (IMD) in enhancing learning experiences for individuals with Autism Spectrum Disorder (ASD). By analyzing various IMD strategies, including multimedia learning, adaptive content systems, and video-based interventions, the study highlights their effectiveness in improving accessibility and engagement for ASD learners. The review synthesizes empirical findings, identifies gaps in the literature, and discusses future research directions for optimizing instructional strategies tailored to diverse learning needs.

Introduction

Autism Spectrum Disorder (ASD) has increasingly gained awareness over the past century, characterized by challenges in social interactions, communication, and repetitive behaviors (Fuentes et al., 2012; Perochon et al., 2023). Consequently, instructional interventions such as Applied Behavior Analysis (ABA) and specialized occupational therapies have been implemented to support learning for individuals with ASD (Thull, 2019; Odom et al., 2015), characterized by challenges in social interactions, communication and repetitive behaviors (Fuentes et al., 2012; Ismail & Jomhari, 2019; Perochon et al., 2023). Subsequently, instructional interventions such as Applied Behavior Analysis (ABA) and specialized occupational therapies have been implemented to support learning for individuals with ASD (Thull, 2019).

Thus, integrating instructional message design (IMD) theories into ASD-focused curricula can significantly enhance personalized learning experiences (Odom et al., 2015). Furthermore, well-structured instructional tools promote accessibility and inclusivity, fostering cognitive and behavioral development in learners on the spectrum (Omar et al., 2020; Schmidt et al., 2023).

Purpose

Despite advancements in educational technologies, assessing their long-term efficacy remains a challenge (Thull, 2019). Empirical evidence supporting the sustained impact of IMD interventions is essential (Ismail & Jomhari, 2019). This literature review explores various IMD strategies to evaluate their effectiveness in enhancing learning for individuals with ASD (Sani et al., 2021; Schmidt et al., 2023).

Literature Review

Early research on ASD identified its core challenges, including communication deficits and social difficulties (Ismail & Jomhari, 2019; Thull, 2019). As prevalence rates increased, specialized instructional approaches emerged, incorporating multimedia technologies to enhance learning (Omar et al., 2020; Schmidt et al., 2023). Advances in IMD have focused on integrating these technologies into structured educational strategies (Cook-Posley, 2024; Bishop, 2014).

Theoretical Frameworks

Several theoretical models support IMD interventions for ASD learners. Schmidt et al. (2023) advocate for the Universal Design for Learning (UDL) framework, emphasizing accessibility and inclusivity. Additionally, Sani et al. (2021) apply User Experience (UX) and Multimedia Project Management (MPM) principles to develop user-centered educational videos. Kennedy et al. (2012) highlight the Cognitive Theory of Multimedia Learning (CTML), which integrates visual and auditory inputs to enhance comprehension. Thull (2019) incorporates Cognitive Load

Theory (CLT) to optimize video-based instruction, reducing unnecessary cognitive processing. Furthermore, Omar et al. (2020) utilize Bandura and Walters' (1977) Social Learning Theory (SLT) to support video modeling, promoting independent learning. Lastly, Ismail and Jomhari (2019) propose the Adaptive Content Management Learning System (ACMLS) model to personalize instruction, while Cook-Posley (2024) employs Social Constructivist Learning Theory (SCLT) to emphasize the role of social interactions in learning. Schmidt et al. (2023) advocate for the Universal Design for Learning (UDL) framework, emphasizing accessibility and inclusivity. Additionally, Sani et al. (2021) apply User Experience (UX) and Multimedia Project Management (MPM) principles to develop user-centered educational videos. Kennedy et al. (2012) highlight the Cognitive Theory of Multimedia Learning (CTML), which integrates visual and auditory inputs to enhance comprehension. Thull (2019) incorporates Cognitive Load Theory (CLT) to optimize video-based instruction, reducing unnecessary cognitive processing. Furthermore, Omar et al. (2020) utilize Bandura and Walters' (1977) Social Learning Theory (SLT) to support video modeling, promoting independent learning. Lastly, Ismail and Jomhari (2019) propose the Adaptive Content Management Learning System (ACMLS) model to personalize instruction, while Cook-Posley (2024) employs Social Constructivist Learning Theory (SCLT) to emphasize the role of social interactions in learning (Vygotsky et al., 1962).

