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# Supporting Inclusivity Through an Automatic Transcription Application to Improve Hearing Skills for the Deaf

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**ABSTRACT**

Inclusivity is the principle that underlies a just and equal society for all individuals, including students or pupils who have hearing disabilities such as the deaf. In an effort to realize inclusivity, technological developments have opened the door to solutions that can improve the quality of life for deaf users. One of the main challenges faced by deaf users is difficulty in understanding and communicating with the outside world through hearing. This article discusses how automatic transcription applications can serve as powerful tools in supporting inclusiveness by improving the listening skills of deaf users. An automatic transcription application is software that is capable of converting spoken conversations into text in real-time. This has the potential to enable deaf users to access previously difficult-to-reach information. The use of automatic transcription applications can provide significant benefits for deaf users. Firstly, it allows pupils and students to follow conversations and presentations better, improving their listening skills. Second, users can participate more actively in various social and educational activities, feeling more confident in interacting with friends, colleagues and instructors. Apart from that, the use of this application can also help in the development of their spoken language, because students can view the transcribed text while listening to the conversation. However, there are several challenges that need to be overcome in implementing this automatic transcription application. These include accuracy of transcription, availability of appropriate hardware and software, and community understanding of the needs and rights of deaf users. Therefore, collaboration between technology developers, the deaf community, and other interested parties is important in ensuring that automated transcription applications can be used effectively to increase inclusivity for deaf users.

**Keywords:** *Inclusivity, Hearing, Transcription*

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## INTRODUCTION

In a modern era that is increasingly digitally connected, inclusivity has become one of the key aspects in ensuring that all individuals, including pupils and students who have various disabilities, can access and participate in various aspects of life(Chen et al., 2023). One of the challenges faced by the deaf community is accessibility in terms of listening to and understanding information delivered in audio form, such as lectures, presentations and various multimedia materials. Automatic transcription is one technology that can be used to support this inclusivity(Schwartz et al., 2020). Automatic transcription is the process of automatically converting speech or audio into text using special algorithms and software. Automated transcription applications can greatly benefit deaf users by improving their access to audio content(Frantzeskaki, 2019). Therefore, this approach can play an important role in improving the hearing skills of deaf people. The importance of inclusivity is a fundamental value that must be emphasized in various aspects of society, including education and the world of work. With the help of automatic transcription technology(Qin et al., 2021), can create a more inclusive environment for those with hearing challenges. In this article, we will explain why automatic transcription applications are important in supporting inclusivity for deaf users, how this technology can be used to improve the listening skills of students and students, and the benefits and challenges associated with implementing this technology(Salinas & Lozano, 2019). Here the researcher will discuss further the use of automatic transcription in supporting inclusivity, the potential for further development in this domain, and the positive impact it can have in efforts to improve the quality of life and opportunities for the deaf community(Sovacool, 2021). Hopefully this article will help more people understand the importance of inclusivity and how technology like automatic transcription can play a role in achieving it.

Challenges and Benefits of Using Automatic Transcription, the first of which is accessibility, namely that automatic transcription applications provide greater accessibility to various audio content for deaf users. They can easily read the text transcription while listening to the audio(Pretorius et al., 2019), allowing them to understand content that was previously difficult to access. The second is inclusive education, namely in the field of education, automatic transcription can be used to create learning materials, such as lectures, presentations and tutorials(Walton et al., 2019), become more inclusive. This allows deaf students to follow lessons better and develops students' and college students' listening skills. Professional Support i.e. In a work context, automated transcription applications can be used to improve accessibility in the workplace. Deaf users can better participate in meetings, seminars, or presentations, which can increase their productivity and participation in the work environment(Jo & Gebru, 2020). Independence: The use of automatic transcription also gives deaf users more independence when it comes to consuming audio content. College

students and students no longer need to rely on sign language interpreters or spoken translations(Gilmore-Bykovskyi et al., 2019). However, there are several challenges that need to be overcome, Accuracy, namely Automatic transcription technology is not always 100% accurate. This can be an obstacle in ensuring that information is conveyed correctly and can be understood by deaf users(Dagens et al., 2020). Cost: Development and implementation of an automated transcription application can involve significant costs. This may be an obstacle for educational institutions and businesses who want to adopt this technology. Training: Deaf users need to be given training to utilize automatic transcription applications effectively(Tan & Taeihagh, 2020). College students and students must learn how to use it and also understand the limits of this technology. Awareness, namely awareness of the existence and benefits of automatic transcription technology, needs to be increased both among deaf users and the general public(Dewsbury & Brame, 2019). In a broader context, the development of more sophisticated automated transcription technologies, capable of addressing some of these challenges, is essential. This will help in creating a more inclusive and equitable environment for all individuals, including those with various hearing disabilities(Allam & Jones, 2021). Supporting inclusivity through automatic transcription apps is an important step in creating a more inclusive world for the deaf community. This technology has great potential to improve their listening skills, provide greater accessibility to a variety of audio content, and increase participation in education and the world of work(Zuniga-Teran et al., 2020). Although there are still challenges that need to be overcome, the development and use of this technology can bring great benefits in the effort to create a more inclusive and equitable society for all.

