



Critical thinking at Rwanda's public universities: Emerging evidence of a crucial development priority



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ABSTRACT

Rwanda's national development strategy relies heavily on expanding access to higher education, largely due to an assumption that a university education encourages the ability to think critically about problems and to use evidence when making decisions. This study empirically investigated this assumption by administering a performance-task-based test of critical thinking, adapted for use in Rwanda, to students enrolled at three of Rwanda's most prestigious public institutions. Results of the study suggest that Rwandan students are not substantially improving in their critical thinking ability during their time at university. These findings have significant implications for Rwanda's development agenda.

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Since the late 1990s, Rwanda has spent a larger proportion of its education budget on higher education than almost any other country in sub-Saharan Africa (World Bank, 2004). In the years immediately following the genocide in 1994, the government invested heavily in the re-establishment of its decimated higher education sector. Since 2000, the emphasis has shifted from reconstruction to expansion, largely as a result of the crucial role assigned to higher education within *Vision 2020*, Rwanda's national development strategy (Murenzi and Hughes, 2006; Tikly and UK Department for International Development, 2003).

Despite such support for the sector, highly-skilled workers continue to be recruited from outside Rwanda to fill technical and leadership posts across the country (Hayman, 2005; Palmer et al., 2007). Given the high cost of expatriate employees and the government's rhetoric of self-reliance, the continued dependence on foreign workers suggests that employers may not be able to find university graduates with similar skills within Rwanda (Hayman, 2005). Indeed, in two recent surveys of employers in Rwanda, critical thinking and problem solving skills emerged as areas of particular concern (Africa-UK Engineering for Development Partnership, 2012; Republic of Rwanda National Council for Higher Education, 2011). Although these surveys suggest that Rwandan universities may not be supporting the development of such skills

in their student populations, there has never before been an empirical study available to corroborate such an interpretation. A few studies have investigated the role of critical thinking in the secondary school curriculum in Rwanda (Freedman et al., 2011; McLean Hilker, 2011; Rutayisire et al., 2004; Walker-Keleher, 2006), but no analysis has ever been conducted at the university level.

This study aimed to fill this gap by empirically investigating whether students at three of Rwanda's public institutions appear to be improving in their critical thinking ability during their time at university. The study followed a sequential mixed-methods design. During the first phase of the study, an adapted version of a performance-task-based assessment of critical thinking was administered to a random sample of first- and fourth-year students attending three of the public universities in Rwanda. The second phase of the study aimed to contextualise and expand upon the assessment results by qualitatively investigating the institutional environment at two of the participating universities. This paper presents the findings from the study's initial phase.¹ It begins with a discussion of the theoretical background and a description of the methodology of the first phase of the study. The assessment results are then presented, and implications of the findings for Rwanda's development strategy are elaborated.

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¹ The results of the case study analysis are available in Schendel (2013).

1. Theoretical background

Despite widespread consensus around its importance as an educational objective, critical thinking remains a highly debated construct. There is little agreement over the definition of the term, and there are questions about how the construct should be conceived, taught and assessed. In order to investigate the acquisition of critical thinking skills in the Rwandan context, it was therefore necessary to begin the study by building a conceptual framework that could both define the central construct in light of these ongoing debates and justify the selection of variables for consideration during analysis.

As this study aimed to assess critical thinking within Rwandan universities, it was most appropriate to identify a conceptualisation of critical thinking representative of the use of the term within the Rwandan education policy literature. A review of relevant documentation (e.g. MINEDUC, 2007, 2010) indicates that 'critical thinking' is broadly viewed as a general ability that can be fostered within a particular academic discipline and then applied to a multitude of potential situations outside of the classroom. This conceptualisation of critical thinking resonates closely with Kuhn's (1999) theory of critical thinking development. Kuhn's research has indicated that, through the study of discrete academic subjects, individuals develop a number of "meta-knowing competencies" (i.e. cognitive and metacognitive skills, as well as an increasingly sophisticated level of epistemological development), which can then be applied to ill-structured problems across domains. As cognition, metacognition and epistemology have all been found to follow developmental trajectories (Baxter Magolda, 1992; King and Kitchener, 1994; Kuhn, 1995; Perry and Harvard University Bureau of Study Counsel, 1970; Piaget, 1975; Vygotsky et al., 1978), Kuhn suggests that critical thinking should also be viewed in developmental terms.

