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# Bridging the Digital Divide: Technology Enhanced Teaching of Xitsonga at the Tertiary Level in South Africa

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## Abstract

The rapid growth of digital technologies is changing the way teaching and learning happen in higher education, creating new and exciting opportunities for African languages such as Xitsonga, especially within Universities of Technology. This paper looks at how technology-enhanced teaching can act as “digital bridges” that link what happens in the classroom with wider linguistic, cultural, and community contexts. In doing so, it seeks to strengthen language use and make learning more accessible and inclusive. More specifically, the paper focuses on how digital tools are used in teaching Xitsonga, how they support student engagement and learning, how they extend learning beyond the classroom into everyday life, and what challenges are experienced in the process.

Drawing on Constructivist Theory (Piaget, 1972), Social Interactionist Theory (Vygotsky, 1978), and Connectivism (Siemens, 2005), the study shows that digital environments give students more active roles in their learning. They are able to build knowledge for themselves, collaborate with others, and access a wide range of multilingual resources through connected digital spaces. It also draws on earlier research by Valoyi (2025), which highlighted the difficulties faced by non-Xitsonga-speaking students at a University of Technology in Gauteng, including language barriers, limited institutional support, and challenges in engaging with Xitsonga as an academic subject. A qualitative case study approach was followed, using document analysis, classroom observations, and reflective field notes, with the data analysed thematically to identify key patterns.

The findings indicate that digital tools such as learning management systems, mobile applications, and social media platforms can improve student participation, encourage collaboration, and deepen engagement with Xitsonga. They also help to take learning beyond the classroom into real-life community contexts, making the language more relevant and meaningful. However, the study also highlights ongoing challenges, such as unequal access to digital resources, a shortage of Xitsonga digital content, and limited institutional support. Overall, the study shows that, if used thoughtfully, digital technologies have strong potential to revitalise, decolonise, and sustain the teaching and learning of Xitsonga in higher education, although these challenges still need to be addressed.

## Keywords

Xitsonga, digital pedagogy, technology-mediated learning, constructivism, social interactionism, connectivism, qualitative research, higher education

## INTRODUCTION

Education has undergone significant change because of the quick development of digital technologies, which have made learning more connected, interactive, and collaborative. Modern learning increasingly takes place through active involvement, engagement, and digital networks where students interact with both content and one another, as opposed to merely depending on one-way knowledge transfer from lecturers to students (Selwyn, 2016). Diverse voices and languages must be incorporated into the digital environment because this transformation is not just a technical one but also a pedagogical progression. Not all South African language groups have benefited equally from the digital transformation, despite these developments. Xitsonga is one of many indigenous African languages that are still marginalized in both academic and internet contexts. Long-standing structural disparities in language policy and the distribution of educational resources, where traditionally dominant languages like English and Afrikaans continue to enjoy greater institutional backing and digital visibility, are reflected in this mismatch (Alexander, 2003; Heugh, 2019).

According to recent studies, Xitsonga is often underrepresented in online resources like Wikipedia and Human Language Technology (HLT), which restricts its usefulness as a teaching medium in a digital age (Mlambo et al., 2021; Mabasa, 2025).

At the postsecondary level, where students frequently face a "digital divide" that is both language and technical, the issue is more severe. According to earlier research by Valoyi (2025), there are several obstacles that students at Gauteng's Universities of Technology must overcome to engage with Xitsonga as an academic subject, such as a dearth of easily accessible, contemporary, and relevant digital learning tools. Academic competency and cultural sustainability suffer when indigenous languages are removed from high-status digital platforms because learners regard them as less valuable (Chabalala, 2025). Pedagogical approaches that go beyond conventional techniques to integrate technology-enhanced learning are desperately needed.

This paper investigates the possibility of digital technologies as "bridging tools" to link regular community-based language activities with formal classroom education in response to these difficulties. By investigating how technology-enhanced instruction might lower learning barriers and simultaneously increase Xitsonga's prominence in higher education, it expands on the findings of Valoyi (2025). In order to promote linguistic equity, this article first describes Xitsonga's current digital state, assesses particular technology instruments for language education, and then suggests a framework for incorporating these "digital bridges" into the postsecondary curriculum.

