The African Journal of Information Systems

Volume 8 | Issue 2 Article 5

Spring 4-1-2016

The role of educational technology in design and delivery of curricula programmes: A case of STEPS at a University of Technology

Patient Rambe Dr
Central University of Technology, Department of Business Support StudiesBloemfontein,
pjoerambe@gmail.com

The role of educational technology in design and delivery of curricula programmes: A case of STEPS at a University of Technology

Cover Page Footnote

The author is grateful to Profs Isaac Ntsoe and Mabokang Mapesela who first introduced him to the Strategic Transformation of Educational Programmes and Structures (STEPS) through the Scholarship of Teaching and Learning seminars.

The Role of Educational Technology in Design and Delivery of Curricula Programs: A Case of STEPS at a University of Technology

Research Paper

Volume 8, Issue 2, April 2016, ISSN 1936-0282

Patient Rambe
Central University of Technology, South Africa
pjoerambe@gmail.com

(*Received August 2015, accepted October 2015*)

ABSTRACT

While Universities of Technologies (UoTs) regard the adoption of educational technology for the creation of effective learning environments as one of their defining features, there is limited research on these universities' innovative use of technologies to transform their curricula design and delivery. This research explores the extent to which educational technology has been integrated into the implementation of new and revised educational programs under the Strategic Transformation of Educational Programs and Structures (STEPS) at a UoT. The research employed document analysis and interview data from middle level managers (deans), curriculum designers and educational technologists. The findings suggest that, except for one faculty where educational technology was an enduring feature of the design and delivery of curricula programs, technology played a peripheral role in the design and reorganization phases although it featured more in the implementation of curricula programs under STEPS. The paper concludes that the innovative use of technology, a holistic teaching and learning strategy, and training of educators on technology integration are critical in achieving total integration of educational technology into curricula programs.

Keywords

STEPS, curriculum innovation, technology integration, emerging technologies, educational transformation.

INTRODUCTION

The post-apartheid era in South Africa ushered in a complex transformation of higher education culminating in three differentiated university education systems. The established institutional types comprise *research based institutions*, *comprehensive universities* and *Universities of Technology*. Ntshoe and Selesho (2014) broadly capture the mandate of these institutional types as follows:

1. the primary purpose of research based institutions is to produce research-based knowledge and offer university type academic programs.
2. comprehensive universities created from the merger of universities and technikons offer university and erstwhile technikon programs with teaching as a major component as well as applied research.
3. universities of Technology (UoTs) offer sectoral knowledge derived from specific occupational, industrial sectors on the one hand, and specialist disciplines on the other. They focus on teaching and applied research required by industry and employers.

As these universities fiercely compete to attract and train top graduates for the market, UoTs have strategically drawn on their purported technological strengths to make their campuses premier choices for prospective candidates. The strong technological foci and aspirations of UoTs is embedded in their key defining features which are:

(i) technology-focused programs, with undergraduate career oriented education and technological competence as attributes,

(ii) research and innovation in and through technology and technique in strategic areas, with the attributes of technology transfer and postgraduate programs (Ntshoe and Selesho, 2014),

(iii) and achieving quality social and technological innovations for partners at university, in government and industry (Mtembu, Orkin and Gering, 2012).

While UoTs in South Africa often use the adoption of educational technology as a distinct feature of their professional identity and defining yardstick to benchmark their innovative teaching and learning strategies (see Du Pré, 2009; Ntshoe & Selesho, 2014), there is limited research evidence on how they have used technologies innovatively to transform their curricula design and delivery. South African universities particularly UoTs are reportedly struggling with integrating educational technologies into their curriculum design and delivery, which often leads to institutional decisions that hinder technology adoption (Bozalek, Ng'ambi, & Gachago, 2013; Gachago et al., 2013). Although some rich anecdotes of innovative integration of technology into curricula programmes, which positively impact student experience of learning materials (Collier-Reed, 2012; Deacon & Wynsculley, 2013) are beginning to emerge on the South African university landscape, these technology-mediated curricula designs tend to unfold predominantly at well resourced, research-based institutions. Evidence of limited integration of technology into higher education curricula continues to manifest in minimum usage of integrated systems and limited understanding of the affordances of Learning Management Systems (LMS) (Unwin, et al., 2010). As such, the growing availability of educational Information and Communication Technologies at South African universities has not automatically translated into transformed curricula and pedagogical practices (Carr, 2013).

The problem is that in spite of technology adoption becoming a common practice at South African universities, the innovative use of emerging technologies to transform [curricula,] teaching and learning remains an emerging phenomenon (Gachago et al., 2013). Dhunpath, Nakabugo and Amin (2012) warn that curriculum transformation in higher education will remain trapped in rhetoric unless higher education addresses the crucial role of learning enablers (such as educational technology) and barriers to academic performance such as ineffective integration of technology into the curricula and literacy practices. This study, therefore, explored the extent to which educational technology was integrated into the design and implementation of selected revised and new educational programs at a UoT. This is in view of the paucity of research on the innovative integration of educational technology into the curricula

design and delivery at UoTs. The study drew on Critical Discourse Analysis (CDA), an institution wide curricula transformation program, the Strategic Transformation of Educational Programmes and Structures (STEPS), document analysis and a corpus of interview data from selected middle level managers (deans), curriculum designers and educational technologists. The study addressed the question: how is the discourse of technology integration into curricula design and delivery constructed in middle level managers (i.e. deans), curriculum designers and educational technologists' narratives and in the STEPS documents?

While technology integration may not address all challenges of engagement faced in higher education, it however, has potential to mediate the complex practice of curricula design and delivery. Technology integration may support the creation of dialogical spaces of engagement between university educators and students as well as scholarly practices that induct students into academic communities of practices (Fataar, 2005; Waghid, 2007; Hugo, 2009). This article constitutes a response to the need for the strategic integration of educational technology into the curricula of UoTs, with particular reference to the Central University of Technology (CUT) to the extent that it documents some examples of technology integration and challenges associated with the integration process.

BACKGROUND

The STEPS design and implementation process

The STEPS embodies the practical implementation of Vision 2020 at CUT. Vision 2020 seeks to establish a "distinctive and proficient university" that contributes to developmental imperatives of South Africa, tackle head on the challenges of the triple helix (university, government, industry) and take advantage of strategic partnerships, revise the university's curricula as well as academic structures (CUT STEPS, 2010). The STEPS is a complex, protracted institutional programs initiated by the Vice Chancellor (VC) of CUT in 2010. The program was borne out of the VC's formal consultations with other academic institutions, government institutions, parastatals and industry with regard to the relevance of university program offerings to the demands of industries and other external stakeholders. Based on these consultations, the VC noted some strengths and mismatches between some programs CUT offered and demands of industries. This recognition culminated in the convening of a preparatory conference on industry's expectations of graduates and qualifications, which was attended by the CUT leadership and academics, high profile curricula experts, international and local academics, government officials and industrial stakeholders. At the conference, steered by a highly experienced external consultant, delegates discussed a way forward on developing more relevant, socially responsive and innovative curricula programs. Among the conference highlights were the need to develop new curricula programs that increase the employability of CUT graduates and produce graduate entrepreneurs who would start their own ventures. The insights from the conference were synthesized into "a 'Bridging Document: Learnings from the Conference' (2010a) and discussed in a workshop comprising hundred CUT academics and management staff in August 2010" (Mtembu, Orkin & Gering, 2012).

More workshops were held after this curricula transformation conference. The STEPS process proceeded with the convening of a series of intra-faculty and interfaculty workshops where the senior leadership, Deans, Heads of Departments, Faculty Managers and staff members brainstormed current strengths of existing offerings, new innovative programs and the revision of existing ones. These workshops culminated in the constitution of several structures, such as those responsible for teaching

and learning matters, evaluation of cost of curricula transformation and quality of the initiated new programs, for the implementation of the STEPS. These structures ensured that the industry's need of graduates with work-related skills would be balanced with the UoT's needs of "labor market focus [of qualifications], workplace-oriented learning, applied research and innovation, and symbiosis with the workplace on curriculum development" (Mthembu, Orkin, and Gering, 2012:214).

In liaison with the Deputy Vice Chancellor (DVC) (Academic), deans steered and oversaw the implementation of the STEP process at faculty levels. Heads of Departments, in consultations with their staff members, curricula experts and learning designers, managed the revision process of existing programs and the development of new ones. The revision process also involved the conduct of industry/labor market surveys to determine the consistency of the current program offerings with the professional demands of the market. Where inconsistencies were identified, the curricula were revisited and adjusted to correct these anomalies. Where huge discrepancies were identified, new curricula programs were developed in consultation with curricula experts and learning designers.

While the implementation of STEPS comprises multiple stages, documents and schedules and task teams, in two years (Feb 2010-Nov 2011), four landmark documents were produced in the buildup and implementation of the process. These documents covered areas such as admission of underprepared students, teaching and learning, work integrated learning, continuing education, problem-based, career-focused curricula and challenges associated with large classes (Mtembu et al., 2012).

