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Bridging the Gap: Assessing Teachers' Knowledge, Utilization, and Training Needs in Technology for Deaf and Hard of Hearing Education

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Abstract

Background: *Technology has become an integral component of modern education, playing a crucial role in supporting diverse learners, including students who are deaf or hard of hearing (DHH). However, teachers' knowledge levels and utilization of technological advancements vary due to several factors, including gender, qualifications, and teaching experience. Understanding these variations can provide valuable insights into how best to support educators in effectively integrating technology into DHH education.*

Aims: *This study is aimed at examining the differences in teachers' knowledge regarding technological advancements based on gender, qualifications, and experience. Additionally, its goal is to explore variations in the usage of technology among teachers and identify the most pressing educational training needs related to these variables.*

Methodology: *A descriptive survey methodology was employed to achieve the study's objectives and answer its research questions. Twenty-five teachers were initially surveyed during the 2023-2024 academic year, with a final sample consisting of 18 teachers who met the inclusion criteria. Data collection focused on teachers' knowledge of assistive technologies, their application of the technologies in their classrooms, and their perceptions of professional development needs.*

Results: *The findings revealed that one of the most critical needs among teachers is having classrooms that are well equipped with technological tools and supported with appropriate technical programs. Additionally, teachers expressed the need for more specialized training on effectively using search engines to enhance children's language development. Furthermore, a significant demand exists for professional development in multimedia production and its application in DHH classrooms. Many teachers indicated challenges in accessing training opportunities that specifically address the integration of assistive technology in special education settings.*

Conclusion: *Despite the recognized importance of integrating technology into the education of DHH students, teachers still lack sufficient knowledge regarding its effective utilization. Addressing this gap requires intensive training programs focused on existing technologies tailored to DHH students, along with clear guidance on how to accommodate and integrate these tools into instructional practices. Enhancing teachers' technological competencies will ultimately lead to improved educational outcomes for DHH students and a more inclusive learning environment.*

Keywords: *Assistive Technology, Deaf and Hard of Hearing Education, Teacher Training, Inclusive Education, Educational Technology, Professional Development*

INTRODUCTION:

Education plays a fundamental role in enhancing individuals' quality of life and serves as the cornerstone for personal, social, and professional development (Pedro et al., 2020). It empowers individuals with the skills and knowledge necessary to navigate daily life, foster critical thinking, and contribute meaningfully to society. Beyond basic literacy and numeracy, education influences economic stability, civic participation, and social mobility, underscoring its profound influence on both individuals and communities. Research has shown a strong correlation between the quality of education and individuals' overall wellbeing, with better educational opportunities leading to improved health outcomes, higher income levels, and increased job satisfaction (Kumar, 2020). Moreover, education plays a critical role in promoting inclusivity, reducing social inequalities, and preparing individuals for the demands of an ever-evolving global workforce.

One of the most significant determinants of education quality is teacher competence and preparedness. Teachers' qualifications directly affect various aspects of the education system, including their

effectiveness in the classroom, job satisfaction, and ability to foster inclusive learning environments. Well-trained educators contribute to higher student achievement by implementing evidence-based teaching strategies, integrating technology effectively, and addressing diverse student needs. Furthermore, teachers serve as role models who influence students' motivation, self-efficacy, and lifelong learning habits. Therefore, examining factors that influence teachers' instructional abilities, such as their training, professional development opportunities, and access to educational resources, is crucial for enhancing education quality (Darling-Hammond, 2017).

This study focused on the factors that help train teachers to achieve high efficiency in student training, while our study aims to investigate the factors that help teachers, their training needs, the extent of the need for them, and how to conduct courses and workshops to deal with technology in the educational process.

Among specialized fields in education, teachers who work with DHH students face unique challenges that require specialized training and resources. DHH students require tailored instructional approaches, communication strategies, and assistive technologies to support their learning. Teachers of DHH students must be proficient in various communication methods, such as American Sign Language (ASL), cued speech, and auditory-verbal techniques, to effectively engage with their students. Additionally, they must be knowledgeable about assistive technologies, including hearing aids, cochlear implants, and real-time captioning systems, which play a crucial role in facilitating access to education for DHH learners (Grönlund et al., 2010). Beyond technical knowledge, these educators must possess cultural competency and an understanding of DHH students' broader social and emotional needs to create an inclusive and supportive learning environment.