## LITERATURE REVIEW

The rapid advancement of digital technologies has significantly changed the landscape of higher education, including the way languages are taught and learned. Universities are no longer dependent solely on conventional face-to-face instruction but increasingly make use of Learning Management Systems (LMSs), mobile technologies, multimedia resources, online collaboration platforms, and social media to create interactive and learner-centred educational environments. These digital tools encourage collaboration, independent learning, and greater student engagement (Bates, 2015; Selwyn, 2016). For indigenous African languages such as Xitsonga, which have historically received limited institutional attention and digital representation, the adoption of technology presents new opportunities. Beyond improving language learning, digital technologies also contribute to the preservation, promotion, and revitalisation of indigenous languages in an increasingly digital world.

### Technology-Enhanced Language Learning

Technology-Enhanced Language Learning (TELL) has emerged as a major area of interest in language education because of its potential to improve teaching and learning experiences. Bates (2015) explains that digital technologies make learning more flexible by allowing students to access educational materials at their convenience, regardless of time or location. Likewise, Kukulska-Hulme (2012) notes that mobile devices such as smartphones and tablets have expanded learning opportunities by enabling students to continue practising language skills beyond the traditional classroom environment.

Digital learning environments expose students to a variety of resources, including videos, audio recordings, online quizzes, discussion forums, and collaborative tasks, which support the development of reading, writing, listening, and speaking skills (Selwyn, 2016). These technologies also provide immediate feedback and encourage learners to take greater responsibility for their own learning. Thorne and May (2017) further argue that digital platforms create opportunities for multilingual communication and intercultural engagement, making them particularly valuable in the teaching of indigenous languages.

Studies also indicate that students are generally more motivated when technology forms part of the learning process. Access to authentic learning materials, opportunities to interact with native speakers, and digital assessment tools that allow learners to track their progress all contribute to improved engagement and language development (Bates, 2015). Consequently, technology-enhanced learning is increasingly recognised as an effective approach for improving both student participation and academic achievement.

### Indigenous Languages and Higher Education

Although South Africa recognises eleven official languages, indigenous African languages continue to occupy a relatively marginal position within higher education. Alexander (2003) argues that colonialism and apartheid established English and Afrikaans as the dominant languages of education while limiting the development of African languages. Despite the country's democratic language policy, English remains the primary language used in teaching, research, and academic publishing (Heugh, 2013).

Xitsonga reflects many of these broader challenges. Mabasa (2024) observes that while Xitsonga is widely spoken across Limpopo, Mpumalanga, and parts of Gauteng, it remains underrepresented within universities and other public institutions. The shortage of academic materials, digital learning resources, and specialised terminology continues to limit its use as a language of teaching and scholarship.

Research by Valoyi (2025) further reveals that students studying Xitsonga at a South African University of Technology experience a range of learning difficulties. These include limited exposure to the language, inadequate institutional support, insufficient learning materials, and challenges related to grammar, vocabulary, and pronunciation. Such findings highlight the need for innovative teaching strategies that improve learning experiences while strengthening the academic status of Xitsonga.

## Digital Divide and Educational Inequality

While digital technologies offer considerable educational benefits, unequal access remains a major concern in South Africa. Warschauer (2004) argues that the digital divide extends beyond simply owning a computer or having internet access. It also includes differences in digital literacy, access to quality educational resources, language representation, and opportunities for meaningful participation in digital spaces. Students without reliable internet connectivity or suitable digital devices are therefore disadvantaged in technology-supported learning environments.

These challenges are particularly evident in the teaching of indigenous African languages. Banda (2016) points out that African languages remain poorly represented online, resulting in limited access to quality educational content produced in learners' home languages. This lack of digital resources perpetuates educational inequalities and reinforces the dominant position of English within higher education.

Similarly, Mlambo, Skosana and Matfunjwa (2021) argue that Human Language Technologies (HLTs) remain insufficiently developed for many South African indigenous languages, including Xitsonga. The shortage of digital dictionaries, machine translation systems, speech recognition technologies, and other language-processing tools reduces the visibility and practical use of these languages within digital environments.

