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Exploring the Impact of Digital Technology on Indigenous Language Teaching and learning: A case study of the Igbo language

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ABSTRACT

indigenous languages, including the Igbo language. This study used a qualitative research approach, focusing on a literature review and document analysis to explore the impact of digital technology on Igbo language teaching and learning. It synthesized academic sources, reports, and case studies to understand how digital tools, such as mobile apps and online platforms, contributed to Igbo language preservation and revitalization. key themes identified and synthesized to highlight trends in the use of technology in Igbo language education. The research highlighted the role of technological innovations like iSabi Igbo+, Learn Igbo - EuroTalk, and NKENNE in enhancing the learning experience, making Igbo language education more accessible and engaging. The study revealed that digital tools offer flexible learning options, expand access to learning materials, and nurture greater cultural connection among younger generations. The study concluded with recommendations for policymakers, educators, and technology developers to focus on improving access to digital resources, enhancing teacher training, and promoting collaboration to ensure the sustainability and growth of the Igbo language in the digital era.

Keywords: Utilization, E-office, Paperless Realization

INTRODUCTION

In recent years, indigenous languages across the world, including the Igbo language, have faced the threat of extinction, especially as younger generations gravitate towards global languages like English. This trend presents a significant challenge to preserving cultural identities, as language is closely tied to tradition, history, and worldviews (Dioka, 2021). With digital technology transforming education globally, there is hope it can offer a solution to this issue (Hasyim et al., 2024; Teräs, 2022; Torro et al., 2024). Despite growing interest in digital education worldwide, indigenous languages like Igbo still struggle with minimal presence in digital spaces. While English dominates formal education and mass media, Igbo language learners are often faced with limited resources, outdated teaching methods, and a lack of engaging content. This issue is more pronounced in urban areas where access to modern digital tools is more common, but culturally relevant, tech-based resources for Igbo language education are scarce (Dudar et al., 2021). This study explores the potential role of digital technology in revitalizing the Igbo language by examining the use of digital tools and platforms for teaching and learning.

Digital technology in education refers to the tools and platforms such as mobile apps, social media, online resources, and multimedia that enhance teaching and learning experiences. These tools can be especially valuable for indigenous language education, which often lacks the resources and formal recognition available to widely spoken languages (Gorter et al., 2021). Digital platforms offer new ways of engaging learners, providing access to language lessons, cultural stories, and even opportunities for social interaction that would be difficult to achieve with traditional methods. Several studies have pointed out that the survival of indigenous languages depends on their ability to adapt to modern educational trends. According to Ajani et al, (2024), there is an urgent need to incorporate digital technology into indigenous language education to engage younger, tech-savvy generations. While Igbo language education still

relies heavily on traditional methods such as classroom-based instruction and textbooks, digital tools like mobile apps, social media, and online platforms are beginning to show their potential.

For instance, apps like iSabi Igbo+, Learn Igbo - EuroTalk, NKENNE are examples of mobile technology used to teach Igbo language vocabulary, grammar, and pronunciation in a fun and interactive way. Similarly, social media platforms like Facebook, YouTube, and Instagram have become spaces where Igbo learners can find language lessons, cultural insights, and even live video discussions on Igbo heritage (Awolor & Aboh, 2025). These platforms not only help users learn but also connect people from different parts of the world, creating a global community of Igbo speakers. However, challenges remain in integrating these technologies into classrooms. One major issue is unequal access to digital resources, particularly in rural areas where many Igbo speakers live. Furthermore, many teachers lack the necessary training to effectively use digital tools in the classroom (Amhag et al., 2019). Also, the role of teachers is evolving. No longer just conveyors of knowledge, teachers are now facilitators who guide students in navigating digital platforms and encourage them to explore the Igbo language in new, innovative ways. This shift calls for ongoing professional development to help educators integrate digital tools effectively into their teaching practices.

As younger generations shift toward global languages like English, Igbo language learners encounter significant barriers, such as limited access to quality learning materials and insufficient digital resources. Existing studies have shown that while some technological advancements have been introduced into Nigerian classrooms, they often overlook the specific needs of indigenous language education (Chukwukere & Ajileye, 2024). For instance, Igbo language resources are few, with most content still confined to traditional forms like textbooks and oral traditions, which are not well-suited to engage the youth who are more inclined to digital learning methods (Hasanah & Nurha, 2025). Furthermore, despite the global push for digital learning, much of the research on educational technology in Nigeria has focused on English and other widely spoken languages, neglecting the unique requirements of indigenous languages. This study aims to fill this gap by exploring how digital technology, such as mobile apps, social media, and e-learning platforms, can enhance the learning experience of Igbo language students. It seeks to investigate whether these technologies can nurture language acquisition and preservation, thus ensuring the Igbo language's survival in the digital age.

