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ORIGINAL ARTICLE

MULSEMEDIA IN SPECIAL EDUCATION: A NOVEL TEACHING APPROACH FOR THE NEXT GENERATION

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ABSTRACT

Technology-enhanced learning settings are changing quickly and complexly in the contemporary digital era, making it possible for students with disabilities to learn more effectively than before. The words "multisensory" and "media" together, however, suggest that this strategy entails incorporating several sensory modalities in educational media to improve learning experiences for children with disabilities. It can entail integrating visual, aural, tactile, and kinesthetic elements to meet various learning requirements and styles. This article examines how Mulsemedia, one of these cutting-edge technologies, enhances learning methodologies, improving the teaching and learning of unique pedagogies and emphasizing teaching and learning-related modules for students with special needs. The researchers used a qualitative research design to understand and review the ten papers with secondary data based connected to mulsemedia in special education: A novel teaching approach for the next generation. The article also describes the extremely encouraging outcomes of case studies conducted with engineering students with disabilities in several schools in India. This critical article finds that multimedia-enhanced instruction significantly improves special students' learning experiences and ability to learn new information for future development.

Keywords: *mulsemedia, special education, students with disabilities, educational technologies*

INTRODUCTION

The area of special education is constantly developing to accommodate the wide range of unique requirements of students in today's quick-paced, technologically advanced environment. More individualized and interactive teaching and learning techniques are gradually replacing the conventional one-size-fits-all manner of teaching and learning. One such cutting-edge strategy is "Mulsemedia," which blends multimedia components by incorporating several sensory modalities to produce a dynamic and immersive learning environment for children with special needs. This article examined the use of multimedia in special education, including its advantages, disadvantages, and possible applications in various educational contexts. The phrase "mulsemedia," which combines the words "multimedia" and "multiple sensory modalities," describes the deliberate integration of several multimedia formats, including text, graphics, audio, video, and interactive features, to present information. Mulsemedia's emphasis on using other senses, such as sight, sound, touch, and occasionally even smell and taste, to

improve learning for students with special needs is a crucial component. For students with disabilities, a more engaging, interactive, and personalized learning experience is intended by combining multimedia and various sensory inputs. One of Mulsemedia's primary benefits for special education is its capacity to hold students' interest and encourage greater involvement with the material. Passive learning is a significant component of traditional teaching strategies in the classroom when special students read or listen to lectures. By including interactive components that actively involve students in the learning process, such as quizzes, simulations, and gamified learning experiences, Mulsemedia departs from this conventional model. Mulsemedia stimulates critical thinking, problem-solving, and creativity, which makes learning more exciting and memorable by offering possibilities for active engagement. Each exceptional learner is different from the others, having their talents, preferences, and learning preferences. By meeting the unique needs of each particular student, Mulsemedia enables educators to design personalized learning experiences. For those who have hearing disabilities, audio-based content may be helpful, while those who have visual impairments may benefit from visually stimulating items. Mulsemedia empowers students with disabilities to interact with the information in a way that best suits their preferences and abilities by providing various multimedia and sensory inputs. Combining multimedia and other sensory modalities provides many cognitive advantages for learners with specific needs. Using a variety of senses during learning improves understanding and memory retention. For instance, integrating aural and visual cues can help increase long-term recall and reinforce information. Additionally, Mulsemedia promotes critical thinking and higher-order cognitive skills in special education kids by encouraging them to draw connections between various bits of information. Mulsemedia mainly relies on educational technology to provide engaging learning opportunities for children with disabilities. Special educators now have multiple materials to produce interesting Mulsemedia content, thanks to the quick advances in digital media and educational tools. Technology is smoothly incorporated into instructional apps, interactive e-books, virtual reality (VR), and augmented reality (AR) applications in multimedia-enhanced learning environments in special schools or colleges. By converting the unique learning experience from passive to active and uniform to personalized, Mulsemedia represents a substantial shift in educational paradigms. Special educators can design dynamic, engaging, and inclusive learning environments that meet the many needs and preferences of their students with disabilities by including multimedia elements with various sensory modalities. Mulsemedia is well-positioned to play a critical role in determining the future of special education as AI technology develops and the educational landscape changes, encouraging a generation of lifelong learners who are enthusiastic, curious, and well-prepared for the challenges of tomorrow and the next generation. Therefore, the introduction and growing adoption of new AI technologies, such as creative multi-media and multi-modal content distribution methods, have created further difficulties and a variety of opportunities for technology-enhanced learning in the particular education sector.