This study focused on assistive technologies for students with learning difficulties that help them learn and enable them to facilitate the learning process. However, teachers may face difficulties in dealing with these technologies and challenges, while our study focuses on preparing teachers well to deal with technological means well by holding intensive training courses for them so that they can deal with them well, and this is what distinguishes this study.

The integration of assistive technology into education may bridge communication barriers, enhance learning experiences, and promote inclusivity for DHH students. However, these technologies' effectiveness largely depends on teachers' ability to utilize them appropriately (Fadare et al., 2024). Despite advancements in educational technology, many educators face barriers such as limited professional development opportunities, lack of funding for assistive technology, and insufficient institutional guidance on best practices for technology use in special education settings. Addressing these challenges requires targeted training programs, policy reforms, and increased collaboration among educators, technology developers, and policymakers.

Need for the Study

Despite various assistive technologies' availability, many teachers remain inadequately prepared to integrate these tools into their instructional practices. The lack of comprehensive training and professional development in this area creates a barrier to effective teaching for DHH students (Eriks-Brophy & Whittingham, 2013). Furthermore, existing research on the intersection of technology and DHH education remains limited, highlighting the need for more in-depth studies assessing teachers' competencies and training gaps (Cannon & Marx, 2024). By addressing these gaps, this study contributes to improving the quality of education for DHH students, ensuring they have access to the most effective teaching strategies and technological tools available (Marschark et al., 2015).

Statement of the Problem

The increasing need to integrate technology in education, particularly for DHH students, requires a comprehensive understanding of how teachers interact with and employ technological tools in their classrooms. Assistive technologies significantly enhance the learning process for DHH students, yet research examining the extent to which teachers are trained to use these tools effectively is scarce (McNicholl et al., 2021). This study's aim is to address this gap by investigating teachers' knowledge and usage of technology in DHH education while identifying the challenges they face in the implementation process, as well as their specific training needs.

Objectives of the Study

The growing need to integrate technology into education, particularly for students with special needs, necessitates a comprehensive understanding of how teachers interact with and utilize technological tools in their classrooms. While assistive technologies significantly enhance the learning process for students with special needs, research examining the extent to which teachers are trained to use these tools effectively is scarce (McNicol et al., 2021). This study aims to bridge this gap by investigating teachers' knowledge and use of technology in special education, identifying the challenges they face in implementation, and determining their specific training needs to better serve this student population.

Study Questions

1. Does a statistically significant difference exist in teachers' knowledge of technological advancements based on gender, educational qualifications, and teaching experience?
2. Does a statistically significant difference exist in teachers' use of technology based on gender, educational qualifications, and teaching experience?
3. What are the most pressing training needs related to technology for teachers of DHH students based on gender, educational qualifications, and teaching experience?

SIGNIFICANCE OF THE STUDY

Theoretical Importance

- Enhance teachers' awareness and knowledge regarding instructional strategies for students with learning difficulties.
- Emphasize technology's role in facilitating the learning process for students with special needs.
- Develop teachers' competencies in using technological tools and integrating them effectively into their teaching practices.

Practical Importance

- Explore advanced technologies that support DHH students, such as speech-to-text conversion, avatar-based translation systems, and AI-driven sign language recognition.
- Investigate multimedia tools that assist students in visual learning and communication.
- Identify gaps in teachers' technological competencies and offering recommendations for professional development programs.

METHODOLOGY

The study involved teachers of Deaf and Hard of Hearing (DHH) students in the Najran region, comprising approximately 25 teachers of both genders. Given the nature of the research, its objectives and questions, and the information to be obtained, the descriptive method using a survey approach was used to achieve the research objectives and address its questions.

Study's Population and the Sample

The study population consisted of all teachers of DHH students in the Najran region, numbering 25 teachers for the 2023/2024 academic year.

The study sample consisted of 18 teachers, representing 72% of the study population, and they were selected randomly. The final version of the research tool (questionnaire) consisted of 12 statements, each rated on a five-point Likert scale: strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1).

Validity of the Study Questionnaire

The study tool's (questionnaire's) validity was verified through external validity and internal consistency and reliability.

External Validity

The questionnaire's validity was verified by presenting it to five experienced and specialized faculty members. Their directions and suggestions were taken into account, including the addition of new paragraphs, the deletion or modification of inappropriate paragraphs, and the adjustment of paragraphs to align with their respective sections. This ensured clarity of wording and linguistic integrity.

