

Role of Educational Technology in Enhancing Learning Outcomes in Indian Special Education

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Abstract

This study discusses educational technology and enhances the Learning outcomes of special education in India. It is important to identify the defined kind of tools that are properly applied to enhance the mode of education accepted by the teacher as well as the students. Applications as well as the tools to be properly incorporated to improve the performance level on the particular area that reflect on the growth of learning outcome on the special education where the tools and devices can be managed by everyone. In this aspect it is identifying the security tools as well as software upgradation by preventing data leakage and the start of senses not being properly identified here with more social for future.


Keywords: Education activity, Dyslexia, Education, Education technology, Indian education, Student, Learning outcome


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1. Introduction

1.1. Background

Special education activity can improve by the use of Technology that increases the learning outcome on Indian education. Special education teachers basically focus on their learning disabilities covered in dyslexia and the visual empowerment with intellectual disabilities that have the deficit of the attention disorder. It is dependent on application of technology and it allows the word to follow the text on their space¹. It is helpful to improve the significance of the study process by analysing the software applications, improving reading fluency and being able to analyse the involvement of complex texts.

¹ Jaiswal, A. and Arun, C.J., 2021. Potential of Artificial Intelligence for transformation of the education system in India. International Journal of Education and Development using Information and Communication Technology, 17(1), pp.142-158.

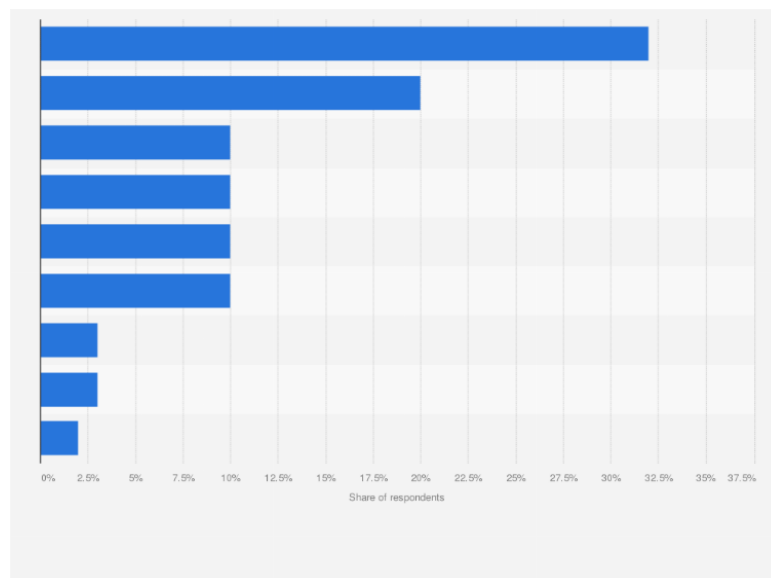


Figure 1.1: Statistics of Education Technology in India

(Source: Statista, (2024))

1.2. Aim and Objective

Aim

Aim of the study is education technology can apply in the Indian special education sector that enhances the learning outcomes for better results on the disabled students.

Objectives

- To Understand about education Technology how much helpful it is to grow the learning outcomes in the special education sector of India.
- To analyse education Technology can impact on the performance level in learning outcomes on special education in India.
- To identify the issue arises on implication of education Technology in the education sector in India.
- To recommend a better strategy that can overcome the problem of special education by the implication of Technology in India.

1.3. Research question

- How can we understand the activity of education Technology can improve learning outcomes on special education in India?
- What kind of factors have an impact on technology improving the performance level in learning outcomes of some special education programs in India?
- What kind of problem arises on the implication of education technology in the education sector of India?
- What kind of strategy is taken to work on the problem of special education by the integration of Technology in India?

1.4. Scope of the study

The study is being analysed about the particular application on different digital tools as well as covered implication process can enhance the performance level on the learning outcomes in special education. In India where different kinds of disabled students are learning in different special schools where the government provides rules and regulations to follow it². It is able to understand the material being identified and provide the classes by the

² Joshi, A., Vinay, M. and Bhaskar, P., 2021. Impact of coronavirus pandemic on the Indian education sector: perspectives of teachers on online teaching and assessments. *Interactive technology and smart education*, 18(2), pp.205-226.

special trend teacher. Text to speech can help with reading where it assists the reading difficulties on transactions into the spoken words. Involvement in that student's interactive stations with a multi-sensory learning approach improve their participation. Different kinds of applications and training processes to analyse here which can increase better outcomes on the particular study.



