

Pedagogies for critical thinking at universities in Kenya, Ghana and Botswana: The importance of a collective “teaching culture”

Abstract

While critical thinking is widely regarded as a key outcome of higher education, research has shown that in practice it is only developed when certain conditions are in place, relating to the pedagogical approach, the nature of the curriculum and the level of challenge, amongst other factors. This article reports on findings from a four-year mixed methods study in Botswana, Ghana and Kenya, aiming to investigate the factors underpinning the successful development of critical thinking amongst undergraduate students. A two-stage critical thinking assessment was conducted with students in 15 sites, showing that only some of the institutions were ensuring significant gains in students’ critical thinking, even when endorsing learner-centered methods. The study points to the central importance of teaching orientations amongst lecturers, involving a deep shift in approaches to knowledge, and a facilitation rather than a transmission approach.

Keywords: African higher education; critical thinking; higher education pedagogy; learner-centred education; learning gain

Introduction

The perceived links between critical thinking and the demands of the “knowledge economy” - as well as concerns about how best to prepare graduates to become reflexive and active citizens, following career trajectories which are as yet largely unknown - have positioned critical thinking as a crucial outcome of a university education all over the world (Star & Hammer, 2008; Task Force on Higher Education and Society, 2000; UNESCO, 2009). Critical thinking is also seen as crucial to solving complex development challenges, such as climate change, peace building and conflict resolution, fostering an active citizenry and holding governments to account (Author 2019; Bengtsson, Barakat & Muttarak 2018; Rieckmann, Mindt & Gardiner 2017). As such, universities almost universally assert that they encourage the development of critical thinking skills in their students.

Despite the apparent consensus around the importance of critical thinking, there is evidence to suggest that in many Sub-Saharan African contexts students may not be improving such skills as a result of university study (Author, 2015; Africa-UK Engineering for Development Partnership, 2012). As a result, in recent years, many universities in the sub-region have explicitly reformed their curricula and/or pedagogical approach in order to better foster student critical thinking ability (Brewis & McCowan, 2016; Author, 2016). Such reform efforts have benefited from a substantial body of research, focused on the kinds of pedagogical approaches that are more or less likely to encourage critical thinking in students (e.g. Blaich & Wise, 2010; Moon, 2008; Terenzini et al, 1995; Tsui, 2002). However, almost none of this evidence base comes from the sub-region, nor from any comparable contexts. Indeed, there has to date been little empirical

analysis of effective pedagogical practice within Sub-Saharan African universities, with the exception of South Africa (Waghid, 2009), let alone of pedagogy that might explicitly support critical thinking. Pedagogical reforms implemented at African universities have not therefore been developed from a local evidence base, which – given that teaching and learning are fundamentally cultural processes – raises concerns about the applicability of the models advanced.

This article outlines the key findings from a four-year study, in which we explored this premise in three African contexts: Kenya, Ghana and Botswana. The study investigated why particular reform efforts implemented in the three contexts were more (or less) effective at supporting the development of student critical thinking skills than other approaches. The study's conclusions indicate that students in the three contexts do appear to have benefitted from pedagogical models found to be successful in enhancing critical thinking elsewhere in the world. However, they do highlight some of the key barriers and enablers that other universities in Sub-Saharan Africa will likely need to consider, if interested in attempting a similar reform effort on their campuses. The paper will begin by outlining the key theoretical concepts underpinning the study before outlining the study methodology. The key findings will then be presented and discussed.

Towards a definition of critical thinking

Despite its broad acceptance as a crucial learning outcome of a university education, 'critical thinking' is one of the most contested constructs in education. Researchers and theorists argue over its definition, its relationship with similar constructs (such as 'reflective thinking' or 'problem solving') and its scope. Davies and Barnett (2015) have classified the existing definitions of critical thinking into three main groups: those viewing critical thinking as 'skills in inference making and argumentation'; those viewing critical thinking as '(reflective) judgment formation'; and those viewing critical thinking as 'a variety of dispositions and attitudes' (p. 10). Within these three groupings, it is possible to identify two main themes: the 'cognitive elements' of critical thinking (e.g. argumentation, inference making, etc.) and the 'propensity elements' (e.g. dispositions and attitudes) (Halonon, 1995).

In addition to this broad conceptual difference, the field is divided between those who view critical thinking as a *generic* skill (e.g. Ennis, 1985) and those who see it as *discipline-specific* (e.g. Moore, 2004, 2011). In recent years, this debate has been somewhat mitigated by arguments suggesting that critical thinking is both generic and discipline-specific, in the sense that critical thinking comprises a number of generic cognitive skills which can be applied across disciplines but which may rely on fundamentally different criteria depending on the discipline (see, for example, Lipman, 2003).

There is another strand of theory and practice around criticality in education of a more political vein, with its origins in the critical theory of the Frankfurt School. This approach views the 'critical' as being directed primarily at unjust status quo brought about by contemporary capitalism, and criticality as part of a process of emancipation, of stepping outside of the hegemonic common sense. The primary theorist of this view within education is Paulo Freire (1972; 1994), who put forward a detailed account of the *conscientising* process enabling the exercise of *praxis*, a generative cycle of reflection and action leading to societal transformation. These ideas have been extended in the latter 20th century through others associated with the

critical pedagogy movement such as bell hooks (1994), Henry Giroux and Peter McLaren (Giroux & McLaren 1986). While the authors recognise the importance of this strand of thinking, we were guided by the conceptualisations of critical thinking evident in the discourse and practice of the participating universities, and none of them emphasised this more political understanding of why critical thinking might be supported.

In this project, we adopted a ‘skills-plus-dispositions’ conceptualisation of critical thinking, as all of the university reforms included in the study rest on the premise that university education should both teach students how to use a broad range of cognitive skills and inculcate the disposition to use them when confronted with complex challenges in the real world. One of the leading theorists taking such a view of critical thinking, Deanna Kuhn, has contributed to the generalist versus discipline-specific debate by conducting extensive empirical research into cognition and epistemology across domains. Her work (e.g. Kuhn 1999) supports the more nuanced view advocated by Lipman and others, as it suggests that individuals learn critical thinking skills by practicing them – and, crucially, seeing them modelled – *across* disciplines and domains but that the subsequent application of such skills to ‘ill-structured’ problems in the real world¹ has generic attributes (i.e. once one has learned the skills of argument by practicing them in different domains, one applies them in a similar way in daily life, regardless of the topic under consideration).

