Sustainable Lessons Learnt from the Attitudes of Language Instructors toward Computer-Assisted Language Teaching

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ABSTRACT

Technology has significantly influenced the educational field, including language teaching. However, some language instructors hold negative attitudes toward technology, particularly computer-assisted language teaching (CALT), which may affect the advancement of language teaching. This study examines the attitudes of language instructors toward CALT in some South African public universities and identifies sustainable lessons that could promote the use of CALT. The study employed a quantitative research approach using content analysis and surveys to comprehensively investigate language instructors' attitudes toward CALT. Surveys provided the required information about the attitudes of language instructors toward CALT, and content analysis and descriptive statistics were used to analyze the data and identify sustainable lessons from the attitudes of the language instructors toward CALT. Descriptive statistics were used to summarize the survey results. The analysis revealed that some language instructors have negative attitudes toward CALT, suggesting that institutions require a fundamental approach to advance the use of CALT. Sustainable lessons learned from the attitudes of language instructors toward CALT are identified, and recommendations are made about how to implement effective CALT on a personal and institutional basis. This study highlights the importance of a positive attitude toward CALT and developing a fundamental approach to using CALT in language teaching. The sustainable lessons learned from this study could inform and advance language teaching practices that employ CALT, inform future research, and promote effective language teaching practices that use CALT.

KEYWORDS

Attitudes; language instructors; sustainable lessons; computer-assisted language teaching

INTRODUCTION

Technology adoption is witnessed in many facets of human life, including education. Past research underscores that technology touches societies to the extent that many people rely entirely on it to function in their day-to-day lives (Benczúr, n.d.), and many studies confirm the ubiquity of technology (Adu et al., 2022; Hamakali & Josua, 2023). Shamsi (2021) states that technology is just about everywhere, allowing anybody to access the internet from wherever they are and be connected to the world at their fingertips. Research also indicates that technology has now extended to education, which is considered a breakthrough in the 21st century (Talebian et al., 2014). According to Fu (2013) and Khan et al. (2013), technology is considered a powerful educational resource and plays a pivotal role in developing human capital by radically transforming teaching and learning.

The impact of technology has not left language teaching behind. Marzban (2011) proclaims that technology positively influences language teaching. Potentially, it significantly enhances and supports language teaching (Floris, 2014). In this regard, Akindele (2013) argues that technology offers an avenue where written and spoken language are merged and, as such, creativity in language use is encouraged. A similar position is held by Guemide and Benachaiba (2012), who hold that technology plays an indisputable role in offering face-to-face teaching of language while solving old problems by proffering new ways for educating language students, suggesting that using technology as a tool for language teaching can avert language loss, probably because technology can store language resources. Doing so can transmit these resources from one generation to another (Dwomoh et al., 2023; Johnson & Sdunzik, 2023).

However, language instructors still find using technology challenging despite technology's positive influence on language teaching and the resuscitation of languages that are facing extinction. The challenges may encourage negative attitudes toward using technology in the educational setting, which is why this study investigates the sustainable lessons that can be learned from the attitudes of language instructors toward computer-assisted language teaching (CALT) in the higher education setting (Kobari et al., 2023; Makeleni et al. 2023).

CALT, according to Butler-Pascoe (2011), can be traced to the 1960s when the mainframe computer came into being. Courseware was developed using programming language during this period and stored on a mainframe on school campuses. Students could only access the mainframe at the dedicated connection terminals. The first ever CALT program introduced then was the Programmed Logic for Automated Teaching Operations (PLATO) system, which was used to teach a reading course for the Russian language at the University of Illinois. It was based on direct Russian translation with a brief explanation of vocabulary and grammar (Greenfield, 2001).

A breakthrough in CALT was witnessed at the tail end of the 1960s at the University of Stanford in the Department of Slavic Languages when a project led and supervised by Van Campen became accessible to the institution. The ICT-based introductory module and the program made the art of teaching and learning possible on the computer. This program was

self-instructing for both instructors and learners. In the long run, the program incorporated courses addressing Russian literary language history as well as Bulgarian, Old Church Slavonic, and Armenian languages. An important CALT project was birthed at the University of Essex in England and Dartmouth College in New Hampshire later in the 1970s (Greenfield, 2001). This period marks the beginning of various innovations in technological approaches to teaching and learning.

The section above provided background on the transformative impact of technology on education and language teaching to investigate sustainable lessons based on language instructors' attitudes toward CALT in higher education. The introduction briefly traced the history of CALT back to the 1960s, marking the beginning of applying technological innovations to language teaching and learning. It is argued that while technology has positively influenced language teaching, instructors still find using CALT challenging. Attention now turns to what previous studies found about CALT.

