The role of emerging educational technology in the transformation of educational programmes and structures at a South African university: The case of STEPS at the Central University of Technology

Subtitle as needed (paper subtitle)

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Abstract—To deal with demand-response imbalance – the growing pressure to bear upon universities from their external environment vis-à-vis their capacity to respond sufficiently to those pressures while they remain in their productive form, the Central University of Technology in South Africa implemented the Strategic Transformation of Educational Programmes and Structures (STEPS) in 2010. Among other considerations, this strategic process (STEPS) seeks to develop new curricula and programmes that are aligned to the developmental priorities of the region (i.e. Free State Province, South Africa) as well as discontinue existing ones that are inconsistent with contemporary contextual needs. In addition to developing transformed curricula in which developing professionally trained, market-ready graduates are trained and contextual operational knowledge are prioritised, the document calls upon academics to develop context-relevant classroom methodologies together with social, technological innovation for improving pedagogy and classroom environments. Mindful of the mandate of Universities of Technology of adopting the relevant state-of-the art technology and media that render powerful learning environments and rich student experiences, this study employs critical discourse analysis to examine the extent to which CUT academic leadership factored in and considered emerging educational technologies in the implementation of the STEPS process. The findings suggest that although various teaching technologies are salient and considered in various documents steering the practical implementation of STEPS, their location, strategic application and contribution to transformed teaching and learning remain a grey area that calls for more deliberation

Keywords—STEPS, curriculum innovation, technology integration, emerging technologies, educational transformation

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I.   Introduction

A familiar trope in the South African Higher Education (SAHE) discourse is the detailed narratives of the mounting indigenous and exogenous pressures brought to bear upon universities, which in various scales and dimensions differentially impact on curriculum and pedagogical delivery. At the epicentre of these challenges are: a deeply fragmented Apartheid past that persistently reflect in the racial composition of groups that enroll and succeed at university, differential configurations of institutions and their resourcing, notwithstanding government and societal expectations of these universities to contribute to fostering all-rounded graduates who contribute to the knowledge society (Bozalek, 2011; Brown and Gachago, 2013). Other powerful forces that continue to define South African Higher education include a transition from elite educational provision to massification, the 'triple helix' comprising radically new relations between government, society and universities, marketisation and corporatisation of higher education (HE) and multiple development-oriented demands and expectations of the university emanating from societal actors and stakeholders (Bundy, 2006; Badat, 2010). Internationally, other drivers of HE changes include globalisation [and internationalisation], which are transforming the conventional notions of domestic students attending a local university by shifting higher education policy developments and assumptions regarding employment, skills, economic development and social engagement (Dhunpath, Nakabugo and Amin, 2012) and the changing composition of students attending university due to the prevalence of non-traditional students.

Collectively, these pressures impose new demands on the conceptualisation of the curriculum and its implementation, redefine how universities should constitute themselves and deliver their core mandates as well as refine (or re-learn) the professional values of university graduates in light of new circumstances. 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 enablers and barriers to academic performance such as language and literacies [and technology adoption]. At a more practical pedagogical layer, the challenges are profound, underpinned by the value of mediating the complex

practice of teaching and learning, providing dialogical spaces of engagement between university educators and students including promoting scholarly practices of inducting students into academic communities of practices (Fataar, 2005, Waghid, 2007; Hugo, 2009). Extending these leading scholars' views on mediation, dialogicality of instructional discourses and academic communities of practice at pedagogical level, this paper argues that the "demand-response imbalance" – that is, the growing pressure to bear upon universities from their external environment vis-à-vis their capacity to respond sufficiently to those pressures while they remain in their original form (Clark, 2001) is not insurmountable if university academics were to adopt more pro-active roles and approaches in conceptualising, designing and implementing globally benchmarked but contextually relevant curricula. Such curricula would sufficiently respond to aforementioned global imperatives as well as adapt and respond sufficiently to local needs, realities and circumstances that South African universities find themselves in.