Given the particular focus of this project, it is important to supplement this more general discussion with an acknowledgement of a third debate within the literature: whether or not critical thinking can be viewed as a universal construct or a uniquely Western approach to reasoning. In recent years there has been renewed awareness of the Eurocentrism of the academy and higher education institutions, with a questioning of epistemologies and emerging processes of decolonisation, drawing on postcolonial theorists such as Fanon (1956), Said (1995) and Mbembe (2016). Alternative epistemic approaches have been put forward in the form of ‘epistemologies of the South’ (Santos, 2015) and Southern Theory (Connell, 2014), and influential paradigms have emerged from Southern Africa (*Ubuntu*) and Latin America (*Sumak Kawsay/Buen Vivir*). While these debates have relevance for critical thinking, much of the cultural specificity debate within the critical thinking literature has focused on cultural differences between models of cognition. In this domain, the majority of work has contrasted ‘Western’ and ‘Eastern’ models, rather than engaging specifically with any African contexts. However, the central arguments in the Western/Eastern debate are instructive for this study, as they highlight the major concerns in assuming similarities in cognitive development across cultures.

One of the foremost scholars in this domain is Barbara Rogoff (2003), who has argued that cognitive development can only be understood in light of cultural practices, given that cognitive functions develop in different ways depending on cultural circumstances. In terms of critical thinking in particular, Norenzayan et al (2002) have claimed that Western and Asian students differ in their preference for using formal or intuitive reasoning, suggesting that such differences are likely to be the result of dissimilarities in cultural norms and pedagogical practices, while Durkin (2008) has observed that Asian students studying in the UK are less likely to demonstrate criticality in their academic work, not because of a lack of ability but because of

¹ ‘Ill-structured problems’ are defined as “problems with no definitive solution” (Kuhn, 1991, p. 7).

an aversion to critique, which they tend to see as a confrontational, and therefore offensive, practice.

In contrast, other scholars disagree with the premise that there are fundamental differences in cognition between cultures. Chan and Yan (2008), for example, have argued that, although preferences regarding the *use* of reasoning are culturally specific (i.e. the propensity elements), people are equally likely to form logical judgments, regardless of their culture of origin, depending on their level of education and their exposure to the use of reasoning to address problems. Ryan and Louie (2008) present a similar argument, suggesting that it is problematic to conflate Asian students' disposition to use critical thinking with their critical thinking ability.

Although largely focused on Asian cultures, the themes outlined in this section are relevant for any discussion of critical thinking in Kenya, Ghana and Botswana. Despite the cultural diversity in the region, there are scholars who claim a uniquely African "way of thinking", which privileges collective decision-making over individual analysis and the reliance on intuitive, rather than analytical, reasoning (e.g. Ngara, 2012). Such an argument implies that "being critical" might not be valued in many African societies, including the three countries of interest in this study. However, there is also a growing awareness that globalisation and migration have complicated some of these traditional cultural distinctions (Crossley & Watson, 2003; Yang, 1988). Indeed, the emphasis on critical thinking as an important learning objective in all three countries suggests that reasoning and problem solving *are* highly valued within all three societies.

Given the value ascribed to critical thinking in all of the study contexts, we assume that students in all three countries are motivated to acquire critical thinking skills – and, dependent on their prior education, equally able to demonstrate them. However, we also acknowledge that there are cultural dimensions which may affect the propensity or disposition to use those skills in the 'real world', as well as the process through which they may develop.

Supporting the development of critical thinking in university students

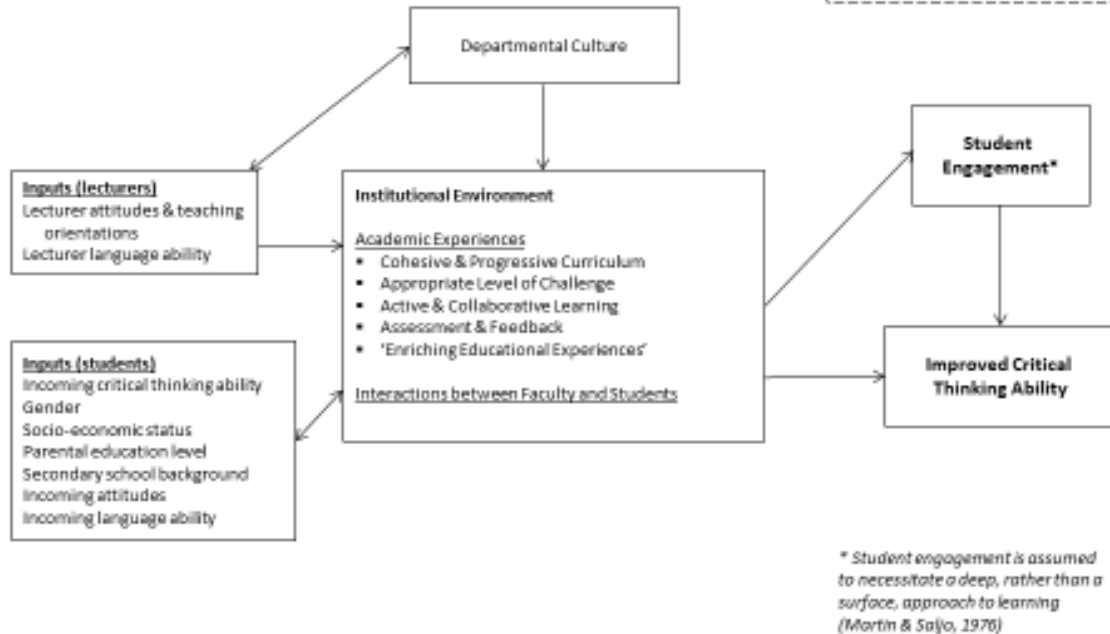
Kuhn's theory suggests that critical thinking can be developed over time, and there is empirical evidence to suggest that it can be improved as a result of university education (see Hatcher, 2009; Pascarella & Terenzini, 2005; Saavedra & Saavedra, 2011). Yet the evidence is equally clear that critical thinking does not automatically improve as a result of university attendance. Indeed, recent studies in the USA, Scotland, Australia, Hong Kong and Rwanda have indicated problems in this regard, by identifying institutional contexts in which students did not demonstrate any significant improvement in their critical thinking ability during their time at university (Arum & Roksa, 2011; Blaich & Wise, 2010; Phan, 2011; Pithers & Soden, 1999; Author, 2015).

There are a number of different factors which affect the likelihood of students acquiring improved critical thinking skills during university. In her recent study of critical thinking in Rwanda, one of the authors of this article (Author 2013) proposed a conceptual framework (presented below as Figure 1) that brought these factors together, through the use of an Input-Environment-Output (as suggested by Astin, 1970). As the model is both comprehensive and adapted for use in an African context, we elected to use this framework as a guide to this study. In this section, we briefly present the main factors included in the model, although interested readers may also wish to refer to Author (2015, 2016a, 2016b) for more detail.