Internal Consistency and Reliability

The study tool was applied to an exploratory sample of 18 teachers. The Pearson correlation coefficient was calculated between the statements within the axes of knowledge regarding the training needs of teachers of the DHH in relation to technical innovations in the Najran region and the total score of their respective axes. Table 1 illustrates these results:

Table 1 *Descriptive Title of the Table*

N	The statements	Correlation coefficient	Statistical significance
Training needs of teachers of DHH students in knowledge of technical innovations			
1.	Technical laboratories equipped in schools	.822**	.000
2.	Classes are prepared and supported with technical programs.	.956**	.000
3.	Appropriate training factors are available from place, time, etc.	.920**	.000
4.	Classrooms are suitable in terms of the number of trainees.	.589*	.010
Training needs of teachers of DHH students in using technical innovations			
5.	Use graphing tools to develop the language skills of hearing-impaired students.	.934**	.000
6.	Use smart mind maps to develop the language skills of hearing-impaired students.	.934**	.000
7.	Use search engines to develop and advance the language skills of hearing-impaired students.	.965**	.000
8.	Use smartphones to develop the language skills of hearing-impaired students.	.925**	.000
Training needs of teachers of DHH students in producing technical innovations			
9.	Hearing-impaired students participated in digital stories in the educational process.	.671**	.002
10.	I need training programs in animation.	.797**	.000
11.	I need training programs in multimedia.	.735**	.001
12.	I need training programs in infographics: a form of visual communication that helps simplify information and attract the learner's attention.	.579*	.012

** Statistically significant at 0.01, * Statistically significant at 0.05

Table 1 shows that the Pearson correlation coefficients between the statements of the axes of knowledge regarding the training needs of teachers of the Deaf and Hard of Hearing in relation to technical innovations in the Najran region and the total score of the respective axis are statistically significant at the 0.01 or 0.05 significance level. The Pearson correlation coefficients between the statements and the total score for the respective axis ranged from 0.579* to 0.965**, with all coefficients being significant at the 0.01 or 0.05 level.

The Study Tool's Stability

Reliability coefficients were calculated on the axes of knowledge of the training needs of teachers of the DHH regarding technical innovations in the Najran region, and Table 2 shows the reliability coefficient.

Table 2 *Cronbach's Alpha Reliability Coefficient for Axes of Knowledge of Training Needs of Teachers of DHH Regarding Technical Innovations in Najran Region*

N	Statements	Ratability coefficient	Number of statements
1	Training needs of teachers of DHH students in knowledge of technical innovations	0.84	4
2	Training needs of teachers of DHH students in using technical innovations	0.95	4
3	Training needs of teachers of DHH students in producing technical innovations	0.86	4

Table 2 shows the Pearson correlation coefficient between the statements of the axis of knowledge regarding the training needs of teachers of the DHH concerning technical innovations in the Najran region and the total score of the axis to which they belong.

Table 3 shows that the Cronbach's alpha reliability coefficients for the axes of knowledge regarding the training needs of teachers of the DHH in relation to technical innovations in the Najran region ranged from 0.84 to 0.96. These are high-reliability coefficients and are appropriate for the purposes of the study, indicating that the study tool is reliable.

Table 3 *Criteria for Interpreting the Values of Arithmetic Averages According to Range Equation*

Very Large	Large	Moderate	Little,	Very little,	Degree of agreement
> 4,20 to 5,00	< 3,40 to 4,20	> 2,60 to 3,40	>1,80 to 2,60	1 to 1,80	Arithmetic mean

Statistical Methods

The statistical software (SPSS version 23) was used to analyze the study's results and answer its questions. The software was employed to perform the following tasks:

1. Pearson correlation coefficient to verify consistency
2. Cronbach's alpha to verify the study tool's stability
3. Arithmetic means, standard deviations, and rank were calculated to answer the study questions

The following grading was adopted for the degree to which the study tool's statements were met to determine the degree of agreement based on the range equation.

RESULTS

Results of the First Question: What Are the Training Needs of Teachers of DHH Students in the Knowledge of Technical Innovations?

Arithmetic means, standard deviations, and rank were calculated for the study sample members' estimates of the training needs of teachers of DHH students in the knowledge of technical innovations. Table 4-1 shows this.