It is in light of this pro-activity, persistent anticipation and accommodation of change that Strategic Transformation of Educational Programmes and Structures (STEPS) process was established in 2010 at the Central University of Technology, South Africa in 2010 to tackle head on curriculum innovation, re-curriculation of certain academic programmes as well as dissolve those conceived to be out of tune with cotemporary societal needs and realities. What remains underexplored in the literature on the STEPS process however, is the role, focus and contribution of emerging technology in the conception, design and implementation of this transformative policy. Given the pervasiveness and prominence of educational technology in higher educational delivery (Bozalek, 2011; Gachago et al., 2013) one way of enhancing the dynamic success of curriculum innovation and re-curriculation of programmes is understanding the mediating and transformative roles of technology in the conception, design, implementation and delivery of the university curricula and innovative teaching.

Despite the adoption of educational technologies becoming a common practice in South African Higher education (SAHE), the innovative use of emerging technologies to transform [curricula and] teaching and learning remains an emerging phenomenon (Gachago et al., 2013). To further compound this challenge is the increasing gulf between the ubiquitous emerging technologies that students bring in their encounter with the university education, technology which educators recommend in their pedagogical delivery and those traditional technologies sanctioned by the university (see Traxler, 2009; Bozalek, 2011; Ng'ambi 2011). In view of the acknowledged ambivalence and complex normative technology choices in South African higher education (SAHE), what often remains insufficiently recognised or undervalued is the mediating role of technology in the overhaul of the curricula (curriculum innovation), re-curriculation and transformation of educational programmes. To this end, this study uncovers the obscure terrain of the role, contribution and loci of emerging technology in teaching and learning and curricula innovation in the STEPS process. The study employs Critical Discourse Analysis (CDA) to unveil the ways in which emerging technology roles or contributions are portrayed in purposively selected STEPS documents.

II. **Research Problem**

The discourse of the adoption of emerging technology for teaching and learning in higher education has often been funneled through utopian and dystopian perspectives, which are polarised but determinist theorisations of human engagement with educational technologies (Rambe and Nel, 2011). Deterministic approaches to technology uptake tend to prevail when the views of the senior academics/ senior management are privileged while those of the rest of the broader academic community are silenced, co-opted or conspired into agreement with the dominant views of the academic oligarchy under the banner of "broad-based" consultation. These determinist approaches are contrary to the human-centric view of development which advocates for technology intervention that are not stultifying for the target beneficiaries (Heeks, 2008) and that illuminates understanding of the situated, socially constructed nature of human interaction with educational technologies. The problem, therefore, is that given the top-down approach to the implementation of Strategic Transformation of Educational Programmes and Structures (STEPS) process at the Central University of Technology in South Africa, little is known about the role, contribution and significance of emerging educational technologies in the implementation of this initiative, including the extent of democratic representation of interests of various academic stakeholders (senior management, senior academics, junior academic staff and students). Consequently, the study examines the extent to which technology was factored into teaching, learning and curricula transformation discourses of the STEPS process including whose (academic/political) interests are well privileged and whose are silenced, subverted or co-opted in these discourses.

III. **Research question**

Consistent with the aforementioned research problem, the following research questions are posed:

1. How is the discourse on the contribution of technology to teaching and learning and curricular transformation constructed in the STEPS documents?

2. Whose interests are reinforced and whose interests are silenced in this discourse?

3. Is there any evidence of misrepresentation of facts /distortions or exaggerations in the discourse on the contribution of technology to teaching and learning?

4. Overall, to what extent has emerging technologies been factored into the teaching and learning and programme re-curriculation discourses in STEPS documents?

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

In the South African context where mounting local pressures to open the floodgates of higher education to accommodate historically marginalised groups are juxtaposed with the imminent urgency to overcome the unproblematised "parachuting" of Western educational philosophies that have little resonance with African contexts, the call for innovative curricula and transformative teaching have been louder. Innovative teaching and transformative curricula programmes insinuated in Dhunpath, Nakabugo and Amin's (2012) reiteration of the necessity for African scholars to shape and influence university teaching and learning so that it emphasises the educational needs of Africa and overcomes their dictation by powerful, wealthier contexts with narrow self-interests. As such, reflecting critically and responding consciously to challenges of massification of South African higher education, large classes and providing context-relevant graduate education necessitates a rethinking of curriculum and innovative pedagogical delivery (Bozalek, Ng'ambi and Gachago, 2013) and other different strategies, such as extended curriculum programmes, re-curricularisation and multilingual policies (Boughey 2002; Garraway 2009).