Framework format based on Input-Environment-Outcome model of college impact (Astin 1970)

Figure 1: Conceptual Framework

Initial framework based on Arum & Roksa (2011), Bleich & Wise (2010), Kember & Leung (2005), Kuhn (2005), Kuh et al (2005), Lonka & Ahola (1995), Moon (2008), Rosenahine & Meister (1992), Terenzini et al (1995) and Tsui (2001, 2002); modified based on Schendel (2013)



Most importantly, the model acknowledges that academic experiences within university appear to have the greatest impact on the development of critical thinking skills. Specifically, the nature and structure of the curriculum, the level of challenge expected of (and support provided to) students, and the pedagogical approach (including the approach to assessment) have all been found to have a marked impact on student critical thinking ability. It is this part of the literature which is most often referenced as the justification for pedagogical innovation within universities, as the assumption is that, if academic experiences are the most important factor influencing student learning outcomes, then changes in pedagogy are likely to have a substantial effect (Browne & Freeman 2000). However, the model also recognizes that academic experiences should not be conceptualized as neutral and technically easy to alter, given that they are fundamentally shaped by lecturer attitudes, teaching orientations and motivations, as well as diverse epistemologies and ontologies – all of which are influenced by the surrounding departmental (or, at smaller institutions, institutional) culture and more broadly by local and national cultures.

Indeed, orientations towards teaching have been found to have a fundamental effect on the likelihood that particular pedagogical approaches will have an impact on student critical thinking ability (Author, 2016). In their seminal study of teaching orientations, Kember and Gow (1994) identify two broad categories of teachers: those with a “knowledge transmission” orientation (in which they understand their fundamental role as being about transmitting knowledge), and those with a “learning facilitation” orientation (in which they understand their fundamental role as being about facilitating students to engage in their own process of

discovering new knowledge). Many of the pedagogical methods often assumed to positively affect critical thinking (e.g. class discussion, group projects, open-ended assessments) will only have such an effect if implemented by an instructor with a learning facilitation orientation.² Otherwise, these same methods can be used to transmit knowledge (i.e. by holding a class discussion in which the focus is on clarifying the “right answer” or by organizing an open-ended assessment which tests student ability to recall information delivered by the teacher). Teaching orientations, therefore, play a fundamental role in any attempt to teach “for critical thinking”.

In addition to faculty backgrounds, the model also acknowledges that students enter university with their own attitudes, perceptions and prior preparation, all of which affect both levels of incoming critical thinking ability and the likelihood of improvement over time. These incoming characteristics, meanwhile, are substantially affected by demographic characteristics, particularly socio-economic status, secondary school background and parental education level. In some contexts, gender is also a significant factor.

The model also emphasises the importance of student engagement as a crucial mediating factor in the development of critical thinking skills (Astin, 1984; Carini, Kuh, & Klein, 2006). As the evidence suggests that the same kinds of academic experiences likely to improve critical thinking are likely to increase student engagement, it can be difficult to disentangle the direct and indirect influences on improved critical thinking ability. *Author’s* model incorporates this phenomenon by suggesting that individual backgrounds, academic experiences and institutional culture can both directly affect critical thinking and indirectly influence it by increasing student engagement levels. The model also assumes synergy between the literature on ‘attitudes to learning’ (i.e. Biggs, 1985; Marton & Saljo, 1976) and that on student engagement (i.e. Kuh & the Documenting Effective Educational Practice Project, 2005), recognising that both constructs refer to a student’s level of engagement with their academic learning and assuming that both can be improved (or ‘deepened’) through particular kinds of academic experiences within university.

Study Context

It is important to begin this section by clarifying that, although this study was based in three countries, it was not designed to be traditionally ‘comparative’, in the sense of comparing the three contexts at the country level. This was because, although there is obviously tremendous cultural diversity within the sub-region, we had no *a priori* reason to believe that student improvement in critical thinking *when exposed to the same pedagogical innovations* would vary due to any national-level cultural factors, nor did we believe that national-level culture would help to explain differences in the ‘uptake’ of such innovations by faculty. Rather, it seemed likely that any differences identified would be the result of certain approaches being more or less effective and/or of institutional norms that might explain the relative success of a particular intervention. At the same time, we did not want to overly limit the potential generalizability of the study by restricting ourselves to only one country context. As the study funding was sufficient to support three country teams, we opted to select research sites from three country contexts. However, we did not strive to recruit a nationally representative sample in any of the three

² It is important to acknowledge that a knowledge transmission orientation can be very successful at encouraging other kinds of learning outcomes. However, such an orientation does not help to develop the kinds of skills necessary for critical thinking.

countries. Rather, we selected institutions that would help us to answer our key research questions (elaborated further below).

The three countries selected for this study - Ghana, Kenya and Botswana – were chosen because they share a number of common characteristics, while also showing some important elements of diversity. In addition to the key rationale of emphasising university teaching as a key focus of reform efforts in recent years, these locations use English as their medium of instruction and have their roots in the British model of higher education (both due to their shared history as British colonies). At the same time, the three countries are located in different regions – West, East and Southern Africa - and have different levels of income, in addition to other distinctive features, which introduced important elements of variation in the analysis.

Crucially, for the purposes of this study, it was possible to locate a number of institutions (or sub-units within institutions)⁴ in all three contexts where there had been some attempt at an “innovation” in pedagogy, which the literature suggests would have a positive impact on student critical thinking skills (e.g. the use of problem-based or experiential learning, an emphasis on group work, the use and provision of formative assessment and feedback, and the creation of reflexive academic staff development programmes). These sites (three each in Ghana and Kenya and two in Botswana) were identified through a series of stakeholder consultations in the three countries (held in Summer 2015). For comparative purposes, we then worked to identify similar institutions (or sub-units) where no such pedagogical innovation had been attempted. The final institutional sample consisted of 15 sites in 14 institutions (six each in Ghana and Kenya, and four in Botswana, given the much smaller size of that country’s higher education system), with eight “intervention” sites (i.e. where innovations had occurred) and seven “comparison” sites⁵. These sites are described in Table 1. In accordance with ethical requirements, all institutions remain anonymous, and are represented by a code in this article, but their relevant characteristics are outlined below.

Table 1: Summary of research sites

Country	Type of Site	Role in Study	Innovation and Rationale for inclusion	Code
Kenya	Faculty within a public university	Intervention	Problem-based learning across curriculum; community placements Problem-based learning simulates student engagement with ill-structured problems, which has been found to encourage the development of critical thinking skills. Community placements extend beyond classroom-based learning by requiring students to engage with complex problems in the ‘real world’, thereby encouraging	Kenya Public A

⁴ As the student experience at most African universities is limited to the faculty or school, our intention was to use university faculties as the central unit of analysis for this study. However, following consultation with stakeholders, it became clear that some of the most promising interventions had been designed as university-wide reforms and would thus be best investigated at the institutional level. Our final institutional sample, therefore, included both institutions and individual faculties.