Empirical Findings

Research findings demonstrate the effectiveness of IMD in ASD education. Schmidt et al. (2023) report that ASD learners engaged in Project PHoENIX exhibited enhanced comprehension and social interaction when participating in extended reality (XR) applications. Similarly, Sani et al. (2021) found that UX- and MPM-based educational videos significantly improved cognitive engagement in ASD learners. Kennedy et al. (2012) explored the impact of multimedia tools on teacher education, finding that Content Acquisition Podcasts (CAPs) improved instructional effectiveness. Additionally, Thull (2019) demonstrated that video modeling reduces cognitive load and enhances vocational skill development. Omar et al. (2020) reported that tablet-based video modeling applications facilitated behavioral learning in young ASD learners. Moreover, Ismail and Jomhari (2019) found that adaptive learning systems promoted literacy skills, while Cook-Posley (2024) emphasized the need for culturally inclusive IMD strategies to support diverse learners. Schmidt et al. (2023) report that ASD learners engaged in Project PHoENIX exhibited enhanced comprehension and social interaction when participating in extended reality (XR) applications. Similarly, Sani et al. (2021) found that UX- and MPM-based educational videos significantly improved cognitive engagement in ASD learners.

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Gaps in the Literature

Despite promising findings, gaps remain in IMD research for ASD learners. Schmidt et al. (2023) and Sani et al. (2021) highlight the lack of long-term empirical studies on instructional interventions. Additionally, Kennedy et al. (2012) and Thull (2019) note the need for scalable IMD solutions across diverse educational settings. Furthermore, existing research primarily focuses on short-term outcomes rather than longitudinal effects (Cook-Posley, 2024; Ismail & Jomhari, 2019; Omar et al., 2020). Schmidt et al. (2023) and Sani et al. (2021) highlight the lack of long-term empirical studies on instructional interventions. Additionally, Kennedy et al. (2012) and Thull (2019) note the need for scalable IMD solutions across diverse educational settings. Furthermore, existing research primarily focuses on short-term outcomes rather than longitudinal effects (Cook-Posley, 2024; Ismail & Jomhari, 2019; Omar et al., 2020; Mayer & Fiorella, 2021).

Synthesis of Findings

Findings suggest inclusive, adaptive, and multimedia-enhanced instructional strategies significantly benefit ASD learners. Schmidt et al. (2023) and Sani et al. (2021) emphasize user-centered IMD design, while Kennedy et al. (2012) and Thull (2019) highlight the role of multimedia in reducing cognitive load. Omar et al. (2020) and Ismail and Jomhari (2019) underscore the importance of personalized and adaptive learning technologies. Lastly, Cook-Posley (2024) stresses the value of culturally sensitive instructional design.

Discussions

Educators and instructional designers should prioritize inclusive, user-centered approaches in IMD. Schmidt et al. (2023) recommend involving ASD learners in VR-based curriculum development, while Sani et al. (2021) advocate for UX-driven video content. Additionally, Kennedy et al. (2012) and Thull (2019) emphasize the role of multimedia tools in teacher training, demonstrating their potential for enhancing instructional effectiveness.

Future Research

Future studies should explore the long-term impact of IMD interventions using scalable frameworks. Additionally, research should focus on the adaptability of IMD strategies across different educational environments (Kennedy et al., 2012; Thull, 2019). Further investigation into integrating diverse instructional approaches into a comprehensive support system is also necessary (Cook-Posley, 2024; Ismail & Jomhari, 2019; Omar et al., 2020).

Conclusion

This review underscores the importance of IMD in ASD education, highlighting the role of multimedia, adaptive learning technologies, and user-centered instructional design. Schmidt et al. (2023) and Sani et al. (2021) emphasize the need for inclusive learning environments, while Kennedy et al. (2012) and Thull (2019) advocate for multimedia-driven cognitive support. Omar et al. (2020) and Ismail and Jomhari (2019) highlight personalized learning models, and Cook-Posley (2024) stresses the importance of cultural inclusivity. Future research should address the long-term efficacy of these interventions, ensuring their sustainability and scalability across diverse educational contexts.

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