Table 4-1 *Arithmetic Means, Standard Deviations, and Rank of Study Sample Members' Estimates of Training Needs of Teachers of DHH Students in Knowledge of Technical Innovations*

N	Rank	Arithmetic	Average expressions	Standard deviations	Score
1	3	Technical laboratories equipped in schools	2.44	71	Few
2	1	Classes are prepared and supported with technical programs	2.78	1.06	Medium
3	2	Appropriate training factors are available from place, time, etc.	2.50	86	Few
4	4	Classrooms are suitable in terms of the number of trainees	2.11	32	Few
The total score for the training needs of teachers of deaf and hard of hearing students in knowledge of technical innovations			2.46	**64**	Few

Table 4-1 shows that the overall score for the training needs of teachers of DHH students in the knowledge of technical innovations was low, with a mean of 2.46 and a standard deviation of 0.64. Statement 2, "Classrooms are prepared and supported with technical programs," ranked first, with a mean of 2.78 and a standard deviation of 1.06, indicating a moderate degree. Statement 3, "Appropriate training factors are available (place, time, etc.)," ranked second, with a mean of 2.50 and a standard deviation of 0.86, indicating a low degree. Statement 1, "Technical laboratories equipped in schools," ranked third, with a mean of 2.44 and a standard deviation of 0.71, indicating a low degree. Statement 4, "The classrooms are suitable in terms of the number of trainees," ranked fourth, with a mean of 2.11 and a standard deviation of 0.32, indicating a low degree.

The researcher attributes this to the inadequacy of the infrastructure, laboratories, facilities, and equipment necessary to meet the training needs of teachers of DHH students in the area of technical innovations.

The researcher also attributes the lack of attention to the specialized training needs of teachers of DHH students.

Results of the Second Question: What Are the Training Needs of Teachers of DHH Students in Using Technological Innovations?

Arithmetic means, standard deviations, and rank were calculated for the study sample members' estimates of the training needs of teachers of DHH students in using technological innovations. Table 4-2 illustrates these results.

Table 4-2 *Arithmetic Means, Standard Deviations, and Rank of Study Sample Members' Estimates of Training Needs of Teachers of DHH Students in Using Technological Innovations*

N	Rank	Arithmetic	Average expressions	Standard deviations	Scores
1	2	Use graphing tools to develop DHH students' language skills.	2.72	96	Medium
2	3	Use smart mind maps to develop DHH students' language skills.	2.72	95	Medium
3	1	Use search engines to develop and advance DHH students' language skills.	2.78	1.17	Medium
4	4	Use smartphones to develop DHH students' language skills.	2.72	1.02	Medium
The total score for the training needs of teachers of DHH students in using technical innovations.			2.74	**96**	Medium

Table 4-2 shows that the overall score for the training needs of teachers of DHH students in using technological innovations was moderate, with a mean of 2.74 and a standard deviation of 0.96. Statement 3, "Use search engines in developing and improving linguistic skills for hearing-impaired students," ranked first, with a mean of 2.78 and a standard deviation of 0.95, indicating a moderate degree. Statement 1, "Use graphing tools in developing the linguistic skills of hearing-impaired students," ranked second, with a mean of 2.72 and a standard deviation of 0.96, also indicating a moderate degree. Statement 2, "Use smart mind maps to develop the language skills of students with hearing loss," ranked third, with a mean of 2.72 and a standard deviation of 0.95, indicating a moderate degree. Finally, Statement 4, "Use smartphones to develop the language skills of hearing-impaired students," ranked fourth, with a mean of 2.72 and a standard deviation of 1.02, indicating a moderate degree.

The researcher attributes this to the limited use of technical innovations by teachers of DHH students and their insufficient professional qualifications related to employing technology and its tools in the field. Additionally, the researcher notes a lack of interest among these teachers, stemming from their experiences with students facing challenges and the false belief that additional effort would be futile with such students.

Results of the Third Question: What Are the Training Needs of Teachers of DHH Students in Producing Technical Innovations?

The arithmetic means, standard deviations, and rank were calculated for the estimates of the study sample members regarding the training needs of teachers of DHH students in producing technical innovations. Table 4-3 illustrates this.