METHODS

This study adopted a qualitative research approach, focusing on a literature review and document analysis to explore the impact of digital technology on the teaching and learning of the Igbo language. The research synthesized existing academic sources, reports, and case studies to provide insights into how digital tools, such as mobile apps, online platforms, and social media, were used to teach Igbo and contribute to the language's preservation and revitalization. The aim was to understand the current landscape of digital technology in Igbo language education and assess its effectiveness. To ensure that the literature reviewed was relevant, only studies, reports, and resources directly related to digital tools for Igbo language education were considered. These resources had to be recent, within the last ten years, to reflect the current state of digital integration. Any studies or resources that focused on languages other than Igbo or that were outdated were excluded.

The data for this study came from a variety of secondary sources, such as peer-reviewed journals, conference papers, reports from educational bodies, and digital resources related to language teaching. These sources were accessed through academic databases like Google

Scholar and JSTOR, as well as through digital learning platforms that provided resources for language education. A systematic search strategy was employed to gather relevant literature, using keywords such as "digital tools in Igbo language education" and "mobile apps for Igbo language." This helped to ensure that the study captured the most pertinent information on digital innovations in Igbo language learning.

The data extraction process involved identifying key themes, findings, and conclusions. The literature was examined for its discussion on digital tools used in Igbo language teaching, the effectiveness of these tools, and the challenges faced in their integration. The key insights from the studies were categorized to create a cohesive understanding of the role digital technology played in language education. The data was synthesized thematically to highlight trends and patterns that emerged across the studies.

RESULT AND DISCUSSION

Case Study: Digital Innovations in Igbo Language Education

In the context of Igbo language education, digital innovations have notably transformed the way the language is taught and learned. Mobile apps, social media, and online learning platforms have emerged as powerful tools for language preservation and revitalization. These technologies have provided accessible, engaging, and interactive means of learning the Igbo language.

1. Mobile Apps

Mobile apps for Igbo language learning provide learners with tools for on-the-go language acquisition. These apps vary in terms of interactivity, features, and accessibility. Some apps focus on basic vocabulary and grammar, while others integrate more complex cultural insights and advanced language use.

Mobile Apps	Description	Features/Comparisons
iSabi Igbo+	A mobile app offering language games, lessons, and cultural context.	Combines Igbo language learning with cultural education. Interactive features include games and quizzes, appealing to learners of all ages.
Learn Igbo - EuroTalk	A language learning app with a structured course that covers basic Igbo vocabulary and grammar.	Structured lessons focus on fundamental vocabulary and phrases. Clear, simple interface, suitable for beginners.
NKENNE	An app that focuses on Igbo language learning through interactive exercises and quizzes.	Features quizzes, pronunciation practice, and grammar exercises. More focused on basic learning, lacks deeper cultural integration.
Igbo 101	A beginner's guide to Igbo language, focusing on basic communication and pronunciation.	Targeted at beginners. Offers vocabulary and pronunciation practice with some basic grammatical lessons.
Igbo Dictionary & Translator App	A mobile dictionary that also provides translation services and context for Igbo words.	Focuses on vocabulary and translation. Not structured for learning full sentences but excellent for quick translation and understanding of words.

The study explored the impact of digital technology on the teaching and learning of the Igbo language, with a specific focus on mobile applications designed to support language

acquisition. Several key applications were identified as central to the study, including iSabi Igbo+, Learn Igbo - EuroTalk, NKENNE, and Igbo 101. These applications represented a significant advancement in the use of digital tools for indigenous language education. The iSabi Igbo+ app emerged as a powerful tool for learners, offering a variety of interactive lessons that focused on vocabulary, grammar, pronunciation, and common phrases. This app provided users with a user-friendly interface and clear audio recordings, making it accessible to a wide range of learners, from beginners to those seeking to refine their language skills.