Notwithstanding the acuteness of demands for transformed [technology-mediated] curricula and transformative teaching in South Africa (see Dhunpath, Nakabugo and Amin, 2012; Blewett, 2012), there is paucity of research into the effective use of emerging technologies in HEIs, such as social media or mobile phones, and how these influence teaching and learning practices in SA institutions (Brown and Gachago, 2013). Blewett (2012) acknowledges the disturbing dichotomy within e-learning in SA higher education manifested in increasing use of e-learning environments by higher education institutions on one hand, and indications of limited use of technology and implementation of rigid pedagogy. The limited knowledge on the mediating and transformative role of emerging technologies in innovative pedagogy and curricula innovation in South Africa is surprising in light of what Gachago, Ivala and Chigona (2011) consider as the justifications for staff and students' about the increased reliance on emerging technologies to support teaching and learning such as the growing availability of free, easy to use and visually appealing web applications and more stable access to the Internet (especially through the use of mobile phones). While the increasing academic reception of emerging technologies is undoubtedly unquestionable due to their profound affordances, the challenge lies in assessing and proving their impact on the delivery of innovative teaching and transformed curricula. This not only poignant given the often reactive approaches to new technologies by higher educational institutions

(Committee of Inquiry into the Changing Learner Experience (CLEX), 2009), but critical given the under-exploration of the effective use of emerging technologies in HEIs (e.g. social media or mobile phones) by educators, and how these influence teaching and learning practices in our institutions (Brown and Gachago, 2013). While the integration of technology into the curriculum through the implementation of resource intensive institutional Learning Management Systems (LMS) in all HEIs in South Africa is well documented (Ivala 2011; Bozalek, Ng'ambi and Gachago, 2013), research pointing to the academic resonance of emerging technologies in curricula transformation and pedagogical innovation remains a grey area.

The central place of emerging technology in higher education pedagogy and curricula transformation is embodied in the view that curricula innovation requires educators, educational technologists and HE administrators to critically appraise the structure of degree programmes and explore innovative teaching strategies in the context of technology rich learning environments (e.g. Web 2.0 applications, virtual learning and social networking platforms) which enable a wide range of flexible learning: from distance learning, collaborative learning, blended learning to mobile learning (Dhunpath, Nakabugo and Amin, 2012: 7). Understanding the mediating and transformative roles of technology in curricula innovation and hitherto pedagogical delivery should be given more prominence to avoid the eschewing of student reflexive inquiry through their rigorous engagement with educators, disciplinary conventions, norms and practices. Fataar (2013: 13) warns against an educational agenda that narrowly concentrates on improving educational quality without providing a basis for troubling the discursive productions that the implied educational processes entrench. Our reading of Fataar's reflections is that mediating tools like emerging technologies should be powerfully harnessed to critically question the underlying assumptions of the curricula and to confront the obscurities and ruminations that underlie functionalist driven pedagogies such as preparing and training students to the world of work at the expense of critical inquiry and production of new knowledge. Therefore, the explorative engagements inherent in emerging technologies such as social media (Facebook, Twitter) and reflective conversations in conversational technologies (e.g. blogs, wikis, Google drive) can gainfully lever innovative teaching by introducing new modes of engagement and making knowledge production, critical reflection and deep learning the core foci of the curricula. This foci helps overcome the unsubstantiated, yet strong claims that "universities are producing poor quality graduates because they have 'lowered their standards' or they 'offer outdated curricula' or they 'do not train students to operate in the real world" (Adam, 2009). Responding and rebutting these claims about antiquated, diluted curricula and the corporatist /managerialist argument that reduces students to "commodities" that should have relevance to the mechanics of the market, calls into sharp gaze the mediating and transformative role of emerging technology in "the intellectual insertion of students into existing communities of

scholarship and their theoretical or conceptual entailments" (Fataar, 2013: 112).

B. *Selected cases of using educational technology to deliver curricula*

Educational technology encapsulates new practices around online pedagogies, patterns of information and communication technology (ICT) access and of exclusion, and the relation of e-learning practices to other institutional interventions seeking to transform the colonial fabric and cultures of South African higher education institutions (Ravjee, 2007). As such, educational ICTs can be ideally viewed as 'one thread in a complex net of transformation, including historical redress, curriculum transformation, diversity, equity and so on' (Czerniewicz, Ravjee and Mlitwa, 2006: 43).