Table 4-3

Arithmetic Means, Standard Deviations, and Rank of Study Sample Members' Estimates of Training Needs of Teachers of DHH Students in Producing Technical Innovations

N	Rank	Arithmetic	Average expressions	Standard deviations	The degree

1	4	Hearing-impaired students participated in digital stories in the educational process.	2.78	94	Medium .
2	3	I need training programs in animation.	4.72	46	Very big
3	1	I need training programs in multimedia.	4.83	38	Very big
4	2	I need training programs in infographics: a form of visual communication that helps simplify information and attract the learner's attention.	4.78	43	Very big
The total score for the training needs of teachers of DHH students in producing technical innovations			4.28	38	Very big

Table 4-3 shows that the overall score for the training needs of teachers of DHH students in producing technical innovations was very high, with a mean of 4.28 and a standard deviation of 0.38. Statement 3, "I need training programs in multimedia," ranked first, with a mean of 4.78 and a standard deviation of 0.43, indicating a very high degree of need. Statement 4, "I need training programs in infographics: a form of visual communication that helps simplify information and attract the learner's attention," ranked second, with a mean of 4.72 and a standard deviation of 0.46, also indicating a very high degree of need. Statement 2, "I need training programs in animation," ranked third, with a mean of 4.72 and a standard deviation of 0.46, indicating a very high degree of need. Finally, Statement 1, "I share stories with hearing-impaired students using digital science in education" ranked last, with a mean of 2.78 and a standard deviation of 0.94, indicating a moderate degree of need.

The researcher attributes this to the importance of providing training courses on producing technical innovations for teachers of DHH students, due to their positive and effective role in the learning and teaching processes for these students.

DISCUSSION

As technology continues to evolve, its role in the education sector becomes increasingly indispensable. Teachers of DHH students must be equipped with the necessary skills and knowledge to integrate technological advancements into their teaching methodologies. Assistive technology's effectiveness in classrooms depends largely on educators' familiarity with these tools, underscoring the need for ongoing training and professional development. This study's goal is to assess the disparities in technological proficiency among teachers based on gender, qualification, and experience while identifying gaps in current training programs.

Training Needs of Teachers of DHH in Technology Knowledge Development Based on Gender, Qualification, and Experience

Technology's role in education, particularly for students with disabilities, such as those who are DHH, is increasingly critical. To ensure effective teaching, educators must possess adequate knowledge and training in technological advancements (Bowen & Probst, 2023). This study emphasizes the need for tailored training programs for teachers based on gender, qualification, and experience in a southern city of Saudi Arabia. The technological tools in question range from fundamental devices such as overhead projectors to advanced tools like smart boards.

Extent of Technology Knowledge and Training Needs

The findings indicate that teachers' knowledge of technology remains relatively low across gender, qualification, and experience, highlighting the urgent need for targeted training. Prior research (e.g., Kaye, 2000) examined the use of technology by teachers of DHH students in general education settings, revealing an average level of technological competency. The current study emphasizes that the existing

infrastructure for technology training requires enhancement, with a special need for intensive workshops and training programs covering emerging technologies.

Establishing well-equipped training centers is crucial to improving teachers' technological competencies and ensuring the effective utilization of assistive technologies for DHH students. These centers should be strategically located within educational institutions and provide access to the latest assistive tools, such as speech-to-text applications, interactive learning platforms, and real-time captioning software. Additionally, specialized training should focus on equipping teachers with the knowledge of software and applications designed explicitly for students with hearing impairments. The continuous assessment and certification of teachers following these training sessions will ensure that their technological competencies remain up to date and relevant.

Moreover, collaboration with technology developers and industry experts can bridge the gap between theoretical knowledge and practical implementation. Hands-on training sessions should be conducted where teachers can actively engage with technology in simulated classroom settings. These interactive training programs should incorporate case studies, practical demonstrations, and real-time troubleshooting exercises to build confidence in using technology effectively. Additionally, mentoring programs pairing experienced educators with novice teachers can help facilitate knowledge transfer and peer-supported learning.

It is also essential to incorporate an adaptive learning approach within these training programs. Individualized professional development plans should be created based on teachers' existing knowledge and skill levels. Educators who are new to technology can begin with foundational courses, whereas those with intermediate skills can be introduced to more complex assistive technology tools. Advanced training should include workshops on artificial intelligence–driven assistive devices, gamified learning approaches, and virtual reality applications tailored to DHH students. The ongoing evaluation of these training programs will ensure their relevance and effectiveness.

ntegrating assistive technology into education can bridge communication barriers, enhance learning experiences, and promote inclusion for students with disabilities. However, the effectiveness of these technologies depends heavily on teachers' ability to use them appropriately (Fadare et al., 2024). This was highlighted in the findings of that study, while our study emphasized the need to integrate an adaptive learning approach into these training programs. Individualized professional development plans should be developed based on teachers' existing knowledge and skills. New technology teachers can begin with basic courses, while those with intermediate skills can be introduced to more complex assistive technology tools. Advanced training should include workshops on AI-powered assistive devices, gamified learning methods, and virtual reality applications specifically designed for students with disabilities. Ongoing evaluation of these training programs will ensure their relevance and effectiveness.