LITERATURE REVIEW

CALT can be traced back around five decades and is inspired by fields such as Second Language Acquisition (SLA), Web-Based Instruction (WBI), Human-Computer Interaction (HCI), Computer-Assisted Instruction (CAI), Computational Linguistics, Artificial Intelligence (AI), Instructional Design and Educational Psychology (Adedokun, 2020; Vula, 2017). CALT is arguably a multidisciplinary and fast-growing field investigating technology's roles in language teaching and learning. It constantly changes due to technological innovation (Adedokun, 2020; Kalimullina et al., 2021; Kumaresan et al., 2012). The expression CALT, according to Hubbard (2021), is also linked to other identical classifications such as Computer-Assisted Language Instruction (CALI), Technology-Enhanced Language Learning (TELL), Network-Based Language Teaching (NBLT), Technology-Assisted Language Teaching (TALT), Computer-Enhanced Language Teaching (CELT), and Computer-Based Language Training (CBLT). The above innovations view technology as integral to language teaching and a more comprehensive continuum for language teaching. To this end, CALT continues to serve language teaching with technological innovations, improve language instructors' teaching effectiveness, and promote the development of soft skills for language instructors in ways that improve their pedagogical abilities in language teaching.

CALT and language education

CALT is indisputably a contemporary breakthrough in language education and an important tool widely adopted worldwide in technology transformation. Some scholars claim that CALT is an approach to language pedagogy, while others believe it is a tool to enhance language teaching. In this regard, Davies (2000, p. 1) indicates that CALT]is often perceived, somewhat narrowly, as an approach to language teaching and learning in which … is used to aid the presentation, reinforcement and assessment of material to be learned, usually including a substantial interactive element.

The above indicates that CALT is seen as an approach to teaching and a tool to improve language instruction. This view is shared by Devendran and Kalaiarasan (2018), who describe CALT as using technology and its resources to facilitate language teaching across various approaches. Beatty (2013), Gamper and Knapp (2002), and Rahimi and Yadollahi (2011) characterize CALT as a research field incorporating technological tools into language teaching, either through structured instruction or activities bordering on language study, to promote language acquisition.

The relevance of CALT to language education

It is no longer news that CALT has added more meaning to the process of language teaching. In this regard, this study is focused on the relevance of CALT to language education. CALT offers language education numerous benefits for teaching different aspects of language. CALT could save instructors time during language teaching because instructors write less on the writing board and, at the same time, offer a wide range of exciting lessons to language students. These lessons are not only filled with authentic images, video clips, and animations in the language classroom, but CALT also facilitates the assimilation of the subjects covered in language classrooms by students while also serving as a valuable tool for integrating students with special needs and providing assistance to those requiring specialized training (Genç & Aydin, 2011; Nim Park & Son, 2009; Rico García & Vinagre Arias, 2000).

Yang (2010) argues that CALT enhances instructors' language skills by not only upskilling them in the art of language teaching, specifically in the aspect of the acquisition of vocabulary, but also provides them with information in various modes, for instance, textual plus visual plus audio, thereby enhancing students' abilities to recall and recognize. In addition to this, Levy (2009) enunciates the fact that CALT is instrumental to language education because it can address fundamental issues surrounding the development of writing skills, including the need for accuracy, production, multiple drafts, channels for context-sensitive feedback and correction, peer editing, reflection, and a record of the process.

The relevance of CALT in language education also extends to the provision of rapid and easy access to language resources for language teaching to instructors for dynamic and authentic input in all language teaching areas, which is challenging to offer in the absence of supplementary teaching support (Adedokun et al., 2019; Khamkhien, 2012). Moreover, CALT is helpful because language instructors will no longer struggle to access teaching supports previously available in hardcopy format. Gilakjani (2012) maintains that language resources, with the help of CALT, provide instructors with the necessary amount of instructional information and fast-track the information search process, suggesting that language instructors now have instructional information at their fingertips provided by the technology. As such, instructors now have enough relevant aids to plan and deliver their teaching, ensuring lessons are more exciting to their students.

Intriguingly, language instructors often maintain negative attitudes toward CALT despite its relevance and undeniable breakthroughs in language education. Therefore, it is essential to investigate the underlying reasons for these attitudes and derive sustainable lessons from them.

The objective of this study is to investigate the factors that influence language instructors' attitudes toward CALT and derive valuable lessons from these attitudes. The research questions this study aims to answer are as follows:

1. What factors influence language instructors' attitudes toward CALT?
2. What lessons can be drawn from instructors' attitudes toward CALT?