LITERATURE REVIEW

A case for the adoption of emerging technology to transform curricula and pedagogy

The call for innovative curricula design and transformative curricula delivery has intensified in the South African context owing to mounting local pressures to redress the "disjuncture between curriculum design and what is required of working professionals" (Bozalek et al., 2013). There are also strong unsubstantiated claims that universities are producing poor quality graduates because they 'offer outdated curricula,' have 'lowered their [curricula] standards' or they 'do not train students to operate in the real world" (Adam, 2009). This general lack of preparedness of university students for the 21st century workplace is partly explained by a largely decontextualized curricula that does not support contextually relevant learning (Herrington et al., 2010; Bozalek et al.; 2013). The disjointed curricula, an absence of context-relevant graduate education and the massification of higher education all necessitate a rethinking of curricula and innovative pedagogical delivery (Bozalek, Ng'ambi and Gachago, 2013). One of the effective ways of addressing disjointed curricula and providing context-relevant education is the integration of a relevant context and infusing educational technologies into functional curricula. Collier-Reed (2012) observes that while studies have often emphasized technological affordances and implementation of technology-assisted strategies, they should rather focus on effective design and integration of technology into curricula to improve its impact on classroom practice. Despite these calls for rethinking the curricula through leveraging available low cost technologies, there is limited evidence on the effective use of and integration of educational technology in South African universities to make curricula transformation a reality.

Despite the calls for an ecological approach to technology integration into the curricula, Blewett (2012) acknowledges a disturbing dichotomy in e-learning in South African higher education characterized by an increased use of e-learning environments on one hand, and manifestations of a limited use of technology for transforming curricula and pedagogy on the other hand. We infer from this that effective

integration of technology has been undermined by the sandwiching of new educational technologies on untransformed, decontextualized curricula and antiquated pedagogies. Therefore, innovative approaches to making technology an integral part of a rejuvenated, context informed curricula are hard to come by in South African Higher Education (SAHE).

Although there is a demand for transformed [technology-mediated] curricula in South Africa (Blewett, 2012; Dhunpath, Nakabugo & Amin, 2012), there is a paucity of research into the effective use of emerging technologies to transform curricula, teaching and learning in SAHE (Brown and Gachago, 2013). While the integration of technology into the curriculum through the implementation of resource intensive Learning Management Systems (LMS) in SAHE is well documented (Ivala 2011; Bozalek, Ng'ambi & Gachago, 2013), transformative curricula design and innovative curriculum delivery, using emerging technologies such as social media, cloud computing and mobile technologies, remains a grey area.

Despite its limited implementation in the South African higher education contexts, effective technology integration into the curricula presents opportunities to integrate the strengths of synchronous (face-to-face conduct) and asynchronous online learning activities (Garison & Kanuka, 2004). An effective integration of educational technologies such as virtual learning platforms into the curricula can bridge administrative aspects of the course (e.g., enrollment, student support and administering assessment) and certain student-learning activities related to communication and information sharing (e.g. discussion forums, and chat) (Daspit & D'souza, 2012). Yet the greatest value of technology integration lies in transitioning from embracing the benefits of ICTs to students towards promoting *learning with* or *through* the use of ICTs (Jonassen, Peck & Wilson 1999; Wilson-Strydom & Thomson, 2005). As such, the optimal pedagogical value of technology integration for South African educators and students lies in integrating or embedding ICT across the curriculum (*infusing approach*) and using ICT to rethink institutional organisation in creative ways (*transformative approach*) (UNESCO 2002; Wilson-Strydom & Thomson, 2005).

THEORETICAL FRAMEWORK

Critical Discourse Analysis (CDA) (Habermas, 1984) was used to unravel how middle managers (comprising 3 deans and the directors of e-learning and curriculum planning) who participated in and managed selected STEPS processes (namely preparatory conference, various workshops and work teams) constructed the discourses of technology integration into curricula programs in their narratives of STEPS. CDA was also used to explore how the discourses of technology integration were articulated in selected STEPS documents. Discourse constructed differently by different theorists of communication and linguists (van Dijk, 1997; Faiclough, Mulderrig & Wodak, 2010), is the mean or "the medium" (Habermas 1981a, p. 39) to clarify contentious validity claims (Ulrich, 2001) of the speaker. To this end, STEPS documents and middle managers' constructions of discourses on technology integration into curricula design and delivery were examined to determine the veracity of their claims.

CDA is relevant for this study given its potential to situate utterances and discourses in their context, to articulate their social construction as well as the power of social structures in shaping discourses. For Blommaert and Bulcaen (2000), CDA conceives discourse as an opaque object of power, which is socially constitutive and conditioned by social behavior in modem societies. This implies that CDA perceives discourse as a form of social practice- a dialectical relationship between a particular discursive event and all the diverse elements of the situation(s), institutions(s), and social structure(s) that frame it (Faiclough, Mulderrig & Wodak, 2010). We infer that the ways in which STEPS documents and task

teams articulated technology integration into curricula design and delivery in their narratives of the STEPS process was shaped by their situated contexts, their institutions and the associated discursive events.

Although Fairclough's CDA has been widely adopted in political, education and media studies, it has had limited application in educational technology discourses (for an exceptional case Ng'ambi, 2004) where Habermas' Theory of Communicative Action has been widely adopted for ICT and information systems-related discourses (see Cukier, Bauer & Middleton, 2004, Stahl et al. 2005; Ng'ambi & Brown, 2009; Nyemba & Chigona 2012). For this reason, Habermas' conception of discourse (which is well illustrated in Cukier, Ngwenyama, Bauer and Middleton, 2009's framework) is adopted in this study.

Discourse forms a cornerstone of Habermas' Theory of Communicative Action. Communicative action, which is premised on taking the "other" (referent person) seriously and accepting him or her as equal and deserving respect, has an ethical side to it (Stahl, 2004). Drawing on the communicative acts and technology integration statements contained in the STEPS documents and in middle managers' narratives of the STEPS process, the author examines the meaning, sincerity and authenticity of statements in their context of production to ensure ideal communication. Habermas (1981/1984) is pre-occupied with principles of ideal communication upon which discourses oriented to mutual understanding could be based (Cukier, Ngwenyama, Bauer & Middleton, 2009). Habermas' (1984) work, therefore, partly focuses on circumstances /contexts under which ideal speech could be communicated to improve mutual understanding between the hearer(s) and the speaker. From a strategic perspective, Habermas conceives social action by rational purposive agents to involve "strategic action," (Habermas, 1984, p. 85), in which agents aim to influence the other and follow the speaker's perlocutionary intentions with regards to an objective world (Forchtner, 2010). That is, the purposive rational utterances of the speaker are aimed at influencing the psychology of the hearer irrespective of the veracity of these utterances.

As such, Harbermas' work is also concerned with explaining conditions of conscious and unconscious deception in communication (Habermas, 1976/2001; Cukier et al., 2009). Overall, it can be argued that from Habermas' perspective, public speech can be *communicative* and oriented to achieving understanding between the speaker and the listener, or *strategic*-aimed at achieving success for the speaker (Cukier et al., 2009). When public speech is communicative, its object is advancing ideal speech aimed at promoting understanding while strategic communication could potentially generate conditions inimical to the advancement of democratic discourse.

When a speaker speaks in a communicative event, his /her utterances imply at least three validity: claims-truth, (normative) rightness, and authenticity. This means that no matter what a speaker says, it is implied that the content of the statement is true, it conforms to normative rules, and that the speaker means what he or she says (Stahl 2004). Cukier et al. (2009) elaborates that for Habermas, every communication implies a set of validity claims, namely the truthfulness, legitimacy and comprehensibility of the utterance and sincerity of the speaker. In his theory of communicative action, Habermas (1979; 1984), truth tests on how true, clear and jargon-free the discourse is for comprehensibility while sincerity tests whether there is a hidden agenda in the discourse (cited in Nyemba and Chigona, 2012). Comprehensibility refers to the technical and linguistic clarity of the communication (Cukier et al., 2009).

METHODOLOGY

Data collection and analysis in this study relied on an adaptation of Habersian CDA, which drew on Cukier, Bauer and Middleton (2004), Stahl et al (2005), and Nyemba and Chigona's (2012) work. This provided a useful heuristic for the analysis of the STEPS documents and interview transcripts (see Table 1 below). Not all categories were well represented in this paper except for those that kept recurring across several documents.

Validity Claim	Claim-ID	Guiding Questions
TRUTH	TI	**What** is said about technology integration in curricula design and delivery in the CUT STEPS documents and in middle managers' narratives?
	T2	Are the views and opinions (thoughts) **clearly articulated?**
	T3	What failures (**costs**) and success claims (**benefits**) have been exposed and examined?
	T4	What **evidence** has been provided to give weight to the arguments?
	T5	Has the relevant detail been conveyed without **misrepresentation** and/ or **omissions**?
	T6	Are there rudimentary **problems** that are mentioned explicitly or implicitly in the text?
	T7	Are there any **ideological claims** which are not investigated?
SINCERITY	S1	Are **metaphors**, such as exaggerations or hypes on the potential of technology in relation to curricula design and delivery, used in the text?
	S2	Do the used metaphorical connotations **advance** or **restrain** the comprehension of the text?
	S3	Do the metaphors create false assurances and acclamations?
LEGITIMACY	L1	Who is **speaking**, who is **silent**? What are their interests?
	L2	What is **privileged**? What is **not said**/ **not mentioned** about technology integration in curricula design and delivery?
	L3	What is assumed or implied?
	L4	What is **missing** or **suppressed** in the discourse?

