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Profiling Disadvantaged Undergraduate Students in Higher Education

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ABSTRACT The focus of this paper is the academic progress of university students who come from disadvantaged schools. While research has been conducted on students' academic progress at higher education institutions, previous studies were generic in that they treated students as a homogenous group. This study differentiates different groups of students using the quintile system and links this to their academic progress.This study was conducted within the sustainable livelihoods approach and sought to explore three aspects of the population under study: namely, livelihood assets, context, and outcomes both before attending university and during their studies. It measured pre-university assets (such as school quintile) against pre-university outcomes (such as matric scores) and then applied these to university outcomes such as grade point average (GPA) and time to graduation. The results show that low quintile students have much lower average matric scores, achieve amuch lower GPA of just 50% and lower, have a much higher dropout rate (of more than 51%) and take longer to achieve a degree (four to seven years for three-year degrees and five to seven years for four-year degrees) than high quintile students.

INTRODUCTION

Attrition rates in the South African higher education system have been exponential since 2005. This periodisation is important because official data on dropout rates in South African higher education was first published in 2005 for the 2000 cohort of students. The second set of data was published in 2013 by the Council on Higher Education (CHE) with Ian Scott and the Department of Higher Education and Training for the 2005 to 2010 group (CHE 2013).The attrition rates have not changed in this seven-year period. Given this evidence, some scholars have dubbed the South African higher education system a 'low-participation and high attrition system' (Fischer and Scott 2011). The data presented in the 2013CHE report is remarkably similar to that reported by the *Mail and Guardian* in 2006, based on the 2000 student cohort. Some 46% of all students who enrolled for three- and four-year degrees in 2005 at South Africa's 22 universities, excluding Unisa, had dropped out by 2010 (CHE 2013). Public discussions and reports have linked student failure to poor primary and secondary schooling, poverty, academic underpreparedness (Letseka and Maile 2008), and lack of support (Gwala SABC Asikhulume 2007; John 2013 in *Mail and Guardian*; CHE 2013) in terms of career guidance and financial assistance.

The abovementioned studies followed the general trend of treating students as a homogenous group. The only real differentiation made by these studies is that their analyses of academic progress focused on variables such as race and gender. While such variables are important in terms of inequalities and/or socio-economic disparities in higher education opportunities and outcomes from a historical perspective, they do not provide a clear indication of who the 'really' disadvantaged are in higher education in South Africa.

There is a paucity of data on which to base an empirical analysis of disadvantage in higher education in South Africa. The CHE report identified financial constraints as a major obstacle to poor students for succeeding at university (Letseka and Maile 2008), while also citing academic factors as core impediments (CHE 2013). Thus, financial aid is used as a proxy for disadvantage in higher education.The questionsare: Who are these disadvantaged students? How well do they perform academically compared to their more advantaged counterparts? This paper seeks to present a well-rounded account of the characteristics of a disadvantaged student in the South African context. Different groups of disadvantaged students are differentiated and defined using the quintile system; this is then linked to students' academic progress at uni-

versity. The study aims to contribute to the discourse of social justice in higher education and to facilitate the development of disadvantaged students' abilities, promoting livelihood opportunities and enhancing capabilities.

The quintile system groups students into five categories based on the relative poverty of their catchment communities. It is based on average measures of income, unemployment rates and functional literacy as depicted in the Expenditure Survey of 2002.

Literature

Analytical Approach: The Sustainable Livelihoods Perspective

While the Sustainable Livelihoods Approach (SLA) has been applied mainly in studies of poverty rather than education, its use in this study is due to its potential to provide a broader picture of academic progress. Most conventional definitions and approaches to academic progress have focused on GPA, tests and other 'tangible' assessment measures as if these were the only units of analysis. There has been a tendency to brush aside other salient aspects of academic progress (in higher education) such as poverty or student food insecurity, which are sources of vulnerability and academic (and social) exclusion. Thus, the motivation for using the SLA as an analytical tool hinges on its potential to investigate three factors relating to the sample of the population under study, namely, livelihood context, assets and the outcome (Chambers 1988; Chambers and Conway 1992). For the purpose of this study a composite definition which encapsulates the three aspects noted above as propounded by Chambers and Conway (1992), has been adopted, namely:

> *a livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term* (Chambers and Conway 1992).