Another app, Learn Igbo - EuroTalk, offered a comprehensive curriculum that focused on building vocabulary and sentence structure. The app provided an immersive language learning experience, using both audio and visual prompts to teach the Igbo language in context. This approach helped learners to not only understand the language but also apply it in real-life situations, promoting effective language acquisition. NKENNE was designed to offer learners a more structured approach to Igbo language learning. It featured lessons on pronunciation, sentence construction, and conversation practice. What made NKENNE stand out was its focus on cultural immersion, integrating Igbo proverbs, idiomatic expressions, and cultural references that enhanced the learning experience. The app also catered to advanced learners by offering more complex content related to Igbo literature and history, thereby promoting both linguistic and cultural knowledge.

Igbo 101 provided a simple yet effective way for beginners to learn Igbo. The app's lessons were structured around foundational elements such as greetings, numbers, and basic vocabulary, designed to build confidence in learners new to the language. The straightforward approach made it easy for anyone, regardless of their prior knowledge of Igbo, to begin learning immediately. The study revealed that these mobile applications played a vital role in democratizing Igbo language learning, particularly for people living outside Igbo-speaking regions. Learners gained access to structured language lessons, which were flexible and could be used at their own pace. Moreover, the study highlighted that these apps contributed notably to the preservation of the Igbo language, particularly among younger generations who are more inclined to use technology for educational purposes.

2. Social media and Multimedia Content

Social media platforms have proven to be key in spreading Igbo language resources. These platforms offer a variety of content types, from informal language learning groups to professional video tutorials. YouTube, for example, is a highly visual medium where learners can engage with audio-visual content, while WhatsApp allows for instant communication and peer learning. Compared to mobile apps, social media provides more dynamic, real-time language practice and interaction with native speakers.

Social Media and Multimedia Content	Description	Features/Comparisons
Facebook Igbo Language Learning Groups	A space for learners to share tips, resources, and practice Igbo through discussions.	Interactive group learning. Offers direct interaction with learners and native speakers. Less structured but promotes peer learning.
YouTube Igbo Language Tutorials	Video tutorials on Igbo pronunciation, vocabulary, and grammar.	Offers detailed, visual lessons with audio-visual elements. Suitable for beginners to advanced learners, but lacks personal interaction.

WhatsApp Language Exchange Groups	Groups where learners can practice Igbo through messaging and voice notes.	Provides informal language exchange. Real-time communication with native speakers, allowing learners to practice pronunciation and sentences.
Instagram Accounts Sharing Igbo Phrases & Idioms	Instagram profiles dedicated to posting daily Igbo phrases, idioms, and language lessons.	Focuses on daily language snippets. Highly visual and engaging but lacks depth in grammar and sentence structure practice.
Twitter Threads for Daily Igbo Language Lessons	Twitter accounts that post daily Igbo language tips and discussions on its cultural significance.	Concise, daily tips. Great for quick language lessons but lacks full-fledged language structure or deep learning.

3. Online Learning Platforms

While online learning platforms for Igbo are fewer compared to other widely spoken languages, they still offer structured courses that can reach a wide audience. Platforms like Coursera and Udemy offer professional courses for learners seeking a more formal education. However, platforms like Duolingo have not yet fully incorporated Igbo, limiting the scope of digital learning for native speakers and potential learners. The advantage of these platforms is their structured curriculum, but they may require a greater investment in terms of time and cost, especially compared to more informal social media groups or free apps.

Online Learning Platforms	Description	Features/Comparisons
Coursera	Hosts online courses from universities that include African languages, with potential for Igbo courses.	Academic courses offered by university professors. Structured, but limited Igbo content compared to other languages. More formal, higher learning potential.
Udemy	Offers Igbo language courses taught by experts or native speakers, including introductory courses.	Variety of paid courses focused on beginner to intermediate levels. Good content but not as widely available as more mainstream languages.
Duolingo	A popular language-learning app that could soon include Igbo language courses in its curriculum.	Free language learning app known for its interactive, game-like lessons. Igbo is not yet included, but future potential remains.
EdX	Offers online courses related to African languages, with potential for Igbo language inclusion.	More formal academic courses. Still limited content in African languages, but strong potential for growth in language offerings.
Memrise	Provides interactive language lessons, with a community-focused approach to language learning.	Features audio-visual lessons with user-generated content. Memrise has some Nigerian language courses, but Igbo resources remain underdeveloped.