Figure 1.2: Factors of Education Technology
(Source: Paliwal and Singh,2021)

2. Literature review

2.1. Educational technology Application

Text to speech application is important activities on the learning process easily a custom by the students by the proper training given to the teacher. It is difficult to understand when the conversion on the spoken words makes it easier to analyse the involvement of the material and the natural applications can read a variety of the sources like PDF or the Microsoft Word documents³. On the other hand, the Voice Reader application can manage the source including the PDF and the eBooks where the variety of the voice is and the language can be understood by the students to capture the topic. Clamored application is the high quality of variety on the sources that offer the range of the voice and language for choosing on the built in prediction of the features.

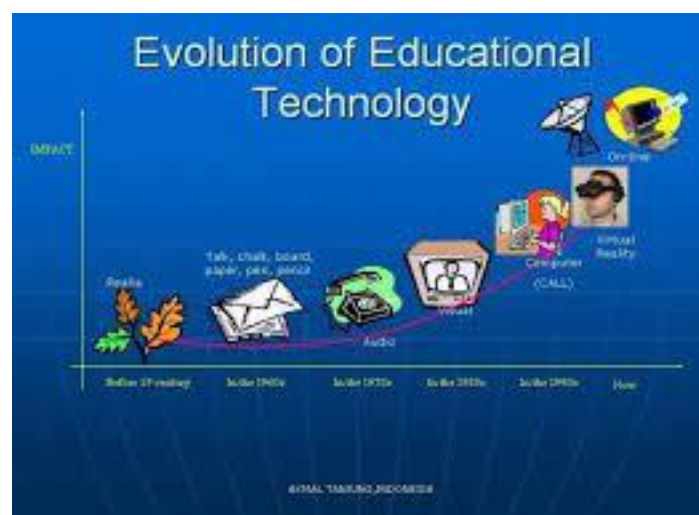


Figure 2.1: Evolution of Education Technology
(Source: Jain *et al.*, 2021)

³ Singh, H.P., Alshammari, K. and Singh, H.P., 2021. Impacts of Digital technology-enabled personalized and adaptive learning on student learning performance: A TOE framework for Saudi Arabia. *Applied Sciences & Technologies*, 12(13), pp.1-12.

2.2. Types of technology and devices

Interactive boards like whiteboard or Digital boards are used today for the class activity mode interesting and the students can easily understand any topic. The classroom towards the students on the involvement of any learning materials like PowerPoint presentations for the animation activity that depend on the software allowed to generate interactive and multimedia the reach out session⁴. Video conferencing tools can improve the learning of special education that allow on the hotspot instructions and communicate with the students and their parents. It is facilitated on exchange about communication that involve the education so what the Google meet and zoom⁵.



Figure 2.2: Exploring of Education Technology

(Source: Dayal, 2023)

2.2. Special education strategies

Immersive application about the learning process in special education in India dependent on the internet connecting the features and support the students can verify the topic on their systems at any time. It is dependent on the difficulties for analysing the environment that provide the number of the features because the text-to-speech can be read to allow the help of the students and minimize the improvement on highlighting the text. Text and the background of colour options and grammatical activities also improve the language skills that make it easy to configure their information to the other⁶. A medical assistant is an important part of the strategy that can improve on the hearing visual approach and can manage to understand and try to manage to minimize stress of the students.

2.3. Challenge facing by the teachers on the technology implication for special education

Special education teacher facing the challenges on the task that is the diverse requirement of the students and technology easy to understand about the planning process can effectively manage for recognition and the assistive applications enhance communication. Reading skills and the virtual augmented applications provide the learning experiences where the online source can properly prostrate and the educational games activities are made more interactive by the students⁷. A special education teacher can import the students to reach their potential strength.

⁴ Jain, S., Lall, M. and Singh, A., 2021. Teachers' voices on the impact of COVID-19 on school education: Are ed-tech companies really the panacea?. *Contemporary Education Dialogue*, 18(1), pp.58-89.