**Review of Literature**

1. Inclusivity

   Inclusivity is a concept that refers to efforts to create a social, cultural, economic, and political environment that accepts, values, and includes all individuals, regardless of their background, identity, or condition. It is an approach that encourages diversity and provides equal access, opportunity and fair treatment for all people(Morris et al., 2021). Inclusivity encompasses various aspects, including Diversity, recognizing and respecting individual differences, such as gender, age, ethnicity, sexual orientation, religion, physical or mental abilities, and socio-economic background. Diversity is considered a wealth and resource that enriches society. Equality, ensuring that all individuals have equal opportunities to develop, succeed and participate in all aspects of life, including education, work and social life. Accessibility, ensuring that physical environments, technology and information can be accessed and used by all individuals, including those with physical or mental disabilities(Sheikh et al., 2021). It also involves efforts to remove barriers that hinder participation. Participation, encouraging everyone to participate in decision-making processes that affect them directly or indirectly. This creates a feeling of belonging and involvement in society. Acceptance and Respect, ensuring that every individual feels accepted, valued and welcomed in all aspects of social, cultural and economic life. Inclusivity is an important principle in many contexts, including education, employment, social policy, and culture(Roche et al., 2020). The ultimate goal is to

create a fair, welcoming, and diverse society, where all individuals have equal opportunities to develop and contribute. Efforts to realize inclusivity require cooperation from various parties, including government, private institutions, civil society and individuals.

2. Automatic Transcription App

   Automatic Transcription Applications are technology solutions designed to automatically convert spoken conversations, audio recordings, or even videos into written text(Ghodake et al., 2021). This technology has become important in a variety of contexts, including business, academic, medical, media, and law. Automated transcription apps leverage artificial intelligence and voice recognition to produce accurate and useful text without requiring intensive manual input(Vaca et al., 2019). The advantages of the Automatic Transcription Application include, Efficiency, this application can produce text in a short time, much faster than the manual transcription process which takes time and money. Accuracy is With the development of speech recognition technology and natural language processing algorithms(Sezgin et al., 2022), automatic transcription applications can achieve a high level of accuracy in converting speech to text. Ease of Use: These apps often have a user-friendly and intuitive interface, allowing people with no technical background to use them easily(Valtonen et al., 2019). Multilingual Capability: Some automatic transcription apps can support multiple languages, allowing users to transcribe conversations in different languages. Various Uses This application is used in various contexts, such as interview transcription, recording lectures, creating medical notes, creating subtitles for videos, and much more(Wang et al., 2020). Although Automatic Transcription Apps offer many benefits, it is important to remember that students are not always perfect and can still make mistakes, especially in recognizing accents, unclear speech, or less common language. Therefore, it is often necessary to carry out revisions and editing after the automatic transcription is complete. With continued technological developments(Nakatsuka et al., 2021), Automatic Transcription applications will continue to become a more powerful and important tool in managing information and communication in various sectors of life.

3. Hearing Skills in the Use of the Deaf

   Automatic Transcription Applications are technology solutions designed to automatically convert spoken conversations, audio recordings, or even videos into written text. This technology has become important in various contexts, including business, academic, medical, media(Van Wieringen et al., 2019), and law. Automated transcription apps leverage artificial intelligence and voice recognition to produce accurate and useful text without requiring intensive manual input(Lederberg et al., 2019). The advantages of the Automatic Transcription Application include, Efficiency, namely that this application can produce text in a short time, much faster than the manual transcription process which takes time and money. Accuracy is that with the development of speech recognition technology and natural language processing algorithms, automatic transcription applications can achieve a high level of accuracy in converting speech into text(Caselli et al., 2021). Ease of Use: These apps often have user-friendly and intuitive interfaces, allowing people with no

technical background to use them easily. Multilingual Capability: Some automatic transcription apps can support multiple languages, allowing users to transcribe conversations in different languages. Various Uses is that this application is used in various contexts(Antia et al., 2020), such as interview transcription, lecture recording, creating medical notes, creating subtitles for videos, and more. Although Auto Transcription Apps offer many benefits, it is important to remember that they are not always perfect and can still experience errors especially in recognizing accents, unclear speech, or less common languages. Therefore, it is often necessary to carry out revisions and editing after the automatic transcription is complete. With continued technological developments(Yoshinaga-Itano et al., 2020), Automatic Transcription applications will continue to become a more powerful and important tool in managing information and communication in various sectors of life.

There are several previous research opinions whose discussion is almost the same as what the researchers discussed, namely about Supporting Inclusivity Through Automatic Transcription Applications to Improve Hearing Skills for the Deaf. According to the first research, entitled Concerning the Understanding of Students with Deaf Disabilities SMPLB and Smalb B Yakut Purwokerto on the Content of the Liputan 6 Siang News Using Indonesian Sign Language (Bisindo), the results of the discussion were students' understanding after watching the Liputan 6 Siang news, namely that students were able to understand and know the content of the news conveyed(Melo et al., 2019). Students can practice the sign language they see on television and help their friends who are confused about the content of the news being conveyed.