## Digital Technologies and Language Revitalisation

In recent years, digital technologies have increasingly been viewed as valuable instruments for preserving and revitalising indigenous and endangered languages. UNESCO (2018) emphasises that digital platforms play an important role in documenting indigenous knowledge, safeguarding oral traditions, and promoting multilingual education. Resources such as online dictionaries, digital archives, mobile applications, and social media enable communities to preserve, share, and transmit both linguistic and cultural knowledge to future generations.

Supporting this perspective, Chavalala (2025) argues that pedagogical approaches incorporating translanguaging alongside digital literacy practices strengthen learners' engagement with Xitsonga while improving literacy skills. The use of digital technologies therefore contributes not only to language acquisition but also to cultural preservation and the strengthening of linguistic identity.

Social media platforms, including WhatsApp, YouTube, and Facebook, further provide authentic opportunities for learners to communicate with native speakers, access multimedia learning resources, and participate in collaborative learning communities (Selwyn, 2016). These interactions encourage greater confidence and promote the practical use of indigenous languages beyond formal educational settings.

## Theoretical Perspectives Supporting Digital Language Learning

Several learning theories provide a strong foundation for understanding technology-enhanced language learning. Constructivist Theory proposes that learners actively build knowledge through meaningful experiences and engagement with learning activities (Piaget, 1972). Social Interactionist Theory emphasises that language learning develops through interaction with others, collaborative activities, and guided support from more knowledgeable individuals (Vygotsky, 1978; Lantolf & Thorne, 2006). Building on these perspectives, Connectivism suggests that learning in the digital age depends on learners' ability to locate, connect, and evaluate information across multiple digital networks (Siemens, 2005). Collectively, these theoretical perspectives explain how digital technologies can support Xitsonga language learning by encouraging learner independence, collaboration, knowledge sharing, and continuous learning within both formal and informal educational contexts.

## Research Gap

Although a growing body of literature examines technology-enhanced learning, multilingual education, indigenous language development, and the digital divide, there remains limited research focusing specifically on the role of digital technologies as digital bridges for teaching and learning Xitsonga within South African Universities of Technology. Much of the existing scholarship concentrates on language policy, multilingualism, or the broader challenges facing African languages, with comparatively little attention given to students' lived experiences of learning Xitsonga through digital technologies. In addition, few studies have explored how digital learning environments simultaneously enhance language acquisition, strengthen cultural identity, increase learner engagement, and foster community participation. This study seeks to address these gaps by investigating how technology-enhanced teaching and learning can improve Xitsonga language education while contributing to the long-term preservation and sustainability of indigenous languages in higher education.

## THEORETICAL FRAMEWORK

This article is grounded in three interrelated theoretical perspectives that move beyond abstract pedagogy and speak directly to the realities of learning Xitsonga in a digital age. Together, these theories provide a meaningful lens for understanding how technology can bridge the gap between traditional teaching approaches and the evolving demands of contemporary language learning.

### 1. Constructivism

According to (Jean Piaget, 1972) Constructivism views learning as an active and engaging process in which students construct their own understanding, rather than passively receiving information. In the context of Xitsonga at the postsecondary level, digital tools such as interactive quizzes, videos, and multimedia resources transform the subject from

something static into a more dynamic and lived experience. These tools encourage students to move beyond memorisation and instead engage in exploration, experimentation, and reflection. As a result, learners are able to test their understanding of linguistic concepts and gradually build confidence and fluency in the language.

## **2. Social Interactionist Theory (Lev Vygotsky, 1978)**

Language learning is inherently social. Vygotsky's concept of the Zone of Proximal Development (ZPD) highlights the importance of guidance and interaction in helping learners reach higher levels of competence. In a digital learning environment, platforms such as Learning Management Systems (LMS) and mobile applications like WhatsApp act as important "digital bridges." They create spaces where students can collaborate, ask questions, and support one another beyond the classroom. Through peer interaction and mentorship, learners become part of a continuous, supportive community, which is especially important in contexts affected by the digital divide (Lantolf & Thorne, 2006).

## **3. Connectivism (Siemens, 2005)**

Connectivism responds to the realities of the digital era, where knowledge is not confined to the individual but is distributed across networks. This perspective is particularly relevant for Xitsonga, a language that is often underrepresented in digital spaces. It highlights how students can use online resources such as digital archives, social media communities, and online dictionaries to access and share knowledge. Learning, in this sense, becomes the ability to connect different sources of information and remain engaged with the language as it evolves within a globalised world.