⁵ Anderson, T. and Rivera Vargas, P., 2020. A critical look at educational technology from a distance education perspective. *Digital Education Review*, 2020, num. 37, p. 208-229.

⁶ Paliwal, M. and Singh, A., 2021. Teacher readiness for online teaching-learning during COVID-19 outbreak: a study of Indian institutions of higher education. *Interactive Technology and Smart Education*, 18(3), pp.403-421.

⁷ Dutta, A., 2020. Impact of digital social media on Indian higher education: alternative approaches of online learning during COVID-19 pandemic crisis. *International journal of scientific and research publications*, 10(5), pp.604-611.



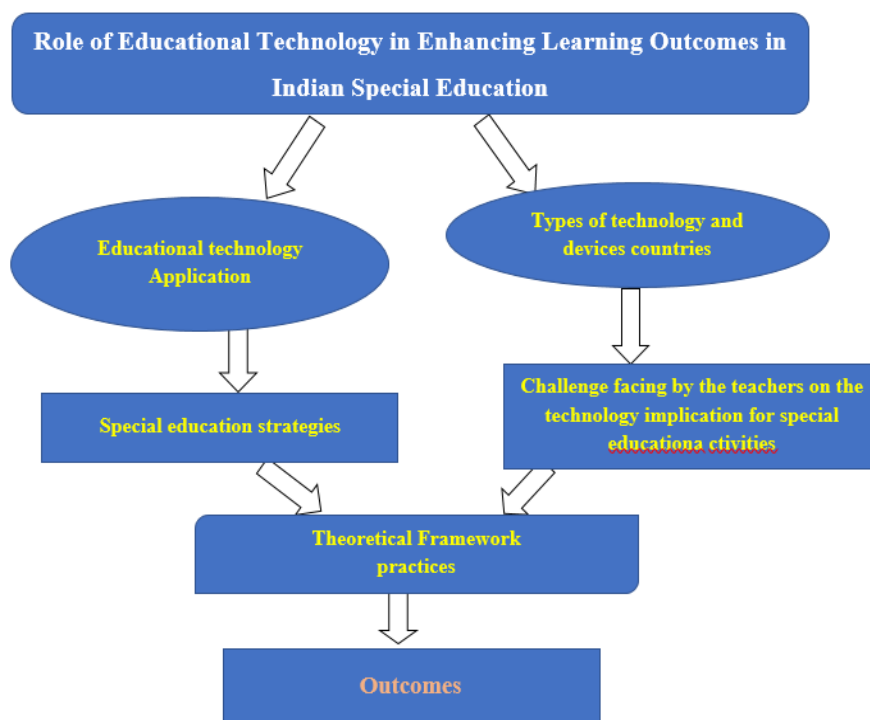
Guiding Design Principles--Nearly Two Decades in the Making

Figure 2.3: Regulation of Education Technology
(Source: Khalil *et al.*, 2024)

2.4. Theoretical background

Active inspirations on the teaching approach on interactive with the multimedia lesson that can display on the Google Jam board. Smartphone applications and many devices like touch screens were the audio visual effects and easy to understand any topic by the students. Accessibility on interactive technology led to the several benefits which is focus about the disabilities and allow navigation for controlling the content for helping the difficulty using the traditional approach. Financial challenge is another part where the network connectivity and several kinds of costly machinery equipment required for the installation purpose in the institute whereas the virtual classes can be available that can be also installed by the parents. in addition to understanding that social statement approach dependent on the media that required support and empathetic applications leading to the isolations for acceptance.

2.5. Outline of the Literature



2.5. Literature gap

Government rule and regulations to be followed in India where the specific guidelines cannot be analysed here. It is important to manage the data security and the safety purpose tools to be installed on this segment. Various kinds of communication and the protocol not clearly identified here which can also improve the system applications into the purpose⁸. Overall community development and sequel analysis under the superior exports well the version changes and all kinds of treatments can be modified on regular inter part of the study.

3. Methodology

3.1. Research Philosophy

It is an important part of the study Following over the research process to be maintained under the stages of activity. Research philosophy is basically maintaining the positivist philosophy of collecting the information in different statements and trying to analyse to get a result. Positivism research philosophy is improvising the better results on any kind of research work for collecting the information can property analysed to get the outcomes.