Mindful of Universities of Technology's thrust towards advancing the mastery of high-level vocational skills while pursuing a research agenda that critically engages with epistemologies of technology (Winberg 2005), the role of technology in teaching, learning and curricula transformation cannot be down played. Blewett (2012) employed search engine count estimates on Google Scholar and five top ranked journals to trace, compare and contrast the use of learning management systems (LMS), virtual learning environments (VLE) and personal learning environments (PLEs) in curriculum and pedagogical implementation in South African higher education over a decade (2001-2010). He laments the preference and predominance of LMS in curriculum and pedagogical delivery, followed by the increasing popularity of VLEs and the flattering of personal, learning environments (PLEs) despite technological innovations in Web 2.0 platforms. Blewitt (2012) attributes the popularity of LMS to the prevalence of out-dated approaches to learning and industrial-age models, which are hampering the adoption of alternative learning paradigms which are more readily supported by PLEs. The floundering of PLEs is attributed to the limited control institutions have over these environments and multiple options they have for student optimisation of learning, which further limit educator regulation of these spaces.

The Higher Education Monitor (2006) provides a nomenclature of South African university ICT policies as they relate to curriculum innovation and pedagogical delivery.

- *Approach 1* – Institutions with formal policies in place,
- *Approach 2* – Institutions with ICT-and-education policies incorporated into related policies,
- *Approach 3* – Special merger issues,
- *Approach 4* – Institutions with no evidence of any policy frameworks and
- *Approach 5* − Institutions with relevant structures, but no policy frameworks (Czerniewicz, Ravjee and Mlitwa, 2006).

In relation to Approach 1, the institution normally has a detailed, comprehensive ICT policy and associated documents that specify (Czerniewicz, Ravjee and Mlitwa, 2006) various issues relating to campus-wide roll out of ICT into specific courses and programmes, ICT integration into teaching and learning, language policy among others. For instance, Stellenbosch University, has an E-Campus strategy, which incorporates all university business specifically including online learning, e-Information, e-Student administration, e-Research, and e-Services. The document also has Electronic Information and Communication Technologies policy aimed at improving the quality of teaching, research, and community service) and an e-Learning strategy, which focuses on ensuring a minimum online presence for all courses (Van der Merwe and Pool, 2002). The University of Cape Town Education Technology Policy (2003) provides an integrative approach to the use of educational technology, encourages (rather than compels) ICT usage, and prioritizes a linkage between ICT and pedagogy in ICT usage (Czerniewicz, Ravjee and Mlitwa, 2006). Articulation of other models is beyond the scope of this paper because of lack of space.

C. *Strategic Transformation of Educational Programmes and Structures (STEPS) at the Central University of Technology (CUT): An overview*

The Strategic Transformation of Educational Programmes and Structures (STEPS) at CUT can be conceived as one of the instantiations and expressions of the practical implementation of Vision 2020. Vision 2020 seeks to establish a "distinctive and proficient university" that contributes to developmental imperatives of the South Africa, tackle head on the challenges of the triple helix (university, government, industry) and take advantage of strategic partnerships, and revise the university's curricula and academic structures (CUT STEPS, 2010). STEPS therefore, constitutes a practical materialization of Vision 2020' goal of fostering academic excellence through curricula transformation, re-curriculation of certain programmes to attune them to current academic and developmental needs and the total disbanding of some programmes conceived to be out of tune with contemporary academic and societal needs. As such, STEPS seeks to implement CUT's decisions regarding academic structures and curricula through adopting "an output/outcome approach to attune its curricula and research to the needs of its primary users [...] revisiting its own offerings, processes and structures for greater responsiveness and flexibility" (STEPS close out and recommendations document, n.d.). More so, the STEPS process also seeks to apply the Vision 2020 through carefully chosen and sustained strategic partnerships with stakeholders in business, government and civil society - the 'triple helix' model (Etzkowitz and Dzisah, 2007) to achieve quality social and technological innovations for partners on both sides (Mtembu, Orkin and Gering, 2012). While the implementation

of STEPS comprises multiple stages, documents and schedules and task teams, its suffices to say, in two years (Feb 2010-Nov 2011) four major landmark documents were produced in the build up and implementation of the process, covering various areas ranging from admission of underprepared students, teaching and learning, work integrated learning, continuing education, problem-based, career-focused curricula, large class among other considerations (see Mtembu et al., 2012).