When combined, these three theories provide a strong and relevant framework for understanding Xitsonga teaching and learning in the digital age. They support a learner-centred approach that values active participation, social collaboration, and digital connectivity. More importantly, they offer practical ways of addressing the challenges posed by the digital divide at the postsecondary level, helping to create a more inclusive and responsive language learning environment.

## **RESEARCH METHODOLOGY**

This section outlines the methodological approach that guided the paper, explaining how the research was designed and conducted. The aim of this paper was not simply to measure outcomes, but to develop a deeper understanding of how digital tools are used in the teaching and learning of Xitsonga within a real educational setting. To achieve this goal, this section describes the research design, paradigm, paper site, data collection methods, data analysis procedures, and strategies used to ensure the trustworthiness of the findings. Each of these components was carefully selected to align with the nature of the research problem and the need to capture rich, meaningful experiences from both lecturers and students.

### **Research Design**

This paper adopted a qualitative case paper design, as outlined by Yin (2018), to explore the use of digital tools in teaching Xitsonga within a specific educational context. A qualitative approach was considered appropriate because the paper sought to understand lived experiences, teaching practices, and interactions rather than relying on numerical data. The case paper design allowed the researcher to focus closely on a single institution, providing a detailed and holistic view of how digital tools are integrated into both classroom and online learning environments. This approach made it possible to capture the complexity and uniqueness of the teaching and learning processes as they naturally occur.

### **Research Paradigm**

The paper was guided by an interpretivist paradigm, which emphasises understanding how individuals make meaning of their experiences (Creswell & Poth, 2018). In this context, the research aimed to explore how lecturers and students perceive, experience, and interpret the use of digital tools in Xitsonga teaching and learning. Rather than seeking one objective truth, the interpretivist approach recognises that reality is shaped by personal perspectives and social interactions. This made it particularly suitable for this paper, as it allowed the researcher to engage with participants' viewpoints and gain insight into their unique experiences.

### **Research Site**

The research was conducted at a University of Technology in Gauteng, South Africa. The institution offers Xitsonga as part of its communication and language modules, making it a relevant and appropriate setting for the paper. This environment provided an opportunity to observe how digital technologies are incorporated into language teaching in a real-world academic context. The choice of this site was also influenced by its diverse student population and the increasing use of digital learning platforms within the institution.

### **Data Collection Methods**

To gain a comprehensive understanding of the phenomenon under investigation, data were collected using multiple methods. This study relied solely on qualitative data collected through semi-structured interviews. A total of 25 students were interviewed to explore their experiences and perspectives on the use of digital tools in learning. The interviews were conducted at University of Technology in Gauteng between on the 25 June 2024. This method allowed the researcher to gain in-depth insights into students' views, attitudes, and experiences. The use of interviews as the primary data collection method enabled the generation of rich, detailed, and contextually grounded information regarding how digital tools are perceived and used in practice.



## Data Analysis

The data collected for this paper were analysed using thematic analysis, as proposed by Braun and Clarke (2006). This process involved carefully reading and re-reading the data to identify recurring patterns, ideas, and themes. The analysis focused on key aspects such as digital engagement, student participation, accessibility of learning resources, and language use. These themes were then organised and interpreted in relation to the paper's theoretical framework. Thematic analysis allowed the researcher to move beyond surface-level observations and uncover deeper meanings within the data.

## Trustworthiness

To ensure the quality and credibility of the paper, several strategies were employed in line with Lincoln and Guba (1985). Credibility was enhanced through triangulation, where data from different sources were compared to confirm consistency and accuracy. Dependability was ensured by maintaining detailed records of the research process, often referred to as an audit trail. Confirmability was achieved through the use of reflective notes, which helped the researcher remain aware of their own perspectives and potential influence on the paper. Lastly, transferability was supported by providing rich, detailed descriptions of the research context and findings, allowing others to assess the relevance of the paper to similar settings.

Overall, these strategies strengthened the trustworthiness of the research and ensured that the findings are both meaningful and reliable.

## FINDINGS

The findings of this paper tell a compelling story about how digital spaces are quietly transforming the way students learn and experience Xitsonga. Rather than being confined to the classroom, language learning is becoming more interactive, social, and connected to students' everyday lives. Four key themes emerged from the data.