## RESEARCH METHOD

Quantitative methods are a research approach that uses data in the form of numbers and statistics to measure and analyze phenomena. In quantitative research, researchers collect data that can be measured numerically, and data analysis is carried out using statistical methods. The main goal of quantitative methods is to provide a more objective and measurable understanding of the phenomenon under study. A quantitative approach is often used to answer research questions that are how much, how often, or what is the relationship between variable A and variable B. This method allows researchers to make generalizations and make predictions based on the data collected.(Chu et al., 2020). Examples of data collection instruments in quantitative methods involve questionnaires, surveys, experiments, or systematic observations. The data obtained can be processed using various statistical techniques such as regression analysis, variance analysis, or hypothesis testing. Quantitative methods are often used in fields such as social sciences, economics, psychology, and other applied sciences. While this method has the advantage of providing data that can be measured and tested statistically, it is also important to consider the limitations and limitations that may exist in a quantitative approach. In quantitative research, data is collected by measuring certain variables and converting them into numbers that can be processed. Quantitative methods are used to test hypotheses, identify statistical patterns, measure the impact of variables, compare groups, and make generalizations from samples to broader populations. Examples of quantitative approaches include surveys with questionnaires,

experiments involving numerical measurements, analysis of secondary data from available sources, and mathematical models to describe relationships between variables.(Leslie et al., 2022). Quantitative approaches have the advantage of providing results that can be measured objectively, allowing for in-depth statistical analysis, and allowing for broader generalizations. However, this approach may not be able to describe the richer and more complex context that more in-depth qualitative methods can. Therefore, the choice between quantitative and qualitative approaches often depends on the research objectives, research questions, and type of data required.

The data collection technique in this research is using a questionnaire distribution technique that is distributed online. In the questionnaire there are several questions or statements regarding Supporting Inclusivity Through Automatic Transcription Applications to Improve Hearing Skills for the Deaf. The questionnaire technique is one of the tools or tools used in research methods, especially in quantitative research. A questionnaire is a list of questions designed systematically to collect data from respondents. In making this questionnaire, researchers wanted to know how big the influence of automatic transcription applications is on improving listening skills for the deaf. The questionnaire that the researchers created contained questions about effectiveness, benefits, functions, and so on regarding Supporting Inclusivity Through Automatic Transcription Applications to Improve Hearing Skills for the Deaf. In this study, a research design was used, namely a survey. Data from these surveys can provide an overview of student needs and provide guidance for the development of more effective teaching methods. Quantitative data analysis is carried out by statistical analysis using survey data that has been previously conducted. The main advantage of quantitative research methods is their ability to produce objective and measurable data, allow for robust statistical analysis, and allow generalization of research results to a larger population. Research with survey designs and quantitative data analysis has a number of invaluable advantages, especially in the context of research to identify student needs and guide the development of more effective teaching methods. Surveys in quantitative research can be carried out relatively easily and efficiently, especially if researchers use appropriate data collection tools, such as online questionnaires or structured interviews. In interpreting the results, quantitative research tries to organize the scope of the research results and generalize them into general empirical truths or facts.

## DISCUSSION RESULT

Inclusivity refers to the trait or state of including or encompassing all people, regardless of their differences or diversity. This concept often appears in social, educational, organizational and societal contexts in general. Inclusivity aims to create an environment that accepts, values, and supports all individuals, regardless of background, ability, or identity. Diversity Acceptance, Recognizing and respecting diversity in all its forms, including differences in ethnicity, religion, gender, sexual orientation, abilities, and others. Active Participation, Encouraging the participation of all individuals without discrimination. This could mean creating a space where every voice is heard and valued. Accessibility, ensuring that facilities, services or

opportunities are accessible to everyone, including those who may have special needs or challenges. Empowerment, Providing support and resources so that each individual can develop optimally and feel like they have a meaningful contribution. Justice, ensuring fair treatment for all, regardless of background or identity(Theobald et al., 2020). Examples of inclusivity can be found in various fields, from inclusive education that includes students with special needs into regular classes to work environments that encourage diversity and provide equal opportunities for all employees. Inclusivity aims to create a more just and equitable society, where every individual feels valued and accepted. Supporting inclusivity is an approach that aims to create a friendly and supportive environment for all individuals, regardless of their differences or diversity. Here are some ways to support inclusivity: Awareness and Understanding Increase awareness and understanding of diversity and individual needs. This can include training and education to increase understanding of various conditions or settings. Inclusive Communication: Ensure that communication and information are delivered in a way that is accessible to everyone. For example, providing materials in different formats or languages, and considering the needs of different audiences. Inclusive Friendly Facilities, Design and organize facilities to support accessibility. This could include ramps for wheelchairs, braille signs, or hearing aid devices. Active Participation, Facilitate active participation of all individuals in activities and decisions. Ensure that all voices are heard and considered(Li et al., 2020). Equal Opportunities Ensure that all individuals have an equal opportunity to participate, develop and succeed. This could include adjustments in the workplace or education. Promotion of Openness and Acceptance, Facilitation of an organizational culture that promotes openness, acceptance and respect for diversity. This creates an environment where every individual feels welcome. Training and Education Conduct regular training for employees or community members to increase their understanding of inclusivity and diverse needs. Supporting Technology Integration(Castelli & Sarvary, 2021), Leverage technology to support inclusivity, such as automatic transcription apps or assistive technology that can help individuals with special needs. Commitment and Leadership Ensure that commitment to inclusivity comes from the leadership level and is implemented throughout the organization or community. Continuous Evaluation and Improvement, Periodically evaluate existing inclusive policies and practices, and continuously improve them based on feedback and evolving needs. Supporting inclusivity is a progressive step that involves all of society in creating a more just and welcoming world for all individuals.