⁵ See footnote 6 for discussion of why the eighth comparison site was ultimately excluded from analysis

			both cognitive development and student engagement.	
Kenya	Faculty within a public university	Comparison		Kenya Public B
Kenya	Faculty within a private university	Intervention	<p>Active faculty development programme; use of constructive alignment in all modules; required critical thinking module for first-year students</p> <p>The faculty development programme supports faculty to develop the kinds of active, collaborative, and 'student centred' methods of pedagogy likely to support the development of critical thinking skills in students. In the faculty itself, nearly all of the lecturers have chosen to attend faculty development workshops, so there is reason to believe that such methods are being incorporated across the curriculum. In addition, an explicit module, focused on critical thinking, has been introduced as a requirement for all first-year students.</p>	Kenya Private A
Kenya	Faculty within a private university	Comparison		Kenya Private B
Kenya	Private university (whole institution)	Intervention	<p>Active faculty development programme</p> <p>This university has a similar faculty development programme to the one outlined above with a similar uptake from the lecturing staff. We therefore assumed that students were being exposed (across the curriculum) to the kinds of reflective, active and collaborative pedagogical approaches found to encourage critical thinking in other university contexts.</p>	Kenya Private C
Kenya	Private university (whole institution)	Comparison		Kenya Private D
Ghana	Faculty within a public university	Intervention	<p>Community placements</p> <p>All students at the end of first and second years have an intensive experience of living and working in a rural community, involving carrying out a diagnostic assessment of development needs. (See general rationale for community placements above).</p>	Ghana Public A

Ghana	Faculty within a public university	Comparison		Ghana Public B
Ghana	Department within a public university	Intervention	Problem-based learning; community placements See rationale for problem-based learning and community placements above.	Ghana Public C
Ghana	Department within same public university	Comparison		Ghana Public D
Ghana	Private university (whole institution)	Intervention	Liberal arts modules for first- and second-year students; community placements; active faculty development programme Students in all programmes are required to do modules in social studies, African studies etc. to encourage them to adopt a critical approach to knowledge and to develop generic skills of analysis, interpretation and argumentation. There is also an active programme of pedagogical support for faculty.	Ghana Private A
Ghana	Private university (whole institution)	Comparison		Ghana Private B
Botswana	Faculty within a public university	Intervention	Problem-based learning across curriculum; extensive group work; community placements Same rationale as listed above.	Botswana Public A
Botswana	Faculty within same public university	Comparison		Excluded from sample ⁶
Botswana	Faculty within a private university	Intervention	Active faculty development programme Same rationale as listed above.	Botswana Private A
Botswana	Faculty within a private university	Comparison		Botswana Private B

Methodology

⁶ This site was initially included in the institutional sample, but due to significant attrition of participants between the first and second critical thinking assessments, it was not possible to report the results.

The study was guided by the following core research questions: first, are any of the pedagogical “innovations” implemented at universities in Kenya, Ghana and Botswana having a significant impact on student critical thinking ability? (And if so, which are having the most substantial effect?) Second, why are particular interventions successful – or unsuccessful – at improving critical thinking ability?

These questions were investigated through a mixed methods design, comprising a longitudinal study of student outcomes and a qualitative investigation of how institutions are able to encourage processes of pedagogical change.

Longitudinal analysis

Within each of the selected research sites, a random sample of 170 incoming undergraduate students was recruited to participate in the longitudinal component of the study. All student participants completed a critical thinking assessment during their first year – and again during their third year – at university. The critical thinking assessment took the form of a “performance-task” exercise, based on the performance task component of the Collegiate Learning Assessment, but adapted for use in the study contexts (following the adaptation methodology outlined in Author, 2017). The performance task asked students to imagine that they were in a ‘real world’ scenario, in which they had to make a choice in a decision for which there was no clear ‘right’ answer. They were provided with seven documents, which included different kinds of evidence related to the decision, and were asked to answer a series of questions, which were intended to simulate their ability to select and apply, interpret and evaluate, and synthesise the information from the documents.⁹ In addition, student participants completed a number of other quantitative instruments, intended to measure a range of relevant individual and institutional characteristics. During the first round of data collection (i.e. during their first year at university), participants completed two questionnaires: first, an adapted version of the Study Process Questionnaire (SPQ), an instrument designed to capture student ‘approaches to learning’ (Biggs, 1987; updated Biggs, Kember & Leung, 2001); and second, a short demographic survey, designed exclusively for this project, which included questions about participant gender, family and secondary school background, secondary school achievement/qualifications, socio-economic status (as captured through an asset-based index) and university enrolment. During the second round of data collection (i.e. during their third year), participants once again completed the adapted SPQ, so that we could ascertain if there was any change in their approaches to learning over time. They also completed an adapted version of the National Survey of Student Engagement (NSSE), a questionnaire that collects information about the academic experiences encountered by participating students at their institutions.

Participation rates in the first round of the study were generally quite high across the sample (greater than 70% of the total sample in most cases). However, the study did suffer from significant attrition, with less than 60% of those who participated in the first round agreeing to participate again in the second round. The total sample for all three countries was 1,812 students at baseline and 1,068 students at endline.

⁹ Space limitations prevent a full discussion of the assessment tool here; interested readers are referred to Authors (2020) and Author (2017) for further details.

The first stage of quantitative data analysis was largely descriptive in nature, although we did conduct some regression analysis at baseline to get a sense of the predictive effect of background characteristics on incoming critical thinking ability. We also investigated the correlation between critical thinking ability and 'surface' approaches to learning. The baseline also allowed us to test for background factors likely to affect the selectivity of the programmes involved in the study, in order to determine if selectivity was likely to be a factor affecting the final analysis.

After the second round of data collection, scores on the critical thinking assessment were compared alongside the baseline scores in each site in order to determine whether students enrolled in particular sites (and exposed to particular kinds of pedagogy) demonstrated relatively more progress than students enrolled in other institutions. It is crucial to note that our analysis focused on comparing these 'gains' between baseline and endline, rather than simply comparing student scores across contexts. As discussed above, this allowed us to compare the impact of particular interventions, rather than comparing the relative demonstrated abilities of students in the three country contexts.

Institutional case studies

Between the first and second round of quantitative data collection, the project team completed qualitative case studies of all of the participating institutions. These involved the following data collection methods, within each of the participating institutions: examination of teaching and learning materials (or other institutional documentation) for content likely to aid (or otherwise) critical thinking development; focus groups with students, focusing on general teaching and learning processes within the research site; interviews with lecturers, emphasising their teaching orientations and motivations, and their understanding of critical thinking (i.e. what it is, whether it is important and how it might be improved through particular approaches to pedagogy). Lecturers at 'intervention' sites were also asked about their understanding of the rationale for – and practice of – the innovation. Within the 'intervention' sites, we also supplemented our data collection with additional interviews with other relevant stakeholders and key informants (e.g. representatives of Centers for Teaching & Learning; administrators involved with teaching, learning and assessment policy, etc.). These interviews focused on the rationale for introducing the interventions, their perceptions of how implementation has worked at their institution, and their perceptions of the main barriers and enablers.

Students who participated during the first round of the study were recruited to participate in the focus group discussions. Between two and five focus groups were held at each research site. Staff/faculty members were selected purposively, in an effort to ensure a broad representation of perspective and (in the case of the 'intervention' sites) to capture the rationale behind - and process of implementing - the intervention in question. Generally, ten staff/faculty interviews were held at each research site, representative of a broad range of academic ranks and perspectives.