IV. Theoretical Framework

Critical Discourse Analysis (CDA) (Habermas, 1984) was used to understand the discourse on the contribution of technology to transformation of teaching, learning and the curricula, the motivations and interests represented in the statements on technology, the sincerity of the statements including the significance of technology in pedagogical delivery and curricula transformation. Tenorio (2011) highlights that CDA refers to the communication expected in one situation context, alongside one field and register. The current study therefore, is preoccupied with how communicative language and metaphors were appropriated in STEPS documents to provide arguments for and motivations/ justifications on the capabilities and affordances of technology in teaching and learning. For Habermas, discourses are the means or the medium (Habermas 1981a, 39) to clarify contentious validity claims (Ulrich, 2001) of the speaker. To this end, discourses on technology's mediation of teaching, learning, and curricula as articulated by the STEPS documents were examined to establish its veracity in their immediate context of its production as well as in its broader social context.

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, and hence this type of action has an ethical side to it (Stahl, 2004). Drawing on the communicative acts and statements contained STEPS documents, the authors will therefore examine the meaning, sincerity and authenticity of statements in their context of production (the educational context) to ensure ideal communication. Habermas (1981/1984) is pre-occupied with principles of ideal communication (*or universal pragmatics*) upon which discourses oriented to mutual understanding could be based (Cukier, Ngwenyama, Bauer and Middleton, 2009). Partly therefore, Habermas' (1984) work 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: 85), one 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 explicating 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 and oriented to 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, that it conforms with normative rules, and that the speaker is veracious, 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: Is what is said audible (or legible) and intelligible? (Cukier et al., 2009).

V. Methodology

For the purpose of data collection and analysis, an adaptation of CDA of Cukier, Bauer and Middleton (2004), Stahl et al (2005) and Nyemba and Chigona (2012) provided a useful heuristic for the analysis of the data (see Table 1 below). It is critical to note that due to the limitations of space, not all categories were well represented in this paper but only those that kept recurring across several documents.

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

Validity Claim	Claim-ID	Guiding Questions
TRUTH	TI	**What** is said about the role of technology in teaching, learning and curricula change in the CUT STEPS documents?
	T2	Are the views and opinions (thoughts) **clearly portrayed**?
	T3	What failure claims (**costs**) and success claims (**benefits**) have been exposed and examined?
	T4	What **evidence** has been given 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 **ideological claims** which are uninvestigated?
SINCERITY	S1	Are **metaphors** used in the text, such as exaggerations or hypes on the potential and capacity of technology in relation to teaching and learning?
	S2	Do the used metaphorical connotations **advance** or **restrain** the comprehension of 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 the role of technology in teaching, learning and curricula transformation?
	L3	What is assumed or implied?
	L4	What is **missing** or **suppressed** in the discourse?

The hard data employed in this study which was subjected to CDA was drawn from the Central University of Technology websites and from the Internet. In view of the fragmented data on STEPS, six key documents on STEPS were selected and their various texts were examined. The main highlights of these documents are summarised below.

Table 2: Data sources for the analysis

Title of document		Document summary
1.	1 STEPS (Strategic Transformation of Educational Programmes and Structures) Learnings from the Conference, for the curriculum transformation Workshop	Articulates the vision of the university, the distinctness of UoTs, lessons learned from key speakers and reflections of strategic teams on the content and structure of transformed curricula at UoTs
2.	Central University of Technology Annual Report 2010	Provides a highly summarised version of STEPS goals of curricula review, modalities of teaching, learning and support, as well as graduate attributes and competencies.
3.	Central University of Technology Annual Report 2012	Some of the highlights and landmarks of 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 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 (UoTs): The STEPS process at CUT	Engages with the institutional form of UoTs, genealogy and mandate of STEPS, and conceptualises the curricula envisaged

Four main documents served as primary sources while the others served to corroborate the evidence from main documents and to provide more balanced representation of views.

VI. Presentation and Discussion of Findings

To understand the discourse of emerging technology, the focus of the analysis was on what was said about it and what was omitted/ downplayed in the role of emerging technology in the various STEPS documents. First, we examined the truthfulness of the statements by analysing the actual statements made, the extent of their clarity, the costs and benefits embodied in the statements and the evidence provided to back up the claims. Drawing on CDA, all the recurring findings across the different documents that related to truthfulness of statements were examined.

