

Integrating Technology in Teaching African Languages in South African Universities: A Call for Digitalisation

*Xulu, Zolile Celine
Sinenblanbla, University of
KwaZulu-Natal,
xulusinenblanbla0@gmail.com/ sneshx@gmail.com*

Abstract

The strategic role of integrating Information and Communication Technologies (ICT) when teaching indigenous languages continues to become increasingly apparent within language planning and policy discourse. The integration of ICT in teaching African languages is a complex and diverse research area, making it challenging to identify common factors that define fundamental methods. The argument put forth is that higher education institutions should invest in implementing continuous and intensive awareness-raising seminars about the value of linguistics, language technology, and practice. This paper aims to investigate a comprehensive plan for emerging digital practices and learning design expertise to enable digital democracy in South African higher education by exploring the various opportunities for integrating technology and African languages. Descriptive themes are developed after an intensive existing literature review and analysis. The Language Management Theory (LMT) guides the paper. The author highlight suggestions to ensure that South Africa meets the 2030 United Nations Sustainable Development Goal number 4, which aims to provide inclusive and quality education for all and promote lifelong learning, primarily using ICTs. By presenting various ICT-based models for education as a transformational approach towards integrating ICTs in teaching African languages, the higher education sector will be revolutionized in the African continent and all developing countries that lack understanding of the power of incorporating technology in teaching and developing native languages. Practice recommendations are also made to ensure successful adaptation to the 4th Industrial Revolution.

Keywords: Information and Communication Technology (ICT), Digital tools, African Languages, Higher Education, South Africa

1 Introduction

Language is crucial to a person's life because it reflects their identity, culture, and surroundings (Barakabitze, et al., 2019)¹. Language is the only medium humans can use to access their abstract reality (De Valoes, 2014)². It has been noticeable in the literature that ICT incorporation when teaching languages is paramount as it comes with numerous opportunities. Hung et al. (2018)³ argue that to respond appropriately to the changes brought about by the digital revolution, both the pace and the intensity of technology utilization must match. Research evidence from existing literature conducted in most Western and Asian countries show that integrating digital tools in classrooms when teaching languages comes with various and vast opportunities, such as enhancement of students' learning experience (Gacs, Goertler, & Spasova, 2020)⁴. Consequently, ICT possesses the capacity to function as a catalytic agent for the revolutionisation of the educational landscape, with simultaneous enhancement in the quality of teaching and learning in African languages. Additionally, ICT stands as a pivotal force in the protecting and propagating African languages (Brack, Osborn, Zhang, 2010; Barakabitze et al., 2019; Dang, 2023). Dang (2023) further elucidates that the utilization of digital instruments within tertiary educational establishments substantially enhances African languages quality. While lecturers can employ ICT tools to create tailored educational materials from online digital sources, the situation is different when it comes to lecturers who teach African languages. This distinction is due to the fact that African languages are underrepresented in most ICT online platforms (Dang, 2023)⁵. In higher education globally, there has been a remarkable increase in the adoption of digital learning and teaching with little critical analysis and focus on African languages (Bennett, Maton, & Kervin, 2008; Bullen et al., 2009)⁶.



The paper's argument underscores the importance of leveraging technology to enhance education in South African higher learning institutions, particularly concerning African languages. This approach not only has the potential to improve educational outcomes but it also contributes to the preservation of cultural and linguistic diversity in the country. This paper's primary purpose is to investigate various opportunities for integrating digital tools in teaching African languages in South African higher learning institutions. Interventions that explicitly support teaching and promoting African languages will also be highlighted. While South Africa has experienced digitalisation, there is still room for more implementation (Brown & Czerniewicz, 2010)⁷. According to Brown and Czerniewicz (2010) only a small group of elite students in South Africa possess the necessary technological skills and characteristics of a "digital native". This lack of technology skills among students and lecturers hinders their adaptation to the Fourth Industrial Revolution (4IR). Developing a rigorous plan for emerging digital practices and learning design expertise is crucial to enabling digital democracy in South African higher education (Brown, & Czerniewicz, 2010; Albelbisi, Yusop, & Salleh, 2018⁸; Xi, Chen, & Wang, 2018⁹).