Limitations

Despite its valuable insights, the current study has several limitations. First, the sample size was limited to a specific geographical area, which may affect the findings' generalizability. Future research should include a more diverse sample across multiple regions to better understand the variations in training needs among teachers of DHH students.

Second, the study relied primarily on self-reported data, which may be subject to biases such as social desirability or inaccurate self-assessments of technological proficiency. A mixed-methods approach incorporating observations and practical assessments would provide a more comprehensive evaluation of teachers' competencies.

Finally, the study did not explore training programs' long-term influence on teachers' ability to integrate technology effectively. Longitudinal studies tracking teachers' progress over time would offer deeper insights into technology training initiatives' sustainability and effectiveness.

Implications for Practitioners

This study's findings have significant implications for educational policymakers, teacher training institutions, and school administrators. First, policymakers must recognize the urgent need for dedicated funding to support professional development programs in assistive technology for DHH educators. By

allocating resources effectively, they can ensure that all teachers receive training tailored to their technological competencies and instructional needs.
Second, teacher training institutions should integrate mandatory technology-based courses into their curricula for special education programs. These courses should focus on both the theoretical and practical applications of assistive technology, ensuring that graduates enter the workforce with the necessary skills to support DHH students. Additionally, partnerships between universities and technology companies can provide hands-on experience with the latest educational tools.
Finally, school administrators should take an active role in facilitating continuous professional development by organizing regular training sessions and creating a culture that encourages technological adoption. They should also implement mentorship programs where experienced teachers can guide their peers in effectively using technology in classrooms. By fostering a supportive environment, schools can enhance teachers' confidence and competence in utilizing assistive technology for DHH students.

Recommendations for Future Research
Future research should focus on identifying the most effective training models that cater to different educator experience levels. Comparative studies analyzing the effects of various training methodologies, such as online learning versus in-person workshops, can help determine the most efficient approach for equipping teachers with technological skills.
Additionally, research should investigate professional development programs' long-term effect on teachers' ability to integrate assistive technology. Longitudinal studies tracking educators' progress before and after undergoing technology training would provide valuable insights into these initiatives' sustainability.
Another important area for future research is the role of cultural and contextual factors in technology adoption among educators of DHH students. Examining how socio-economic conditions, institutional policies, and cultural attitudes influence teachers' engagement with technology will help create more targeted and adaptable training programs.
Finally, studies should explore student outcomes to determine the direct benefits of enhanced technological training for teachers. Evaluating improvements in DHH students' academic performance, engagement, and overall learning experience will provide evidence-based support for investing in teacher training initiatives. By addressing these research gaps, future studies can contribute to the ongoing development of effective strategies for integrating technology into DHH education.
This study's findings have significant implications for educational policymakers, teacher training institutions, and school administrators. First, policymakers must recognize the urgent need for dedicated funding to support professional development programs in assistive technology for DHH educators. By allocating resources effectively, they can ensure that all teachers receive training tailored to their technological competencies and instructional needs.
Second, teacher training institutions should integrate mandatory technology-based courses into their curricula for special education programs. These courses should focus on both the theoretical and the practical applications of assistive technology, ensuring that graduates enter the workforce with the necessary skills to support DHH students. Additionally, partnerships between universities and technology companies can provide hands-on experience with the latest educational tools.
Finally, school administrators should take an active role in facilitating continuous professional development by organizing regular training sessions and creating a culture that encourages technological adoption. They should also implement mentorship programs where experienced teachers can guide their peers in effectively using technology in classrooms. By fostering a supportive environment, schools can enhance teachers' confidence and competence in utilizing assistive technology for DHH students.

CONCLUSION
In conclusion, the integration of technology into education for DHH students is essential to ensuring equitable access to learning opportunities. However, the current level of technological knowledge among teachers remains insufficient, requiring targeted training programs tailored to educators' gender, qualifications, and experience levels. Investing in well-equipped training centers, fostering collaboration

between educators and technology experts, and implementing ongoing professional development initiatives can significantly enhance teachers' technological competencies.

Moreover, addressing the barriers to technology adoption, such as lack of institutional support and funding constraints, is crucial for creating an inclusive learning environment. Future research should explore more comprehensive methods for assessing training programs' effectiveness and influence on student learning outcomes. By prioritizing technology integration and teacher training, educational institutions can ensure that DHH students receive the high-quality education they deserve.

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