### Theme 1: Motivation for learning Xitsonga in a digital learning environment

The findings show that students are not only learning Xitsonga for academic purposes, but also for deeply personal and practical reasons. Their motivation is shaped by a desire to connect with culture, improve communication, and create future opportunities in education and the workplace. For many, learning the language is also a way of strengthening identity and belonging within the Vatsonga community.

*PF11 explained that learning Xitsonga allows her to feel more connected to the customs, heritage, and history of the Vatsonga people across Southern Africa.*

*PM12 shared that the language becomes especially useful when travelling, as it helps him communicate more easily in Xitsonga-speaking areas.*

*PM8 highlighted the value of multilingualism, noting that it opens doors to careers in fields such as tourism, education, and translation.*

*PF2 described learning Xitsonga as a way of improving her thinking ability and strengthening problem-solving skills.*

*PM21 emphasised that the language helps him communicate better with family members and build stronger relationships with native speakers.*

*PF5 linked her motivation to academic development, explaining that Xitsonga supports her research and linguistic interests.*

*PF10 added that she is also motivated by the desire to preserve and revitalise the language for future generations.*

Based on the above verbatim quotes, students' motivation to learn Xitsonga in digital settings is a multifaceted endeavour based on social connectivity, cultural identification, and practical, economic utility. The results imply that the digital environment supports not just language learning but also a comprehensive development that includes professional capital, improved cognitive skills, and cultural heritage preservation.

### Theme 2: Technology use in supporting Xitsonga language learning

The findings reveal that students actively rely on a variety of digital tools and platforms to support their learning, especially outside formal classroom settings. These technologies play an important role in making the language more accessible and engaging.

*PM12 mentioned that he learns through television programmes such as Giyani: Land of Blood, listens to Munghana Lonene FM, and uses language apps and flashcards for revision.*

*PM8 explained that attending cultural events, combined with digital exposure, boosts his confidence and improves his language use.*

*PF22 shared that she interacts with native speakers through social media platforms, online forums, and language exchange websites.*

*PF11 added that YouTube channels, Quizlet, Anki, and apps like Tandem help her build vocabulary and practise communication.*

*PF26 explained that she monitors her progress through digital recordings, online tests, and personal language diaries.*

According to the conclusions drawn from the above excerpts, students are now independent, tech-enabled practitioners who use a "hybrid immersion" paradigm instead of being passive recipients of language learning. Students are

successfully bridging the gap between formal linguistic rules and real-world fluency by combining targeted digital tools like Anki and Tandem with mass media, such as Giyani: Land of Blood and Munghana Lonene FM.

The above excerpts demonstrate that this deliberate use of social media and "edutainment" suggests that digital spaces are low-stakes settings that promote genuine engagement with native speakers while lowering communicative anxiety. Additionally, a high level of metacognitive awareness, where students accept personal responsibility for their competency, is reflected in the use of digital recordings and self-testing instruments for progress tracking. In the end, the author views these digital habits as essential connecting architecture that turns Xitsonga from a static academic subject into a living, everyday activity incorporated into the contemporary digital lifestyle, rather than just as additional tools.

### **Theme 3: Cultural orientation and digital exposure in language learning**

Students consistently linked their motivation to learn Xitsonga with cultural awareness and identity. Technology further enhances this connection by making cultural content more accessible and engaging.

**PF3** explained that learning Xitsonga helps her understand cultural heritage, music, and traditional practices.

**PF20** noted that the language helps her build stronger connections with Tsonga-speaking communities.

**PF9** added that it enriches travel experiences and improves cultural interaction.

The above results imply that for these students, Xitsonga serves as a symbolic entry point to social and cultural capital rather than just a language system. Students are participating in identity-work, where the digital media serves as a "cultural repository," by connecting language acquisition to heritage, music, and customs. According to the author, students can develop a sense of community even when they are geographically separated from Tsonga-speaking hubs by using digital platforms to acquire music and participate in online conversations. In the end, this digital exposure suggests that cultural relevance is the main factor driving persistent engagement in a digital learning environment by transforming the language from an abstract academic necessity into a relational tool that improves travel, work, and community inclusion.