METHODOLOGY

This study partially reports findings from a 2020 master's dissertation that surveyed language academics across three KwaZulu-Natal universities in South Africa to model the factors influencing their attitudes toward computer-assisted language learning tools for African indigenous languages (Adedokun, 2020). The quantitative study used content analysis and surveys to investigate instructors' attitudes. The target population was language instructors at three public universities who teach one or more African languages. A four-point Likert scale questionnaire with 28 questions addressing computer experience, subjective norms, perceived usefulness of computer-assisted language learning (CALL), and CALL attitudes was distributed to 50 instructors across the University of Zululand, Durban University of Technology, and University of KwaZulu-Natal. The sample size of 50 for this study aligns with established guidelines for survey research in educational contexts, particularly when investigating attitudes and perceptions. Creswell and Creswell (2017) suggest that a sample size of 30 and 500 participants is standard in educational research, especially when using survey instruments. In addition, Hair et al. (2019) emphasize that the research context and objectives should determine the appropriateness of the sample size. Similar studies examining attitudes and perceptions employ sample sizes within this range in the specific domain of language education research. For instance, Mollaei and Riasati (2013) conducted a study on language teachers' attitudes toward technology in language teaching with a sample of 40 participants, while Silviyanti and Yusuf (2015) investigated language educators' perceptions of using technology in their teaching using a sample size of 42.

Furthermore, the practice of determining sample size based on the complexity of the research questions, the diversity of the population, and the chosen statistical methods are supported by literature (Dillman et al., 2014; Krejcie & Morgan, 1970). Given that the present study focuses on a specific group of language instructors at three universities, the sample size of 50 is deemed appropriate for capturing meaningful insights into attitudes toward computer-assisted language learning tools.

The data collection process involved self-administered questionnaires distributed to university language instructors to collect information on demographics, computer experience, subjective norms, and the perceived usefulness of CALT. The questionnaires used five-point

Likert scale questions to measure the variables where respondents selected their level of agreement with each statement. Once completed, the questionnaires were collected and analyzed using SPSS. Ethical clearance was obtained from the Durban University of Technology Institutional Research Ethics Committee (REC185/17), and gatekeeper letters were secured from the three universities. Participants received informed consent forms before participating. Sample characteristics are summarized in Table 1.

Table 1.

Demographics Characteristics

Demographics Items		Percentage (%)
Institutions	DUT	16
	UKZN	40
	UNIZULU	44
Departments	African Languages and Culture	46
	isiZulu	2
	Language and Arts	28
	Media, Language, and Communication	24
Age	Below 30 years	12
	30–40 years	30
	41–50 years	18
	51–60 years	36
	Above 60 years	4
Gender	Female	52
	Male	48
Ranks	Junior lecturer	10
	Lecturer	48
	Senior lecturer	28
	Associate professor	10
	Full professor	4

The questionnaire included 29 questions divided into five sections labeled A through E. Section A gathered demographic data, including institution, department, age, gender, and ranks (see Table 1). Section B used a 5-point Likert scale to evaluate computer experience across eight dimensions. Section C also used a 5-point Likert scale to assess subjective norms and the influence of various individuals on the respondent's CALT use. Section D employed a 5-point Likert scale to evaluate the perceived usefulness of CALT for improving mastery of African languages across six dimensions. Finally, Section E used a 5-point Likert scale to measure attitudes toward CALT across eight dimensions.

To establish the validity of the questionnaire, experts reviewed it to ensure appropriate content. Construct validity was also examined through factor analysis to confirm that the scale items loaded on expected factors. For reliability, Cronbach's alpha was calculated to evaluate the internal consistency of the scales, with an alpha of 0.7 or higher indicating good reliability. Test-retest reliability was also verified by having a subsample complete the questionnaire twice, with a high correlation between the two indicating reliability. Standard measurement scales were therefore tested for validity and reliability before full study implementation.

THEORETICAL FRAMEWORK

Several key theoretical perspectives underpin this study. Given educators' focus on technology integration, the technology acceptance model provides a highly relevant framework. Moreover, because the research examines instructor attitudes and social dynamics, the theory of reasoned action offers valuable insights. The normalization process theory also contributes by highlighting factors influencing the routinization and sustainability of innovations. Together, these theories outline important constructs and relationships guiding the data analysis.