An automatic transcription application is software or a computer system designed to convert speech or audio into text automatically. By using voice recognition technology, this application is able to translate spoken or heard words into written format. Automated Transcription applications can come in many forms, either as independent software or as features integrated within other platforms or services(Taori et al., 2019). Here are some common forms of automatic transcription applications: Online Transcription Applications, These applications are usually accessible via a web browser and allow users to upload or record audio files to be converted into text automatically. They can provide transcriptions directly on the web page or provide

downloadable text files. Mobile Apps, Automatic transcription apps for mobile devices allow users to record audio using their phone and get text transcription in real time or after recording is complete. Caption Add-Ons on Video Conferencing Platforms Some video conferencing platforms include an automatic transcription feature, allowing meeting participants to see the captions of what is said during the meeting. Integration with Recording Platforms This application can be integrated with recording platforms or broadcasting services, such as podcasts or streaming platforms, to provide automatic text transcription for audio content. Operating System Features Some operating systems or productivity software include automatic transcription features, which can be used in word processing applications or other programs. Add-ons for Conference Equipment, Some conference equipment or conference audio systems are equipped with an automatic transcription feature, allowing users to view the text of the current talk. API (Application Programming Interface), Some automatic transcription service providers provide APIs that allow developers to integrate the service into custom applications or platforms. Transcription Recording Equipment, There is also physical equipment specifically designed with automatic transcription functions, which is usually used in the context of conferences or interviews. Each form of application has its own uses and advantages, depending on the user's needs and the context of use.

If you imagine creating an automatic transcription application to improve hearing skills in deaf users, this could be a very useful innovation. The following are some possible aspects that could be integrated in the application: Real-Time Transcription, The application can provide real-time transcription during a conversation or listening situation. This allows deaf users to follow conversations better. Adaptation to User Needs, Applications can be configured to meet specific user needs(Rodriguez-Moncayo et al., 2021). This may include the option to modify the transcription speed or adjust the difficulty level. Inclusive Friendly User Interface, User interface design must consider the needs of deaf users. This can include support for braille displays, high contrast options, and voice control. Practice and Test Listening Skills, Applications can provide practice or test listening skills that focus on understanding transcribed text. This can help users to practice listening skills. Customize Text Appearance Users should be able to customize the appearance of transcribed text according to their preferences, including font size, color, and background. Integration with Hearing Assistive Technology If the user uses hearing assistive technology, the app can be integrated with these devices to provide a more holistic experience. Recognition of Special Names and Terms, Applications can be enhanced with the ability to automatically recognize and transcribe special names or terms that may be difficult for the system to identify. Progress Reporting and Analysis, Applications may provide reporting features to measure users' progress in improving their listening skills. This can help users to track progress(Dash et al., 2022). Collaboration and Social Interaction, Where possible, applications can facilitate social interaction and collaboration between users to create a supportive learning environment. Use in Educational Contexts, Applications can be applied in educational contexts, such as classes or training, to help deaf students or trainees improve their listening skills. It is important to involve potential users in the development of this application to ensure that it meets their needs effectively. The

integration of technology to support hearing skills in deaf users can open the door to greater inclusivity in various aspects of life.

The benefits of this Automatic Transcription Application for Improving Hearing Skills for the Deaf are: 1) Increased Understanding: By using automatic transcription, deaf users can read text from what is said in conversations or audio material. This can help them understand the content better. 2) Listening Training: Automated transcription apps can be an effective training tool. Users can listen to the audio while reading the transcription to improve their listening abilities over time. 3) Ease of Access: Automatic transcription allows easier access to audio information. Deaf users can rely on captions to get information conveyed in various contexts, such as lectures, presentations, or everyday conversations. 4) Participation in Discussions: By having access to automatic transcription, deaf users can more easily participate in discussions and conversations. They can follow the conversation with the help of text, allowing them to be more actively involved. 5) Independence: Deaf users can be more independent in consuming audiovisual content with automatic transcription. They don't always need to rely on the help of others to translate information from audio to text.

**Figure 1.**This Automatic Transcription Application is to Improve Hearing Skills for the Deaf Used.

In Figure 1 above is an example which will help to improve listening skills with Automatic Transcription Application Technology. Benefits arising from using this Automatic Transcription Application to Improve Listening Skills. Today's technological developments really help make it easier to develop listening skills so that they become clearer. This Automatic Transcription Application for Improving Online Listening Skills is very helpful in improving hearing skills for the deaf, the process of improving listening skills will be achieved more quickly if you use the Automatic Transcription Application because with this technology the process of improving listening skills will be easier and faster so that in Using the application will make things easier for the deaf. So that when listening, listeners feel satisfied and understand what is released by this Automatic Transcription Application. The use of the Automatic Transcription Application is usually used by people who do not have clear hearing and people who are working so that their listening can be clearer and clearer.