Table 1: Habermasian CDA Guiding Questions (adapted from Stahl et al. 2005, Nyemba and Chigona, 2012)

The hard data used in this study, which was subjected to CDA, was drawn from the CUT websites and the Internet. In view of the fragmented data on the STEPS, six key documents were selected and their various texts were examined. The main highlights of these documents are summarized in Table 2.

Four comprehensive documents served as primary sources while the shorter documents served to corroborate the evidence from main documents and to determine the consistent representation of views across these documents. These documents were triangulated with interview data to ensure more dependability of results.

Title of document		Document summary
1.	STEPS Learnings from the Conference: For the curriculum transformation Workshop	Articulates the university's vision, distinctness of the UoTs, lessons on content and structure of transformed curricula at UoTs learned from the key speakers and the reflections of strategic teams.
2.	CUT Annual Report 2010	Provides a highly summarized version of the STEPS goals of curricula review, modalities of teaching, learning and support, as well as graduate attributes and competencies.
3.	CUT Annual Report 2012	Some of the highlights and landmarks of the STEPS such as the practical adoption of technology in the class, curricula transformation, work-integrated learning and other spin offs such the development of a lean university staff complement.
4.	Communication and Marketing, Central University of Technology	Reviewed the key focus areas of curriculum transformation, quality teaching and learning with a view to develop a niche focused academic institution. The processes and broad mandate of the strategic workshops are discussed in the process.
5.	Task Teams with University-wide Significance	Reflects on the implications of an output/outcome focus for the university-wide task teams. Discusses the distinct attributes of CUT graduates, nature of curricula, research, learning environment and student profiles.
6.	Towards distinctive and developmental curricula at Universities of Technology: The STEPS process at CUT	Engages with the institutional form of UoTs, the genealogy and mandate of the STEPS, and conceptualizes the curricula envisaged.

Table 2: Data sources for the analysis

Interview transcripts data

Since the STEPS process involved the entire university – all levels of management, academics, students, support staff and external stakeholders – a reasonable proxy for exploring technology integration discourses in STEPS was to consider middle managers who would constitute a typical STEPS task team. The researcher, therefore, interviewed three Deans of Faculty, a Head of Department (HoD) and the Directors of Curriculum Planning and E-learning. The Deans and the Head of Department were considered ideal respondents as they were responsible for the overall management and administration of the revision process and development of new curricula programs at Faculty and departmental levels respectively. The deans considered were from those faculties that the university regarded as providing best examples of technology integrated learning. The HoD was an ideal participant as he chaired/steered one of the STEPS sub committees on large class. More importantly, he managed the Hotel School that acquired a-state-of-the-art smart classroom to conduct technology-mediated learning and hence was considered as leading a school already involved with the integration of technology into the curricula. The Director of Curricula Planning coordinated the revision process and in particular gave some inputs

on the required curricula structure and ensured uniformity in the strategic documents submitted to her division from various departments. The Director of E-learning was responsible for ensuring the skillful integration of technology into the new and revised programs and that they had more online presence. All interviews were conducted by the researcher, audio-recorded using a digital audio recorder, and transcribed verbatim. The interviews were conducted in the respective offices of these participants. The interviews were analyzed using an adapted CDA of Cukier, Bauer and Middleton (2004), Stahl et al (2005) and Nyemba and Chigona (2012).

PRESENTATION AND DISCUSSION OF FINDINGS

The study examined the truthfulness, sincerity and legitimacy of statements and utterances in order to understand the way the various middle managers who were interviewed constructed discourses of technology integration in their narratives on the STEPS process. Under truthfulness of the statements, the researcher analyzed the actual statements made, the extent of their clarity, the costs and benefits embodied in them and the evidence provided to back up their claims. Drawing on CDA, an examination of all the recurring findings across the different documents and across participants that related to truthfulness of statements was done.

Truthfulness of statements

Statements were examined for their truthfulness under the main category truth. Document 1 (see Table 2) expressed the significance of first year entry level competences such as computer literacy as a basis for the development and implementation of a successful curriculum (see T1 under truth in Table 3). The statements about computer skills were authentic and intelligible as the value of computer skills was considered in conjunction with curricula delivery especially tuition and self-study by students. This demonstrates the Strategic Task Team's appreciation of individual student skills, and the social and ecological context to the successful implementation of curriculum delivery. Therefore, a successful delivery of curricula necessitates that the curriculum implementers recognize the importance of technological literacy, especially considering the large pool of previously disadvantaged students that is enrolled at this university.

To make subjective evaluations of the comprehensibility of statements made in the various documents, the researchers assessed whether various views were categorically expressed and clearly portrayed. Some detailed claims were made about the educational affordances of electronic response systems (i.e. clickers), educators trained to use them and the number of classes for which they were applied (see T2 under Table 3). These highlights demonstrate the truthfulness of technological statements in the STEPS documents, notwithstanding the omissions about occasional disengagement and deflation of hyped expectations that normally follow sustained usage of clickers by students. The Hype Cycle for Emerging Technologies (Gartner, 2011) suggests that technology users go through the common pattern of over-enthusiasm about emerging technology upon its introduction, disillusionment with it and eventual realism that accompanies each new technology and innovation (Gartner, 2011). As such, benefits realized from using clickers may be short lived in view of such claims.

The CUT Communication and Marketing Department made some success claims (benefits) about the role of STEPS in curricula delivery, particularly excellence in teaching, learning, research and innovation. The document alludes to strategic task teams, conferences and workshops that deliberated on the STEPS, phases evolved and insights gained from presentations in the STEPS consultation processes

(see T3 in Table 3). While the outcomes of strategic task teams and various consultative processes, particularly curricula review and transformation process, establishment of new academic structures to meet contemporary teaching, learning, research and innovation challenges are clear, the role of technology in these processes is latent, assumed and not clearly stated.

Evidence provided student training on the use of Blackboard (locally branded e-Thutho), access to multiple courses via this platform, and the percentage increases in levels of accessibility (see T4 under Table 3). While these statements demonstrate the capacity of Blackboard to transmit content and improve student access to learning resources, they ignore the reality that using technology as a medium for transmitting content does not in itself transform learning. Rather, using technology in creative ways to improve student engagement with content, peers and learning contexts provides a more productive way of improving student engagement and performance. Literature suggests that the 21st century educational practices should be defined more by the students' synthesis of information pulled from a deluge of electronic resources and social networks (Ng'ambi & Bozalek, 2013). As such, emphasis should shift from content transmission to engagement and academic networking, although accessing content remains a thorny issue for resource-constrained African contexts.

More so, hyped claims about improved access do not take cognizance of the varying levels of access by students on and off campus and their different levels of agency across academic spaces. While access to ICTs has the potential to increase access to higher education and may improve the quality of teaching and learning (Czerniewicz, Ravjee & Mlitwa, 2006), the flipside is that technology only mediate access to educational resources but does not supplant epistemic agency demanded of students to ensure meaningful appropriation and engagement with these resources. Czerniewicz and Brown (2013) argue that South African university students often display a complex technological "habitus", which functions within a lack of access to and limited practices in relation to computers, in contexts where computers and digital practices are highly valued.

To evaluate the truth in documents, we explored whether the relevant detail on curricula delivery had been conveyed without misrepresentation. The statement "a SMART classroom – the first of its kind in a South African university – was conceptualized and constructed as a mean of allowing lecturers and students to actively engage with one another …." (Document 3) was conceived to be an exaggeration as smart classroom versions were available at other South African universities such as the Centre of Educational Technology at the University of Cape Town (UCT) by the time they were established at CUT (i.e. in 2012).

The ideological claims evident in statements were investigated to unpack their truthfulness. The statement T6 in Table 3 presented multiple underexplored ideological assumptions. For instance, the capacity of technologies to promote social empowerment and leapfrog development has no fundamental basis given the irrefutable evidence that hopes of technology-mediated transformation in African institutions have been dashed judging from ICT for Development (ICT4D) debates. Such technological determinism is conceived as one of the major reasons behind the failure of ICT4D programs (Heeks, 2010).