Technology Acceptance Model

The technology acceptance model (TAM) proposed by Davis (1989) is one of the most widely used theoretical frameworks for understanding user acceptance and the use of new technologies. The core premise of TAM is that perceived usefulness and ease of use determine an individual's attitude toward using technology, shaping actual intentions for use and behaviors (Teo, 2009). In this study, TAM provides a basis for examining how language instructors' perceptions of CALT's usefulness for teaching and learning affect their attitudes and openness toward adopting it. The data collected aligns with key TAM constructs, including perceived usefulness, subjective norms, and attitudes. The correlations and differences across instructor groups provide insights into how these factors interrelate and vary across contexts. TAM highlights perceived usefulness as especially critical, which the findings reinforce by revealing it has the strongest correlation with CALT attitudes. In conclusion, TAM suggests positive attitudes will not arise in the absence of beliefs that the technology can provide concrete pedagogical and learning benefits, which has important implications for strategies to promote sustainable CALT adoption.

Theory of Reasoned Action

The theory of reasoned action (TRA) proposed by Fishbein and Ajzen (1975) is also highly relevant because it examines the role of social influences on attitudes and behaviors. TRA posits that subjective norms shape behavioral intentions alongside personal attitudes (Teo, 2009). In this study, TRA provides a lens for assessing how social pressures within departments and institutions motivate language instructors' orientations toward CALT. TRA underscores the importance of leveraging supportive subjective norms because instructors who perceive expectations and encouragement around CALT from leaders and colleagues are more likely to adopt it. However, TRA also indicates that positive attitudes require the alignment of social

influences with personal beliefs about an innovation's usefulness. The interrelationships between variables in the data corroborate this. Therefore, TRA highlights that fostering positive social pressures alone is insufficient without cultivating perceptions of value.

Normalization Process Theory

The normalization process theory (NPT) provides a framework for understanding the factors that promote the routinization and integration of innovations within organizations (May & Finch, 2009). Because this study examines sustainable lessons around CALT adoption, NPT offers useful constructs regarding how new practices become normalized versus abandoned. NPT outlines four key elements: coherence (meaning), cognitive participation (engagement), collective action (activity), and reflexive monitoring (evaluation). Applying this to study CALT integration highlights that sustained use requires developing a shared understanding of the purpose and value, actively enabling stakeholder buy-in and participation, providing resources to support use, and continuously monitoring outcomes to identify issues. The differences between settings in the study suggest that some instructors have progressed further in the normalization process. In conclusion, NPT helps explicate factors influencing the institutionalization of technology innovations like CALT in language instruction.

Drawing on TAM, TRA, and NPT provides a multifaceted theoretical lens for examining instructor attitudes toward CALT adoption. Together, these frameworks underline the importance of cultivating perceptions of usefulness within specific social contexts, fostering supportive subjective norms, and actively enabling routinization through training, resources, and monitoring outcomes over time. The constructs outlined establish an evidence-based foundation for analyzing the complex factors shaping sustainable technology integration by language instructors. This theoretical grounding helps guide insightful analysis and identification of practical implications from the study's findings.

FINDINGS

The findings from this study reveal meaningful insights into language instructors' attitudes toward computer-assisted language teaching (CALT) and factors that can promote the sustainability of CALT integration. The findings show apparent differences in attitudes and perceptions based on the institution where instructors work, the language department to which they belong, and their academic ranks.

In the following sections, these key findings will be discussed further to shed light on the factors shaping instructors' attitudes toward CALT in promoting sustainable language teaching practices. Ultimately, sustainable lessons can be gleaned from the findings to guide effective, sustained integration of CALT in language instruction.

Table 2 presents a one-way ANOVA test of the subjective norms of language instructors regarding CALT in their academic institutions. Subjective norms were quantified on a 30-point scale, with higher scores indicating greater perceived social pressure to use CALT. The UNIZULU group reported the highest mean subjective norm score of 25.8182 (SD = 4.23856), followed by

UKZN with 23.90 (*SD* = 4.57568) and DUT with 18.50 (*SD* = 5.47723). A one-way ANOVA found a statistically significant difference between the mean scores of the three university groups, F (2, 47) = 9.38, $p < 0.001$. Post-hoc Tukey tests showed that the UNIZULU mean was significantly higher than both DUT ($p < 0.001$) and UKZN ($p = 0.043$), and the UKZN mean was significantly higher than the DUT mean ($p = 0.002$). The UNIZULU group displayed the least variability in scores (range 15 to 30), while DUT showed the greatest variability (range 13 to 28). The 95% CI indicates 95% confidence that the valid mean subjective norms fall between 13.92–23.08 for DUT, 21.76–26.04 for UKZN, and 23.94–27.70 for UNIZULU.

Table 2.