Success Stories and Best Practices in Integrating Technology into Indigenous Language Learning

The study revealed several success stories and best practices in integrating technology into indigenous language learning, particularly in the case of the Igbo language. One of the

standout successes was the widespread adoption of mobile applications like iSabi Igbo+, Learn Igbo - EuroTalk, and NKENNE. These platforms proved effective by offering learners a flexible and interactive environment to learn Igbo. Through engaging lessons, quizzes, and games, these apps catered to different learning styles and proficiencies, allowing users to progress at their own pace. As observed, the apps not only focused on language learning but also incorporated cultural elements, making the experience more comprehensive. This feature was particularly important in preserving the cultural context of the language while teaching it (Amirovich et al., 2021).

Social media platforms such as Facebook, WhatsApp, and YouTube also emerged as critical tools in promoting Igbo language learning. Online communities and forums allowed learners to practice Igbo in informal settings, where they could engage with native speakers and fellow learners (Eke & Salawu, 2025; Gebrye et al., 2023; Mgbeojedo et al., 2022; Okwuosa et al., 2021). The study highlighted the effectiveness of peer-driven learning on these platforms, where learners could share resources and ask questions, creating an environment of continuous language practice. These platforms helped bridge the gap for learners in both urban and rural areas, as well as the Igbo diaspora.

The research also identified best practices that contributed to the success of these initiatives. One crucial best practice was the involvement of native speakers in the development of digital tools. This ensured the authenticity of the language used in the apps and online platforms. Furthermore, providing content tailored to different proficiency levels was essential in keeping learners engaged and motivated. Both Igbo 101 and NKENNE were successful examples of platforms that adapted their content to suit both beginners and more advanced learners, ensuring accessibility for a wide range of users. Lastly, the study found that combining technology with traditional language teaching methods, such as in-class learning and community-based language immersion, led to more successful language acquisition. These findings show that digital tools, when used effectively and in combination with cultural practices, can play a significant role in the preservation and growth of indigenous languages like Igbo.

Pedagogical Shifts and the Role of Teachers

The integration of digital technology into language learning has brought about significant pedagogical shifts, particularly in the context of indigenous languages like Igbo. These shifts emphasize a departure from traditional teacher-centered approaches to more learner-centered, technology-enhanced strategies. The role of the teacher has evolved from being the sole knowledge provider to a facilitator and guide in the learning process. As noted by Swerzenski (2021), teachers are now required to adapt their teaching methods to incorporate digital tools that cater to diverse learning styles and enable more interactive, engaging learning experiences. Incorporating digital technologies into language teaching demands that teachers embrace new roles as curators of content. This includes the use of mobile apps, social media platforms, and multimedia tools that offer diverse and engaging resources for learners. For Igbo language teaching, platforms such as iSabi Igbo+ and NKENNE provide interactive lessons and activities that allow teachers to introduce language concepts in innovative ways. According to Aithal and Aithal (2023), teachers who adopt these tools effectively can create more dynamic learning environments that empower students to take ownership of their learning while also promoting deeper engagement with the language.

Moreover, the pedagogical shift also emphasizes the importance of cultural contextualization. Teachers are increasingly required to integrate cultural elements alongside language instruction, thereby ensuring that the language learning process is not only about

grammar and vocabulary but also about understanding the cultural nuances embedded in the language. Nwankwegu (2021) highlights that the incorporation of Igbo cultural heritage into digital language tools has enhanced learners' connection to the language, making the learning experience more meaningful and relevant. Another important aspect of this pedagogical shift is the necessity for continuous professional development. Teachers must acquire new skills to effectively use digital tools and integrate them into their teaching practices. This includes not only mastering technology but also understanding how to design lessons that promote active learning, critical thinking, and collaboration. Jena & Barad (2024) stresses that professional development programs should be established to equip teachers with the skills to navigate digital platforms and adapt to the evolving landscape of language education.