Validity Claim	Claim-ID	Guiding questions and extracts from the STEPS documents
TRUTH	TI	**What** is said about the role of technology in curricula design/ implementation in the CUT STEPS documents? "The key focus of the Task Team was the conception of a core curriculum targeting essential entry level competencies for all first year students entering the CUT: ▪ Computer literacy will include an entry assessment for proficiency, and a mix of tuition and self-study to be completed by all students (indicative of 6 credits)" (Document 5).
	T2	Are the views and opinions on technology integration into the curricula design or implementation **clearly portrayed**? Hand-held gadgets known as "clickers" were introduced, particularly for use in testing large classrooms. A total of 73 lecturers were trained in the use of this new technology, and clickers were used in 38 classrooms during the year. The system allows students to give feedback anonymously and promptly, and also computes and presents class results graphically (Document 3).
	T3	What failures (**costs**) and success claims (**benefits**) about curricula design/ implementation have been exposed and examined? The Strategic Transformation of Educational Programs and Structures (STEPS) project entails reviewing the courses offered by CUT to ensure that as an institution of higher learning we deliver on our core business of teaching, learning, research and innovation. […] a conference in May, a workshop in August and in October saw the documentation of the process as well as the Task Teams taking up their positions to design and plan the implementation of specified new curricula and structures at CUT (Document 4).
	T4	What **evidence** has been provided to give weight to technology-supported teaching and learning arguments? A complete student database was imported into eThuto (i.e. Blackboard), and students were activated for its use. A total of 707 courses were actively accessed – an increase from 38% to 57% (Document 3).
	T5	Has the relevant detail been conveyed without **misrepresentation** and/ or **omissions**? In addition, a SMART classroom – the first of its kind at a South African university – was conceptualized and constructed as a mean of allowing lecturers and students to actively engage with one another using the latest educational technologies at CUT (Document 3). "The Task Team also identified a range of interventions that will have an impact on student performance. These include: increasing the use of technology, self-study opportunities, by placing more materials accessible to students through Blackboard and smart classrooms" (Document 5).
	T6	Are there **ideological claims** which are not investigated? Furthermore, there is the impact of technology on the knowledge of society: we expect technology to be infused in the content of the curricula, enrich teaching methodologies, as well as extend coverage and improve quality of e-learning; apply technology to our social and economic issues to "leapfrog" the stages of development, and respond to the career and vocational opportunities created by new technologies (Document 1).

Table 3: Critical Discourse Analysis of raw data from various STEPS documents –Truth category

The discourse on technology-supported curricula design and delivery was funneled by some deans from the perspective of harnessing technology to avail content and improve lecturer-content, student-content and lecturer-student interactions (see Dean 1 under T1). The "lever" metaphor was drawn upon in this

dean's conception of technology integration to demonstrate that although technology was harnessed as a tool for maximizing the design (i.e. through lecturer-content interaction) and delivery (lecturer-student, student-content) of existing (i.e. revised) and new programs, it was not necessarily the central issue. Similarly, the e-learning Director's claim that his office enabled e-learning to unfold in revised and new programs under the STEPS process (see E-learning Director under T1) corroborates the "lever" and "harnessing" metaphors employed by dean 1. Dean 2's claims about educators' dependence on lectures is symptomatic of a lack of continuity in the delivery of technology-enhanced programs and signifies the dominance of transmission pedagogies in untransformed curricula (see Dean 2 under T3). We infer that technology integration into CUT curricula design and delivery seemed to straddle efficient transmission of content (through transmission pedagogies), widening access to learning resources, and promoting two way communication (evidenced by promoting three forms of interactions) (Krull, 2014). Thus, with the exception of one dean, there was limited hard evidence of a shift towards total technology integration into a transformed curricula, that is, a transition from the lecture-dominated approach of pre-packaging curricula content and transmitting them towards exploration of various curricula methodologies, co-creation of content and deep interaction [with course content using educational technologies] (Krull, 2014).

There was a polarity of views on technology integration into the curriculum. Although Dean 1 alluded to using educational technology to increase educator access to content at curricula design stages, he was preoccupied with supporting various interactions (educator-content, educator-student, and student-content) at the curricula delivery stage to heighten student learning (See Dean 1 under T2). This model is at variance with the e-learning Designer's perspective on total technology integration - where technology is embedded in and infused into the entire curricula design and implementation process - to cover the selection of appropriate content, pedagogical approaches, design of programs and curricula delivery in the classroom (see E-learning Director under T2). Dean 1's statement that when student-content interaction using educational technology is strong, lecturer–student interaction becomes insignificant reinforces an industrial era transmission model where content platforms served as purveyors of a pre-dominantly de-contextualized curricula. The dean's imagination of educators becoming ancillary resources seems to support the dominant scenarios in South Africa where technology has not played a pivotal role in transforming learning curricula but rather focused 'learning *about* ICTs' rather than learning *with* or *through* the use of ICTs (Jonassen, Peck & Wilson 1999; Wilson-Strydom and Thomson, 2005). The dean's position suggests an *applying approach*, in which understandings of ICTs' contribution to learning results in its uses for tasks already carried out in the curriculum (UNESCO, 2002). In contrast, however, the e-learning Director's perspective represents a more effective, *infusing approach* in which ICTs are integrated or embedded across the curriculum, thus enabling teachers to explore new ways in which ICTs could change their productivity and professional practice (UNESCO, 2002; Wilson-Strydom & Thomson, 2005).

Dean 2's lamentations over the disjuncture between educator practices, especially designing untransformed curricula programs and employing untransformed teaching approaches, on one hand, and transformed digital literacies of students, on the other hand, represent a yearning for a transformed technology-enhanced curricula (see Dean 2 under T3). This desire consummates the E-Learning Director's enthusiastic embrace of total integration of technology into the curriculum at the design, implementation and evaluation stages (see T3). When these perspectives are considered in conjunction with the Curriculum Planning Director's observation about STEPS' potential to widen lecturers' application of latest ICTs in industry (see T3), these narratives collectively represent a desire for a *just in time* approach to technology integration, which advocates for a situated application of ICTs by educators in their subject contexts (Ndlovu and Lawrence, 2012). This approach can be harnessed to support

learning before a task is performed or a new subject matter is learnt (Kester et al., 2001). Dean 2's narrative of students "googling" concepts before the lecture is symptomatic of student possession of basic concept knowledge in a given subject, and their harnessing of technology just-in-time to facilitate deeper understandings. In the E-learning Director's case for "total" integration," which involves infusing educational technology into the entire curriculum design and implementation process (see E-learning Director under T5), the learning of technology skills and subject matter occurs simultaneously (Ndlovu & Lawrence, 2012).

Although Deans substantiated their arguments about technology integration in the STEPS process with evidence, their approach was anchored in curricula delivery and not necessarily curricula design. For Dean 1, evidence of embedding educational technology into the implementation of curricula manifested in lecturers' use of the institutional learning management system (LMS) for uploading and delivering content, use of e-books for linking chapters in different books to topics they taught, provision of online feedback to students, and their adoption of the discussion feature to support-peer interaction (see T4). Similarly, while Dean 3 applauded the STEPS for enhancing curricular transformation, he had concerns about limited use of technology in educational programs and emphasized the need to modernize management programs (see T4). While deans seemed to emphasize the metaphor of "ICTs as an *enabler* of curricula delivery (i.e. teaching and learning) and privileged the *applying approach* where ICTs are used for tasks already designated in the curricula, the E-learning Director advanced a transformative approach, in which educators harness ICTs to rethink and renew the curricula in creative ways and ICTs become an integral though invisible part of daily professional practice (UNESCO, 2002; Wilson-Strydom & Thomson, 2005).

Validity Claim	**Claim-ID**	**Guiding Questions and extracts from STEPS documents**
TRUTH	TI	**What** does the STEPS task team say in their narratives on technology integration in STEPS process? After conducting some industrial surveys, we realized that there were gaps between some CUT programmes and the industry's demands. Consequently, we developed four programs in my faculty: logistics and transport management, hydrology and water resource management and then a Higher Certificate in Renewable Energy and a Diploma in Energy. For all revised and new programs, we encourage our educators to find which interactions (student-teacher, student-content, teacher-content) to leverage and then harness technology to support them. If we have student-content interaction which is strong through technology, then we can remove teachers without effect (Dean 1). Our role in the revision process was to enable e-learning to happen in all courses in the STEPS process (E-learning Director).
	T2	Are the views and opinions (i.e. thoughts) **clearly portrayed**? Lecturers should leverage technology to improve both student and their access to content before they learn and teach existing or new programs respectively. If we look at curricula implementation in class through promoting student teacher-interaction, the cost goes up because teachers get increments yearly but for student-content

		interaction, the cost declines with the use of technology. So we leverage technology by creating and availing content to students, making student-content interaction more effective so that teachers become secondary (Dean 1). Our role in the STEPS process was ensuring that the revision process and development of new programs take cognizance of educational technology. We ensured that course designs and their presentation in class made use of data projectors or e-learning platforms to improve teaching and learning. We envisage course designs, content selection and course delivery to consider and integrate education technology (E-learning Director).
	T3	What failure (**costs**) and success claims (**benefits**) have been exposed and examined? One of the STEPS revelations was that while higher education has changed significantly our [technology-supported] educational programs have lagged behind so we do not have some continuity. So students get bored because when lecturers conduct their lectures, students have googled the lecture content already. But we still consider lectures to be mandatory so it is ridiculous (Dean 2). Technology integration should not be totally ignored until everything is done rather than educators/designers should start to think about it from the onset (E-learning Director). One output of the STEPS was that lecturers must have more hands-on experience of their subjects so that they can approach and engage with industry to explore what other technologies they can use (Curriculum Planning Director).
	T4	What **evidence** has been given to give weight to the arguments? We integrate technology in the design and delivery of all our curricula programmes. We encourage our lecturers to upload content on the LMS and to use the discussion feature for student collaboration and student-student interaction. All our lecturers use online feedback because students do not like delayed feedback. Our library bought e-books which replaced the hard copies from Van Schaik [Publishers]. Instead of using prescribed textbooks, our lecturers tap into the internet, use team books to link chapters in different books to their topics (Dean 1) I encourage our curriculum developers to think about educational technology when they develop curricula with lecturers. Currently, there is limited technology integration although we have started to think about it in the curricula design phase (E-learning Director). [On whether the STEPS had any shortcoming relating to curricular transformation], I would say yes and no. Yes much has been done. However, more could be done about using technology. For example, we could have a course on using educational technologies in education since we are a UOT. There is a big gap in our teachers' education. I also think some management courses could be more modern (Dean 3).
	T5	Has the relevant detail been conveyed without **misrepresentation** and/ or **omissions**?