In this research the researcher will present a table in which the table will explain how important it is to use this Automatic Transcription Application to Improve Listening Skills. Here the researcher distributes a questionnaire in the form of questions which can find out how much influence this Automatic Transcription Application has on Improving Listening Skills. In the table below the researcher has presented the data on the results of filling out the questionnaire, which was completed by respondents. In filling out this questionnaire, respondents were actively involved in filling out the questionnaire, with this Automatic Transcription Application to Improve the Hearing Skills of the deaf. In the description of the data in the form of a table below, we will explain the results of the questionnaire that has been distributed. The table below will explain in detail about this Automatic Transcription Application to Improve Hearing Skills for deaf people.

**Table 1,**This Automatic Transcription Application is to Improve Hearing Skills for the Deaf Used.

| **NO** | **Question** | **Answer** | | | | |
|---|---|---|---|---|---|---|
| | | **SS** | **S** | **RR** | **T.S** | **STS** |
| 1. | I feel that this Automatic Transcription Application can Improve Hearing Skills for the Deaf. | 43% | 57% | - | - | - |
| 2. | I feel that technology has a positive impact on improving hearing skills for the deaf | 45% | 55% | - | - | - |
| 3. | I feel that using automatic transcription apps can develop listening skills | 40% | 60% | - | - | - |
| 4. | I feel that this Automatic Transcription Application can improve listening skills for the Deaf and can support self-confidence and enthusiasm for learning. | 50% | 50% | - | - | - |
| 5. | In my opinion, everyone should follow the development of digital technology | 60% | 40% | - | - | - |
| 6. | I feel that the Automatic Transcription Application is very suitable in improving hearing skills for the deaf | 70% | 30% | - | - | - |
| **7.** | I think developing listening skills goes very well with using Automated Transcription Apps | 65% | 35% | - | - | - |
| 8. | In my opinion, having an application that can help with listening skills makes it very easy for the deaf | 50% | 50% | - | - | - |
| 9. | I think technology really helps every education in many ways | 60% | 40% | - | - | - |
| 10. | I feel that the Automatic Transcription Application is easy to get. | 75% | 25% | - | - | - |
| 11. | I feel that the Automatic Transcription Application | 80% | 20% | - | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| | can optimize the process of developing hearing skills for the deaf to become better and more enthusiastic | | | | | |
| 12. | I feel that everyone should have hearing skills including the deaf | 40% | 60% | - | - | - |
| 13. | I feel maintaining listening skills can enable learning activities. | 75% | 25% | - | - | - |
| 14. | I feel that the Automatic Transcription Application can optimize my listening skills to become even clearer | 88% | 12% | - | - | - |
| 15. | I don't think using the Automatic Transcription App takes up much time. | 95% | 5% | - | - | - |

**Information:**
SS = Strongly Agree
S = Agree
RR = Undecided
TS = Disagree
STS = Strongly Disagree

The table above is a table of the results of questionnaires that have been given to students, the responses and responses that have been given by students to the questionnaires that researchers have distributed, have a very important influence on the achievement of the results of this research. In the responses and responses by these students to this research which is entitled Supporting Inclusivity Through Automatic Transcription Applications to Improve Hearing Skills for the Deaf. Give a very extraordinary assessment of this research. In this assessment there are 5 assessment categories, the first is strongly agree (SS), the second is agree (S), the third is doubtful (RR), the fourth is disagree (TS), the fifth is strongly disagree. Based on this table, the first highest research result was obtained at point 15, namely obtaining a percentage of 95%, in the strongly agree category, while the second highest assessment was obtained at point 14, namely obtaining a percentage of 88% in the strongly agree category. Meanwhile, the third highest assessment was at point 11, namely getting a percentage of 80%. Supporting Inclusivity Through Automatic Transcription Applications to Improve Hearing Skills for the Deaf has a very positive impact on improving hearing skills for the deaf. Thus, it can be interpreted that the Automatic Transcription Application really supports efforts to improve listening skills, with the supporting inclusiveness in the form of the Automatic Transcription Application, it will further maximize the hearing abilities of the deaf and make it easier to achieve or optimize the process of improving listening skills. The Automatic Transcription application can be used anywhere and at any time.