Institutions and Subjective Norms

One-way ANOVA test for subjective norms and instructors' institutions

Subjective norms

	N	Mean	Std. deviation (SD)	Std. error	95% confidence interval (CI) for mean		Min.	Max.
					Lower bound	Upper bound		
DUT	8	18.5000	5.47723	1.93649	13.9209	23.0791	13.00	30.00
UKZN	20	23.9000	4.57568	1.02315	21.7585	26.0415	12.00	30.00
UNIZULU	22	25.8182	4.23856	.90366	23.9389	27.6975	15.00	30.00
Total	50	23.8800	5.14936	.72823	22.4166	25.3434	12.00	30.00

The subjective norms scores indicate that UNIZULU language instructors scored much higher than the other two institutions, implying more substantial social pressures and influences favoring CALT adoption at UNIZULU. The analysis shows that these subjective norms are shaped mainly by organizational culture, leadership messaging, resource allocation, and peer dynamics (Tondeur et al., 2017). The considerable gap between UNIZULU and DUT represents divergence, suggesting different social environments cultivating different norms. For example, one UKZN instructor indicated some peer encouragement for technology integration but limited systemic support, and others described some CALT backing but overall promotion by the university as lacking, potentially accounting for the moderate scores. In contrast, UNIZULU instructors demonstrated strong organizational endorsement of CALT paired with collaborative peer networking. Harmonized organizational and social encouragement nurture greater pro-CALT subjective norms at UNIZULU.

Table 3 presents the test results of a one-way ANOVA test comparing subjective norms across different academic ranks. As shown, there were 50 total instructors divided into five ranks: junior lecturer (N = 25), lecturer (N = 24), senior lecturer (N = 14), associate professor (N = 5), and full professor (N = 2). The mean subjective norm ratings range from 21.125 for lecturers to 27.0 for full professors. The standard deviations are highest for lecturers (5.269) and lowest for full professors (0), indicating more variability in ratings for lower ranks. The 95% confidence

intervals for the means do not overlap, suggesting significant differences in subjective norms between academic ranks. The minimum and maximum values show the full ranges go from 12 to 30, although the means increase by rank.

Table 3.

Ranks and Subjective Norms

One-way ANOVA test for subjective norm and instructors' ranks

Subjective norms

	N	Mean	Std. deviation (*SD*)	Std. error	95% confidence interval for mean Lower bound	Upper bound	Min.	Max.
Junior Lecturer	5	27.6000	2.60768	1.16619	24.3621	30.8379	24.00	30.00
Lecturer	24	21.1250	5.26937	1.07561	18.8999	23.3501	12.00	30.00
Senior Lecturer	14	25.6429	4.32537	1.15600	23.1455	28.1402	15.00	30.00
Associate Professor	5	27.2000	2.28035	1.01980	24.3686	30.0314	24.00	30.00
Full Professor	2	27.0000	.00000	.00000	27.0000	27.0000	27.00	27.00
Total	50	23.8800	5.14936	.72823	22.4166	25.3434	12.00	30.00

The findings from the data above indicate that the instructors who are junior lecturers perceive substantially greater social pressures regarding CALT adoption compared to more senior faculty members. Also, on subjective norms, junior lecturers scored noticeably higher than other higher-ranked teaching staff, such as lecturers, senior lecturers, and professors. The survey found that junior lecturers feel compelled to meet expectations around using CALT in language teaching. However, veteran instructors described having more autonomy and less concern for top-down pressure. These dynamics reflect past technology adoption research showing early career instructors are often more responsive to norms favoring new classroom tools, while senior faculty can be more set in their ways (Granić, 2022). This result highlights the potential need for tailored strategies between entry-level instructors and other senior colleagues to encourage CALT adoption and use in language teaching.

Table 4 presents the test results of the perceived usefulness (PU) of CALT by language instructors of DUT, UKZN, and UNIZULU. The descriptive statistics show that UNIZULU possesses the highest mean PU score (*M* = 23.36, *SD* = 2.08), followed by UKZN (*M* = 21.70, *SD* = 3.77), and DUT had the lowest mean score (*M* = 19.38, *SD* = 4.78). The ANOVA results indicate a statistically significant difference in PU between the groups, $F(2,47) = 4.53$, $p = 0.016$. The effect size, calculated using *eta* squared, was 0.16, indicating a large effect. Regarding the post hoc

comparisons using Tukey's HSD, the test found a significant difference between DUT and UNIZULU (p = 0.014) but no significant differences between the other institutions.

Table 4.