		To get good content that complements our curricula programs, we use student-student interaction. We encourage learning commons where educators give assignments to student groups, which access content and engage. Our atrium has wireless connectivity for students to access books and learning materials when discussing group assignments (Dean 1). For total integration to happen, technology should become an integral part of lecturers' design of study guides and that is not happening. You don't only decide what activities to engage in but how to engage in them, put them into your curriculum and the didactic strategy depending on technologies available (E-learning Director).
	T6	Are there **ideological claims** which are not investigated? Technology-supported curricula transformation is more about inclusion of your course technology to fulfill course demands. If you do book keeping, you must do the pastel program that uses technology and the lecturer must have the knowledge and experience of that (E-learning Director). Lecturers should have the knowledge to integrate technologies into curricula and this was accentuated during the STEPS process (Curriculum Planning Director). Some management courses could be out dated because of technology that develops so fast. Microsoft 2013 is the latest technology but they are still using Microsoft 2010 or 2007 to train the students. Design courses are up-to-date with their computer programs/versions but that costs money. You have to renew your license and you cannot always budget for that (E-Learning Director).

Table 4: Critical Discourse Analysis of raw data from in-depth interviews–Truth category

Sincerity of statements

The sincerity category examined the absence of ulterior motives in the terminology used in statements (see Table 5). The discourse was tested to determine whether there were exaggerations or hypes about the potential of technology. The presence of metaphorical connotations in the texts was also examined to assess whether they created false assurances and acclamations. Statements such as "one of its kind" in reference to the Smart classroom only served to exaggerate the innovative nature of this technological development since they were multiple versions of such classrooms at other universities by time the invention was introduced at CUT (see S1 in Table 5).

While the metaphor "audio-visual aids" in reference to data projectors signal their power to disseminate curricula information, hard evidence on the number of video conferences supported in 2012 and that of blackboard training given to lecturers are commendable expressions of the development of technological capacity at this UoT (see S2 in Table 5). However, these narratives are in no way instantiations of the actual educational use of technology or mediation of curricula delivery per se. As Ng'ambi and Bozalek (2013) suggest, the diffusion of emerging technologies in university social systems needs a more transformative leadership that will adopt technologies for effective curricula delivery.

SINCERITY	S1	Are **metaphors,** exaggerations or hypes on the potential and capacity of technology in relation to teaching and learning used in the text? In addition, a SMART classroom – the first of its kind in a South African university – was conceptualized and constructed as a means of allowing lecturers and students to actively engage with one another using the latest educational technologies at CUT (Document 3).
	S2	Do the used of metaphorical connotations **advance** or **restrain** the comprehension of the text? Lecture rooms were equipped with the most appropriate audiovisual aids, and all lecture rooms on the Bloemfontein and Welkom campuses have been equipped with data projectors. More than 166 video conferences were supported in 2012, while Blackboard training was provided to 314 lecturers in groups and 261 lecturers individually (Document 3).
	S3	Do the metaphors create false assurances and acclamations? "…a modern **knowledge-based economy** demands human resources that are numerically and scientifically literate, technology fluent, and skilled at problem solving, critical analysis and engagement" (Document 1).

Table 5: Critical Discourse Analysis of raw data from various STEPS documents – Sincerity category

The metaphorical claims about creating a "knowledge economy" and its dependence on numerically and scientifically literate as well as the existence of a technologically competent human resource base are indeed sincere (see S3 in Table 5). However, these claims appear to be oblivious of South Africa's poor performance in the Science, Technology, Engineering and Mathematics (STEM) disciplines, especially Science and Mathematics at high school level (Trends in International Mathematics and Science Study (TIMSS), 2011; Spaull, 2013, Tachie and Chireshe, 2013). The poor performance of high school learners in these subjects is attributed to lack of material resources, poorly trained teachers, poor teaching methods, bad learning habits and bad teacher behavior (Tachie and Chireshe, 2013). TIMSS, a cross-national assessment of mathematics and science knowledge, conducted on Grade Eight/Nine mathematics and science learners in South Africa in 2011 reported that although there was a marked improvement in numerical literacy from 1995-2002, most Grade 9 learners performed worse than their counterparts in low-income countries on the African continent in 2011 (TIMMS, 2011; Spaull, 2013). For example, 32% of Grade Nine learners relied on guessing the multiple choice items tested, and 76% of them had not acquired a basic understanding of whole numbers, decimals, operations or basic graphs (Spaull, 2013). A Southern and Eastern Africa Consortium for Monitoring Educational Quality study (SACMEQ II), which rated South African Grade 6 learners' achievement in a hierarchy of competencies reported that 80% of the learners reached the lower half of eight levels of competence in mathematics on the SACMEQ (Moloi, n.d.).

The study examined the sincerity of participants' narratives of technology integration at curricula delivery and implementation to determine the extent of technology integration into curricula design and implementation. It is clear from Dean 1's metaphor "*learning anywhere anytime*" that mobile devices were used as mediating tools for accessing learning materials rather than as transformative technologies for deepening collaborative and self-directed learning (see Dean 1 under S1 in Table 6). Yet we are aware that availability of ICTs does not in itself translate into meaningful learning experiences for students if educators do not consider a systemic, holistic approach to integrating technology into curricula design, content selection and development and pedagogical delivery strategies. The E-Learning Director's claim that STEPS has impacted technology-enhanced teaching and learning because technology was "*always kept in mind*" in the revision process and verbalized in senior management's statements and in the "*adoption*" of institutional documents (see E-learning Director, under S1 in Table 6) do not necessarily provide a clear indication of technology integration. Such uses of technology as a mediation and representation tool only suggests low levels of technology integration in the curricula. The South African Teacher Development Framework (Department of Education, 2007) proposes a five-tier pyramid of conceptualizing the capacity of educators to advance ICT usage in the teaching of subjects, namely *entry, adoption, adaptation, appropriation* and *innovation*. Dean 1 and the E-learning Director's narratives of using ICTs for teaching subjects straddle entry, adoption and limited adaptation. Educators' minimal use of ICTs for the generation of knowledge can be attributed to:

1. the lack of technical skills for using ICTs to design teaching tools and learning activities that promote higher cognitive engagement,
2. the lack of appropriate knowledge to integrate these tools into their teaching (Ndlovu & Lawrence, 2012).

The metaphorical connotations of the existence of a clear, comprehensive *learning strategy* and avoidance of *cherry picking* activities are a useful point of departure for the development of an innovative approach to technology integration into the curriculum (see Dean 1 under S2 in Table 6). The provision of learning platforms, generation and uploading of relevant learning content, enhancement of interactions, provision of appropriate technology and eliminating costs of connectivity eclectically mirror Bates and Sangra's (2011) model on goals for ICT integration. Their model is premised on increasing flexible access to content for students, increasing personal interaction between students and staff, developing 21st century skills, promoting greater cost effectiveness, and developing student digital skills to document and apply knowledge. The Head of Department also concurred with the Dean 1's view on the purpose of STEPS by employing metaphors such as using technology to *deliver* relevant content, and *re-thinking* a pedagogical strategy that would *make technology the centerpiece* (see Head of Department, under S2 in Table 6). Overall, technology was considered not to be a panacea in itself, but rather a mediator of student experiences, motivation and engagement. The highlighted significance of a pedagogical strategy and overcoming the pitfalls of foregrounding the technology at the expense of pedagogy contradict Dagada and Chigona's (2013) finding that most South African academics lacked an understanding of the complex relationships between content, pedagogy and the technology to be integrated into the curriculum delivery.

When asked about the potential successes of the STEPS in transforming the university learning environment, Dean 2 claimed that STEPS contributed to increased use of the e-learning platforms for student assessment purposes (see Dean 2 under S3 in Table 6). The E-learning Director also corroborated this view by arguing that the use of online assessments and electronic response systems as a form of formative assessment peaked as a consequence of the STEPS (See E-learning Director under S3 in Table 6). This view is problematic in that it suggests that prior to the STEPS process, online

assessment was non-existent or unheard of. If we were to believe this view, then the increased use of online tools could only be celebrated if these tools were applied as constructive tools - instruments used to manipulate information, construct new knowledge, and trigger student minds to operate at their highest levels (Ndlovu & Lawrence, 2012). This is because higher-order thinking skills are only developed when learners construct their own knowledge or tools, rather than when they merely use them (Jonassen & Carr in Lim & Tay, 2003).