3.2. Research approach

Research approach is an important part where it is properly followed by the researchers under the logical arguments to analyse the collected information. A Deductive approach is following here that focuses on the research and the significance regarding the topic⁹. Analysing the factors on technological tools are helpful to learning outcomes and impact on eliminating the inappropriate factors in the approach. Logical arguments improve the readability of the study and improve the quality of the justifications which are connected to the variables in the research to implement the findings about the key factors.

3.3. Data collection

Data Collection is an important part of the research that conducts the research and the effective place of the findings depends on the collection of the research. Effective Data Collection having the great significance on the overall process for appointing the tools on the collecting the critical information's are using. Qualitative Data Collection method is followed over the research work to get Specific results on the particular research work¹⁰. Availability of the authentic quality of data is part and it is incorporated in the secondary availability of the radius role in collection of different Technology tools. implementation on the secondary data provides the provisions for appropriate resources is convenient for researchers for the result.

3.4. Data analysis

Data analysis is an important part of the research work. The appropriate process on the collective information finding the data analytical tools utilizes to get the results. Logical or comments are incorporated over the suitable data analysis to the significance of the researcher and it develops the particular focus on the object of the important instructor¹¹. Developing the appropriate focus on the research is an important part where it incorporates the collective information to form the credibility of the finding¹². Data analysis is an immense part for significant aspects and the desert finding focuses on thematic analysis tools. Thematic analysis tools are utilizing her for collecting information properly identifying and getting the exact information search is useful for the research work.

⁸ Lynch, P., Singal, N. and Francis, G.A., 2024. Educational technology for learners with disabilities in primary school settings in low-and middle-income countries: a systematic literature review. *Educational Review*, 76(2), pp.405-431.

⁹ Taneja-Johansson, S., Singal, N. and Samson, M., 2023. Education of children with disabilities in rural Indian government schools: A long road to inclusion. *International Journal of Disability, Development and Education*, 70(5), pp.735-750.

¹⁰ Paraskevi-Ioanna, L., Agathi, S. and Driga, A.M., 2023. Special Education Teachers' Gifted Guidance and the role of Digital Technologies. *TechHub Journal*, 6, pp.16-27.

¹¹ Xia, Q., Chiu, T.K., Chai, C.S. and Xie, K., 2023. The mediating effects of needs satisfaction on the relationships between prior knowledge and self-regulated learning through artificial intelligence chatbot. *British Journal of Educational Technology*, 54(4), pp.967-986.

¹² Golden, A.R., Srisarajivakul, E.N., Hasselle, A.J., Pfund, R.A. and Knox, J., 2023. What was a gap is now a chasm: Remote schooling, the digital divide, and educational inequities resulting from the COVID-19 pandemic. *Current Opinion in Psychology*, 52, p.101632.

3.5. Ethical constellation

Maintaining ethical consideration is the social part where the credibility of the finding to be followed and being cooperated on the rainforest about the data. The research work can minimize above the constipations of the placidness but it also focuses on eliminating the inappropriate information. **Data Protection Act 2018** to be followed here and all concerns taken for using the information in the research before connecting the data.

4. Finding and Discussions

4.1 Systematic analysis table

Sl no.	Author, Year	Title	Aim	Method	Key findings
1	Ait <i>et al.</i> , (2024)	The impact of educational chatbot on student learning experience.	AI has an impact on visible domains in these technologies that are used in education. It is focused NLP and deep learning techniques present in the absolute	Primary data collection method is following here to complete the research.	Digital content and preliminary findings are indicating about the enhance on the learning experience is that keeping the motivations
2	Aithal, and Aithal, (2023)	Stakeholders' Analysis of the Effect of Ubiquitous Education Technologies on Higher Education.	The purpose of a study is dependent on the science and the technology that inflicted innovations on higher education.	Explorative research method is applied here to compare on the evaluation and interpret the impact on the component in the education Technology.	Analysis and the competition on the research work deflected in the education Technology delivery in the research method. Opportunity at using over the various components and using in the education center.
3	Anderson and Rivera, (2020)	A Critical look at Educational Technology from a Distance Education Perspective	This article focuses on the education Technology applied to the program in different Institutes by the use of network and image creation tools.	Interpretative analysis where secondary resources helpful to know about the concept where the dimension evidence having the initial insertions on the distance education	It generate about the unique digitalisation with focus about the satisfactory transmissions as well as the campus based concept with configuration of Technology focus on the digital application
4	Asratie <i>et al.</i> , (2023)	Effects of using educational technology tools to enhance students' speaking performance	Focus of the research is dependent about the educational speaking in technology like forvo, youglish, oald	Experimental and test having the group of the design focus on the information communication and the components of Sampling process can	Education speaking technology is helpful for the students who are learning the particular topic of the UN as well as the accurate speech having