This is a flexible approach that can be used to both qualitatively (descriptively) and quantitatively understand a phenomenon. At the quantitative level, the researcher sought to understand the academic progress (livelihood outcome in terms of GPAs and matric scores) of students from low SES (subsumed in the quintile system). At a theoretical level, the researcher sought to link the quintile factor and matric score (livelihood context at the pre-university stage) with livelihood outcomes (GPA) at the university level. In this study the context in the pre-university stage becomes an asset in the university stage. Thus, quintile, which is classified as the context in the pre-university stage, becomes an asset in the university stage. Matric score, which is an outcome in the pre-university stage, becomes an asset in the university stage (Table 1). This study measures assets to assets (quintile to matric), and assets to outcomes (quintiles or matric to GPA; length of registration) and context to outcome faculty to matric and GPA) (Tables 3, 5, 7).

As the following analysis indicates, the livelihood context (faculty as a proxy for university environment – Table 1) may be a source of vulnerability (capability constraint) or strength and is also related to livelihood assets which reflect

Table 1: Application of the SLA approach

Pre-university	*University*
Livelihood Assets (Capability Sets) Household income (proxy for quintile) Education (Functional literacy) – proxy for quintile Employment rate – proxy for quintile	*Livelihood Assets (Capability Sets)* Quintiles (disadvantage - context from pre-university) Matric scores (disadvantage - context from pre-university)
Livelihood Context	*Livelihood Context*
Poverty of community (proxy for quintile) Quality of schooling (proxy for quintile)	Faculty – proxy for campus environment – foundation or bridging programmes, student support services, etc
Livelihood Outcome (Functioning)	*Livelihood Outcome (Functioning)*
Matric scores	Mean GPA

the students' social capital base. From a social capital perspective, student support services, the level of education of a society or a community constitutes social capital. Disadvantaged students reflect a low social capital base because they come from low SES schools and communities as reflected by a low quintile status (quintiles 1, 2 and 3). Thus, low quintile schools are underresourced in terms of financial capital, social capital and human capital. A number of studies have affirmed the association between SES and academic progress. Understanding disadvantaged students therefore requires an assessment of their capabilities in terms of assets (financial capital, human capital, social capital and physical capital) based on the context of vulnerabilities (capability constraints) within which they operate such as trends, shocks and stresses (for example, student failure, dropout, taking longer to graduate) and environmental factors. Amartya Sen's capability approach, which is normatively similar to the SLA, focuses on what people are effectively able to do and to be. The analytical distinction in the capability approach is that between the means and ends of well-being and development (Robeyns 2005). Only ends are of fundamental significance and means are merely instruments to achieve well-being, justice and social development. In the context of this study, the capability to study and graduate with a university degree (an end) is an important variable and unit of analysis. Similarly, the SLA is people-centred; it focuses on what people can do, given their livelihood context and livelihood assets to determine livelihood outcomes. In the capability approach, livelihood outcome is akin to the notion of functioning.

In this study, the focus is on basic capabilities which speak to the real opportunity to avoid failure or dropout from university, or failure to graduate in the set time. As the numerical results show, students from low quintile schools take longer to graduate and have a higher dropout rate. These results point to the fact that students from low quintile schools (quintiles 1 through 3) do not possess the capability to ensure academic success or progress.

How does this analysis contribute to the discourse of social justice? As long as students from low quintile schools do not possess the capability to progress academically, the notion of disadvantage should continue to be analysed. From the subsequent statistical analysis, we can infer that the academic progress of students from low quintile schools is affected by school SES as subsumed in the quintile system which, in turn, results in low matric scores and poor performance at university in terms of their GPA. Thus, from a social justice point of view, addressing the notion of higher education disadvantage requires an examination of the school system in order to improve the matric scores of these students and provide remedial programmes in the faculty or university system to assist students who have been disadvantaged by their poor schooling. The theme of social justice is explicated later in the discussion and conclusions sections.