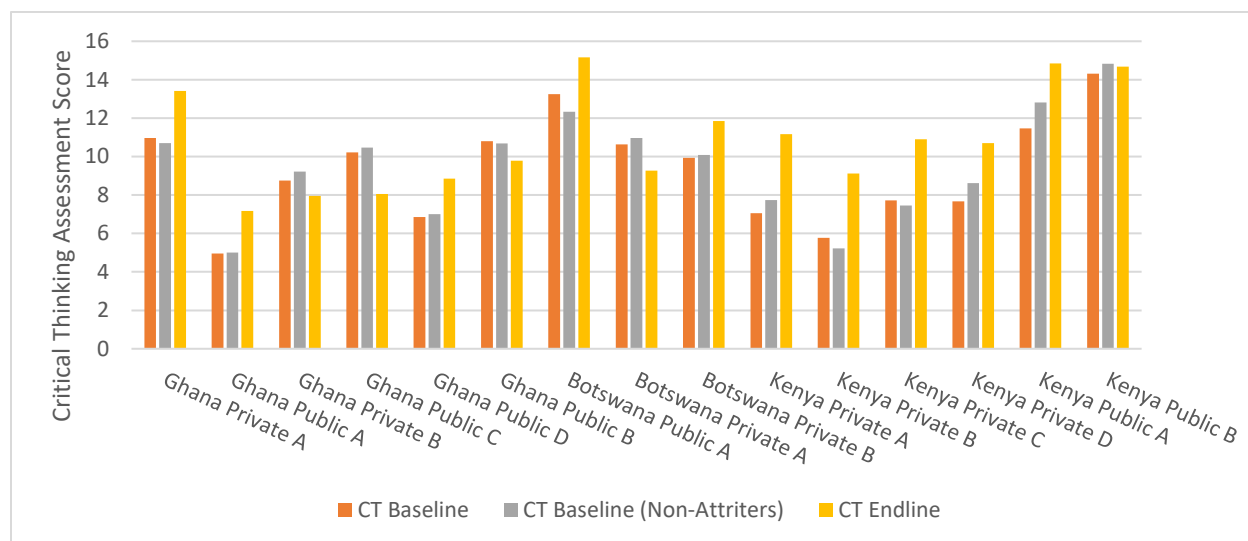
The qualitative data generated by the case studies was thematically coded, using a combination of pre-determined codes (drawn from elements of the conceptual framework) and emergent codes. This combination of inductive and deductive coding allowed us to identify explicit connections with pre-existing literature, while also privileging the emergence of context-specific concepts.

Findings and discussion

Student gains in critical thinking

The first key finding is that not all students improved in their critical thinking skills over time. Figure 2 shows mean baseline and endline scores for the 15 sites in the final sample. In order to account for attrition, the chart also includes a mean baseline score for each site, for those students who remained in the study through to the endline. Comparing the two baseline measures, it is apparent that there is no strong pattern of attrition by incoming critical thinking skill level. A comparison of the non-attrition baseline with the endline across the study sample sites clearly shows that some institutions saw gains, while others did not.

Figure 2: Baseline and Endline Scores, by Research Site



The second key finding is that there is not a simple correlation between the adoption of a pedagogical intervention and student ‘gains’ in critical thinking. As is evident from Figure 2, some of the “intervention” sites showed no improvement in critical thinking over time, while some of the “comparison” sites showed clear gains. Our subsequent analysis identified two core explanations for this finding.

1. Similarity in teaching method

First, the qualitative data indicated that, while there was significant variation between lecturers and departments, the kinds of “learner-centred” teaching methods that one might expect would lead to gains in critical thinking exist in all 15 sites, not just those in the ‘intervention’ group. For example, the use of class discussions and group projects, reliance on multiple assessment points throughout an academic term, and the use of open-ended questions in examinations could be identified in all sites. The crucial point, in terms of the impact of such methods on critical thinking ‘gains’, is that the simple incorporation of some ‘learner centred’ methods is clearly not sufficient. This is not surprising, given that such methods can actually deter critical thinking,

depending on how they are implemented (as discussed above), but it is important to highlight, given that such methods are often presented as a panacea.

2. Barriers to effective implementation

Second, it was possible to identify a number of barriers to the effective implementation of many of the pedagogical innovations included in the study. It is important to begin this part of the discussion by noting that all eight of the selected reforms were implemented (i.e. there was no case in which an intended reform simply did not occur). However, many were plagued by barriers that are likely to have had a significant impact on their success. For example, some of the innovations began as intended but, due to staff turnover, did not persist. In other sites, there was clear variation in implementation, either across departments (in the case of university-wide reforms) or between individual lecturers. In others, a clear “misalignment” could be identified between the pedagogical approach being implemented and the assessment methods in use at the university. Another frequent barrier was class size, a challenge which resulted in lecturers struggling to implement reforms which fundamentally require smaller class sizes – such as project-based curricula or field placements – with inappropriately large numbers of students.

Although there is no doubt that such barriers have a significant impact on teaching, the quantitative results suggest that inconsistent implementation is not a sufficient explanation for limited improvement in critical thinking over time, as some of the institutions showing clear gains also struggled with some of these challenges and still managed to effect positive change. Perhaps unsurprisingly, many of the comparison sites also experienced the same barriers as did the reform sites (i.e. misalignment between pedagogy and assessment; large class sizes; etc), and, in the comparison sample, there was also no clear correlation identifiable in the data between particular barriers and limited improvement over time (i.e. some cases which experienced such challenges still performed well at endline, while others not explicitly experiencing such barriers showed only limited gains).

In itself, this is also an important finding, given that many of these barriers are often presented (including by universities themselves) as insurmountable challenges that limit the possibility of universities across the region successfully reforming teaching on their campuses. However, it does not help to explain why some sites *were* successful in encouraging gains in student critical thinking skills, despite such barriers.

The Importance of a Collective Teaching Culture

In order to answer this question, we moved away from standard baseline-endline analysis to the use of a regression model, in order to acknowledge that student background factors were also likely to affect student gains over time. For example, a site in a particularly disadvantaged region might see spectacular gains, due to the fact that the majority of students would be coming to university from significantly under-resourced secondary schools and might therefore show impressive gains on the critical thinking assessment due to their rapid improvement in literacy skills over the first two years of university (an important learning outcome but not one of direct relevance to this study).¹⁰

¹⁰ From a Freirean perspective, one might assume that students from disadvantaged groups might develop greater criticality in terms of reflexive analysis of the political situation and injustices therein. However, the particular

In order to do this, we employed a simple linear regression model to predict endline scores for students based on their incoming critical thinking scores and background characteristics. A student’s predicted endline score is essentially the average score of students at endline with the same baseline score and basic background characteristics¹¹. Where predicted scores are on average lower than actual scores in a particular institution, students have scored better than expected (based on the whole sample), which may suggest that particular institutional factors have played a role in improving critical thinking skills by more than average, other things being equal. This will include, of course, the pedagogical approach adopted within the institution concerned, as well as other institution-level factors. The results of this analysis are summarized in Figures 3, 4 and 5.