Policy Implications and Future Directions

The integration of digital technology into Igbo language education brings with it significant policy implications and opens up exciting possibilities for the future. One of the key policy considerations is the need for governments and educational bodies to develop strategies that actively support the use of digital tools in language learning. This could include funding initiatives for the development of apps, online platforms, and digital resources specifically tailored for teaching the Igbo language. As pointed out by Alshaer et al, (2017), it's essential that policies encourage collaboration between government agencies, educational institutions, and tech developers to create resources that are culturally relevant, accurate, and accessible to a wide range of learners, including those in rural areas and the diaspora. Another pressing issue is teacher training. For these digital tools to be effective, educators must have the necessary skills to incorporate technology into their lessons in a meaningful way. Falloon, (2020) emphasizes that professional development programs should focus not only on enhancing teachers' digital literacy but also on adapting pedagogical approaches to leverage the potential of digital platforms. When teachers are well-equipped to use technology, they can create a more dynamic and engaging learning environment for students (Maqableh, 2021; Sailan et al., 2023; Xu & Xue, 2023).

Looking ahead, there's a real opportunity to expand access to digital language learning through platforms like iSabi Igbo+ and NKENNE. However, achieving this will require improvements in internet accessibility, especially in remote regions. Moving forward, policies should focus on making the internet more affordable and accessible to ensure that everyone, no matter where they live, has the opportunity to learn and preserve the Igbo language. In the long run, a balanced approach that blends traditional language teaching with digital innovations will ensure the sustainability and growth of indigenous languages like Igbo.

CONCLUSION

The integration of digital technology into the teaching and learning of indigenous languages, specifically Igbo, has shown considerable potential in revitalizing language education. Digital tools such as mobile apps, social media platforms, and online learning resources have provided innovative and accessible methods for learners to engage with the Igbo language. The study highlighted the significant pedagogical shifts that have occurred, with teachers now adopting more learner-centered, technology-enhanced approaches. These shifts emphasize the importance of cultural context and active learning, promoting a deeper connection to the language among students. However, despite the promising advancements, challenges remain, such as limited access to technology in rural areas, a lack of teacher training in digital literacy, and the need for sustained investment in the development of indigenous language resources. As demonstrated through the use of tools like iSabi Igbo+ and NKENNE,

technology has the potential to bridge gaps in language learning and promote greater engagement, but its widespread adoption requires overcoming infrastructural and educational barriers.

Based on the findings, several recommendations emerge for enhancing the integration of digital technology in Igbo language education. First, there should be a concerted effort to develop and fund more culturally relevant digital language resources tailored to the specific needs of Igbo language learners. Governments, alongside educational and technological institutions, should prioritize initiatives that make digital tools accessible, particularly in underserved areas. Second, teacher training programs must be expanded to include comprehensive digital literacy and pedagogical strategies for integrating technology into language instruction. This will empower educators to effectively utilize digital tools to enhance learning outcomes.

REFERENCES

Aithal, P. S., & Aithal, S. (2023). How to Empower Educators through Digital Pedagogies and Faculty Development Strategies. *International Journal of Applied Engineering and Management Letters*. https://doi.org/10.47992/ijaeml.2581.7000.0198

Ajani, Y. A., Oladokun, B. D., Olarongbe, S. A., Amaechi, M. N., Rabiu, N., & Bashorun, M. T. (2024). Revitalizing indigenous knowledge systems via digital media technologies for sustainability of indigenous languages. *Preservation, Digital Technology & Culture*, *53*(1), 35–44.

Alshaer, I. M. A., Al Shobaki, M. J., & Abu Naser, S. S. (2017). Governance of public universities and their role in promoting partnership with non-governmental institutions. *International Journal of Engineering and Information Systems*, *1*(9), 214–238.

Amhag, L., Hellström, L., & Stigmar, M. (2019). Teacher Educators' Use of Digital Tools and Needs for Digital Competence in Higher Education. *Journal of Digital Learning in Teacher Education*, *35*(4). https://doi.org/10.1080/21532974.2019.1646169

Amirovich, K. S., Zamirovich, G. E., Lutpullayevna, A. F., Nabiyevna, I. Z., & Saliyevna, S. D. (2021). Cross-cultural context of English language teaching. *Annals of the Romanian Society for Cell Biology*, *25*(2), 3737–3750.

Awolor, T. M., & Aboh, S. C. (2025). Examining the impact of digital media technology in teaching Igbo to heritage learners. *Southern African Linguistics and Applied Language Studies*, 1–14.

Chukwukere, F. N., & Ajileye, M. O. (2024). The National Language Policy and the Demands of Indigenous Language Literacy in Nigeria. *International Journal of Humanities Social Science and Management*, *4*(4), 301–331.