2 Gamification in African language classrooms

Incorporating technology and gamifying the content can make African language lessons more fun and interesting. Gamification in education involves using game-like elements and web 2.0 tools such as Kahoot, Quizzes, Epic, Jeopardy, Class Dojo, Bamboozle, and Mentimeter to increase student engagement, improve learning outcomes, and deepen their knowledge (Demirbilek et al., 2022). There has been a significant shift in the way technology is used in teaching and learning in the past decade (Brown & Czerniewicz, 2010; Díaz et al., 2020)¹⁰. According to Lubua (2015¹¹) this shift is due to the growth of technological innovations. Demirbilek (2022a¹²) supports this idea, stating that technology has transformed traditional teaching and learning methods in higher education, including how courses are delivered, assessed, and conducted in the

classroom. Introducing digital tools into the classroom can make learning more enjoyable and engaging (Demirbilek et al., 2022). Kahoot, a game-based application, has become one of education's most commonly used 2.0 tools (Lubua, 2015). It creates a competitive environment among students where they choose the correct answer (Hung et al., 2018). To achieve high scores, students must answer correctly and quickly in Kahoot's quiz game format, which creates a fun learning environment. Mentimeter is another web 2.0 tool that enables interactive presentations, quizzes, and word clouds (Gokbulut, 2020¹³). According to Demirbilek et al. (2022) gamification is the future of education, transforming classroom and everyday activities into games. Gamification has proven beneficial in e-learning environments and educational settings (Fulton, 2019; Kiryakova et al., 2014). Games encourage ongoing engagement by allowing students to challenge friends or invite others to participate, earning points and rewards, and acquiring more knowledge. Thus, gamification in African language classrooms has the potential to improve students' enrolment and enhance their academic performance. A study conducted in Tanzania reveals that gamification does contribute to higher student retention and enrolment rates (Lubua, 2015). Technology can additionally contribute to the cultivation of students' aptitude for problem-solving, critical reasoning, and collaborative abilities in an academic context (Ondrashek, 2017)¹⁴. These skills are essential in the 21st century (Díaz & Bajaan-Zajia, 2020). The theory surrounding gamification in education suggests that learners learn best when having fun (Fulton, 2019)¹⁵.

The study by Lubua, (2015b), indicates that access to technology and a reliable internet connection can significantly benefit students completing their assessments. In Asian countries like China, students find it easier to complete their tasks outside the classroom because of affordable and reliable gadgets and uninterrupted power and internet connection (Yue, 2016¹⁶; Loh, & Teo, 2017¹⁷). In the context of education, gadgets refer to electronic devices that exhibit a diverse array, ranging from compact, portable tools to more



intricate apparatus, such as smartphones, laptops, computers, and tablets (Lie, et al., 2020¹⁸).



These devices are typically engineered with the objective of simplifying tasks and enhancing the efficiency of educational processes, thus facilitating the teaching and learning experience (Lie, et al., 2020¹⁹). Digital tools should be made more affordable to ensure equal access to technology for all South Africans, especially the younger generation.

3 ICT strategy in teaching and advancing African languages

The emergence of digital technology, which has led to a significant change in how we conceptualize, explain, and anticipate our reality, lies at the heart of the information revolution (Andin et al., 2019²⁰). Consequently, the desire for higher education institutions to conduct lectures via and with technological tools is a critical national imperative of the information revolution (Hennessy, et al., 2010²¹). The revolution has resulted in the increased necessity of integrating digital devices capable of handling African languages in the classrooms. However, Sife, Lwoga, & Sanga (2007)²² reveal strong claims that incorporating and utilizing digital tools cannot occur when linguistic impediments exist. Even with the emphasis placed on language as a repository for every aspect of culture, indigenous languages are frequently ignored in all respects (Udoye, 2016)²³. The ex-colonial languages have persisted in elevating themselves above the native languages in many African countries (Lie et al., 2020). This act compels universities to explicitly formulate a technology strategy and language policies that encourage the practice of ICT integration in classrooms to preserve and advance African languages. Hennessy et al. (2010) assert that despite the stalling progress regarding language policy implementation and development in Africa, South Africa is incredibly acquiescent to the indigenous language development and policy as opposed to other African countries. South Africa has established outstanding multiple language planning and implementation bodies such as the

Language Plan Task Group (LPTG), The Pan South African Language Board (PSALB), and National Language Services (NLS) (Barakabitze et al., 2015, 2019). Even with all these language bodies in place, the need for more practice of integrating technology when teaching indigenous languages in most South African universities still need to be at the forefront (Hasin & Nasir, 2021)²⁴. This need calls for a clear strategy for integrating digital tools in classrooms.

4 The value of African linguistics in ICTs

Studies have shown that indigenous African languages are underrated in technology domains (Gudmundsdottir, 2010a²⁵). This marginalisation can be attributed to the legacy of colonialism and apartheid, as well as ingrained myths and inadequate language policies (Lie et al., 2020). This paper argues that indigenous African languages must be incorporated in ICTs due to their significant potential. The integration of ICT within African languages classrooms carries the potential to foster an enduring enthusiasm for the advancement and dissemination of African languages in the realm of ICT, particularly among students, who constitute the forthcoming generation of leaders (Ondrashek, 2017). Sadly, Gumbi (2019)²⁶ has revealed that integrating isiZulu into ICTs in KwaZulu-Natal's higher education sectors is progressing very slowly. While efforts have been made by organizations such as the Organization of African Unity (OAU) and the United Nations (UN) to promote African languages in education and communication, a study by Rahimi & Van Staden (2019) found that only a small number of websites use African languages. Incorporating ICTs in classrooms can improve language development (Gudmundsdottir, 2010b). Thus, embracing this approach can add significant value and have great benefits in preserving and advancing indigenous African languages. It is crucial to facilitate