Livelihood Context, Assets and Students' Academic Progress

This section presents a focused literature reviewthat links the quintile system to livelihoodsand the academic progress (outcome) of students at university. In this paper, most of the socio-economic status (SES) variables are subsumed in the quintile factor. The quintile factor also underscores growing socio-economic disparities in the South African education system. For example, the CHE (2013) affirmed that,"access to and success in higher education is strongly influenced by the socio-economic background of individuals" (See 2008). Other studies haveshown that the majority of South African children are raised in households without adequate access to nutrition and healthcare (Smith 2013).This hinders their academic progress at school. Smith (2013) observes that, inequalities in South Africa's public school system arethe main factor contributing to poor and racially skewed performance in higher education.At school level, De Wet (2013) has observed that disparities between the health and well-being of school children in different provinces in South Africa contribute to dropout rates.

Furthermore, a substantial number of black students at university come from low-income households without the financial capital to support their studies (see Smith 2013). The number of young adults who attend tertiary education may be smaller in poorer households than in richer households due to financial constraints (Branson et al. 2009; Wolfe 1982).

The international literature demonstrates that school background matters when it comes to academic achievement in East Asia, the USA and Western Europe (Ho 2003; Yang 2003; Gorard et

al. 2009; Fuchs and Wobmann 2004; Pascarella and Terenzini 2005). Worldwide, students from higher SES families and those who studied in schools with higher average SES, tend to achieve significantly better and exhibit a higher locus of control than those from lower SES families as well as those who studied in schools with a lower mean SES (Ho 2003). Pascarella and Terenzini (2005) found that, in the US, the high schoolis a telling variable when it comes to academic achievement at university (Tinto 1975; Astin 1993). This is supported by Vermunt's (2005) study, which concluded that the quality of schooling either facilitated or thwarted students' preparedness for further study or employment (TIMMS 2003).

The South African literature concurs that socio-economic status is related to dropout or perseverance at university (DoE 2008; Letseka and Maile 2008; Ministerial Report 2008; CHE, 2010; Smith 2013; John 2013; CHE 2013); this resonates with the international literature (Tinto 1975, 1993; Pascarella and Terenzini 2005; Cardak and Ryan 2006; Clarke 2009).

Letseka and Maile's (2008) study revealed that 70% of the families of the surveyed higher education dropouts were in the category 'low income status', and were predominantly Black South Africans. Furthermore, the parents and caregivers of Black students earned R1600 or less a month in certain cases (Letseka and Maile 2008). Thus, the literature overwhelmingly points to the prominence of the quintile system indicators (wealth/poverty, income, employment, literacy rates) in determining the academic progress of students at both school and university. These indicators underscore the importance of livelihoods in terms of the livelihood context, assets (capabilities to offset shocks such as poverty, which is linked to dropout rates) and outcomes (academic progress in terms of grade point average (GPA), failure or dropout). Thus, differential capacity in terms of assets determines the livelihood outcomes of students in higher education. Like livelihood assets, the livelihood context reflects the extent of the capabilities or vulnerability of each group of students, which also affects their livelihood outcome (academic progress in terms of GPA).

METHODOLOGY

The full dataset comprises the records of 234 886 individuals who registered at a South African university during the period 1990 to 2010. The data on academic progress indicators is drawn from the student management system (SMS) and from the Centre for Higher Education Studies (CHES) in an SPS system which allows for new variables to be created. The data on school quintile was gathered from the website of the Department of Basic Education, South Africa, which is accessible to the public.

The GPA was recorded for each of the two sets of selected samples of the student population at a SouthAfrican university in 2009 for the population of GPAs and graduates for the period 1990 - 2004. The schools at which these students matriculated were graded according to quintiles 1 to 5, with schools in quintile 1 the most disadvantaged and those in quintile 5 the least disadvantaged. The matric scores (matscore) of the students were subdivided into five categories according to the values shown in Table 2 because the faculties at this university had different admission criteria. In South Africa, matric scores and grades for each subject are calculated using a Swedish formula to provide the overall score.

The abovementioned information was obtained for each of the following eight faculties: Engineering, Science, Health Sciences, Medicine, Education, Humanities, Law and Management. The purpose of the analysis is to determine the relationships between GPA, matric score and quintile for each faculty. The matric codes assigned to each faculty in Table 2 are used to decide whether a student is eligible for admission to university. Every year, the Student Management System (SMS) collects a student's GPA which is the average score gained per credit, and is an important factor in understanding academic progression or progress at university.