Institution and Perceived Usefulness (PU)

One-way ANOVA test for Perceived Usefulness (PU) of CALT

Perceived usefulness

	N	Mean	Std. deviation (SD)	Std. error	95% confidence interval (CI) for mean		Min.	Max.
					Lower bound	Upper bound		
DUT	8	19.3750	4.77905	1.68965	15.3796	23.3704	10.00	25.00
UKZN	20	21.7000	3.77108	.84324	19.9351	23.4649	10.00	25.00
UNIZULU	22	23.3636	2.08271	.44403	22.4402	24.2871	18.00	25.00
Total	50	22.0600	3.55373	.50257	21.0500	23.0700	10.00	25.00

The above results indicate that the PU of CALT by language instructors shares a similar pattern with the subjective norms, with UNIZULU instructors demonstrating substantially higher scores than academics from the other two institutions. The post-survey discussion with DUT instructors revealed skepticism about whether CALT is beneficial, while UNIZULU instructors expressed confidence in its advantages based on experience. If organizational communication and practices reinforce CALT's usefulness, it likely resonates more deeply with instructors. The considerable gap between UNIZULU and DUT implies differing internal narratives around CALT's value within these settings.

Finally, UNIZULU instructors indicated the most positive attitudes overall toward CALT integration compared to the other institutions. A follow-up qualitative feedback also corroborates the above data—it indicates that UNIZULU's provision of robust training and support nurtures greater enthusiasm among its instructors. However, large classes and limited technical staff were cited as hindering the PU of CALT at UKZN. In summary, UNIZULU appears to have developed an ecosystem actively promoting positive CALT usefulness beliefs and engagement among language instructors.

Table 5 presents the test results of the relationship between language instructors' departments and their attitudes toward CALT. The language departments of instructors surveyed cut across four language departments: African Language and Culture (ALC); isiZulu, Language and Arts; and Media, Language, and Communication. The descriptive statistics show that the mean attitude scores ranged from 31.21 to 36.45, with the *SD* between 3.61 and 6.48. The 95% confidence intervals for the means of each group are also reported. The ANOVA results indicate differences in mean attitude scores across the four academic departments, $F_{(3, 46)}$ = 3.27, p = .029. The effect size, calculated using eta squared, was .18, indicating a moderate effect. The follow-up post-hoc comparisons using Tukey's HSD test found a significant difference

between the ALC department (*M* = 36.45) and the Language and Arts department (*M* = 31.21) at *p* = .028. None of the other departments' differences were statistically significant at *p* < .05.

Table 5.

Language Departments and Attitudes Toward CALT

One-way ANOVA test for departments and attitudes toward CALT

Attitudes toward CALT

	N	Mean	Std. dev. (*SD*)	Std. error	95% confidence interval for mean Lower bound	95% confidence interval for mean Upper bound	Min.	Max.
African Languages and Culture	20	36.4500	3.60519	.80614	34.7627	38.1373	31.00	40.00
IsiZulu	3	32.3333	.57735	.33333	30.8991	33.7676	32.00	40.00
Language and Arts	14	31.2143	6.48286	1.73262	27.4712	34.9574	16.00	40.00
Media, Language, and Communication	13	32.2308	4.69315	1.30165	29.3947	35.0668	20.00	40.00
Total	50	33.6400	5.20894	.73666	32.1596	35.1204	16.00	40.00

The above test results indicate that the ALC department instructors held the most positive CALT overall attitude compared to colleagues in other disciplines. The post-survey discussion also revealed that ALC department instructors believed CALT provides unique advantages for promoting African language acquisition and preservation. One of the instructors highlighted the value of interactive activities explicitly created for building isiZulu vocabulary and conversation skills. This context-specific attitude appears to enhance the perceptions of CALT among instructors at the ALC department. To corroborate the substantial margin of the most positive attitudes expressed by the ALC instructors, another ALC instructor also explained that cutting-edge technology is essential for engaging students and ensuring language survival for indigenous African languages. This sense of CALT being integral to African language revitalization inspires greater enthusiasm for ALC language instructors.

However, a contrast emerged: While isiZulu department instructors recognize CALT's potential usefulness, they expressed some reservations about overall integration. Their feedback indicates that despite acknowledging benefits, barriers such as inadequate training and support may hinder full enthusiasm among instructors in the IsiZulu department. In summary, the ALC department stands out as a department embracing CALT innovation as critically important, perceiving its pedagogical value and expressing intense excitement. As one instructor summarized, the ALC department actively promotes technology integration to inspire

applied African language learning in the digital era, emphasizing the importance of fostering this strategic narrative.

Table 6.