A. *Truthfulness of statements*

Statements were examined for their truthfulness under the main category *truth*. Document 1 (see Table 2) expressed the vitality 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 not only authentic but were intelligible to the extent the value of computer skills was

not considered in isolation but in conjunction with tuition and self-study by individual students. This demonstrates the Strategic Task Team's deep appreciation of the contribution of the individual student skills, social and ecological context to the successful implementation of curriculum transformation. We infer that the successful delivery of learning and curricula necessitates the curriculum implementers to draw on a multi-pronged strategy, one in which technological literacy is conceived to unfold in a context mediated and interpellated by multiple intervening variables.

To make subjective evaluations about the comprehensibility of statements made in the various documents, the researchers also examined the extent to which various views were and opinions (thoughts) were categorically expressed and clearly portrayed. Some detailed claims were made about emerging technologies such as electronic response systems (i.e. clickers) – in particular their educational affordances, the number of educators trained to use them and the number of classes for which they were pedagogically applied. These highlights demonstrate the truthfulness of technological statements in STEPS documents, notwithstanding the omissions about occasion fatigue by students after using clickers continually and the deflation of hyped expectations following sustained usage. The Hype Cycle for Emerging Technologies (Gartner, 2011) suggests that technology users goes 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 realised from using clickers may not always be straight forward but rather involve ambivalent possibilities given that the progression in the hype of technologies moves from technology trigger, peak of inflated expectations, trough of disillusionment, slope of enlightenment and plateau of productivity (Gartner Report, 2011).

CUT Communication and Marketing Department made some success claims (benefits) about the role of STEPS in the delivery of academic excellence in teaching, learning research and innovation. The document alludes to strategic task teams, [technology mediated] conferences and [technology-enhanced] workshops that deliberated on the STEPS, phrases it evolved, including insights gained from presentations and various forms of participation in the STEPS consultation processes (see T3 in Table 3). While the outcomes of the strategic task teams and the various consultative processes are clear, namely: curricula review and transformation and establishment of new academic structures to meet contemporary teaching, learning, research and innovation challenges, the role of technology in these processes is latent, assumed and not clearly stated.

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

Validity Claim	Claim-ID	Guiding Questions and extracts from STEPS documents
TRUTH	TI	**What** is said about the role of technology in teaching and learning 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 CUT: ▪ Computer literacy will include an entry assessment for proficiency, and include a mix of tuition and self-study to be completed by all students (indicative 6 credits)" (Document 5)
	T2	Are the views and opinions (thoughts) **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 and immediately (Document 3)
	T3	What failure claims (**costs**) and success claims (**benefits**) have been exposed and examined? The Strategic Transformation of Educational Programmes 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 the month of October saw the documentation of the process as well as 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 given to give weight to the arguments? A complete student database was imported into eThuto (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 in a South African university – was conceptualised and constructed as a means of allowing lecturers and students to actively engage with one another using the latest educational technologies 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, including self-study opportunities, by placing more materials

		accessible to students through Blackboard and smart classrooms" (Document 5)-increasing use of technology and adopting it as a medium for content transmission do not in themselves transform learning or impact performance-using technology in creative ways to improve student engagement with content, peers, contexts does.
	T6	Are there **ideological claims** which are uninvestigated? Further there is the impact of the knowledge society through technology: we expect technology to infuse the content of curricula; enrich teaching methodologies, as well as extend coverage and improve quality with e-learning; apply technology to our social and economic issues to "leapfrog" stages of development; and respond to the career and vocational opportunities created by new technologies (Document 1)

Evidence was also provided in view of student training on the use of Blackboard (locally branded e-Thutho), access to multiple courses via this institutional learning management system and the percentage increases in levels of accessibility (see T4 under Table 3). While these developments are commendable as they demonstrate the capacity of emerging technology (e.g. learning management systems) to transmit content and improve student access to learning resources, the statements fail to acknowledge that using technology as a medium for content transmission does not in itself transform learning. Rather using technology in creative ways to improve student engagement with content, peers and learning contexts is a more productive way of improving student engagement and performance. As literature suggests, while education system in the 20th century was predominantly characterised by how much information could be pushed to students, the educational practices of the 21st century are defined more by students' synthesis of information pulled from a deluge of electronic resources and social networks (Ng'ambi and Bozalek, 2013). As such, emphasis has shifted drastically from content transmission to engagement with content and academic networking, although accessing content remains an issue for resource constrained African contexts.