SINCERITY	S1	Are **metaphors**, such as exaggerations or hypes on technology integration inherent in the team's narratives on the STEPS? We ensured that students learn anywhere anytime using mobile phones, laptops or tablets. We categorized students as self-sponsored, sponsored by industry, provincial government and by National Student Financial Aid Scheme (NSFAS). We informed all sponsors that a laptop was mandatory. We requested NSFAS to convert their student book allowance from purchase of books to laptops because our library is providing free e-books (Dean 1). Yes, STEPS has impacted technology-enhanced teaching and learning in that it was always mentioned and kept in mind in the e-learning courses. What is coming from the Deputy Vice Chancellor (DVC) Academic and the e-learning strategy is that more courses will use technology. Technology is being harnessed in the online courses we offer in collaboration with Further Education and Training (FET) colleges and Maccauvlei, which will use educational technology extensively (E-learning Director).
	S2	Do the used metaphorical connotations **advance** or **restrain** the comprehension of texts? So widening student access to technology, educator training in technology usage, providing educators and student connectivity, cutting student costs of connectivity and diversifying interaction forms demonstrate a clear *learning strategy* because you can't cherry pick things. If you have e-books but do not have content platforms it does not make sense. Similarly, if learning content is availed when students do not have laptops, students will use labs and restricted areas so *learning anywhere, anytime* will not work (Dean 1). The STEPs' purpose was to develop relevant content, how you *deliver* that is where technology comes in and it requires another *thinking* where a faculty develops a *strategy* to make technology the *centerpiece*. Technology is not a remedy in itself but is rather important in *student motivation and engagemen*t (Head of Department).
	S3	Do the metaphors create false assurances and acclamations? STEPS impacted technology-supported teaching and learning because after its introduction, academics started using e-learning environments for assessments (Dean 2). Definitely [STEPS impacted student assessments] because big classes were difficult to assess formatively. Lecturers started using clickers, which were a follow up from the large classroom committee that was part of the STEPS. Lecturers are now doing online assessments (E-learning Director).

Table 6: Critical Discourse Analysis of raw data from in-depth interviews– Sincerity category

Legitimacy of statements

The VC of CUT spoke eloquently about the constitutive components of STEPS with a view to bolster support for the implementation of this process (see L1 in Table 7). While various academic areas covered by STEPS are represented in his account, such a narrative could be reflective of a senior management perspective, which might not be commonly shared by academics in line management.

The study also examined what is explicit and what is implied in the statements. The statement under category L3 in Table 7 that "the focus of the learning process should be on the student rather than the lecturer" seems to reinforce the assumption that the learner can succeed academically with minimal involvement of the educator. While learner self-regulation should be a precondition for effective learning, this assumption ignores the general academic under-preparedness of many students who enroll at UoTs in South Africa. Besides, self-regulation tends to depend on the academic level of the student.

LEGITIMACY	L1	Who is **speaking**, who is **silent**, what are their interests? STEPS is a major analytical and interactive (internal and external) review of CUT's philosophy and education; curriculum content and structure; modalities of teaching, learning and support, as well as graduate attributes and competencies (Document 2).
	L2	What is **privileged**, what is **not said**/ **not mentioned** about the role of technology in teaching, learning and curricula transformation? Graduates who are "**Technically competent"**: have sufficient expertise in the field to be able to be immediately productive in the work environment (employable) Computer numerate: [students who] able to use the computer packages required in the specific work environment and have sufficient conceptual ability to adapt to [these] new packages" (Document 1).
	L3	What is assumed or implied? CUT believes that the focus of the learning process should be on the student rather than the lecturer, meaning that teaching methodologies must focus on the real needs of the student. The STEPS process includes a task team that deals with teaching and learning methodologies focusing on e-learning and distributed learning methodologies (Document 2).
	L4	What is **missing** or **suppressed** in the discourse? The 2009 survey on the success of technology-enhanced education was used by the STEPS Task Team in 2010 to make recommendations and to identify relevant improvement strategies. This is a consolidated and coordinated curriculum development process, which arose from the fact that CUT's Vision 2020 requires the review of the [teaching] philosophy, content and structures within the academy (Document 2). "The task team approached the research with the following activities to inform its recommendations: […] The opportunities to be realized by the use of technology, particularly the later releases of Blackboard were considered. Opportunities for interactive classrooms, offering online courses and online, formative and summative assessment need to be realized" (Document 5).

Table 7: Critical Discourse Analysis of raw data from various STEPS documents – Legitimacy category

The study also examined what is missing or suppressed in the discourse. Statements made under category L4 are sweeping and there is no sufficient grounds to claim that technology has the capacity to transform curricula, academic structures and teaching philosophy (see Document 2 in Table 7). Technology is presented as having the capacity to radically advance curricula transformation without providing an empirical base to demonstrate how it addresses teaching, academic structures and curricula. Other statements under the category L4 highlight the significance of strategic teams' research consultations in an effort to establish technology's potential to promote interactive classrooms, offer online courses and promote assessments (see Document 5 in Table 7).

While technology-mediated teaching and learning may indeed caution academics on the hypes about academic affordances of new technology, however, the statement that "opportunities realized by technology were considered" suggests that the strategic team had some preconceived, unsubstantiated notions about the power of technology in transforming pedagogy (see Document 5 in Table 7).

The deans' narratives on their role in the design and implementation of the STEPS process suggested a clear division of labor. While the HODs, departmental staff and curricula designers were directly involved in technology-supported curricula design as content and curricula experts of their respective disciplines, deans became managers, custodians and coordinators of the revision process, programs to phase out, the development of new programs and their registration with SAQA and advisory boards (see Dean 2 under L1 in Table 8). As chairperson of the Executive Committee and Faculty Board, this dean's narrative represents the advancement of faculty and institutional interests of providing academic content relevant [to industry's needs], improving learning motivation and meaningful learning experiences for students (see Dean 2 under L1 in Table 8). These would be guaranteed by effective teaching and learning practices as well as preparing students for the workplace where ICTs are becoming increasingly important (Kozma, 2005). Meaningful learning experiences are rendered when the integration of ICTs in the curriculum delivery encourages constructive learning, which develops learners' thinking in a more efficient way than traditional teaching practices (Bester & Brand, 2013). Deans also served as privileged intellectuals who contributed to the STEPS Preparatory Conference discussions and brainstorming sessions on developing new qualifications and rejuvenating existing curricula (see Dean 3 under L1 in Table 8). The claim that they were the link between the STEPS conception (by senior management) and the faculty suggests that they carried and represented faculty and institutional interests. Nevertheless, the fact that curricula and learning designers were more involved at revision and design of new programs while deans steered the STEPS at higher levels where some academics, curricula and learning designers might not have been represented does not guarantee that these subordinates' interests were always well represented. Though as it may, the clear division of labor among the different stakeholders within the university is symptomatic of the diversity of expertise required of the revision-process and design of new programs.

With regard to what was privileged about educational technology in curricula design and implementation, Dean 2 presented an interesting view of technology as a tool for mediating the delivery of new programs (see Dean 2 under L2 in Table 8). For Dean 3, the role of technology was implicit and ambiguous as it was never clarified in his narrative of curricula design or implementation (see Dean 3 under L2 in Table 8). These deans' representations affirm two contrasting approaches to technology usage: *technology as an enabler approach* and *bolt on approach* to technology adoption respectively. While the bolt-approach considers educational technology after the design of learning programs, the technology as an enabler approach emphasizes the learning opportunities to be harnessed through skillful use of technologies in the teaching and learning process. In the bolt on approach, technology is only considered as a vehicle for transmitting a pre-defined curriculum and representing curricula content

in a digital format with limited opportunities for students to use technology hands on (Moeller & Reitzes, 2011). The technology as an enabler approach emphasizes the importance of enabling students to experience technology in the ways professionals do in their fields (e.g., to conduct experiments, organize information, and communicate) and encourages educators to create learning experiences that mirror students' daily lives (U.S. Department of Education, 2010).

LEGITIMACY	L1	Who is **speaking**, who is **silent**, what are their interests? At technology-supported curricula design level, I was not involved much because I am not an expert on learning programs or in revision. That happened at departmental levels where academics engaged in how to revise and in which programs to phase out and those to develop. I was more involved at the implementation level as Chairperson of the Executive Committee (EXCO) of the faculty as those programs would serve at EXCO and at Faculty Board (Dean 2). The deans were involved from the first conference, through various workshops where we brainstormed new qualifications to develop, innovative ways to rejuvenate or revise existing programs or to develop new programs. We and faculty managers took responsibility to drive the implementation process at the faculty level and we were the link between the STEPS and the entire faculty (Dean 3). As experts, curriculum designers and teaching and learning experts were more involved in the curricula design process while the implementation process was more directed at the university's formal structures. STEPS documents were submitted to the Deans' Offices, Faculty Boards and served on the Teaching and Learning Committee where these people were also represented but that was from the office side (Curricula Planning Director).
	L2	What is **privileged**, what is **not said**/ **not mentioned** about the role of technology in teaching, learning and curricula transformation? As part of the STEPS process, we developed a new program called Higher Certificate in Community Development Work (CDW), which will be implemented in 2016. We are exploring possibilities of offering this in blended learning format-combining online and block release (Dean 2). Transformation of programs involved a re-look at the entire curriculum to decide if we could continue with a program, we re-looked at that program, its offering and technology's role in the process. It was also about academic structures because it was through the STEPS that this whole new structure in our academy was born. Prior to STEPS, we had Vice Chancellor, DVC, Dean, School director and program Head. Now it is Vice Chancellor, DVC, Dean, HOD and departmental managers (Dean 3).
	L3	What is assumed or implied? Perhaps technology-supported curricula transformation may not necessarily

		be because of the STEPS, but CDW program was an outcome of the STEPS. To the extent that we want to offer it online, that was STEPS's contribution (Dean 2). The Hotel School has the Smart Classroom-a lab applying top-of-the-range technology. It is a High Performance Learning Centre, which is a result of the STEPS process. Each faculty had to have a smart classroom and we were the first (Head of Department).
	L4	What is **missing** or **suppressed** in the discourse? If we implement it, such technology-supported curricula delivery will be as a result of the STEPS. We will phase out all Bachelor of Technology (BTech) programs and replace them with Advanced and Postgraduate Diplomas. We also want to deliver these diplomas via online formats in the workplace (Dean 2). Part of the revision exercise was also to re-look at your teaching and learning modalities in various offerings. After the STEPS process, there is a high increase in the use of blackboard as our daily offerings of various programs (Dean 2).