				be applied here under the quantitative data analyze	the grammatical changes on the positive perceptions towards educational speaking.
5	Chan and Hu,(2023).	Students' voices on generative AI: Perceptions, benefits, and challenges in higher education	Perception of artificial Intelligence can be reflected in higher education to focus on formality as well as to engage with the potential benefits of the challenges.	A survey method of 400 undergraduate and postgraduate students focuses on the research to get their positive attitude by the use of teaching and learning processes.	Student perceptions can influence the policy maker for addressing the requirement on the promotion of effective learning outcomes.
6	Jaiswal and Arun, (2021)	Potential of Artificial Intelligence for transformation of the education system in India.	Application of the artificial intelligence developing over the transformation of education in India where it is reviewed on machine learning and personalized the learning process.	Secondary data resources are useful or identification of the particular information regarding the research	Machine learning and the personalized learning process under the taxonomy is analyzed here which is helpful to know on the potential transformation in the education system.
7	Paraskevi <i>et al.</i> , (2023)	Special Education Teachers' Gifted Guidance and the role of Digital Technologies	Focus of study is dependent on the person's vision as well as the quality of significantly associated with digital applications in special education.	Emotional intelligence is applying had so qualitative data analysis to be followed to understand about the same court of employee against the teachings profession	The teachers are focused about the eventual target on the use of techniques helpful to the high level of the word and it is effective for the growth of the learning process constantly.

4.2. Findings

4.2.1. Benefit of the special education classroom by use of Technology

Technology is a useful application that differs on the instructions by the teacher and can easily use the tools for providing the study materials and particularly it is beneficial to understand by the students. Accessibility is an important part of the applications for analysing the software's monitoring the activity and disability access curriculum activity can follow¹³. Engagement is an important part like games and the simulations which improve the students' involvement in the particular class activity that make a better learning approach. Communication is an important part that can be followed by the use of Technology Word The collaborations can be maintained regardless of the locations and it is very official for the attention of the school.

¹³ Pandita, A. and Kiran, R., 2023. The technology interface and student engagement are significant stimuli in sustainable student satisfaction. *Sustainability*, 15(10), p.7923.

4.2.2. Software implication process can improve the performance

Virtual reality environments are helpful for the autistic students to minimize their pressure and dealing with the Crowd as well as the school environment¹⁴. It is focused on the scenario of the virtual environment where we had gradually become accustomed to the preparedness of the appropriate real time situations to be followed. In addition to understanding that the Motor disabilities on the manipulation of objects are unable to manipulate the real world where touch screen computers can be helpful to draw and read any topic. Handle touch screen computer that coordinates with the disabilities on comprehend for the region information and the Autism response for managing the device on learning process.

- a. Read 180 is designed for the students to be able to customize the program and the fluency of the whole can track the progress to maintain the application.
- b. Dynamo press is augmented communication to develop the fluency of the natural speech about the pronunciation. It is a useful technique for expressing the language to manage the vocabulary of the user.
- c. Mangomon is reading the mathematical approach to provide for the individual attention for the education plan¹⁵. It is also helpful for parents to be able to reach the learning progress activity of their children.

4.2.3. Assistive Technology tools are using in classroom activity for the special education

Different kind of Technology and tools are utilized here on the education purpose like screen reader is important part that can design on the students detail and share them with all kind of material¹⁶s. Speech software can also manage on the customized activities to allow the speed of the content where the language and addition are already able to manage on the conversion of the text to Braille.