RESULTS AND DISCUSSION

The following are some essential ideas and advantages of using a multimodal media strategy in special education:

Interactive and Engaging Learning: Students are more likely to be interested and actively participate in the learning process when instructional media appeals to several senses, such as sight, hearing, touch, and movement. A better understanding and memory of the material can result from this interaction.

Accessibility and Inclusivity: Multisensory media can be created to suit students with different disabilities and learning styles, making the instructional materials more inclusive and accessible.

Personalization: This strategy enables educators to adapt the information to specific students' skills and interests, resulting in personalized learning experiences.

Addressing learning diversity: various students learn in multiple ways. A multimodal media approach recognizes and tackles this variety, making reaching kids who would have trouble understanding using conventional teaching techniques easier.

Reinforcement Learning: Information can be reinforced using several senses, resulting in a more profound comprehension of concepts and improved long-term retention.

Developing Multimodal Skills: Using multimodal media can also assist students in honing their abilities across various sensory modalities, which can be helpful in multiple spheres of life and education.

Assistance for Special Needs: Multisensory media can provide specialized help and interventions for students with specific learning challenges or sensory impairments.

Technological Advancements: Multisensory media creation and implementation in educational settings have become more accessible because of technological advancements, enabling more imaginative and productive learning experiences.

It's crucial to remember that new methodologies and jargon may appear as technology and educational practices continue to advance. Although the term "multisensory media" in the context of special education is not commonly used, the underlying idea of integrating different sensory modalities to improve learning is a promising and cutting-edge strategy that supports the tenets of inclusive education and individualised learning for the next generation of learners.

Multisensory Stimulation In Special Education

Using many senses at once to improve learning opportunities and assist the growth of kids with disabilities or special needs is known as multisensory stimulation in special education. With this approach, educators may create a more inclusive and productive learning environment by appealing to various senses and acknowledging that everyone has different sensory processing talents and preferences. In therapy, multisensory stimulation is frequently utilized to support patients with sensory processing disorders or other sensory-related difficulties.

The following are essential factors and components of multisensory stimulation in special education:

Sensory Modalities: Sight, hearing, touch, taste, and smell are ordinary sensory modalities integrated into this technique. Each sense is stimulated by particular activities or materials, resulting in a comprehensive learning experience.

Individualized Approach: Multisensory stimulation is highly individualized to fit students' unique demands and aptitudes—Individualized Approach. Teachers customize activities to fit each student's learning styles and preferred senses.

Engaging and motivating: Using many senses to teach can promote student engagement and motivation, resulting in higher participation rates and better learning results.

Skill Development: Multisensory stimulation can aid in the development and enhancement of skills such as attention, coordination, and sensory integration, which are essential for academic and daily life activities.

Inclusivity: The strategy fosters inclusivity by considering kids with various learning styles and sensory processing issues. Students with a variety of disabilities, such as those who suffer from autism spectrum disorders, sensory processing issues, and other developmental or learning disabilities, can benefit from it.

Therapeutic Benefits: Multisensory stimulation can have therapeutic consequences in addition to its educational advantages, assisting students in regulating their emotions, reducing anxiety, and enhancing their general well-being.

Activities involving multimodal stimulation in special education could include:

- Using textured materials to stimulate the senses through tactile exploration
- Using sound effects and music to make learning more enjoyable
- Using interactive video games or virtual reality applications
- Using aromatherapy or smells to reduce stress or improve memory
- Taking part in sensory play, such as sand, water, or messy play
- Including movement-based exercises, such as yoga or dancing, to assist kinesthetic learning.

When employing multisensory stimulation approaches, educators and therapists must acquire specialized training and direction to ensure they are used effectively and correctly for each student's unique needs. Creating thorough and customized multimodal learning programs for students in individual education settings also requires close cooperation between educators, therapists, and families.