Next, the researcher will describe the research results by filling out a questionnaire. For the first question, namely I feel that with this Automatic Transcription Application to Improve Hearing Skills for the Deaf, I received responses in the category of strongly agree at 43% and agree at 57%. For the second question, I feel that technology has a positive impact on improving hearing skills for the deaf, with the strongly agree category being 45% and agree being 55%. For the third question, I feel that using an automatic transcription application can develop listening skills, with the category strongly agree at 40% and agree at 60%. For the fourth question, I feel that this Automatic Transcription Application can improve listening skills for the Deaf and can support self-confidence and enthusiasm for learning, with the strongly agree category being 30% and the agree category being 70%. For the fifth question, I think everyone should follow the development of digital technology, with the strongly agree category being 60% and the agree category being 40%. For the sixth question, I feel that the Automatic Transcription Application is very suitable for improving listening skills for the deaf

with the strongly agree category being 70% and the agree category being 30%. For the seventh question, in my opinion, developing listening skills is very suitable for using the Automatic Transcription Application with the strongly agree category being 65% and the agree category being 35%. For the eighth question, in my opinion, having an application that can help with listening skills really makes things easier for the deaf, with the strongly agree category being 50% and the agree category being 50%. For the ninth question, namely: I think technology really helps every education in many ways with the strongly agree category being 60% and the agree category being 40%. For the tenth question, I feel that the Automatic Transcription Application is easy to get, with the strongly agree category being 75% and the agree category being 25%. For the eleventh question, I feel that the Automatic Transcription Application can optimize the process of developing hearing skills for the deaf to become better and more enthusiastic, with the strongly agree category being 80% and the agree category being 20%. For the twelfth question, namely I feel that everyone should have hearing skills, including the deaf, with the strongly agree category being 40% and the agree category being 60%. For the thirteenth question, namely I feel maintaining listening skills can activate learning activities, with the strongly agree category being 75% and the agree category being 25%. For the fourteenth question, I feel that the Automatic Transcription Application can optimize listening skills to make it even clearer, with the strongly agree category being 88% and the agree category being 12%. For the fifteenth question, I think using the Automatic Transcription Application doesn't take up much time, with the strongly agree category being 95% and the agree category being 5%.

## CONCLUSION

From the results of the discussion above, it can be concluded that by using an automatic transcription application, we can see a significant increase in supporting inclusivity for deaf users. Automatic transcription opens the door to access to verbal information, allowing them to more actively engage in conversations and gain full benefit from the communication situation. In this way, the app not only improves the

hearing skills of deaf users, but also helps create a more inclusive and supportive environment for them. Additionally, the use of automatic transcription applications can also reduce communication barriers between deaf individuals and those without hearing loss. With live text transcription, information can be conveyed more clearly and effectively, promoting better understanding among various groups of society.

The importance of inclusivity in technology is increasingly visible through this application, underscoring that innovation can be a means of creating equality. By providing access to all individuals, regardless of hearing condition, we reinforce the principle that everyone has the right to participate fully in social and community life. From the results of the discussion above, the researcher explains the data that the researcher has obtained from the results of distributing questionnaires which supports inclusiveness in the use of automatic transcription applications that can optimize and improve the listening skills of the deaf.

## REFERENCES

Allam, Z., & Jones, D. S. (2021). Future (post-COVID) digital, smart and sustainable cities in the wake of 6G: Digital twins, immersive realities and new urban economies. Land Use Policy, 101, 105201. https://doi.org/10.1016/j.landusepol.2020.105201

Antia, S.D., Lederberg, A.R., Easterbrooks, S., Schick, B., Branum-Martin, L., Connor, C.M., & Webb, M.-Y. (2020). Language and Reading Progress of Young Deaf and Hard-of-Hearing Children. The Journal of Deaf Studies and Deaf Education, 25(3), 334–350. https://doi.org/10.1093/deafed/enz050

Caselli, N., Pyers, J., & Lieberman, A. M. (2021). Deaf Children of Hearing Parents Have Age-Level Vocabulary Growth When Exposed to American Sign Language by 6 Months of Age. The Journal of Pediatrics, 232, 229–236. https://doi.org/10.1016/j.jpeds.2021.01.029

Castelli, F.R., & Sarvary, M.A. (2021). Why students don't turn on their video cameras during online classes and an equitable and inclusive plan to encourage them to do so. Ecology and Evolution, 11(8), 3565–3576. https://doi.org/10.1002/ece3.7123

Chen, M., Gao, E., Lin, G., Shen, J., & Wang, D. (2023). The transcription factor optomotor-blind restricts apterous expression through TrxG and PcG genes. Developmental Biology, 497, 59–67. https://doi.org/10.1016/j.ydbio.2023.03.002

Chu, DK, Akl, EA, Duda, S., Solo, K., Yaacoub, S., Schünemann, HJ, Chu, DK, Akl, EA, El-harakeh, A., Bognanni, A., Lotfi, T ., Loeb, M., Hajizadeh, A., Bak, A., Izcovich, A., Cuello-Garcia, C.A., Chen, C., Harris, D.J., Borowiack, E., … Schünemann, H.J. (2020). Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: A systematic review and meta-analysis. The Lancet, 395(10242), 1973–1987. https://doi.org/10.1016/S0140-6736(20)31142-9

Dagens, A., Sigfrid, L., Cai, E., Lipworth, S., Cheng, V., Harris, E., Bannister, P., Rigby, I., & Horby, P. (2020). Scope, quality, and inclusiveness of clinical guidelines produced early in the covid-19 pandemic: Rapid review. BMJ, m1936. https://doi.org/10.1136/bmj.m1936

Dash, T. K., Chakraborty, C., Mahapatra, S., & Panda, G. (2022). Gradient Boosting Machine and Efficient Combination of Features for Speech-Based Detection of