the transition of lecturers from a state of mere awareness to the practical implementation of ICT within the South African academic context. South African universities should fully embrace digitalisation of African languages for better education. To ensure that indigenous Africans can benefit from the information revolution without adopting foreign languages, new techniques that cater to the unique features of African languages are urgently required. Indigenous Africans refer to Indigenous Africans encompass a heterogeneous array of ethnic and cultural communities who have resided in Africa for numerous generations, often characterized by unique languages, customs, and lifestyles (Gumbi, 2019). They constitute the continent's autochthonous population, pre-dating the advent of colonialism and external influences (Gumbi, 2019).

5 Conceptual framework

5.1 Language Management Theory

The Language Management Theory (LMT), one of the popular framework in the linguistic field, is used to provide the contextual framework for this paper. Language Management Theory (LMT) is a valuable framework for understanding and addressing language-related challenges in the context of integrating digital tools and African languages (Filipović, & Pütz, 2016)²⁷. This theory was first developed by Jernudd and Neustupný in the late 1980s, and it focuses on the ways in which societies manage and control language use, particularly in multilingual settings (Kassim, 2018)²⁸. LMT offers insights into how language planning, policy, and practices can be strengthened to deal with linguistic challenges in various contexts. One of the key aspects of language management is standardisation, which involves developing orthographies for African languages and maintaining their consistency (Nekvapil & Sherman, 2015)²⁹. This initiative facilitates the integration of African languages into

digital tools (Kassim, 2018). Hence, it is of high importance for every South African institution of higher learning to develop and execute language policies that advocate for the proper utilization of native languages in the context of digital tools. In the context of integrating ICT with African languages, LMT provides a useful lens to analyse, address and propose the possible solutions to the challenges that may arise. LMT is deemed relevant for this papers since it is associated with well-known scholars such as Jernudd and Neustupný (Nekvapil & Sherman, 2015)³⁰. LMT argues that any language planning process should instigate an understanding of language complications in their context of existence, followed by adopting relevant approaches to deal with language challenges carefully and implementing appropriate measures to solve the problem (Nekvapil & Sherman, 2015). Literature indicates that numerous language problems emerge in discourse (Gruber, 2021)³¹. In the realm of this paper, LMT is helpful for its ability to provide a clear understanding of the different types of language problems that might arise in integrating digital tools and African languages. LMT provides a framework that facilitates formulating strategies to address such problems (Ezeanya-Esiobu, 2019)³². Addressing these language problems and fostering the development of digital tools for African languages requires a multidisciplinary approach involving linguists, technology developers, educators, and policy makers. Among these problems, the issues of standardisation, linguistic diversity, limited language resources, low literacy rates, phonological complexities, translation, and localisation are outstanding (Filipović, & Pütz, 2016; Tatham, 2009)³³. However, despite these language challenges, it is crucial to emphasize the importance of allocating a fair amount of attention and resources to African languages in the ICT field, on a level similar to the attention given to Western languages, especially English.



This equal effort distribution is imperative to achieve a complete digital access and effectiveness in African language settings. (Filipović, & Pütz, 2016).

6 Impacts of digitalization on African language education in South African universities

This section presents and discusses the technology integration implications on teaching and advancing African languages in South African higher education sectors. The author presents the literature review results and discusses them in a thematic form.

6.1 Lack of technology skills and inadequate resources

ICT has grown over time to become a vital component of society (Lie et al., 2020).

This growth, however, needs to catch up in emerging countries like South Africa (Hasin & Nasir, 2021). A study conducted by Ndebele (2014a)³⁴ reveals that producing and disseminating local content on the web is virtually only possible with adequate ICT utilisation alongside the local linguistic heritage. Despite facing difficult conditions with limited resources, South African universities have shown signs of investing significantly in ICT infrastructure. This investment has been made using their resources or with the help of grant-giving organisations (Brown & Czerniewicz, 2010). However, it is crucial to better understand how this technology is being utilised for educational purposes rather than just administrative ones. According to Bolton, Goosen & Kritzinger (2023)³⁵, most higher education institutions are reluctant to the transition in technology due to numerous factors. Among these issues are a need for more technology-savvy instructors and students, inadequate resources, and negligible or non-existent ICT and African language integration policies (Munje & Jita, 2020³⁶). The above-highlighted factors justify the growing necessity of implementing intensive and ongoing awareness-raising campaigns about the value of linguistics and language