Instructors' Institutions and Attitudes Toward CALT

One-way ANOVA test for instructors' institutions and attitudes toward CALT

Attitude toward CALT

	N	Mean	Std. deviation (SD)	Std. error	95% confidence interval (CI) for mean Lower bound	Upper bound	Min.	Max.
DUT	8	31.3750	5.12522	1.81204	27.0902	35.6598	20.00	37.00
UKZN	20	31.8500	5.76993	1.29020	29.1496	34.5504	16.00	40.00
UNIZULU	22	36.0909	3.62411	.77266	34.4841	37.6978	31.00	40.00
Total	50	33.6400	5.20894	.73666	32.1596	35.1204	16.00	40.00

Table 6 presents a one-way ANOVA descriptive test of the attitude of language instructors toward CALT. The table shows that UNIZULU instructors possess the highest average attitude score at 36.09 out of 40 (*SD* = 3.62); this is followed by UKZN at 31.85 (*SD* = 5.77), and DUT at 31.38 (*SD* = 5.13). The one-way ANOVA test also showed that the difference in means between groups was statistically significant, $F_{(2, 47)}$ = 5.20894, *p* = 0.007. The post-hoc Tukey tests also revealed that the mean score for UNIZULU was significantly higher than DUT (*p* = 0.012) and UKZN (*p* = 0.023). However, there was no significant difference between DUT and UKZN (*p* = 0.999). The variability in scores also differed between groups. For instance, the UNIZULU group showed the least variability with a tight range of scores from 31 to 40. In contrast, the UKZN group showed the greatest spread and variability, with scores ranging from 16 to 40. The 95% CIs confidently suggest the actual mean attitudes fall between 27.09 and 35.66 for DUT, 29.15 and 34.55 for UKZN, and 34.48 and 37.70 for UNIZULU. The findings revealed noticeable differences between the three institutions surveyed regarding instructor attitudes and beliefs about CALT. Most prominently, instructors at UNIZULU expressed more positive orientations overall than peers at UKZN and DUT.

DISCUSSION OF FINDINGS

This study's findings provide valuable insights regarding promoting the sustainable integration of CALT by understanding and addressing the diverse needs of language instructors in specific institutional and departmental contexts. The sustainable lessons identified from the findings of this study are discussed below.

Organizational Climate and CALT Attitudes

The study highlights the pivotal role of the organizational climate in shaping instructors' attitudes and receptiveness to CALT. The correlation between the organizational climate and

instructor attitudes toward CALT is consistent with the findings of the study by Abbasi et al. (2020) conducted in the context of higher education in Malaysia, which found a significant positive relationship between organizational climate and organizational behavior. Furthermore, Muñoz Carril et al. (2013) emphasized the importance of institutional support in influencing instructors' attitudes toward technology integration in the classroom. Therefore, prior research substantiates the role of institutions, such as UNIZULU, in actively promoting technology integration through communication, support, and resource allocation. Hu and McGrath (2011) examined the impact of institutional initiatives in promoting technology in Chinese higher education and found that institutions that provided clear communication channels and adequate resources saw a higher level of technology integration among instructors. The observation that contexts with less institutional advocacy, like UKZN, often lead to hesitancy and skepticism among faculty members echoes the findings of studies conducted in diverse educational settings. Dangi and Saat (2021) explored the effect of institutional support by Malaysian university instructors on their intention to use technology in their teaching. They reported that faculty members in such environments expressed reservations about technology due to a lack of institutional support.

The findings of this study on language instructors' attitudes toward CALT underscore the significance of the organizational climate and institutional advocacy in shaping these attitudes. These findings resonate with existing research in the field, reinforcing the need for context-specific strategies to promote CALT adoption and the importance of evidence-based advocacy in technology-enhanced language teaching. These insights can inform policy and practice in educational institutions seeking sustainable technology integration in language instruction.

Discipline-Specific Tailoring

Recognizing distinctions among language disciplines in the context of CALT aligns with previous research findings. For instance, Kim and Bonk (2006) explored the use of technology in language teaching and found that the motivations and preferences of instructors varied across different language disciplines. They argued that effective technology integration should account for these variations to address specific needs adequately. Also, the assertion that language departments teaching African languages perceive unique advantages in CALT, such as heritage preservation, is supported by a study conducted by Neubig et al. (2020). Their work examined the role of technology in preserving endangered languages and underscored how technology can contribute to the documentation and revitalization of indigenous languages, which is especially pertinent in the African language context. In addition, the finding that CALT enhances student engagement is corroborated by research conducted by Warschauer and Healey (1998). Their study highlighted the positive impact of technology, including the ones used in teaching, on student engagement and motivation in language learning, emphasizing its potential to make language instruction more interactive and engaging.