COVID-19. IEEE Journal of Biomedical and Health Informatics, 26(11), 5364–5371. https://doi.org/10.1109/JBHI.2022.3197910

Dewsbury, B., & Brame, C. J. (2019). Inclusive Teaching. CBE—Life Sciences Education, 18(2), fe2. https://doi.org/10.1187/cbe.19-01-0021

Frantzeskaki, N. (2019). Seven lessons for planning nature-based solutions in cities. Environmental Science & Policy, 93, 101–111. https://doi.org/10.1016/j.envsci.2018.12.033

Ghodake, GS, Shinde, SK, Kadam, AA, Saratale, RG, Saratale, GD, Syed, A., Elgorban, A.M., Marraiki, N., & Kim, D.-Y. (2021). Biological characteristics and biomarkers of novel SARS-CoV-2 facilitated rapid development and implementation of diagnostic tools and surveillance measures. Biosensors and Bioelectronics, 177, 112969. https://doi.org/10.1016/j.bios.2021.112969

Gilmore-Bykovskyi, A.L., Jin, Y., Gleason, C., Flowers-Benton, S., Block, L.M., Dilworth-Anderson, P., Barnes, L.L., Shah, M.N., & Zuelsdorff, M. (2019) . Recruitment and retention of underrepresented populations in Alzheimer's disease research: A systematic review. Alzheimer's & Dementia: Translational Research & Clinical Interventions, 5(1), 751–770. https://doi.org/10.1016/j.trci.2019.09.018

Jo, E. S., & Gebru, T. (2020). Lessons from archives: Strategies for collecting sociocultural data in machine learning. Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency, 306–316. https://doi.org/10.1145/3351095.3372829

Lederberg, A.R., Branum-Martin, L., Webb, M., Schick, B., Antia, S., Easterbrooks, S.R., & Connor, C.M. (2019). Modalities and Interrelations Among Language, Reading, Spoken Phonological Awareness, and Fingerspelling. The Journal of Deaf Studies and Deaf Education, 24(4), 408–423. https://doi.org/10.1093/deafed/enz011

Leslie, HA, Van Velzen, MJM, Brandsma, SH, Vethaak, AD, Garcia-Vallejo, JJ, & Lamoree, MH (2022). Discovery and quantification of plastic particle pollution in human blood. Environment International, 163, 107199. https://doi.org/10.1016/j.envint.2022.107199

Li, J., Wu, Y., & Xiao, J. J. (2020). The impact of digital finance on household consumption: Evidence from China. Economic Modelling, 86, 317–326. https://doi.org/10.1016/j.econmod.2019.09.027

Melo, R.S., Lemos, A., Paiva, G.S., Ithamar, L., Lima, M.C., Eickmann, S.H., Ferraz, K.M., & Belian, R.B. (2019). Vestibular rehabilitation exercises programs to improve the postural control, balance and gait of children with sensorineural hearing loss: A systematic review. International Journal of Pediatric Otorhinolaryngology, 127, 109650. https://doi.org/10.1016/j.ijporl.2019.109650

Morris, D.B., Gruppuso, P.A., McGee, H.A., Murillo, A.L., Grover, A., & Adashi, E.Y. (2021). Diversity of the National Medical Student Body—Four Decades of Inequities. New England Journal of Medicine, 384(17), 1661–1668. https://doi.org/10.1056/NEJMsr2028487

Nakatsuka, D., Izumi, T., Tsukamoto, T., Oyama, M., Nishitomi, K., Deguchi, Y., Niidome, K., Yamakawa, H., Ito, H., & Ogawa, K. (2021). Histone Deacetylase 2 Knockdown Ameliorates Morphological Abnormalities of Dendritic Branches and Spines to Improve Synaptic Plasticity in an APP/PS1 Transgenic Mouse Model. Frontiers in Molecular Neuroscience, 14, 782375. https://doi.org/10.3389/fnmol.2021.782375

Pretorius, C., Chambers, D., & Coyle, D. (2019). Young People's Online Help-Seeking and Mental Health Difficulties: Systematic Narrative Review. Journal of Medical Internet Research, 21(11), e13873. https://doi.org/10.2196/13873

Qin, L., Raheem, S., Murshed, M., Miao, X., Khan, Z., & Kirikkaleli, D. (2021). Does financial inclusion limit carbon dioxide emissions? Analyzing the role of globalization and renewable electricity output. Sustainable Development, 29(6), 1138–1154. https://doi.org/10.1002/sd.2208

Roche, J., Bell, L., Galvão, C., Golumbic, Y.N., Kloetzer, L., Knoben, N., Laakso, M., Lorke, J., Mannion, G., Massetti, L., Mauchline , A., Pata, K., Ruck, A., Taraba, P., & Winter, S. (2020). Citizen Science, Education, and Learning: Challenges and Opportunities. Frontiers in Sociology, 5, 613814. https://doi.org/10.3389/fsoc.2020.613814

