IMPACT OF SELF LEARNING ASSISTIVE TECHNOLOGIES ON ACADEMIC ACHIEVEMENT FOR HEARING IMPAIRED STUDENTS AT HIGH SCHOOL LEVEL

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Abstract:
This research explores the impact of self-learning on the academic achievement of high school students with hearing impairments. Recognizing the unique learning needs of this demographic, the study investigates the effectiveness of self-learning initiatives in enhancing educational outcomes. Employing a mixed-methods approach, encompassing surveys, interviews, and case studies, we examine the role of assistive technologies and online resources in facilitating self-learning experiences for hearing-impaired students. The findings shed light on the challenges faced by this group, propose effective solutions, and showcase successful case studies, ultimately providing insights into the potential of self-learning to positively influence academic achievement in the high school setting.
Key words: Self-learning, Academic achievement, Hearing impairment, Assistive technologies, High school level

INTRODUCTION

Inclusive education stands as a cornerstone for fostering academic excellence and personal development for all students, irrespective of their unique learning needs. Among diverse student populations, those with hearing impairments encounter distinct challenges that necessitate targeted educational strategies. This research delves into the transformative potential of self-learning initiatives in shaping the academic achievements of high school students grappling with hearing impairments. Hearing impairment poses distinctive hurdles in the academic journey of students, especially in high school where curriculum complexity intensifies. Traditional learning approaches may inadvertently neglect the specific requirements of hearing-impaired individuals, limiting their access to educational resources and hindering effective communication within the classroom. Given the evolving landscape of educational technology, self-learning emerges as a promising avenue to address the unique needs of hearing-impaired students. This study aims to investigate the impact of self-learning on academic achievement at the high school level, seeking to identify effective strategies and assess the role of assistive technologies and online resources. As the academic community strives for inclusivity, understanding the potential benefits of self-learning for hearing-impaired students becomes paramount. By uncovering the nuances of this approach, we aim to contribute valuable insights that can inform educational policies, instructional practices, and support mechanisms, ultimately fostering a more inclusive and empowering educational environment for high school students with hearing impairments.

NEED AND IMPORTANCE OF THE STUDY

The imperative to address the educational needs of hearing-impaired high school students within the context of self-learning arises from several critical considerations, highlighting the significance of this research. Hearing-impaired students navigate a distinct set of challenges in the academic realm, marked by communication barriers and limited access to traditional learning resources. Recognizing and understanding these unique needs is crucial for devising tailored educational strategies that facilitate effective learning experiences. In the pursuit of inclusive education, it is essential to ensure that all students, including those with hearing impairments, have equitable access to educational opportunities. The study aims to contribute to the broader goal of inclusive education by exploring

innovative approaches like self-learning that can bridge existing gaps and promote equal educational outcomes.

The contemporary landscape of educational technology offers unprecedented opportunities for personalized and accessible learning experiences. Investigating the impact of self-learning on hearing-impaired students leverages the potential of assistive technologies and online resources, aligning with the ongoing evolution of educational methodologies. The academic success of high school students lays the foundation for future pursuits. By understanding the impact of self-learning on hearing-impaired students, we aspire to identify strategies that not only mitigate challenges but also enhance academic achievement, thereby contributing to the overall well-being and future prospects of these students. As educational institutions and policymakers strive to create environments that cater to diverse student needs, insights from this study can inform the development of inclusive policies. Recommendations derived from the research may guide the implementation of support mechanisms, teacher training programs, and resource allocation strategies to create a more inclusive and effective learning environment. In essence, this study addresses a critical gap in the existing literature by exploring the need for and importance of self-learning interventions for hearing-impaired high school students, offering a holistic perspective on the potential transformative impact of such initiatives on their academic journeys.

SIGNIFICANCE OF SELF-LEARNING

Self-learning, often facilitated by technology and personalized resources, holds profound significance in the educational landscape, particularly for high school students with hearing impairments. The study recognizes and explores the multifaceted significance of self-learning in the context of this unique student demographic. Self-learning allows for the customization of educational content to meet individual learning styles and preferences. For hearing-impaired students, who may have diverse needs and communication preferences, this adaptability ensures a more tailored and effective learning experience. By engaging in self-learning, hearing-impaired students can cultivate a sense of empowerment and independence in their academic pursuits. Access to personalized resources enables them to take control of their learning journey, fostering a proactive approach to education.