- a. Alternative input devices like adoption on the keyboard and the joysticks can cover the customized applications to address the extrality issue.
- b. Time management software are important applications that focus on the classroom and specially addressing the problem that can depend on the software to vibrate the colour and deliver the information to the disabled students¹⁷.
- c. Listening system is an important part that is helpful in the hearing and the microphone attachment coupled with the transmission of the technology. The system also provides the beneficial on the useful techniques at the artificial activities and patient systems can minimize the background voice and allows it to focus on the student.

4.3. Discussions

Contemporary society and Technology applications depend on the literacy to control the device and applications where the education based game like Microsoft office and Google Drive integral part can enhance the learning outcomes. information through the email attachment is dependent on the technology, find the skills and easily man the challenges. Communication gap is managed by the technology where it promotes the introductions for the certain impairment¹⁸. The teachers will help assist Technology dependent on augmented and alternative communication by the Social Skill building tools. educational opportunity is important part on the applications write the student can identifying the right amount of the problem and support having the identify learning

¹⁴ Dayal, S., 2023. Online education and its effect on teachers during COVID-19—A case study from India. *Plos one*, 18(3), p.e0282287.

¹⁵ Aithal, P.S. and Aithal, S., 2023. Stakeholders' Analysis of the Effect of Ubiquitous Education Technologies on Higher Education. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 7(2), pp.102-133.

¹⁶ Pratiwi, D.I. and Waluyo, B., 2023. Autonomous Learning and the Use of Digital Technologies in Online English Classrooms in Higher Education. *Contemporary Educational Technology*, 15(2).

¹⁷ Khalil, M., Slade, S. and Prinsloo, P., 2024. Learning analytics in support of inclusiveness and disabled students: a systematic review. *Journal of Computing in Higher Education*, 36(1), pp.202-219.

¹⁸ Asfahani, A., El-Farra, S.A. and Iqbal, K., 2024. International Benchmarking of Teacher Training Programs: Lessons Learned from Diverse Education Systems. *EDUJAVARE: International Journal of Educational Research*, 2(1), pp.1-12.

software for modification the base and the particular content¹⁹. Social and communication skill is expressing themselves on clearly about the important for identifying the tracking the development on the learning process as well as the strength and weakness also managing the intervention.

Financial parameters are obtained on the assistance for the hardship on the obstacles and it is difficult to manage enough money over the poor areas to be mitigated²⁰. In addition to understanding that it is also playing the existence gap about the educational possibilities where the software requirement is updated and the ongoing training process helpful in important resources. Training and professional development is the part of the business as well as the learning process having used the adaptation on the particular requirement for the special education. Personalized and the customized debilities are allowed to understand the location as well as it is reaching to the student's requirement by the use of technology.

5. Conclusion and Limitations

5.1. Conclusion

Concept of these applications depends on the observation about the progress on the stage that covers the digital tools is crucial and holds a significant amount of the information on learning outcomes. Team activity is an important part of the shaping of the feedback where the positive classroom cultures shift the provident of the beneficial approach that can engage with the opportunity.

5.2. Limitation

In this study it is discussed about the different kinds of parameters as well as the implication process of how much helpful the learning process in special education is by the use of Technology. Regarding these situations it is very much important and leaving the tools and applications will cause the cyber security related application not to be properly identified²¹. This kind of application is also important for security, the information on the students and their teacher details. The demand of the students on the education purpose is devoting about The Deals and the demand of the students on the education purpose is devoting about the deals entering the adoption of the customization can always Full feel the requirement.

5.3. Recommendation

Robotics applications and machine learning tools can also identify the growth of the improvement in the learning process on a real time basis. any kind of issue or doubt arises in the book session by parents of the students for including their revision. Technology and the specialist doctor also focus on the legislation and their educational leaders that can manage the business on the guarantee and the distribution of the resources they provide without any hassle²². Strong technical infrastructure support can focus on the dependable internet access and the device maintenance process on the professional development.

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¹⁹ Gerber, B.L., Guay, D.M. and Burnette, J. eds., 2024. *Reaching and teaching students with special needs through art*. Taylor & Francis.

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²¹ Chan, C.K.Y. and Hu, W., 2023. Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology in Higher Education*, 20(1), p.43.

²² Asratie, M.G., Wale, B.D. and Aylet, Y.T., 2023. Effects of using educational technology tools to enhance EFL students' speaking performance. *Education and Information Technologies*, 28(8), pp.10031-10051.

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