Table 8: Critical Discourse Analysis of raw data from in-depth interviews– Legitimacy category

Deans reiterated that the implementation of the STEPS lead to the introduction of blended learning opportunities and technology-enhanced teaching. These views buttress the popular notions about the limited integration of technology into the curricula. For instance, Moeller and Reitzes (2011) report that the findings of the National Centre for Education Statistics study observed how limited integration of technology into curricula and instructional delivery and limited investment of instructional time results in technology failures.

Study implications

Evidence from document analysis suggests that the integration of technology into the curricula was considered from the objective of increasing access to and use of technology through availing learning materials and assessments via the LMS, increased use of smart classrooms for teaching, honing of computer skills through skills training and widening opportunities for self-study through available low cost technology. While tapping into the affordances of technology was the stepping stone to wider use of technology in the design of new programs and revision of existing ones, the STEPS documents concentrated on the provision of and intensified use of technology for teaching and learning rather than provide evidence of total integration of technology into curricula design and delivery in classrooms, which need further examination.

Narratives of deans, curricula director and e-learning director emphasised low levels (especially *entry* and *adoption phases*) of technology integration into the curricula - mainly provision of new programs in blended format, provision of content via LMS and increased online assessments of students by educators. This implies that while availing technology is critical, it does not translate into meaningful learning experiences for students. A clear, holistic teaching and learning strategy where technology

becomes the centerpiece for a wider range of pedagogical activities, such as accessing and delivering content by educators, accessing student-peer networks, engaging in group work and discussions, extending student and educator access to learning networks, promoting computer numeracy and technical competence through student and educator training, would be more effective for student learning than a random, uncoordinated strategy.

Only one dean gave narratives of higher levels (*appropriation* and *innovation*) of technology integration. These included tapping into the interactive (educator-content, student-content, student-teacher and student-student) opportunities of technologies during curricula design and delivery, using student discussions for content generation, using handhelds for accessing content anywhere, anytime and providing wireless connectivity for educators to access content on and off campus. The absence/minimal presence of technology at the curricula design and course development stages suggests limited technology integration into the curricula and the use of technology in replicative ways (converting knowledge representation formats from one form to an online format). The implication is that infusing and embedding technology into the curricula design, course development, selection of delivery methods and the actual delivery would ensure total integration of technology in the design and delivery of existing and revised programs.

Although deans were directly involved in the development of STEPS through various strategic meeting and workshops, their work became more defined during the administration and management of the implementation of STEPS. Their narratives provided a more panoramic view of technology integration into the new and revised–programs at the faculty levels. The e-learning and curricula development directors provided a more crisper and hands-on experience of technology integration at the operational levels. The clearly defined levels of specialization including distinguished lines of responsibility suggested that a shared distributed leadership is critical if curricula design and implementation is to take shape and be entrenched sufficiently in an academic institution.

CONCLUSION

The study examined STEPS documents and middle managers' narratives of the discourses of technology integration into existing and new programs under the auspices of the STEPS. Evidence suggests that although a respectable balance was struck in the various documents between highlights of technology adoption and claims about the vitality of technology in the transformation of curricula and academic programs, several statements about technology promises seemed to be hyped constructions of technology that reinforced technological determinism.

While hard data was provided in reports on staff trained in using various technologies and the functionalities of certain technology platforms and applications, there were no practical examples of best practices of technology-mediated curricula design or implementation. Many statements on curricula design and delivery were unsubstantiated accounts of the potential of educational technologies to transform social and teaching practices that lacked factual information on its actual impact on pedagogy, curricula transformation or transformation of academic structures.

Although all middle managers reported some semblance of technology integration, especially the offering of new programs in blended format, only one dean emphasized the promotion of various technology-enhanced interactions at curricula delivery stages, increasing access of learning resources through increased connectivity, the provision of e-books and handhelds, and the setting up of student

and teacher training in educational technology. The level of technology integration, therefore, was interpreted as straddling entry and adoption and to a limited degree appropriation stages. The innovation and transformation stages were virtually absent in such narratives. With regard to the evidence of technology integration at the university, many reports took a performative and corporatist perspective to technology. Here, the impact of technology was considered in light of figures and percentages (e.g. number of educators trained, number of classes where certain technologies were tested and number of student with access to technology) rather than its actual transformative impact for students (e.g. student engagement with content, learning communities) and educators (e.g. innovative teaching, high profile research, academic collaborations). As such, a technical and performative orientation towards technology should be replaced by a focus on the impact of technology on innovatively mediating and transforming teaching and learning.

It is evident, with regard to the interests represented that, while the strategic planning documents reflected the views of many educators, the coordination of various seminars and conferences by senior management and those in leadership positions (e.g. deans of faculties, senior academics) could mean that, by virtue of their academic authority, these academic elites harnessed their views to indirectly influence and shape the conception and implementation of STEPS. Cukier et al (2004) warns against "selective silence" where the voices of those "in favor of" greatly outweigh the voices "in contradiction of" (Nyemba and Chigona, 2012). Although many statements were informed by hard data on technology-related activities, these statements were ambiguous about the actual impact of technology integration on student experiences and deep learning.

REFERENCES

Adam, F. (2009). Curriculum reform in higher education: A humanities case study, PhD Thesis. Faculty of Humanities, University of the Witwatersrand, Johannesburg.

Bates, T & Sangra, A. (2011). Managing Technology in Higher Education: Strategies for Transforming Teaching and Learning. John Wiley & Sons.

Bester, G. & Brand, L. (2013). The effect of technology on learner attention and achievement in the classroom. South African Journal of Education, 33(2), 1-15.

Blewett, C. (2012). E-Learning terminology trends- A lens into institutional paradigms, Alternation: Interdisciplinary Journal for the Study of the Arts and Humanities in Southern Africa, 19(2), 211-235.

Blommaert, J. & Bulcaen, C. (2000). Critical Discourse Analysis. Annual Review of Anthropology, 29, 447-466.

Bozalek, V., Ng'ambi, D. & Gachago, D. (2013). Transforming teaching with emerging technologies: Implications for Higher Education Institutions. South African Journal of Higher Education, 27(2), 419–436.

Bozalek, V., et al. (2013). The use of emerging technologies for authentic learning: a South African study in Higher Education. British Journal of Educational Technology, 44(4), 629-638.

Brown, C. & Gachago, D. (2013), Emerging technologies in higher education: A guide for higher education practitioners. http://www.mrowe.co.za/blog/wp-content/uploads/2013/11/Emerging-ICTs-in-SA-higher-education-guide.pdf

Carr, T. (2013). e/merging across Africa: Five Papers on the Use of Educational Technology in African Higher Education," The African Journal of Information Systems, 5(3), 65-70.

Central University of Technology (2010) STEPS (Strategic Transformation of Educational Programmes and Structures) Learnings from the Conference, for the curriculum transformation Workshop 2010, portal.cut.ac.za/steps/index/docs/bridging_document.pdf

Central University of Technology (CUT) (n.d.) (2010) STEPS close-out and outcomes document –Part 1– Rationalization and Innovation in the Faculties, 1-20. http://portal.cut.ac.za/steps/index/docs/rationalization_and_innovation_in_faculties.pdf

Collier-Reed, B. I. (2012). Improving the design and implementation of lecturecasting and its impact on an academic's classroom practice. Paper presented at the 4th e/merge Conference, Cape Town, South Africa, 1-8.

Cukier, W., Bauer, R. and Middleton, C. (2004). Applying Habermas' Validity Claims as a Standard for Critical Discourse Analysis, In B. Kaplan, D. P. Truex, T. Wood-Harper, & J. I. DeGross, (Eds.), Information Systems Research - Relevant Theory and Informed Practice, Dordrecht: Kluwer Academic Publishers, 233-258.

Cukier, W., Ngwenyama, O., Bauer, R. & Middleton, C. (2009). A critical analysis of media discourse on information technology: Preliminary results of a proposed method for critical discourse analysis, Information Systems Journal, 19, 175–196.