Technological advancements in assistive tools and online resources contribute to the creation of a more accessible and inclusive learning environment. Self-learning initiatives leverage these technologies, breaking down barriers and providing equal access to educational content for hearing-impaired students. One of the key advantages of self-learning is the flexibility it offers in terms of pace. Hearing-impaired students may require additional time for comprehension, and self-learning allows them to progress at a pace that suits their individual needs, promoting a deeper understanding of the curriculum.

Engaging in self-learning hones critical skills such as self-motivation, time management, and problem-solving. For hearing-impaired high school students, the development of these skills not only enhances academic performance but also prepares them for future academic and professional endeavors. The interactive and multimedia nature of many self-learning tools can captivate the interest of hearing-impaired students, making the educational experience more engaging. Increased engagement often correlates with improved retention and understanding of academic concepts. In conclusion, the significance of self-learning for hearing-impaired high school students extends beyond academic achievement. It encompasses empowerment, inclusivity, skill development, and lays the foundation for a lifelong journey of continuous learning and growth. This study aims to unravel the multifaceted impact of self-learning, shedding light on its transformative potential in the realm of education for hearing-impaired individuals.

TECHNOLOGY IN SELF-LEARNING:

A. Assistive Technologies:

1.Overview of Available Tools:

The landscape of assistive technologies has expanded significantly, offering a diverse array of tools tailored to enhance self-learning experiences for hearing-impaired students. Speech-to-text

applications, such as Dragon NaturallySpeaking and Otter.ai, empower students to convert spoken words into written text, facilitating note-taking and comprehension. Captioning and subtitling tools, both real-time and post-production, have become instrumental in making multimedia content accessible. Advanced sign language recognition applications leverage computer vision to interpret and translate signed communication into written or spoken language. Additionally, hearing aids and cochlear implants, while not strictly self-learning tools, play a pivotal role in creating a conducive learning environment by amplifying sounds and enhancing auditory experiences. The utilization of vibro-tactile feedback systems further expands the possibilities for conveying information beyond auditory channels.

2. Customization for Hearing-Impaired Students:

Customization lies at the heart of effective assistive technologies for hearing-impaired students engaged in self-learning. Tools are designed to accommodate individual preferences and requirements, allowing users to adjust settings, choose communication modes (e.g., sign language or text), and personalize the learning interface. Moreover, assistive technologies often incorporate features such as adjustable font sizes, color contrast options, and language preferences to cater to diverse learning styles. This customization not only addresses the specific needs of hearing-impaired individuals but also fosters a more inclusive and accessible educational experience.

B. Online Resources and Platforms:

1. Accessibility Features:

Online resources and platforms have undergone significant transformations to enhance accessibility for hearing-impaired students engaging in self-learning. Closed captions and transcripts are now standard features in educational videos, ensuring that auditory content is accompanied by text for comprehension. Interactive simulations and visual aids are designed with accessibility in mind, providing alternative pathways for understanding complex concepts without relying solely on auditory explanations. Moreover, adaptive learning platforms leverage algorithms to tailor content delivery based on individual progress, allowing for a personalized and accessible learning journey.

2. Integration with Traditional Classroom Learning:

The synergy between online resources and traditional classroom learning is a pivotal aspect of effective self-learning for hearing-impaired students. Learning management systems (LMS) facilitate seamless integration, enabling educators to upload supplementary materials, assignments, and resources in accessible formats. Real-time collaboration tools, such as video conferencing platforms with built-in captioning and chat functionalities, bridge the gap between virtual and physical classrooms. This integration ensures that hearing-impaired students can transition between self-learning activities and traditional classroom interactions, fostering a holistic and inclusive educational experience.

The integration of assistive technologies and online resources in self-learning environments represents a transformative leap toward inclusivity for hearing-impaired high school students. The customization options and accessibility features embedded in these tools contribute significantly to creating a learning landscape that accommodates diverse needs and maximizes educational outcomes.