technology and constant workshops to equip lecturers with the necessary technology skills (Nekvapil & Sherman, 2015). To make ICT an essential part of the teaching and learning process in any educational setting, it is of paramount importance to involve lecturers as active participants in any technology-centered approach and planning (Alenezi, 2020)³⁷. South African higher learning lecturers must embrace new technologies and utilise them for content creation and delivery in their classrooms. Sadly, there is not enough evidence that in most higher-learning sectors lecturers and students are adequately dedicated to technology to improve the quality of education and facilitate learning in their day-to-day activities (James, et al., 2006³⁸; Van der Westhuizen, & Van Vuuren, 2007³⁹). To achieve effective technology integration within South African universities, it is crucial to underscore the importance of regular foundational technology training, the formulation and execution of comprehensive technology plans involving all relevant faculty stakeholders. In light of the above, according to Adegbol (2009)⁴⁰, creating the technology committees, whose primary responsibility will be overseeing technology use on campus and fostering partnerships with different technology stakeholders for obtaining technological services and equipment, is necessary.

6.2 Lack of African language - ICT policies and practice

In South Africa, to improve the lives of future generations and equip students and lecturers with relevant technology skills, progressive ICT policies introducing new technology in the educational system have been launched (Gudmundsdottir, 2010a). However, there needs to be more evidence of language-ICT policies, particularly for African languages, and there is still a considerable challenge to implementing and practicing these policies in higher education institutions. The presence of new ICTs in Africa justifies the increasing necessity of embracing the usage of different



indigenous African languages in ICTs (Osborn & Osborn, 2010). The potential of Africa's indigenous linguistic heritage within the ICT domain should be considered in the classroom setting. The National Language Policy Framework (Department of Arts and Culture, 2016) is a significant document that obligates different government departments to a 'multilingual mode of operation' (Mesthrie, 2006). This policy primarily advocates for the establishment of language policies guided by the Constitution Republic of South Africa and the Language Policy for Higher Education (Department of Education 2003; Ndebele, 2014b). However, Lafon & Consortium (2009) reveal strong claims that ICT, language policy implementation and practice in the education sector in the South African context is still at its infancy. The awareness of language and ICT policies and their successful establishment, alongside the employment of practical initiatives in higher education sectors, will increase technology integration in classrooms, the achievement of African languages preservation and promotion.

7 Conclusion

This paper has demonstrated that although South Africa is determined to embrace digital change in higher learning institutions, most lecturers and students are reluctant to the change due to several factors. It has been discussed how higher learning sectors can integrate digital tools in their classrooms when teaching African languages. Digital tools integration will contribute to the promoting, preserving and enhancing native African languages. It is concluded that all South African universities should prioritise implementing intensive and ongoing awareness-raising campaigns about the value of linguistics and language technology. Language and ICT seniors should be constantly held to equip language lecturers with the necessary technology skills.

8 Recommendations

The following recommendations are made for future research and practice:

- For African languages preservation and enhancement, adequate language and ICT policies for African language development should be formulated and constantly be practiced in South African higher education sectors.
- South African higher education institutions should invest heavily in implementing continuous and intensive awareness-raising seminars about the value of linguistics, language technology, and practice.
- A rigorous plan for emerging digital practices in classrooms should be carefully developed for digital democracy in South African higher education where African language lecturers will be actively involved.
- More empirical studies on incorporating technology in African language classrooms are strongly recommended to emphasise technology's role in promoting African languages.

Acknowledgements

I would like to express my sincere gratitude to the DHASA conference organizers for providing academics with the opportunity to present and showcase their research work. I also extend my appreciation to the review committee members for their constructive feedback and insights that have significantly improved the quality of my work.

Reference

- Adegbola, T 2009, March. Building capacities in human language technology for African languages. In *Proceedings of the First Workshop on Language Technologies for African Languages*, pp. 53-58.
- Albelbisi, N, Yusop, FD & Salleh, UKM 2018, Mapping the factors influencing success of massive open online courses (MOOC) in higher



education. *Eurasia Journal of Mathematics, Science and Technology Education*, 14(7), pp.2995-3012

Alenezi, A 2020, The role of e-learning materials in enhancing teaching and learning behaviours. *International Journal of Information and Education Technology*, 10(1), pp.48–56.<https://doi.org/10.18178/ijiet.2020.10.1.1338>

Andin, J, Fransson, P, Dahlström, Ö, Rönnberg, J, & Rudner, M 2019, The neural basis of arithmetic and phonology in deaf signing individuals. *Language, Cognition and Neuroscience*, 34(7), pp.813–825.
<https://doi.org/10.1080/23273798.2019.1616103>

Barakabitze, AA, William-Andy Lazaro, A, Ainea, N, Mkwizu, MH, Maziku, H, Matofali, AX, Iddi, A & Sanga, C 2019, Transforming African education systems in science, technology, engineering, and mathematics (STEM) using ICTs: Challenges and opportunities. *Education Research International*, 2019, pp.1-29.