### **Theme 4: Challenges in learning Xitsonga and the need for digital support**

The findings reveal that students face several challenges in learning Xitsonga, particularly in pronunciation, grammar, and exposure to the language.

**PF6** reported difficulty with pronunciation, especially clicks, tones, and unfamiliar sounds.

**PF23** explained that Xitsonga grammar differs greatly from English, making it difficult to apply rules correctly.

**PF14** highlighted that tonal variation can change meaning, making mastery challenging.

**PM18** noted that limited opportunities to practise speaking slow down progress.

**PF13** shared that fear of making mistakes affects her confidence.

**PM8** pointed out that a lack of sufficient learning materials makes the process more difficult.

The above verbatim quotes reveal that the accounts of difficulties show a substantial educational divide between technical proficiency and digital motivation. The persistent challenges with complicated syntax (compared to English) and phonology (clicks and tones) suggest that although digital tools offer access, they might not yet have the subtle phonetic feedback needed for advanced proficiency. According to the author, "limited speaking opportunities" and "fear of making mistakes" are signs of communicative anxiety, which is frequently made worse by a dearth of organized, interactive digital tools. This indicates that although students are motivated, there is an urgent need for more advanced, AI-driven or interactive speaking tools to boost learner confidence because the current digital infrastructure does not provide enough scaffolded support for the more complex aspects of Xitsonga grammar and pronunciation.

### **Theme 5: Learning beyond the classroom through digital and social engagement**

Students reported that much of their language development happens outside the classroom, often through digital platforms and everyday interaction.

**PF1** explained that practising Xitsonga outside class improves her fluency and confidence.

**PM12** shared that he incorporates Xitsonga into daily life using media, apps, and self-study tools.

**PM8** noted that speaking the language at cultural events helps build confidence and real-life communication skills.

**PF22** added that online communities allow her to connect with speakers and practise regularly.

**PF11** explained that YouTube and language apps are useful for improving vocabulary and comprehension.

**PF26** stated that digital feedback tools and recordings help her track progress.

According to the results under Theme 5, the digital and social worlds are interdependent for contemporary Xitsonga learners. The "output" (fluency/confidence) comes from social and cultural interactions, but the "input" (vocabulary/comprehension) comes from technology. This implies that in order to reflect how students actually learn in the twenty-first century, language curriculum might incorporate more "real-world" digital tasks.

### **Theme 6: Peer interaction and collaborative learning in digital environments**

Participants emphasised that learning becomes more meaningful when it is shared with others, both in person and through digital spaces.

**PM21** explained that interacting with peers from different linguistic backgrounds promotes cultural understanding.

**PF10** noted that peer interaction creates a safe space for practising the language.

**PF4** added that shared challenges encourage motivation and emotional support.

**PM18** stated that explaining ideas to others improves understanding and memory.

**PF14** highlighted that diverse backgrounds enrich classroom discussions.

**PF23** explained that peer interaction also helps build friendships and professional networks.

The results imply that peer networks, whether online and offline, serve as a social framework that turns language learning from a solitary endeavour into a group endeavour. According to the author's interpretation, peer contact creates a "safe space" that serves as a vital defence against the demands of the classroom. Students participate in co-construction of knowledge by explaining concepts to others and overcoming "shared challenges," where the digital media (group chats and forums) serves as a social glue that promotes professional and linguistic networking. This suggests that collaborative learning in digital contexts fosters international competence and emotional resilience in addition to improving fluency, making the learning process more durable through mutual support.

### **Theme 7: Emotional and psychological experiences in technology-supported learning**

The findings show that learning Xitsonga is emotionally demanding for many students, with both positive and negative experiences shaping their progress.

**PF25** explained that pronunciation and grammar difficulties often lead to frustration.

**PF2** shared that comparing herself with others sometimes creates feelings of inadequacy.

**PF17** noted that limited cultural exposure leads to confusion and uncertainty.

**PM8** said that a lack of resources can make learning feel isolating.

**PF13** highlighted fear of embarrassment when speaking the language.

**PM21** added that balancing studies with other responsibilities can feel overwhelming.

According to the participants' reflections, learning a language is a high-stakes affective process in which emotional health and cognitive development are closely related. The recurrent emotions of "frustration," "inadequacy," and "uncertainty" are interpreted by the author as proof of linguistic ego fragility, implying that the technical challenges of Xitsonga grammar and phonology provide both academic and psychological obstacles. Additionally, students' reports of "isolation" and "fear of embarrassment" point to a strong affective filter, which probably prevents the impromptu communication required for fluency. The author comes to the conclusion that if there is insufficient human-centric assistance, the digital learning environment may unintentionally increase social comparison and emotional strain. As a result, the results indicate that effective language programs need to go beyond technical instruction to include affective scaffolding that tackles the feelings of fear, loneliness, and overwhelm that come with learning a language that is culturally and structurally complex.