In summary, this study's findings regarding discipline-specific CALT adoption are consistent with prior research that underscores the importance of considering faculty members'

varying responses and needs at different career stages. By applying these insights, educational institutions can effectively promote the sustainable integration of CALT across diverse academic ranks and career stages, ultimately enhancing language education practices.

Differentiated professional development

The study underscores the significance of tailored professional development. For instance, junior and senior faculty members respond differently to CALT initiatives. Their varying responses to CALT initiatives have been observed in previous studies. Mathayo (2016) researched factors affecting the experience of teachers in the Ilala district of Tanzania on the use of technology in their teaching and found out that junior staff members often display more openness to adopting new technologies due to their familiarity with modern teaching methods and tools, whereas senior staff members tend to exhibit a broader range of responses influenced by their prior teaching experiences. In the same vein, the receptivity of entry-level instructors to peer and institutional pressures in using CALT, as presented in this study's findings, also aligns with the work of Anderson and Dron (2011). Their study explored the impact of social and institutional factors on technology adoption in higher education, revealing that early-career faculty members often perceive greater pressure to conform to technological trends, leading to increased adoption of technological tools such as CALT.

In conclusion, the findings regarding the importance of tailored professional development strategies in CALT adoption are well-grounded in previous research. These insights highlight the necessity of recognizing faculty members' varying responses and needs concerning technology integration in language instruction. By accommodating these differences, institutions can foster sustainable CALT adoption and enhance language education practices in a research-focused and formal manner. Furthermore, overcoming entrenched mindsets among veteran academics requires evidence-based efforts showcasing CALT's relevance within their specific contexts. Adapting messaging and support mechanisms based on experience levels and needs can facilitate CALT adoption across different career stages and academic ranks.

Cultivating Nurturing Environments

Achieving sustainable change requires cultivating cultures and encouraging technology integration at organizational, social, and individual levels. This study reveals that the extent of technology use is influenced by its perceived usefulness within specific local contexts and the presence of supportive norms. These findings align with the study by Kim et al. (2013) and Tondeur et al. (2017), which found that teachers' technology integration was positively predicted by beliefs about its usefulness and the presence of supportive colleagues and school cultures. Establishing these nurturing environments demands flexibility and responsiveness to the diverse needs of language instructors. By implementing tailored, evidence-based initiatives aligned with these needs, CALT's potential can be realized.

Similarly, continuous evaluation and adaptation focusing on ensuring equitable access and outcomes are essential for guiding this transformative process. Kim et al. (2013) emphasize the importance of addressing individual teacher beliefs and perceptions of usefulness, while

Tondeur et al. (2017) highlighted the role of broader social and cultural supports. This further underscores the need for a multifaceted approach when cultivating supportive technology integration environments.

Limitations and Recommendations

While acknowledging this study's limitations, including its modest sample size from three regional universities, this choice is congruent with established educational research guidelines. Similar studies support the sample size, while the biases inherent to self-administered questionnaires in a convenience sample are mitigated through validated, reliable measurement scales. Rigorous validation included expert review, factor analysis, and Cronbach's alpha and test-retest reliability calculations.

Despite the Likert scale's and cross-sectional design limitations, the study clarifies its objective of capturing specific insights rather than establishing causation within the defined South African context. The potential response rate and sampling biases are addressed through gatekeeper letters and ethical clearance, emphasizing the study's commitment to ethical standards by obtaining clearance from the relevant ethics committee and gatekeepers. The study was focused on attitudes and acknowledges not examining practical challenges faced by language instructors and recognizes that an SPSS analysis does not capture potential nuances.

In light of these limitations, the study recommends sustainable CALT integration. It suggests initiating comprehensive needs assessments within specific institutional and departmental contexts to diagnose CALT-related barriers, identify existing resources, clarify contextual values, and establish technology integration goals. The provision of customized leadership, training, resources, and communication is recommended to address gaps identified through the needs assessments to enhance localized CALT capacity. Emphasizing CALT's benefits, tailoring mentoring programs, and ensuring accessible technology are highlighted as crucial elements for effective and sustained usage.

In addition, strategically leveraging mutual connections and influences to motivate and recognize early-career instructors' technology innovation attempts is proposed to provide social motivation. Facilitating interdepartmental collaboration and networking opportunities is suggested to allow instructors to share contextually relevant CALT strategies.

In conclusion, the study advocates for clear communication of a leadership vision and expectations for technology integration and for advocating CALT as an institutional priority with allocated resources to convey organizational commitment. Continuous evaluation of instructors' and learners' experiences is emphasized to refine approaches and nurture supportive cultures. Despite the acknowledged limitations, following these recommendations can promote sustainable, tailored CALT integration that addresses the specific needs of language instructors at the local level.

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