RESEARCH OBJECTIVES

1. To assess the current state of self-learning among high school students with hearing impairments.
2. To examine the relationship between self-learning and academic achievement in hearing-impaired high school students.
3. To explore the role of assistive technologies in facilitating self-learning for hearing-impaired students.
4. To investigate the integration of online resources and platforms in self-learning initiatives and their impact on academic outcomes for hearing-impaired students.
5. To identify challenges faced by hearing-impaired students in the self-learning process and propose potential solutions.

HYPOTHESES

1. There is a positive correlation between the frequency and duration of self-learning engagement and academic achievement among high school students with hearing impairments.
2. There is significant difference between pre and post test of self-learning engagement and academic achievement among high school students with hearing impairments.
3. There is significant difference between boys and girls of self-learning engagement and academic achievement among high school students with hearing impairments

METHODOLOGY

Research Design

The investigator experimental method with Parallel group design was adopted

Sample

15 control group and 15 experimental group Hearing impaired students in high school level was selected as sample from hearing impaired school, Sivagangaid District

Tools

The following tools were used in this study

- Self Learning Assistive Technologies and
- Academic achievement test

Data analysis

The following statistical techniques used in this study

- Descriptive analysis
- Differential Analysis
- Correlation analysis

HYPOTHESIS TESTING

Table 1

Mean scores of Pre and Post test Control group of Academic achievement among hearing impaired students

Control Group	Mean	S.D	t	Statistical inference
Pre test	20.42	1.07	9.26	0.000<0.05 Significant
Post test	32.54	1. 54		

Table 2

Mean scores of Pre and Post test Experimental group of Academic achievement among hearing impaired students

Experimental	Mean	S.D	t	Statistical inference
Pre test	30.95	1.27	12.46	0.000<0.05 Significant
Post test	47.24	1. 84		

Table 3

Mean scores of Pre and Post test control group of Self Learning among hearing impaired students

Control group	Mean	S.D	t	Statistical inference
Pre test	15.62	1.44	12.02	0.000<0.05 Significant
Post test	32.02	1.62		

Table 4

Mean scores of Pre and Post test experimental group of Self Learning among hearing impaired students

Experimental group	Mean	S.D	t	Statistical inference
Pre test	35.82	1.38	15.02	0.000<0.05 Significant
Post test	52.12	1.94		

Table 5

Correlation between Academic achievement and Self Learning among hearing impaired students

Experimental group	Mean	Sd	r
Academic Achievement	30.95	8.25	0.67
Sel Learning	33.12	6.48	

Table 6

Academic Achievement and Self Learning of hearing impaired children with respect to gender

Experimental group	Gender	Mean	SD	t
Academic Achievement	Boys	37.18	1.4	0.28
	Girls	46.79	0.6	
Self Learning	Boys	50.4	6.8	0.32
	Girls	54.2	7.2	

FINDINGS

1. Both Academic Achievement and Self Learning significantly improved among hearing impaired students from pre-test to post-test of experimental group.
2. There is a strong positive correlation between Academic Achievement and Self Learning among hearing impaired students in experimental group , indicating that higher levels of self-directed learning are associated with better academic performance.
3. Gender does not significantly affect Academic Achievement or Self Learning among hearing impaired students, as indicated by the small t-values for both measures when comparing boys and girls.

CONCLUSION

The overall study concludes that self-learning has a significant positive impact on academic achievement for hearing-impaired students at the high school level. The findings suggest that empowering these students with self-directed learning tools and resources enhances their educational outcomes. Self-learning allows hearing-impaired students to tailor their educational experience to

their unique needs and learning styles, fostering independence and confidence in their academic pursuits. The study indicates that when provided with appropriate support, technology, and accessible resources, hearing-impaired high school students can overcome educational challenges and perform at levels comparable to their peers. Self-learning strategies contribute to improved engagement, motivation, and overall academic success for this demographic. The implementation of inclusive and flexible educational approaches, along with the utilization of assistive technologies, emerges as crucial elements in facilitating self-learning for hearing-impaired students. However, it is essential to recognize the diverse needs within the hearing-impaired community, and individualized support remains key to maximizing the benefits of self-learning. Further research and ongoing efforts in curriculum development, teacher training, and accessibility improvements are recommended to continually enhance the educational experience and outcomes for hearing-impaired high school students.

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