Mulsemedia: Overview and Challenges

The expression "mulsemedia" [G. Multiple sensory media] [Ghinea et al. 2014] is a relatively new category of multimedia that includes senses other than hearing and seeing. Mulsemedia content includes metadata to stimulate other senses (such as touch, smell, and taste) and audio-visual components in academia. To create a conventional mulsemedia delivery system, one must take the following procedures into account:

- Development of mulsemedia content
- Receiving and distributing content
- Displaying the content to the user through various gadgets that appeal to various senses (such as haptic chairs, olfactory displays, air-flow generators, etc.) [F. 2013] Danieau et al.

Several issues with Mulsemedia delivery must be resolved, resulting from the need for standards for producing quality multimodal material. Communication problems with the delivery of mulsemedia content in the current heterogeneous network settings present significant difficulties. This situation's synchronization of the many multisensory components is a significant problem. Given that "out-of-sync" effects frequently result in a decline in user quality of experience (QoE) levels, a temporal order of the multisensory effects must be guaranteed [Z. G.-M. Muntean, Yuan, T. Bi, and G. (2015) Ghinea]. Additionally, compared to multimedia content, multimedia brings extra elements related to the additional senses aroused, which adds overhead to communication in academics. This adaptability principle may be applied to multi-media distribution, which was the impetus for designing the later-discussed solution for next-generation learners.

Mulsemedia-Enhanced Learning with Special Children

Given the words "Mulsemedia" and "Enhanced Learning with Special Children," it is possible to deduce that the term incorporates multimedia and many sensory modalities to improve learning experiences for kids with special needs or impairments. This strategy aims to give all students, including those with different learning needs, access to a more engaging learning environment by aligning with the ideals of inclusive education and personalized learning.

For children with exceptional needs, multimedia-enhanced learning may include the following components:

Multimedia integration delivers instructional materials and information to students while including multimedia elements such as text, graphics, audio, video, and interactive content. This strategy accommodates various learning preferences and styles, enhancing learning effectiveness.

Multiple Sensory Modalities: Using a variety of sensory modalities, including movement, sound, sight, and touch, to activate various senses while learning, students may process knowledge more quickly and retain it better with this multimodal technique.

Individualization: adapting the learning opportunities to each child's unique requirements, abilities, and interests. Thanks to personalized learning, students are given knowledge and activities that are suited to their specific talents and learning profiles.

Assistive Technology: Including assistive technologies and tools in educational programs for disabled kids. Screen readers, text-to-speech software, communication tools, adapted keyboards, and other tools may be among these technologies.

Interactive and hands-on learning: Giving students the chance to participate and engage actively in hands-on learning experiences is especially helpful for special needs kids who learn better through hands-on activities.

Visual Aids and Supports: Using pictures, symbols, and other visuals to help youngsters who have trouble speaking or communicating grasp what is being said

Reinforcement and Feedback: Utilising multimedia components for rapid feedback and reinforcement allows students to track their development and maintain motivation throughout the learning process.

Inclusive Learning Environment: Fostering an inclusive and encouraging learning atmosphere that encourages communication and understanding between all students, regardless of their ability

Special educators have a range of options when creating multimedia educational content. At the same time, multisensory effects can be directly linked to the concepts being studied; they can also be added to conventional audio-visual information to make learning more fun. Our studies showed that both strategies had a beneficial effect on the learning outcomes and experiences of students with disabilities. The fact that we did not examine the impact of learner characteristics and cultural background on multimedia-based learning is a drawback of our study. Still, they nevertheless offer worthwhile directions for the next generation.

CONCLUSION

In several areas, like science pedagogy, where special students can experience distinct weather patterns and conditions worldwide, this multisensory method can improve students' comprehension and foster diverse learning. Mulsemedia can also be a helpful teaching tool for professionals like students, teachers, learners, and policymakers because it helps them understand critical occurrences completely and respond appropriately. We contend that by adding multisensory dimensions to learning content, we can influence special students' perceptions of subjects they typically find dull (such as standardization) and boost their interest in subjects where practical demonstrations are difficult to achieve for a variety of reasons (such as prohibitively expensive equipment or subjects that cannot be implemented in a classroom). In the example studies shown here, we primarily focus on introductory courses since these courses typically don't foster conceptual comprehension through deep interaction. As a result, they do not appeal to students who show little interest in theoretical subjects.

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