Figure 3: “Predicted” versus “Actual” Endline Scores (Botswana)

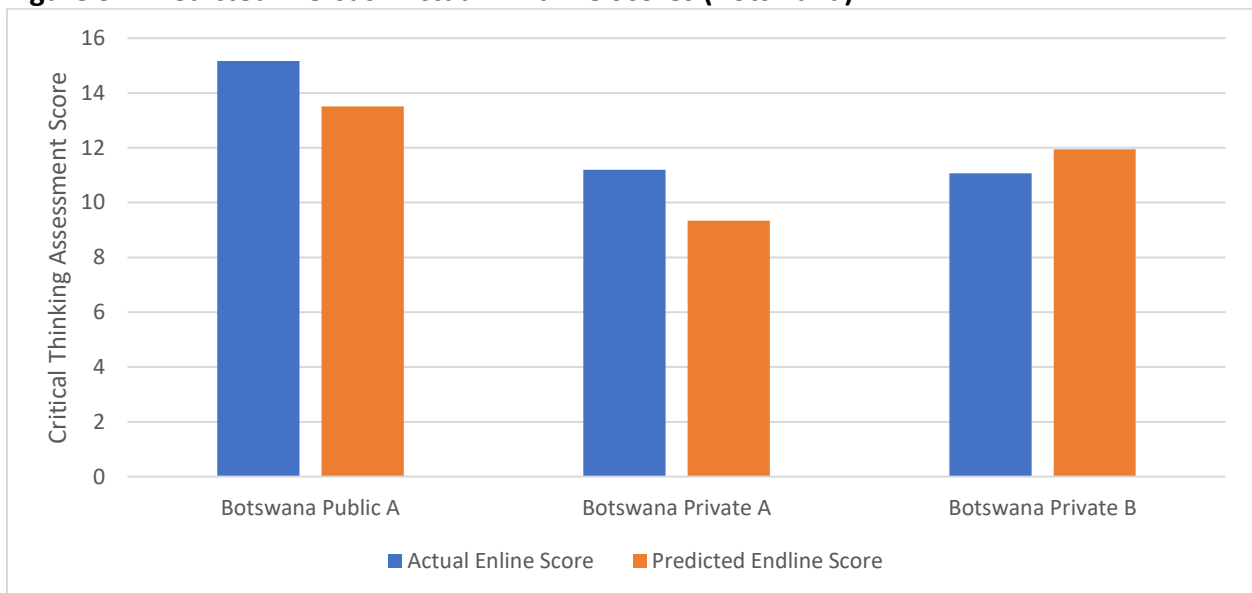


Figure 4: “Predicted” versus “Actual” Endline Scores (Ghana)

assessment used in this study did not assess criticality in this sense, so this aspect is unlikely to have made a difference, whereas the assessment did require high levels of literacy and familiarity with presentations of statistical data, which did presume a certain minimum quality of prior formal education.

¹¹ Predicted scores are estimated using a simple linear regression model with endline score as the outcome and baseline score plus sex, age, household education level, household assets (index) and high school examination scores as the explanatory variables.

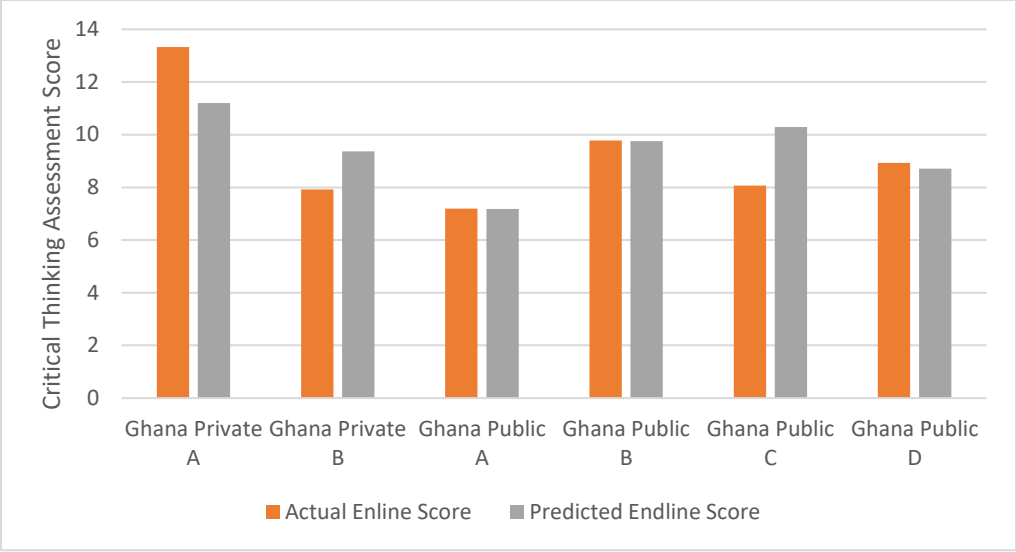
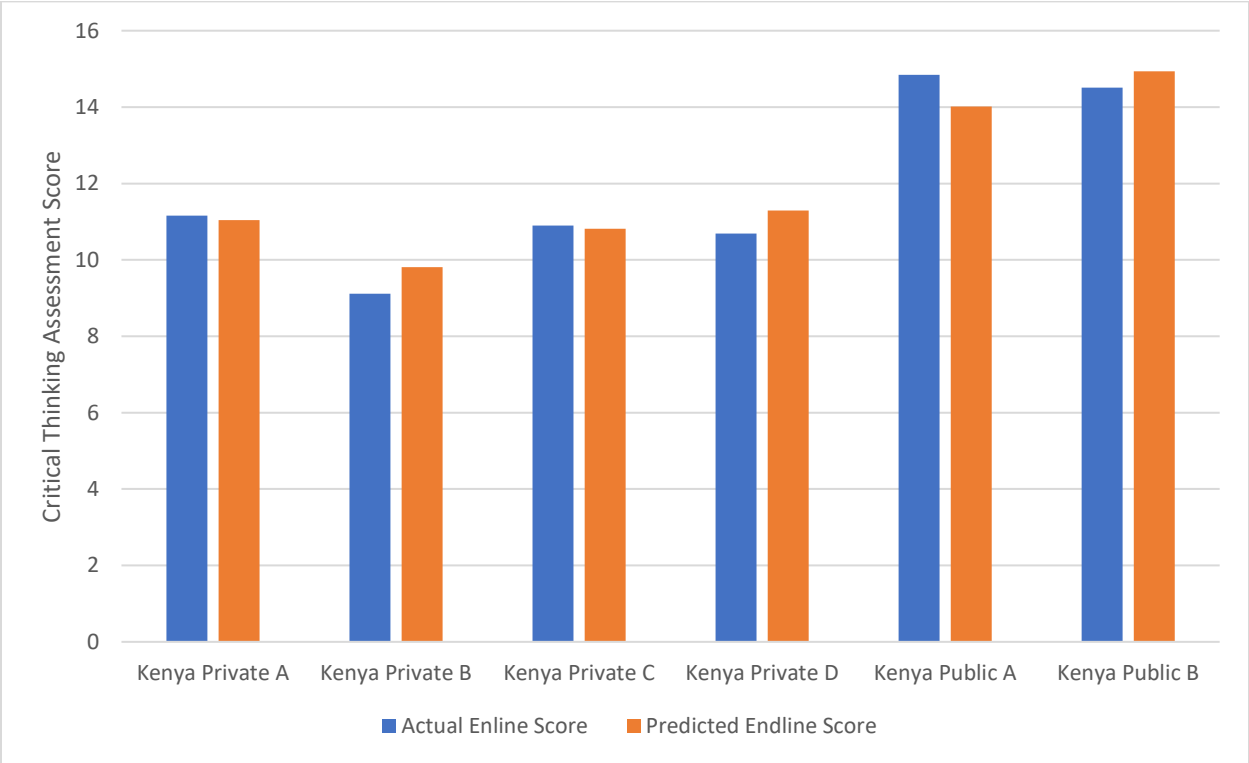