### **CHALLENGES**

Although digital technologies have improved the learning of Xitsonga in many ways, the study also revealed several challenges that continue to affect students' experiences.

One major challenge is the shortage of digital learning resources in Xitsonga (Banda, 2016). Compared to global languages like English, Xitsonga has very limited online learning materials. Students can easily find English videos, quizzes, and academic content online, but similar resources in Xitsonga are rare. For example, a student might find hundreds of English grammar tutorials on YouTube, but very few structured and interactive Xitsonga learning materials. This lack of resources makes it harder for students to learn independently and stay engaged with the language online.

Another challenge is the continued dominance of English in higher education (Heugh, 2019). Even when students are studying Xitsonga, much of the academic environment is still shaped by English. Lecture notes, assessments, and institutional communication are often delivered in English. For instance, students may attend Xitsonga classes but still have to read supporting materials or submit assignments in English. This reinforces the idea that English is the "main" academic language, while African languages are treated as secondary.

The study also found that unequal access to digital tools remains a serious barrier. Not all students have smartphones, laptops, or stable internet connections. Students from rural or low-income backgrounds are especially affected. For example, some struggle to download learning materials, join online discussions, or attend virtual classes because of poor network coverage or high data costs. As a result, some students are able to fully benefit from digital learning, while others are left behind.

In addition, the findings show that some lecturers are not fully prepared to use digital teaching methods effectively (Selwyn, 2016). Instead of using interactive tools like online discussions, videos, or digital quizzes, teaching often remains traditional, relying mainly on PDF notes and basic online uploads. This limits student engagement and reduces the interactive potential of digital learning.

Overall, these challenges show that there is still a gap between what digital technology can offer and how it is actually used in teaching Xitsonga. While technology has great potential to improve language learning, its impact is limited by resource shortages, language inequality, unequal access, and limited digital teaching skills. Addressing these issues is important if we are to truly bridge the digital divide in higher education.

## DISCUSSION OF FINDINGS

### 1. Active Knowledge Construction (Constructivism)

Piaget's (1972) constructivism is directly aligned with the findings from Themes 2 and 5, where students use digital recordings, online quizzes, and diaries. Students are "constructing" their own language proficiency through investigation rather than merely memorizing Xitsonga grammar. Using resources like YouTube and self-study recordings turns Xitsonga from a static academic subject into a "lived experience," as PF26 and PF11 pointed out. By creating a unique, introspective learning path, this active engagement enables students to test language concepts in real-time, assisting them in overcoming the technical difficulties (Theme 4) of clicks and tones.

### 2. Digital Bridges for Scaffolding (Social Interactionist Theory)

Themes 1 and 6 emphasize the value of community and "safe spaces," which is consistent with Vygotsky's Social Interactionist Theory (1978). Students' usage of WhatsApp and group conversations (Theme 6) as "digital bridges" is a realistic example of Vygotsky's Zone of Proximal Development (ZPD). Peer-to-peer mentoring, in which more proficient students offer the support required for others to advance to higher levels of competency, is made possible by these platforms. This social connection is essential in reducing the "fear of embarrassment" (Theme 7); a social and encouraging learning environment lowers the affective filter, enabling pupils to deal with the emotional demands of the language as a group rather than alone.

### 3. Using Connectivism to Navigate Knowledge Networks

Siemens (2005) Connectivism is supported by the trend toward learning through digital archives, FM radio, and social media (Themes 2 and 3). Xitsonga may be underrepresented in traditional textbooks in the digital age, yet students operate as "networked learners." By linking many sources such as cultural events, television shows like Giyani, and online dictionaries to create a thorough grasp of the language, they bridge the digital gap. This "distributed knowledge" strategy makes it possible for students to stay connected to Xitsonga as it develops globally, guaranteeing that their education is shared throughout cultural and digital communities rather than being limited to the individual.