Barakabitze, AA, Kitindi, E J, Sanga, C, Kibirige, G, & Makwinya, N 2015, Exploring Students' Skills and Attitudes on Effective Use of ICTs: Case Study of Selected Tanzanian Public Secondary Schools. *Universal Journal of Educational Research*, 3(6), pp.407-425.<https://doi.org/10.13189/ujer.2015.03.0609>

Bennett, S, Maton, K & Kervin, L 2008, The 'digital natives' debate: A critical review of the evidence. *British journal of educational technology*, 39(5), pp.775-786.

Bolton, AD, Goosen, L, & Kritzing, E 2023, Embracing business sustainability through innovation and productivity in the automotive sector: Creativity, collaboration, and generating savings. In *Embracing Business Sustainability Through Innovation and*

Creativity in the Service Sector pp.184–201. IGI Global.

<https://doi.org/10.4018/978-1-6684-6732-9.ch012>

Brack, C, Samarawickrema, G, & Benson, R 2012, *Technology advances: Transforming university teaching through professional development*. Proceedings of the Higher Education Research and Development Society of Australasia. Conference, Sydney, N.S.W. Retrieved from http://conference.hersa.org.au/2005/pdf/refereed/paper_306.pdf.

Brown, C, & Czerniewicz, L 2010, Debunking the “digital native”: Beyond digital apartheid, towards digital democracy. *Journal of Computer Assisted Learning*, 26(5), pp.357–369.

<https://doi.org/10.1111/j.1365-2729.2010.00369.x>

Bullen, M, Morgan, T, Belfer, K & Qayyum, A 2009, The net generation in higher education: Rhetoric and reality. *International Journal of Excellence in E-Learning*, 2(1), pp.1-13.

Dang, XT 2023, *ICT in foreign language teaching in an innovative university in Vietnam: Current practices and factors affecting ICT use* (Doctoral dissertation, La Trobe).

Demirbilek, M, Talan, T, & Alzouebi, K 2022a, An Examination of the Factors and Challenges to Adopting Gamification in English Foreign Language Teaching. *International Journal of Technology in Education*, 5(4), pp.654–668.

<https://doi.org/10.46328/ijte.358>

Demirbilek, M, Talan, T, & Alzouebi, K 2022b, An Examination of the Factors and Challenges to Adopting Gamification in English Foreign Language Teaching. *International Journal of Technology in Education*, 5(4), 654–668.

<https://doi.org/10.46328/ijte.358>



- De Valoes, L 2014, Importance of language-Why learning a second language is important. *Adjunct Faculty*.
- Ezeanya-Esiobu, C 2019, Indigenous knowledge, and education in Africa. *Springer Nature*, pp.115
- Filipović, L & Pütz, M 2016, *Endangered Languages and Languages in Danger: Issues of documentation, policy, and language rights (Volume 42)*. John Benjamins Publishing Company.
- Fulton, JN 2019, Theory of Gamification--Motivation. *Online Submission*
- Gacs, A, Goertler, S, & Spasova, S 2020, Planned online language education versus crisis-prompted online language teaching: Lessons for the future. *Foreign Language Annals*, 53(2), pp.380–392. <https://doi.org/10.1111/flan.12460>
- Gokbulut, B 2020, The effect of mentimeter and Kahoot applications on university students' E-learning. *World Journal on Educational Technology: Current Issues*, 12(2), pp.107–116. <https://doi.org/10.18844/wjet.v12i2.4814>
- Gruber, A 2021, Teaching Language Online: A Guide for Designing, Developing and Delivering Online, Blended, and Flipped Language Courses Victoria Russell and Kathryn Murphy-Judy. *CALICO Journal*, 38(3). <https://doi.org/10.1558/cj.18559>
- Gudmundsdottir, GB 2010a, From digital divide to digital equity: Learners' ICT competence in four primary schools in Cape Town, South Africa. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, Vol. 6, no. 2.
- Gudmundsdottir, GB 2010, When does ICT support education in South Africa? The importance of teachers' capabilities and the relevance of language. *Information Technology for Development*, 16(3), pp.174–190. <https://doi.org/10.1080/02681102.2010.498409>
- Gumbi, P 2019, IsiZulu as an indigenous African language, and technology in the basic education sector in KwaZulu- Natal. *South African Journal of African Languages*, 39(2),pp. 204–210. <https://doi.org/10.1080/02572117.2019.1618026>
- Hasin, I, & Nasir, MK 2021, The effectiveness of the use of Information and Communication Technology (ICT) in rural secondary schools in Malaysia. *Journal of Education and E-Learning Research*, 8(1),pp. 59–64.
- Hung, HT, Yang, JC, Hwang, GJ, Chu, HC, & Wang, CC 2018, A scoping review of research on digital game- based language learning. *Computers and Education*, 126, pp.89–104. <https://doi.org/10.1016/j.compedu.2018.07.001>
- Hennessy, S, Onguko, B, Harrison, D, Ang'ondi, EK, Namalefe, S, Naseem, A & Wamakote, L 2010, Developing the use of information and communication technology to enhance teaching and learning in East African schools: Review of the literature. *Centre for Commonwealth Education & Aga Khan University Institute for Educational Development– Eastern Africa Research Report*, 1, pp.1-3.
- James, T, Smith, R, Roodt, J, Primo, N, Beeby, N, Fok, L, Evans, N & Moutloutsi, V, 2006, Women in the information and communication technology (ICT) sector in South Africa.
- Kassim, A 2018, Standardized Orthographies for African Languages: A Language