More so, the hyped claims about improved basic access do not take cognisance of the varying levels of access by students on and off campus including their different levels of agency as they traverse various academic spaces. While access to ICTs has the potential to increase access to higher education, reconfigure libraries and institutional management as well as improve the quality of teaching and learning (Czerniewicz, Ravjee, and Mlitwa, 2006) the flipside is that technology only mediate access to educational resources but does not supplant epistemic agency demanded of the student to ensure meaningful appropriation and engagement with these resources. Czerniewicz and Brown (2013) argue that South African university students often display a [troubled], complex technological "habitus," which functions within a paucity of

access and limited practices in relation to computers, in contexts where computers and their associated practices are highly valued.

To evaluate the truth in documents, the researchers explored whether the relevant detail had been conveyed without misrepresentation and/ or omissions. The researchers found the statement "*a SMART classroom – the first of its kind in a South African university – was conceptualised and constructed as a means of allowing lecturers and students to actively engage with one another using the latest educational technologies* (Document 3)" to be an exaggeration and misleading as there were several versions of the smart classrooms across other South African universities by the year it was established at CUT (i.e. in 2012). For example, as early as 2008, the Centre of Educational Technology already had advanced version of smart classrooms for the delivery of seminars for its Masters in ICTs in Education programme.

To unpack the truthfulness of statements, the study also examined the ideological claims which were uninvestigated. The statement: "*Further there is the impact of the knowledge society through technology: we expect technology to infuse the content of curricula; enrich teaching methodologies, as well as extend coverage and improve quality with e-learning; apply technology to our social and economic issues to "leapfrog" stages of development; and respond to the career and vocational opportunities created by new technologies* (Document 1) presented multiple underexplored ideological assumptions. For instance, the capacity of technologies to promote social empowerment and leapfrog development has no fundamental base given the irrefutable evidence that hopes of technology mediated transformation in African institutions have since been dashed judging from ICT4D debates. Such technological determinism is conceived as one of the major reasons behind the failure of ICT for development programmes (Heeks, 2010).

B. *Sincerity of statements*

The sincerity category examined the absence of ulterior motives in the jargon used in statements. The discourses were tested for their immunity to exaggerations or hypes about potential and capacity of technology and examined the metaphorical connotations in texts to assess whether they create 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.

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

SINCERITY	S1	Are **metaphors** used in the text, such as exaggerations or hypes on the potential and capacity of technology in relation to teaching and learning? In addition, a SMART classroom – the first of its kind in a South African university – was

		conceptualised and constructed as a means of allowing lecturers and students to actively engage with one another using the latest educational technologies CUT (Document 3)
	S2	Do the used metaphorical connotations **advance** or **restrain** the comprehension of text? Lecture rooms were equipped with the most appropriate audiovisual aids, and as such 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)-oblivious of context where SA have consistently been ranked among the lowest in STEM disciplines

While the metaphorical claim "audio-visual aids" in reference to data projectors signal their power to disseminate information, the general claims about the number of video conferences supported in 2012, number of blackboard training given to specific numbers of teachers are commendable expressions of the development of technological capacity development at the this university. That said, these narratives are in no way instantiations of the actual educational use of technology or mediation of pedagogy by technology. As Ng'ambi and Bozalek (2013) suggests, for emerging technologies to be diffused in university social systems, more transformative leadership is required in the academic uptake and adoption of technologies.

While the metaphorical claims about the "knowledge economy" and it being underpinned by numerically and scientifically literate, technology fluent human resource base are spot on, these claims tend to be oblivious of the South African context in particular the fact that South Africa has performed dismally in the Science Technology Engineering Mathematics (STEM) disciplines especially Science and Mathematics at the high school level. South Africa's active participation in the Southern African Association for research in mathematics, science, technology Education (SAMMSTE) that investigates problems of the teaching and learning of mathematics, science and technology education in Southern African countries is one clear manifestation of the country's inability to cope with these challenges (Stoll 1995:16). A Southern and Eastern Africa Consortium for Monitoring Educational Quality study (SACMEQ II) which rated South African 6 learners' achievement in a hierarchy of competencies reported that 80% of them reached the lower

half of eight levels of competence in mathematics on the SACMEQ (Moloi, n.d.).