Figure 5: “Predicted” versus “Actual” Endline Scores (Kenya)



This analysis highlighted a slightly different list of sites showing ‘gains’. Although nine of the 15 sites showed some gains in critical thinking skills over time when using a standard baseline-endline comparison, the regression analysis helped us to identify only three ‘stand-out’

institutions in the sample (Botswana Public A, Ghana Private A and Kenya Public A) where student gains were significantly better than would be expected, given their baseline scores and institutional characteristics¹². These three ‘stand-outs’, therefore, became the focus of our subsequent analysis.

As with the initial analysis, there was no easy explanation for these three successes, in terms of either the pedagogical methods used or the infrastructural or financial barriers facing the institution. Two of the three ‘stand-out’ cases – Kenya Public A and Botswana Public A – had incorporated problem-based learning across their curriculum (an approach that certainly lends itself to encouraging critical thinking skills); however, another institution had also implemented problem-based learning without showing a similarly positive effect. One of the cases was very well-resourced with relatively small class sizes; however, one of the other sites was a large public institution, which has struggled with the same staff turn-over and infrastructural challenges as many of the other sites in the sample. There was one easily identifiable similarity between the three sites, and that is that all three are quite ‘selective’ within their country contexts in terms of their student intake. However, other sites in the sample would also be classified as highly selective, and they did not show similar gains. Furthermore, the regression model took student backgrounds into consideration, and these institutions still performed better than one would have expected, even when incorporating student population characteristics and baseline scores.

However, once the qualitative data were considered alongside the quantitative results, another clear pattern could be identified: what set these three ‘stand-out’ cases apart was the fact that all three sites had what one might term a ‘collective’ teaching culture that privileged a) learning facilitation, rather than knowledge transmission, orientations towards teaching, and b) encouraging students to think about what is “unknown” about their discipline, rather than simply learning what is known. That is to say, there was a shared understanding that knowledge in any disciplinary area is in a process of continuing construction, and that students should be aware of uncertainties and contestations, and see themselves as active participants in the creation of new knowledge.

It was possible to identify many individual lecturers within the overall sample who demonstrated these orientations towards their teaching. Indeed, statements like the following could be identified across all 15 of the research sites:

*My teaching philosophy is not that of a bearded professor who comes to the lecture as a reservoir of knowledge and presents in a very low tone, students don't hear and then he'd direct them later to see his assistants ... My teaching philosophy is not that one. So, then I must answer: what, then, is it? It is that of a professor who **understands the changing dissemination of knowledge** and the fact that students might know more or might know the diverse ways of the topic and **must understand what the students know and only position himself as the facilitator of the dissemination of knowledge**. – Ghana Public C, Lecturer (authors' emphasis)*

Another lecturer in Ghana echoed this approach to knowledge:

¹² While Botswana Public A also showed an actual endline score greater than its predicted endline score, it nonetheless scored lower at endline than baseline and therefore this institution was not identified as ‘stand out’.

[One thing that is] important to my teaching philosophy ... I don't ask a question that I know the answer of. That is ... not interesting to me. I might not listen well. But if we ask: why is this happening? Why do we have any inequality in Ghana, why somebody is driving in the Mercedes, somebody else is on the side of the road hungry? I don't know the answer to that ... [it is] more interesting to have that conversations. – Ghana Private A, Lecturer (authors' emphasis)

However, these were often isolated cases within a faculty or department, and it was equally likely for us to identify lecturers with more traditional knowledge transmission orientations, e.g.: “*You need to prepare well and make sure that you're imparting the knowledge that the student lacks*”. (Ghana Public C, Lecturer). In contrast, what set the three ‘stand-out’ cases apart was the fact that *all* interviewed lecturers demonstrated the characteristics of a facilitation approach. In other words, these teaching orientations appeared to be *shared* across the research sites.

There are clear reasons why such a shared teaching culture would positively affect students' critical thinking development. First, we know from the prior research outlined in the first part of this article that the kinds of methods likely to improve critical thinking are only likely to do so *if implemented through a learning facilitation orientation*. Class discussions and group projects which push students to think about what they do not know and apply their existing knowledge to novel situations, rather than verify that they understand the ‘right’ answer, are likely to stimulate the development of such skills. Second, we also know from the extensive literature on “communities of practice” (Wenger, 1999) within education that a shared teaching philosophy is crucial for sustaining pedagogical reform. Once a particular orientation towards teaching becomes ‘the way things are done here’, individual lecturers with a natural tendency towards a knowledge transmission orientation rapidly learn that they must change their approach in order to ‘fit in’, thereby leading both to consistency across the curriculum and to sustainability, even in the face of rapid staff turnover. A shared culture also helps to quickly orient *students* to the academic expectations of the institution, which works against any potential resistance that may arise when they are asked to learn in a different way from their previous educational experiences. Finally, when an orientation towards teaching is shared, it is much easier for the academic staff to work to rectify any institutional barriers to success, such as altering traditional examination practices or working to address the challenges posed by large class sizes.

Our data suggests that these three research sites (Botswana Public A, Ghana Private A and Kenya Public A) had all successfully created such a shared culture amongst their teaching staff – and that the shared emphasis on independent student exploration of the unknown was highly successful in encouraging the development of critical thinking skills. A final question, of course, was *how* these institutions fostered such a teaching culture. As we were only able to collect data at one point in time, rather than observing these institutions over time, it was not possible for us to come to a definitive answer to this question. However, our data do highlight a number of things that likely supported the development of such a shared teaching culture at these sites:

- 1) At least two of the 'stand out' sites had an explicit (i.e. written) teaching/assessment philosophy that was visible to (and regularly discussed by) all staff and students
- 2) These same sites also held orientations for all new staff and students, at which newcomers were explicitly introduced to the teaching philosophy within the faculty/institution. As described by a Head of Department at Kenya Public A:

We have, every year, an introductory course like this one for students because there is no way you can bring new students to your school and you teach differently from the way they are taught, without telling them how you teach them and how you examine them. Because when they fail, eventually, you will be accountable so, we introduce them into that. During this course we also invite new members of staff, all new members of staff who have not learned the PBL¹³ are free to attend so they can also pick the methods, the steps that we follow.