### 4. Combining Technology and Identity

These three ideas cooperate because of the overriding goal of bolstering Vatsonga identity (Theme 1 and 3). Instead of taking the place of Xitsonga's cultural core, technology offers Constructivist tools for discovery, Social Interactionist platforms for community, and Connectivist networks for resource sharing. By enabling students to create their own inclusive and adaptable learning environment, these components collectively address the "lack of sufficient materials" (Theme 4).

## CONCLUSION

This study has demonstrated that learning the Xitsonga language in the digital age involves more than just technical proficiency; it also involves navigating social and emotional environments. The three-tiered theoretical framework offers a clear way forward for turning these challenges into chances for development, even though Theme 4 indicated major obstacles such difficult pronunciation, inflexible grammatical structures, and a lack of conventional resources.

First, the "frustration" of grammar and pronunciation is redefined by constructivism (Piaget, 1972) as a necessary stage of equilibration rather than as a sign of failure. Students are empowered to see mistakes as crucial data points in their own knowledge production when the emphasis is shifted from rote memorization to active exploration through digital diaries and recordings. Despite early technical challenges, this active, learner-centered approach cultivates the autonomy required to maintain long-term engagement.

The "fear of embarrassment" and "limited speaking opportunities" are addressed by Social Interactionist Theory (Vygotsky, 1978) through the creation of digital scaffolding. The Zone of Proximal Development is engaged through online forums and platforms like WhatsApp, where peers and mentors offer the interactive support needed to become proficient with tonal nuances and clicks. By lowering the emotive filter, these "digital bridges" transform a potentially lonely academic task into a supportive, community-based experience.

The issue of "insufficient materials" is finally resolved by connectivism (Siemens, 2005), which teaches students how to navigate large knowledge networks. Learners circumvent the constraints of underrepresented textbooks by connecting to digital archives, FM radio streams, and social media centers. Fluency is defined as the capacity to successfully navigate and contribute to these global linguistic nodes in this model, which views Xitsonga as a living, changing entity.

In conclusion, technological integration builds an inclusive, responsive environment in addition to facilitating access. Teachers can make sure that pupils are actively creating a bilingual identity that is both firmly anchored in the Vatsonga legacy and resilient to the digital divide by basing Xitsonga instruction on these three theories.

## RECOMMENDATIONS

Based on the findings of this paper, several practical recommendations can be made to improve the teaching and learning of Xitsonga in the digital age.



Firstly, there is a clear need to develop more digital resources in Xitsonga. Universities and other educational stakeholders should invest in creating accessible and engaging materials such as e-learning content, online dictionaries, and interactive platforms. Doing so will not only make the language more visible but also more usable within academic spaces.

Secondly, mobile learning strategies should be more intentionally integrated into teaching. Lecturers can make use of familiar platforms like WhatsApp by introducing structured activities such as weekly language exercises, group discussions, or peer-feedback tasks. This approach can support continuous learning beyond the classroom and make language practice more engaging for students.

In addition, institutions should actively promote multilingual digital spaces. Encouraging the use of African languages alongside English in online academic environments can help reduce the marginalisation of indigenous languages and create a more inclusive learning experience for all students.

There is also a strong need for lecturer training in digital pedagogy. Ongoing professional development programmes should be provided to help lecturers effectively use digital tools in their teaching. This training should not only focus on technical skills but also on innovative and student-centred teaching methods.

Furthermore, improving access to technology remains essential. Universities and government bodies need to work together to address the digital divide by providing affordable internet access, sufficient data, and appropriate devices, especially for students from disadvantaged backgrounds. Without this support, many students will continue to be excluded from digital learning opportunities.

Lastly, students should be encouraged to participate in community-based digital projects. Activities such as recording oral histories or documenting cultural practices can connect academic learning with real-life community knowledge. This not only deepens students' understanding but also plays an important role in preserving indigenous knowledge systems. While digital technologies offer exciting possibilities for enhancing Xitsonga learning, their success depends on how well institutions address existing inequalities and design learning environments that are inclusive, culturally relevant, and responsive to students' needs.

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