Management Perspective.
International Journal of African Linguistics, 4(1), pp41-52.

Lafon, M, 2009, The impact of language on educational access in South Africa. pp.27.

<https://shs.hal.science/halshs-00451832>

Lie, A, Tamah, SM, Gozali, I, Triwidayati, KR, Utami, TSD, & Jemadi, F 2020, Secondary school language teachers' online learning engagement during the covid-19 pandemic in indonesia. *Journal of Information Technology Education: Research*, 19, pp.803-832.

<https://doi.org/10.28945/4626>

Loh, CYR & Teo, TC 2017, Understanding Asian students learning styles, cultural influence and learning strategies. *Journal of Education & Social Policy*, 7(1), pp.194-210

Lubua, F 2015b, Exploring the Opportunities for Integrating New Digital Technologies in Tanzania's Higher Education Classrooms. In *International Journal of Learning, Teaching and Educational Research*, Vol. 14, no. 2.

Mesthrie, R 2006, Language, transformation and development: A sociolinguistic appraisal of post-apartheid South African language policy and practice. *Southern African Linguistics and Applied Language Studies*, 24(2), pp.151–163.<https://doi.org/10.2989/16073610609486414>

Munje, PN, & Jita, T 2020, The impact of the lack of ICT resources on teaching and learning in selected South African primary schools. *International Journal of Learning, Teaching and Educational Research*, 19(7), pp.263–279.

<https://doi.org/10.26803/IJLTER.19.7.15>

Ndebele, H 2014a, Promoting Indigenous African Languages Through Information and

Communication Technology Localisation: A Language Management Approach. *Alternation Special Edition No, 13*, pp.102–127.

Ndebele, H 2014b, Promoting Indigenous African Languages Through Information and Communication Technology Localisation: A Language Management Approach. *Alternation Special Edition No, 13*, pp.102–127.

Nekvapil, J, & Sherman, T 2015, An introduction: Language management theory in language policy and planning. In *International Journal of the Sociology of Language*, Vol. 2015, no. 232, pp. 1–12. Walter de Gruyter GmbH.

<https://doi.org/10.1515/ijsl-2014-0039>

Osborn, D Zhang 2010, Human Sciences Research Council, & International Development Research Centre (Canada). *African languages in a digital age : challenges and opportunities for indigenous language computing*. HSRC Press.

Ondrashek, N 2017, 21st century learning (master's thesis, Northwestern College, Orange City, IA). Retrieved from http://nwcommons.nwciowa.edu/education_masters/21/

Sife, AS, Lwoga, ET, & Sanga, C 2007, New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. In *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 3(2).

Tatham, M 2009, An introduction to the sounds of languages. *Journal of the International Phonetic Association*, 39(2), pp.235-238.

Xi, J, Chen, Y & Wang, G 2018, Design of a Personalized Massive Open Online Course Platform. *International Journal of Emerging Technologies in Learning*, 13(4).



Udoye, IE 2016, The impact of the National Policy on Education (NPE) on multilingual proficiency in Nigeria. *European Journal of English Language and Literature Studies*, 4(3), pp.14-22.

Van der Westhuizen, P.& Van Vuuren, H, 2007, Professionalising principalship in South Africa. *South African Journal of Education*, 27(3), pp.431-446.

Yolanda Amaya-Díaz, II, & Xavier Bajaña- Zajia, JI 2020, *The use of gamification to enhance the English as a foreign language El uso de la gamificación para mejorar el inglés como idioma extranjero O uso da gamificação para aprimorar o inglês como língua estrangeira.* 5, pp.865–881.
<https://doi.org/10.23857/pc.v5i3.1388>

Yue, XP, 2016, *The re-construction of identity and gender in the emerging digital youth culture: a case study of the Chinese online gaming community* (Doctoral dissertation, University of British Columbia).