C. *Legitimacy of statements*

The Vice Chancellor of CUT spoke eloquently about the constitutive components of STEPS with a view to support the implementation of this process (see L1 in Table 4). While various academic areas covered by STEPS are represented in his account, his account could be reflective of a senior management perspective, which might not be commonly shared by academics in line management, notwithstanding the consultative nature of the STEPS process.

The study also examined what is explicit and what is implied in the statements. The statement under category L3 (see Table 4) 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 multiple variables such as the general academic under preparedness of students who enroll at Universities of Technology in South Africa and negates the fact that self-regulated and independent learning tend to be hard or almost impossible to enforce for first year learners.

Table 4: Critical Discourse Analysis of raw data from various STEPS documents – Legitimacy category

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)-who is speaking the VC of CUT.
	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: Sufficient expertise in the field to be able to be immediately productive in the work environment (employable) Computer numerate: Able to use the computer packages used in the specific work environment and sufficient conceptual ability to adapt to 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 co-ordinated curriculum development process, which arose from the fact that CUT's Vision 2020 requires the review of the philosophy, content and structures within the academe (Document 2). "The task team approached the research needed to inform its recommendations with the following activities: The opportunities to be realised by technology were considered, and particularly the later releases of Blackboard were considered. Opportunities for interactive classrooms, offering courses on-line and online, formative and summative assessment need to be realised" (Document 5). Assumptions made about interactivity online offerings

The study also examined what is missing or suppressed in the discourse. Statements made under category L4 constitute sweeping statements on the capacity of technology to transform curricula, academic structures and teaching philosophy as they are articulated without providing sufficient grounds for making these claims. Technology is presented as a powerful force for advancing curricula transformation without providing an empirical base for the demonstration of how it reconciles and harmonizes these diverse concerns (teaching, academic structures and curricula). The other statements under the category L4 highlight the research consultations by the strategic teams to establish the potential of technology to promote interactive classrooms, offer online courses and promote assessments. While such interrogation of the significance of technology in teaching and learning is crucial to promote a reality check on the hypes about the academic affordances of new technology, the statement that "opportunities realised by technology were considered" insinuates that the strategic team had some preconceived unsubstantiated notions about the power of technology in transforming pedagogy.

VII.   **Conclusion**

The study examined STEPS, a strategic process of transforming curricula and academic structures at the Central University of Technology in South Africa to establish the extent to which emerging technology was factored in by strategic planning team and senior management at the university including the role and significance of emerging technology in the STEPS process. Evidence suggests 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 programmes, many of the statements about technology promises and potentialities seemed to be hyped constructions of technology that reinforced technological determinism. While hard data was often provided in annual reports on the numbers of staff trained in the use of various technologies, the functionalities of certain technology and applications, there were no practical examples on best practices of innovative technology mediated teaching or a serious commitment to provide evidence on the actual impact of technology on pedagogy. Much of the statements in reports seemed to be recycled, recursive accounts of what emerging technologies can do (i.e. its potentialities), its capacity to transform social and teaching practices without providing any factual information on its actual impact (what was has actually done or its contribution to pedagogy, curricula transformation or transformation of academic structures).

Although technology highlights served to provide evidence of the appropriation of technology at the university, many of the reports took a performative and corporatist perspective to technology - where 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 technicist and performative orientation towards technology should be replaced by a focus on what various technologies have actually done to innovatively mediate and transform teaching and learning.

With regard to the interests represented the study reports that although many of the strategic planning documents seemed to reflect the views of the majority of educators involved in teaching and learning, the coordination of the various seminars and conferences by senior management and those in leadership positions (e.g. deans of faculties, senior academics) could insinuate that these academic elites' views were sedimented into STEPS documents by virtue of their academic authority, subtle influence and the control they exerted on the consultative processes. Cukier et al (2004) warns against "selective silence" where the voices of those "in favour of" greatly outweigh the voices "in contradiction of" (Nyemba and Chigona, 2012). Although many of the statements had statistical significance (as hard data on technology-related activities was provided), these statements were often tweaked to obfuscate a deeper understanding of the actual contribution of technology to teaching, learning, and curricula transformation.

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