Rodriguez-Moncayo, R., Cedillo-Alcantar, DF, Guevara-Pantoja, PE, Chavez-Pineda, OG, Hernandez-Ortiz, JA, Amador-Hernandez, JU, Rojas-Velasco, G., Sanchez-Muñoz, F. , Manzur-Sandoval, D., Patino-Lopez, L.D., May-Arrioja, D.A., Posadas-Sanchez, R., Vargas-Alarcon, G., & Garcia-Cordero, J.L. (2021). A high-throughput multiplexed microfluidic device for COVID-19 serology assays. Lab on a Chip, 21(1), 93–104. https://doi.org/10.1039/D0LC01068E

Salinas, C., & Lozano, A. (2019). Mapping and recontextualizing the evolution of the term Latinx: An environmental scanning in higher education. Journal of Latinos and Education, 18(4), 302–315. https://doi.org/10.1080/15348431.2017.1390464

Schwartz, R., Dodge, J., Smith, N. A., & Etzioni, O. (2020). GreenAI. Communications of the ACM, 63(12), 54–63. https://doi.org/10.1145/3381831

Sezgin, E., Oiler, B., Abbott, B., Noritz, G., & Huang, Y. (2022). "Hey Siri, Help Me Take Care of My Child": A Feasibility Study With Caregivers of Children With Special Healthcare Needs Using Voice Interaction and Automatic Speech Recognition in Remote Care Management. Frontiers in Public Health, 10, 849322. https://doi.org/10.3389/fpubh.2022.849322

Sheikh, A., Anderson, M., Albala, S., Casadei, B., Franklin, B.D., Richards, M., Taylor, D., Tibble, H., & Mossialos, E. (2021). Health information technology and digital innovation for national learning health and care systems. The Lancet Digital Health, 3(6), e383–e396. https://doi.org/10.1016/S2589-7500(21)00005-4

Sovacool, B. K. (2021). Who are the victims of low-carbon transitions? Towards a political ecology of climate change mitigation. Energy Research & Social Science, 73, 101916. https://doi.org/10.1016/j.erss.2021.101916

Tan, S., & Taeihagh, A. (2020). Smart City Governance in Developing Countries: A Systematic Literature Review. Sustainability, 12(3), 899. https://doi.org/10.3390/su12030899

Taori, R., Kamsetty, A., Chu, B., & Vemuri, N. (2019). Targeted Adversarial Examples for Black Box Audio Systems. 2019 IEEE Security and Privacy Workshops (SPW), 15–20. https://doi.org/10.1109/SPW.2019.00016

Theobald, EJ, Hill, MJ, Tran, E., Agrawal, S., Arroyo, E.N., Behling, S., Chambwe, N., Cintrón, D.L., Cooper, JD, Dunster, G., Grummer, J.A., Hennessey , K., Hsiao, J., Iranon, N., Jones, L., Jordt, H., Keller, M., Lacey, M.E., Littlefield, C.E., … Freeman, S. (2020). Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and mathematics. Proceedings of the National Academy of Sciences, 117(12), 6476–6483. https://doi.org/10.1073/pnas.1916903117

Vaca, K., Gajjar, A., & Yang, X. (2019). Real-Time Automatic Music Transcription (AMT) with Zync FPGA. 2019 IEEE Computer Society Annual Symposium on VLSI (ISVLSI), 378–384. https://doi.org/10.1109/ISVLSI.2019.00075

Valtonen, M., Waris, M., Vuorinen, T., Eerola, E., Hakanen, A.J., Mjosund, K., Grönroos, W., Heinonen, O.J., & Ruuskanen, O. (2019). Common cold in Team Finland during 2018 Winter Olympic Games (PyeongChang): Epidemiology, diagnosis including molecular point-of-care testing (POCT) and treatment. British Journal of Sports Medicine, 53(17), 1093–1098. https://doi.org/10.1136/bjsports-2018-100487

Van Wieringen, A., Boudewyns, A., Sangen, A., Wouters, J., & Desloovere, C. (2019). Unilateral congenital hearing loss in children: Challenges and potentials. Hearing Research, 372, 29–41. https://doi.org/10.1016/j.heares.2018.01.010

Walton, R., Moore, K. R., & Jones, N. N. (2019). Technical Communication after the Social Justice Turn: Building Coalitions for Action (1st ed.). Routledge. https://doi.org/10.4324/9780429198748

Wang, Y., Luan, H., Yuan, J., Wang, B., & Lin, H. (2020). LAIX Corpus of Chinese Learner English: Towards a Benchmark for L2 English ASR. Interspeech 2020, 414–418. https://doi.org/10.21437/Interspeech.2020-1677

Yoshinaga-Itano, C., Sedey, A.L., Mason, C.A., Wiggin, M., & Chung, W. (2020). Early Intervention, Parent Talk, and Pragmatic Language in Children With Hearing Loss. Pediatrics, 146(Supplement 3), S270–S277. https://doi.org/10.1542/peds.2020-0242F

Zuniga-Teran, A.A., Staddon, C., De Vito, L., Gerlak, A.K., Ward, S., Schoeman, Y., Hart, A., & Booth, G. (2020). Challenges of mainstreaming green infrastructure in built environment professions. Journal of Environmental Planning and Management, 63(4), 710–732. https://doi.org/10.1080/09640568.2019.1605890