Although Kuhn's theory implies that critical thinking can be developed over time, it does not necessarily follow that university education supports this trajectory. However, there is empirical evidence to suggest that critical thinking can be improved as a result of university education. In their meta-analysis of university impact in the U.S., Pascarella and Terenzini (2005) conclude that students do improve in their critical thinking ability during university. Studies referenced in the analysis (e.g. Facione and Facione, 1997; Hagedorn et al., 1999; Mines et al., 1990) find statistically significant improvements on multiple measures of critical thinking, as well as similar constructs such as reflective judgement (Baxter Magolda, 1990; King and Kitchener, 1994), with two additional studies also indicating a modest improvement in the disposition to think critically during university, as assessed via the California Critical Thinking Disposition Inventory (Facione and Facione, 1997; Giancarlo and Facione, 2001). Gains in these studies are identifiable whether or not controls are included for maturation and/or pre-university characteristics and regardless of the study time frame (i.e. gains in different studies were observed after one year, three years and four years of university). Such results have also been confirmed within individual institutions (e.g. Hatcher, 2009) and in other national contexts. In a recent study of more than 3500 students in Colombia, Saavedra and Saavedra (2011) found that fourth-year university students demonstrated significantly higher critical thinking ability (as measured via the Graduate Skills Assessment) than first-year students.

However, it is also clear that critical thinking does not automatically improve as a result of university attendance. In the U.S., two large-scale studies have recently considered this question. In a longitudinal study of 2500 American undergraduates enrolled at 24 institutions, Arum and Roksa (2011) observed that students did not generally improve in their critical thinking ability – as measured by the Collegiate Learning Assessment (CLA) – during their first two

years at university. In a similar study of over 2000 students enrolled at 17 liberal arts institutions, the Wabash Study of Liberal Arts Institutions reports that students only improve by an average of 1% on the Collegiate Assessment of Academic Proficiency Critical Thinking Test (Blaich and Wise, 2010). Such findings have also been supported by studies in other contexts. Pithers and Soden (1999) found no significant improvement in critical thinking ability amongst university students in Scotland and Australia (as assessed via the Smith Whetton Critical Reasoning Test), while Phan's (2011) longitudinal analysis of over 200 students in Hong Kong actually indicates a *decline* in the use of critical thinking during university.

On balance, the evidence suggests that a university education can improve critical thinking ability but that such improvement cannot be assumed, given the diversity in institutional environments. Astin (1970) has suggested that learning outcomes at university should be seen as a function of both inputs (e.g. the demographic characteristics, family backgrounds, and pre-university experiences of incoming students) and the university environment. In his widely used Input-Environment-Outcome model, inputs are assumed to shape outcomes both directly and indirectly, as they can both have a direct impact on an outcome and shape the way in which students interact with their university environment. The conceptual framework developed for this study (included below as Fig. 1) took Astin's model as a basic starting point. A review of the available empirical literature was then undertaken in order to populate the framework with individual and institutional factors found to affect the development of critical thinking ability in other university contexts.

When taken as a whole, the existing body of evidence suggests that it is the nature of the academic experiences provided within universities that has the most profound effect on the development of student critical thinking skills (Kember and Leung, 2005; Kuhn, 2005; Lonka and Ahola, 1995; Rosenshine and Meister, 1992; Terenzini et al., 1995; Tsui, 2002). Some have argued that this effect is systematically related to a student's academic discipline. Facione (1991) found significant differences between the post-test scores of students enrolled in different academic fields. Lehman and Nisbett (1990) observed dissimilarities in the reasoning skills of students enrolled in different fields of study, while Palmer and Marra (2004) identified differences in epistemology across domains, arguing that the variation was likely to be linked to differences in the academic experiences between disciplines. However, other studies (e.g. Schommer and Walker, 1995; Terenzini et al., 1995) have found no systematic differences between students enrolled in different disciplines. One potential explanation for such conflicting findings is that variation in critical thinking ability along disciplinary lines may actually be the result of pre-university characteristics related to the selection of academic subject, rather than any systematic variation in the qualitative experiences of different academic disciplines. Indeed, in their study, Terenzini et al. (1995) observed that any discrepancies between disciplines tended to disappear when pre-university differences were taken into account. Arum and Roksa (2011) found a similar effect in their sample. Pascarella and Terenzini (2005) and Moon (2008) have also supported this argument, noting that factors which appear to have a particularly significant effect on critical thinking – such as pedagogy, curriculum, and interactions between instructors and students – are not necessarily correlated with particular fields of study.

The evidence is clearer in relation to other individual factors that appear to influence the development of critical thinking ability within universities. First, the evidence suggests that students entering university with high levels of critical thinking ability appear to further develop their ability faster than those entering

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