- ¹ Barakabitze, A.A., William-Andy Lazaro, A., Ainea, N., Mkwizu, M.H., Maziku, H., Matofali, A.X., Iddi, A. & Sanga, C. (2019). Transforming African education systems in science, technology, engineering, and mathematics (STEM) using ICTs: Challenges and opportunities. *Education Research International*, 2019, pp.1-29.
- ² De Valoes, L. (2014) Importance of language-Why learning a second language is important. *Adjunct Faculty*.
- ³ Hung, H. T., Yang, J. C., Hwang, G. J., Chu, H. C., & Wang, C. C. (2018). A scoping review of research on digital game-based language learning. *Computers and Education*, 126, pp.89–104. <https://doi.org/10.1016/j.compedu.2018.07.001>
- ⁴ Gacs, A., Goertler, S., & Spasova, S. (2020). Planned online language education versus crisis-prompted online language teaching: Lessons for the future. *Foreign Language Annals*, 53(2), pp.380–392. <https://doi.org/10.1111/flan.12460>
- ⁵ Dang, X.T. (2023). *ICT in foreign language teaching in an innovative university in Vietnam: Current practices and factors affecting ICT use* (Doctoral dissertation, La Trobe).
- ⁶ Bennett, S., Maton, K. & Kervin, L. (2008). The ‘digital natives’ debate: A critical review of the evidence. *British journal of educational technology*, 39(5), pp.775-786.
- ⁷ Brown, C., & Czerniewicz, L. (2010). Debunking the “digital native”: Beyond digital apartheid, towards digital democracy. *Journal of Computer Assisted Learning*, 26(5), pp.357–369. <https://doi.org/10.1111/j.1365-2729.2010.00369.x>
- ⁸ Albelbisi, N., Yusop, F.D. & Salleh, U.K.M. (2018). Mapping the factors influencing success of massive open online courses (MOOC) in higher education. *Eurasia Journal of Mathematics, Science and Technology Education*, 14(7), pp.2995-3012
- ⁹ Xi, J., Chen, Y. & Wang, G. (2018). Design of a Personalized Massive Open Online Course Platform. *International Journal of Emerging Technologies in Learning*, 13(4).
- ¹⁰ Barakabitze, A.A., Kitindi, E. J., Sanga, C., Kibirige, G., & Makwinya, N. (2015). Exploring Students’ Skills and Attitudes on Effective Use of ICTs: Case Study of Selected Tanzanian Public Secondary Schools. *Universal Journal of Educational Research*, 3(6), pp.407-425. <https://doi.org/10.13189/ujer.2015.030609>
- ¹¹ Lubua, F. (2015b). Exploring the Opportunities for Integrating New Digital Technologies in Tanzania’s Higher Education Classrooms. In *International Journal of Learning, Teaching and Educational Research*, 14(2)
- ¹² Demirbilek, M., Talan, T., & Alzouebi, K. (2022 a). An Examination of the Factors and Challenges to Adopting Gamification in English Foreign Language Teaching. *International Journal of Technology in Education*, 5(4), pp.654–668. <https://doi.org/10.46328/ijte.358>
- ¹³ Gokbulut, B. (2020). The effect of mentimeter and Kahoot applications on university students’ E-learning. *World Journal on Educational Technology: Current Issues*, 12(2), pp.107–116. <https://doi.org/10.18844/wjet.v12i2.4814>
- ¹⁴ Ondrashek, N. (2017). 21st century learning (master’s thesis, Northwestern College, Orange City, IA). Retrieved from http://nwcommons.nwciowa.edu/education_masters/21/
- ¹⁵ Fulton, J.N., 2019. Theory of Gamification--Motivation. *Online Submission*
- ¹⁶ Yue, X.P. (2016). *The re-construction of identity and gender in the emerging digital youth culture: a case study of the Chinese online gaming community* (Doctoral dissertation, University of British Columbia).
- ¹⁷ Loh, C.Y.R. and Teo, T.C. (2017). Understanding Asian students learning styles, cultural influence and learning strategies. *Journal of Education & Social Policy*, 7(1), pp.194-210
- ¹⁸ Lie, A., Tamah, S. M., Gozali, I., Triwidayati, K. R., Utami, T. S. D., & Jemadi, F. (2020). secondary school language teachers’ online learning engagement during the covid-19 pandemic in indonesia. *Journal of Information Technology Education: Research*, 19, pp.803-832. <https://doi.org/10.28945/4626>