Czerniewicz, L., Ravjee, N. & Mlitwa, N. (2006). Information and Communication Technologies and South African Higher Education: Mapping the landscape, Research Report for the Council on Higher Education, Council on Higher Education, Pretoria.

Czerniewicz, L. & Brown, C. (2013). The habitus of digital "strangers" in higher education. British Journal of Educational Technology, 44(1), 44–53.

Dagada, R. & Agnes Chigona, A. (2013). Integration of E-Learning into Curriculum Delivery at University Level in South Africa. International Journal of Online Pedagogy and Course Design, 3(Iss 1). DOI: 10.4018/ijopcd.2013010104

Daspit, J. & D'Souza, D. E. (2012). Using the Community of Inquiry Framework to Introduce Wiki Environments in Blended Learning Pedagogies: Evidence from a Business Capstone Course. Academy of Management Learning and Education Journal, 11(4), 666-693.

Deacon, A. & Wynsculley, C. (2013). When my sub-editor is a nit-picking bot: Mediating roles of a TV news scriptwriting exercise. The African Journal of Information Systems, 5(Iss. 3), http://digitalcommons.kennesaw.edu/ajis/vol5/iss3/6

Dhunpath, R., Nakabugo, M. & Amin, N. (2012). Editorial: Transformational Trends in Higher Education Scholarship and Curriculum, In Alternation, Interdisciplinary Journal for the Study of the Arts and Humanities in Southern Africa, CSSALL, Durban.

Du Pré, R. (2009). The Place and Role of Universities of Technology in South Africa. Durban University of Technology on behalf of the South African Technology Network, Bloemfontein.

Fairclough, N., Mulderrig, J., & Wodak, R. (2010). Critical Discourse Analysis. In: Discourse Studies: A Multidisciplinary Introduction, 357-378.

Fataar, A. (2005) Negotiating student identity in the doctoral proposal development process: a personal reflective account, Journal of Education, 36, 37-58.

Forchtner, B. (2010). Jürgen Habermas' Language-Philosophy and the Critical Study of Language, Critical Approaches to Discourse Analysis across Disciplines, 4(1), 18 – 37.

Gachago, D., Ivala, E., Backhouse, J., Bosman, J., Bozalek, V., and Ng'ambi, D. (2013) Towards a shared understanding of emerging technologies: Experiences in a collaborative research project in South Africa, The African Journal of Information Systems (AJIS), 5(3), 95-104.

Garrison, D. & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. Internet and Higher Education, 7, 95 – 105

Gartner (2011). Gartner's Hype Cycle Special Report Evaluates the Maturity of 1,900 Technologies http://www.gartner.com/newsroom/id/1763814

Habermas, J. (2001). On the Pragmatics of Social Interaction, Fultner, B. (trans.), Cambridge, MA, USA: MIT Press.

Habermas, J. (1979). Communication and the Evolution of Society, McCarthy, T. (trans.), Boston, MA, USA: Beacon Press.

Habermas, J. (1981a). Theorie des kommunikativen Handelns - Band I., Frankfurt a. M.: Suhrkamp Verlag.

Habermas, J. (1984). The Theory of Communicative Action, Vol. I: Reason and the Rationalization of Society, London: Heinem.

Heeks, R. (2010). Policy Arena: Do Information And Communication Technologies (ICTs) Contribute To Development? Journal of International Development, 22, 625–640.

Herrington, J., Reeves, T. C., & Oliver, R. (2010). A guide to authentic e-learning. New York: Routledge.

Hugo, W. (2009). Spiraling reference: A case study of apprenticeship into an academic community of practice, South African Journal of Higher Education, 23(4), 703–721.

Human Sciences Research Council (2011). Towards Equity and Excellence-Highlights from TIMSS 2011: The South African perspective. http://www.hsrc.ac.za/uploads/pageContent/2929/TIMSSHighlights2012Dec7final.pdf

Ivala, E. (2011) Implementing eLearning at a university of technology in South Africa: A qualitative study, In Proceedings of the 6th International Conference on e-Learning. 2011, 27-28 June 2011, Okanagan, Canada: University of British Columbia Okanagan, 156-163.

Jonassen, D.H; Peck, K.L. & Wilson, B.G (1999). Learning with Technology: a constructivist perspective. Upper Saddle River, N.J: Merrill.

Kester, L., Kischner, P., van Merriënboer, J.J., & Bäumer, A. (2001). Just-in-Time information presentation and the acquisition of complex cognitive skills. Computers in human Behaviour, 17, 373-391.

Kozma, R. (2005). National Policies that Connect ICT-Based Education Reform to Economic and Social Development. Human Technology, 1(2), 117-156.

Krull, G. (2014). Integrating ICT in TVET for Effective Technology Enabled Learning Educational Technology at South African Institute for Distance Education. http://www.slideshare.net/greigk/integrating-ict-in-tvet-for-effective-technology-enabled-learning

Lim, C. & Tay, L. (2003). Information and Communication Technologies (ICT) in an Elementary School: Students' Engagement in Higher Order Thinking. Journal of Educational Multimedia and Hypermedia, 12(4), 425-451.

Moeller, B. & Reitzes, T. (2011). Education Development Center, Inc. (EDC). Integrating Technology with Student-Centered Learning. Quincy, MA: Nellie Mae Education Foundation.

Mtembu, T., Orkin, M. & Gering, M. (2012) Towards distinctive and developmental curricula at UoTs: The STEPS process at CUT, South African Journal of Higher Education, 26, 2, 214–231.

Ndlovu, N. & Lawrence, D. (2012). The quality of ICT use in South African classrooms. Towards Carnegie 111, Strategies to overcome poverty and inequality, University of Cape Town, September 3-7,

Ng'ambi, D. (2004). Towards a knowledge sharing framework based on student questions: The case of a dynamic FAQ environment. PhD thesis. Department of Information Systems, UCT.

Ng'ambi, D & Brown, I. (2009). Intended and unintended consequences of student use of an online questioning environment. British Journal of Educational Technology, 40(2), 316–328

Ng'ambi, D. & Bozalek, V. (2013). Leveraging informal leadership in higher education institutions: A case of diffusion of emerging technologies in a southern context. British Journal of Educational Technology, 44, 6, 940–950.

Ntshoe, I. & Selesho, J. (2014). Institutional ranking in a differentiated higher education in South Africa. South African Journal of Higher Education, 28(4), 1554–1574.

Moloi, MQ. (n.d.). Mathematics achievement in South Africa: A comparison of the official curriculum with pupil performance in the SACMEQ II Project, http://www.jet.org.za/events/conferences/School%20quality%20research%20seminar%202/testing-programmes-1/Moloi.pdf

Nyemba, E. & Chigona, W. (2012) Analysis of ICT4D Strategies for Developing Nations in Socio-economic and Political Crises: Zimbabwe Case, Communication Policy Research Africa, Nairobi, Kenya, 2012.

Spaull, N. (2013). South Africa's Education Crisis: The quality of education in South Africa 1994-2011. Report Commissioned by Centre for Development and Enterprise, October 2013.

Stahl, B. (2004). Whose Discourse? A Comparison of the Foucauldian and Habermasian Concepts of Discourse in Critical IS Research, Proceedings of the Tenth Americas Conference on Information Systems, August 2004, New York, New York, 4329-4336.

Stahl, B., McBride, N., & Elbeltagi, I. (2005) Combining Postmodernism and Critical Theory in the Study of IS in the Middle East - Some Methodological Consideration, Proceedings of the 4th International Critical Management Studies Conference, Cambridge, United Kingdom.

Tachie, S. and Chireshe, (2013). High Failure Rate in Mathematics Examinations in Rural Senior Secondary Schools in Mthatha District, Eastern Cape: Learners 'Attributions. Studies in Tribes, 11(1), 67-73.

UNESCO (2002). Information and Communication Technology in Education. A Curriculum for Schools and Programme of Teacher Development. Paris: UNESCO.

Ulrich, W. (2001). A Philosophical Staircase for Information Systems Definition, Design, and Development, Journal of Information Technology Theory and Application, 3(3), 55 – 84.

United States Department of Education, Office of Educational Technology (2010). Transforming American Education: Learning Powered by Technology. Draft National Educational Technology Plan 2010. Washington, D.C.: U.S. Department of Education. Retrieved March 24, 2010 from http://www2.ed.gov/about/offices/list/os/technology/techreports.html

Unwin, T., Kleesen, B., Williams, J., Oloo, L.M., Alwala, J., Mutimucuio,I., Eduardo, F., and Muianga, X. (2010). Digital Learning Management Systems in Africa: rhetoric and reality, Open Learning: The Journal of Open, Distance and e-Learning, 25(1), 5-23

Van Dijk T. (1997). Communicating Racism: Ethnic Prejudice in Thought and Talk. Newbury Park, CA: Sage

Waghid, Y. (2007). Education, Responsibility and Democratic Justice: Cultivating friendship to alleviate some of the injustices on the African continent, Educational Philosophy and Theory, 39(2), 182–196.

Wilson-Strydom, M. & Thomson J. (2005). Understanding ICT Integration in South African Classrooms. SchoolNet SA research and evaluation.