Dioka, B. O. (2021). The Threat of Indigenous Language Endangerment and Its Revitalization in the Contemporary Society: The Case of the Igbo Language. *IDEAL INTERNATIONAL JOURNAL*, *14*(2).

Dudar, V. L., Riznyk, V. V., Kotsur, V. V., Pechenizka, S. S., & Kovtun, O. A. (2021). Use of modern technologies and digital tools in the context of distance and mixed learning. *Linguistics and Culture Review*, *5*(S2). https://doi.org/10.21744/lingcure.v5ns2.1416

Eke, I. W., & Salawu, A. (2025). Exploring the role of digital media in the intergenerational transmission of the Igbo language. *South African Journal of African Languages*, 1–11.

Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. *Educational Technology Research and Development*, *68*(5). https://doi.org/10.1007/s11423-020-09767-4

Gebrye, T., Okoye, E. C., Akosile, C. O., Onwuakagba, I. U., Uwakwe, R., Igweze, C. C., Chukwuma, V. C., & Fatoye, F. (2023). Adaptation and Validation of the Nigerian (Igbo) Version of the WHOQOL-OLD Module. *Research on Social Work Practice*, *33*(7). https://doi.org/10.1177/10497315221130527

Gorter, D., Cenoz, J., & der Worp, K. van. (2021). The linguistic landscape as a resource for language learning and raising language awareness. *Journal of Spanish Language Teaching*, *8*(2). https://doi.org/10.1080/23247797.2021.2014029

Hasanah, A., & Nurha, N. (2025). Comparative Analysis of the Use of Traditional and Digital Media in Introducing Local Cultural Heritage to the Younger Generation. *Kampret Journal*, *4*(2), 45–54.

Hasyim, N., Arfiani, A., & Saleh, S. (2024). The Influence of Teachers' Pedagogic Competence on Student Learning Activity. *International Journal of Administration and Education (IJAE)*, 87–95.

Maqableh, M. (2021). Evaluation online learning of undergraduate students under lockdown amidst COVID-19 Pandemic: The online learning experience and students' satisfaction. *Children and Youth Services Review*, *128*. https://doi.org/10.1016/j.childyouth.2021.106160

Mgbeojedo, U. G., Akosile, C. O., Ezugwu, J. C., Okoye, E. C., John, J. N., Ani, K. U., & Okezue, O. C. (2022). Cross-cultural adaptation and validation of the 15-item Geriatric Depression Scale (GDS-15) into Igbo language: a validation study. *Health and Quality of Life Outcomes*, *20*(1). https://doi.org/10.1186/s12955-022-01928-8

Jena, M. K., & Barad, S. (2024). Professional Development of Secondary School Teachers: Adapting to 21st Century Educational Paradigms. *International Journal of Scientific Research in Modern Science and Technology*, *3*(1). https://doi.org/10.59828/ijsrmst.v3i1.172

Nwankwegu, J. A. (2021). Leveraging Digital Technology For Igbo Language Development. *IDEAL INTERNATIONAL JOURNAL*, *14*(2).

Okwuosa, L., Nwaoga, C. T., & Uroko, F. (2021). The Post-War Era in Nigeria and the Resilience of Igbo Communal System. *Jamba: Journal of Disaster Risk Studies*, *13*(1). https://doi.org/10.4102/JAMBA.V13I1.867

Sailan, M., Arhas, S. H., Hasan, M. N. H., & Darwis, M. (2023). Improving the Quality of Learning for Students, Governance and Office Automation at SMKN 3 Jeneponto Regency. *Jurnal Office: Jurnal Pemikiran Ilmiah Dan Pendidikan Administrasi Perkantoran*, *9*(2), 161–170.

Swerzenski, J. D. (2021). Why teaching technology must adapt to our teaching. *Communication Education*, *70*(2). https://doi.org/10.1080/03634523.2020.1857414

Teräs, M. (2022). Education and technology: Key issues and debates. *International Review of Education*, *68*(4). https://doi.org/10.1007/s11159-022-09971-9

Torro, S., Tamrin, S., & Arhas, S. H. (2024). Leadership and School Culture: Their Influence on Increasing Competence, Relevance, and Quality Aspects in Senior High Schools. *Journal of Educational Science and Technology*, *10*(2), 154–160.

Xu, T., & Xue, L. (2023). Satisfaction with online education among students, faculty, and parents before and after the COVID-19 outbreak: Evidence from a meta-analysis. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1128034