- 3) One (Ghana Private A) also organized regular opportunities for teaching staff to come together and discuss their teaching challenges and successes, thereby providing a space for staff to learn and seek inspiration from one another
- 4) In all three cases, the staff within these sites had worked together to ensure that their curriculum was cohesive, that student learning was 'scaffolded' across the curriculum (meaning that academic support reduced gradually over time), and that critical thinking was 'infused' throughout the curriculum (i.e. by explicitly incorporating critical thinking into the learning objectives of *all* modules, rather than simply being 'taught' in one stand-alone module). We know from prior studies (e.g. Author, 2017b) that the process of working together to revise curricula can help to create a shared teaching philosophy across a department, and it appears that a similar process may also have occurred in these three sites.

While a full assessment of these factors would require separate study, it is clear that creating a shared teaching culture requires simultaneous action at the institutional level, with the establishment of a clear vision and conducive forms of governance, as well as bottom-up dynamics of spaces for staff interaction, collective decision-making and fostering of innovation.

Conclusion

This article has explored the factors underpinning success in improving critical thinking scores among undergraduate students in three African countries, with 'success' gauged through an assessment of critical thinking skills with first and third year students in Ghana, Kenya and Botswana. Some limitations and caveats should be highlighted: first, while the institutions participating in the study represent varied types, they are not intended to be representative of all higher education in the countries in question. Second, the assessment utilised in this study

¹³ Problem-based learning

gauges a specific conceptualisation of critical thinking, based on assessment and synthesis of evidence, and does not incorporate more political approaches to criticality. Furthermore, it consisted of a written test, and therefore depended on fairly high levels of literacy and numeracy among students. Nevertheless, with those caveats in mind the article identifies some significant findings, most important of which that of shared teaching culture as central to gains in students' critical thinking skills.

The implications of these findings are significant for universities across the region aiming to implement pedagogical reforms, as they imply that simply introducing new pedagogical methods to teaching staff is not sufficient for driving real change. In the first place, there is the difficulty in bringing about shifts in teaching practice: while staff may be attending induction sessions or workshops, and are subject to institutional teaching and learning strategy, there is no guarantee that what they do within the classroom will change. Yet there is a more complex challenge presented when lecturers do in fact change their teaching styles and methods, but do so in a superficial way, without it being a transformative experience for students.

Teaching methods do matter, as there are approaches that would never be expected to encourage critical thinking skills (e.g. rote memorization of facts). However, simply requiring teaching staff to use new methods will not necessarily result in different learning outcomes for students. Lecturers' underlying philosophies play a role in whether or not the active methods used in class bring about change. They may apply a 'learner-centered' approach, but use active learning methods only as a way of filling in the time or reducing the monotony of a lecture. As Jennifer Moon (2007) and Mezirow (1991) argue, change comes about where students start making or working with meaning. One academic developer involved in the study noted:

Some [of our faculty] think [that pedagogical training] is about active learning... that is important, but that is not what [it] is all about...[One can also] use more active learning techniques, small groups and debates to make [rote learning] tastier...more fun [and] enjoyable...but [that does not mean that they have made the necessary] pedagogical shift. (Kenya Private C, Director of Center for Teaching and Learning).

In other words, the focus of faculty development efforts needs to be as much on the less tangible aspects of teaching as it is on the methods employed. Teaching staff need to be given opportunities to openly discuss – and, for some, to question – how they perceive their role as teachers and what they understand teaching to be about in order for any shift in orientation to occur. Reflection is also needed on the nature of knowledge, its constantly changing nature, its contestations and the diverse perspectives possible even within a single disciplinary area. This space for discussion is important as critical reflection on the part of individual lecturers is essential to a meaningful transformation of their practice and the underlying orientations. Yet it is also a way of creating a shared teaching culture, a consistency of approach across a department, in which practices reinforce and enrich each other, and new expectations are created amongst lecturers and students that prevent slippage back into transmission-based pedagogy. Critical thinking in this way should be infused across the curriculum, rather than being confined to one curricular area, or the work of some lecturers.

The study also points to a number of important structural characteristics that can affect an institution's ability to effect pedagogical change (e.g. the need for flexibility in assessment structures, in order to support assessment methods that are better aligned with teaching approaches). However, the good news for cash-strapped institutions across the sub-region is that the most important factor affecting pedagogical change does not appear to be a hugely cost-intensive one. What is really fundamental appears to be time: time for teaching staff to talk together about their curricula and their teaching philosophy, time for academic support units to help faculty members think about their underlying orientations towards teaching, and time for new staff and students to be oriented to the institution's teaching approach. If institutions could find the time to support such reflective practice, there is real potential for teaching norms to shift across the region – a welcome development which could have a substantial impact on the learning outcomes (and future prospects) of university graduates across the region.

Of course, from one perspective at least, time is money, and structural factors impinge on an institution's ability to create and protect the spaces outlined above. As argued by Author (2018), changes in pedagogical culture are intertwined with questions of resources and governance, meaning that we need to think simultaneously about micro, meso and macro level shifts. Lecturers in many instances do not have time to transform their pedagogical practice and share with colleagues because their low salaries mean they are moonlighting in other institutions and running businesses on the side to supplement their income. Marketization of higher education has led to a rapid increase in students without corresponding investment in staffing and infrastructure, creating further challenges for teaching quality. A full treatment of these questions goes beyond the remit of this article, but they must be borne in mind when putting forward possible responses to the challenge.

The context-specificity of these questions is, therefore, clear. This study was motivated by the need to explore in African countries questions that had been previously researched in the Anglosphere (USA, UK, Australia etc), to see whether findings and connections would hold cross-culturally. It has been shown from the data collected that factors underpinning critical thinking development in students in the three African contexts studied here are broadly similar to those elsewhere. Yet the confluence of factors that allows for a shared teaching culture in higher education institutions, and the time and openness for lecturers to reflect deeply on their practice and transform it, is highly contextual and dependent on the conditions of possibility (Unterhalter et al. 2017). Further research is needed not only on expanding assessments of critical thinking to other contexts in the sub-region and beyond, but also to deepening our understanding of these underpinning conditions.

Higher education features frequently in the vision statements of countries aiming to transform their developmental status, and is framed as central to the achievement of the Sustainable Development Goals (SDGs). Yet expansion of enrolments alone will be unable to bring about this shift: prosperous and democratic societies require critical, reflexive citizens, and higher education can contribute to that goal only in so far as it has created a propitious climate for the development of those qualities. This research has shown that institutions, governments and supranational agencies aiming to support these ends need to focus not only on the quality of teaching and learning institutions, but in providing a space for deeper transformation of academic practice.

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