- ¹⁹ Lie, A., Tamah, S. M., Gozali, I., Triwidayati, K. R., Utami, T. S. D., & Jemadi, F. (2020). secondary school language teachers' online learning engagement during the covid-19 pandemic in indonesia. *Journal of Information Technology Education: Research*, 19, pp.803-832. <https://doi.org/10.28945/4626>
- ²⁰ Andin, J., Fransson, P., Dahlström, Ö., Rönnerberg, J., & Rudner, M. (2019). The neural basis of arithmetic and phonology in deaf signing individuals. *Language, Cognition and Neuroscience*, 34(7), pp.813–825. <https://doi.org/10.1080/23273798.2019.1616103>
- ²¹ Hennessy, S., Onguko, B., Harrison, D., Ang'ondi, E.K., Namalefe, S., Naseem, A. & Wamakote, (2010). Developing the use of information and communication technology to enhance teaching and learning in East African schools: Review of the literature. *Centre for Commonwealth Education & Aga Khan University Institute for Educational Development–Eastern Africa Research Report, 1*, pp.1-3.
- ²² Sife, A. S., Lwoga, E. T., & Sanga, C. (2007). New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. In *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, Vol. 3, no. 2.
- ²³ Udoye, I.E., 2016. The impact of the National Policy on Education (NPE) on multilingual proficiency in Nigeria. *European Journal of English Language and Literature Studies*, 4(3), pp.14-22.
- ²⁴ Hasin, I., & Nasir, M. K. (2021). The effectiveness of the use of Information and Communication Technology (ICT) in rural secondary schools in Malaysia. *Journal of Education and E-Learning Research*, 8(1),pp. 59–64.
- ²⁵ Gudmundsdottir, G. B. (2010a). From digital divide to digital equity: Learners' ICT competence in four primary schools in Cape Town, South Africa. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, Vol. 6, no. 2.
- ²⁶ Gumbi, P. (2019). IsiZulu as an indigenous African language, and technology in the basic education sector in KwaZulu- Natal. *South African Journal of African Languages*, 39(2),pp. 204–210. <https://doi.org/10.1080/02572117.2019.1618026>
- ²⁷ Filipović, L. & Pütz, M (2016). *Endangered Languages and Languages in Danger: Issues of documentation, policy, and language rights (Volume 42)*. John Benjamins Publishing Company
- ²⁸ Kassim, A. (2018). Standardized Orthographies for African Languages: A Language Management Perspective. *International Journal of African Linguistics*, 4(1), pp41-52.
- ²⁹ Nekvapil, J., & Sherman, T. (2015). An introduction: Language management theory in language policy and planning. *International Journal of the Sociology of Language*, 4(29) , pp. 1–12 <https://doi.org/10.1515/ijsl-2014-0039>
- ³⁰ Nekvapil, J., & Sherman, T. (2015). An introduction: Language management theory in language policy and planning. *International Journal of the Sociology of Language*, 4(29) , pp. 1–12 <https://doi.org/10.1515/ijsl-2014-0039>
- ³¹ Gruber, A. (2021). Teaching Language Online: A Guide for Designing, Developing and Delivering Online, Blended, and Flipped Language Courses Victoria Russell and Kathryn Murphy-Judy. *CALICO Journal*, 38(3). <https://doi.org/10.1558/cj.18559>
- ³² Ezeanya-Esiobu, C. (2019). *Indigenous knowledge and education in Africa*. Springer Nature.
- ³³ Tatham, M. (2009) An introduction to the sounds of languages *Journal of the International Phonetic Association*, 39(2), pp.235-238.
- ³⁴ Ndebele, H. (2014a). Promoting Indigenous African Languages Through Information and Communication Technology Localisation: A Language Management Approach. *Alternation Special Edition No, 13*, pp.102–127.
- ³⁵ Bolton, A. D., Goosen, L., & Kritzinger, E. (2023)0. Embracing business sustainability through innovation and productivity in the automotive sector: Creativity, collaboration, and generating savings. In *Embracing Business Sustainability Through Innovation and Creativity in the Service Sector* pp.184–201. IGI Global. <https://doi.org/10.4018/978-1-6684-6732-9.ch012>



-
- ³⁶ Munje, P. N., & Jita, T. (2020). The impact of the lack of ICT resources on teaching and learning in selected South African primary schools. *International Journal of Learning, Teaching and Educational Research*, 19(7), pp.263–279.
<https://doi.org/10.26803/IJLTER.19.7.15>
- ³⁷ Alenezi, A. (2020). The role of e-learning materials in enhancing teaching and learning behaviours. *International Journal of Information and Education Technology*, 10(1), pp.48–56.
<https://doi.org/10.18178/ijiet.2020.10.1.1338>
- ³⁸ James, T., Smith, R., Roodt, J., Primo, N., Beeby, N., Fok, L., Evans, N. & Moutloutsi, V. (2006). Women in the information and communication technology (ICT) sector in South Africa.
- ³⁹ Van der Westhuizen, P. & Van Vuuren, H. (2007). Professionalising principalship in South Africa. *South African Journal of Education*, 27(3), pp.431-446
- ⁴⁰ Adegbola, T. (2009). March. Building capacities in human language technology for African languages. In *Proceedings of the First Workshop on Language Technologies for African Languages*, pp. 53-58.