Table 2: Codes for matric scores

Matscore	*<27*	*28-32*	*33-36*	*37-40*	*>41*
Code	1	2	3	4	5

The technique utilised in this analysis was analysis of variance (ANOVA). This is useful in testing the differences between means for different variables of interest. Thus, if significant differences (close to p-value=0.050) were picked up, a follow-up test (Duncan's test for differences in means) was performed to determine which means are different and to what extent they are

different. The main thrust of this method of analysis is to determine the association between the variables of interest in this study.

Samples

The following figures reflect the two samples used in this paper for populations of GPAs and graduates, respectively. They both indicate the number that was available for this analysis, namely:

a. 17 991 in 2009; and
b. 54 143 in 1990 – 2004.

The GPA was recorded for each of these samples at a South African university between 1990 and 2009. This enabled this researcher to analyse GPA patterns against matric, quintile, faculty*matscore, quintile*matscore as revealed in the sections that follow.

RESULTS

Comparative Analysis of Relationships between GPA,Matric Score and Quintile for Each Faculty

For this section, 17 991 cases were selected from the dataset for the comparative analysis of the relationship between GPA, matric score and quintile for the eight faculties using a methodological technique calledANOVA.The SLA was used to illuminate the results and findings. This approach sought to explain three factors relating to the population under study, namely, livelihood assets, context, and outcomes. Thus, all the findings that are discussed in the sections that follow will be interpreted and explained under the rubric of the SLA.

Analysis of Variance and Faculty *Matscore effect

Table 3 shows that the faculty, quintile, matscore, faculty*matscore and quintile* matscore effects are significant (all close to a p-value=0.050).

Mean GPA for Matscore per Faculty

Table 4 shows the mean GPA according to matric scores for all eight faculties under study. Except for the faculty of engineering (where there is no difference between mean GPAs according to matric scores), the GPA trends according to matric scores are relatively similar (Table 4 and Fig. 1).

Thus, based on the overall analysis of mean GPA for matscore per faculty, these results are summarised as follows:

1 Engineering is the only faculty where there is no difference between GPAs for different matscore categories.The reason for this is that there is not sufficient evidence for an association between these factors.
2 The GPA patterns according to matscore are fairly similar for the other seven faculties.

Table 3: Analysis of Variance (ANOVA) table of GPA for faculty, matric score and quintile

Source	*Type III sum of squares*	*df*	*Mean square*	*F*	*Sig.*
Corrected model	555355.717[a]	198	2804.827	16.130	.000
Intercept	6376296.726	1	6376296.726	36669.651	.000
Faculty	39965.342	7	5709.335	32.834	.000***
Quintile	2698.098	4	674.524	3.879	.004***
Matscore	27761.090	4	6940.272	39.913	.000***
Faculty * quintile	3634.723	28	129.812	.747	.829
Faculty * matscore	22455.340	28	801.976	4.612	.000***
Quintile * matscore	4495.596	16	280.975	1.616	.056*
Faculty * quintile * matscore1	21265.083	111	191.577	1.102	.219
Error	3093759.252	17792	173.885		
Total	52596760.000	17991			
Corrected Total	3649114.969	17990			

*** Significant at the 1% level of significance. P-value < 0.01.
* Significant at the 10% level of significance.
P-value between 0.05 and 0.1, and p-value= 0.05 or less means significant at the 5% level.
Since the main effects can be explained from an analysis of the interaction effects (faculty*matscore and quintile*matscore) based on Table 3, only the interaction effects will be analysed in the sections that follow.

Table 4: Mean GPA per faculty for each matscore category

Matscore	*Engineering*	*Science*	*Health Sciences*	*Medicine*
1	50.36	47.64	43.73	47.14
2	50.35	43.91	51.95	52.4
3	51.42	48.77	58.79	53.47
4	50.54	53.45	63.89	58.16
5	56.49	61.16	66.95	62.94
Total	54.17	50.43	61.03	59.74
Matscore	*Education*	*Humanities*	*Law*	*Management*
1	52.38	46.36	40.21	47.53
2	56	49.05	46.25	45.73
3	58.68	50.43	49.81	47.47
4	59.99	54.62	52.88	49.73
5	64.24	60.11	58.32	54.17
Total	55.71	50.36	51.3	49.87

The highest mean GPA is for matscore 5, followed by matscore 4 (has the second highest mean GPA except for Law, where the means for matscores 3 and 4 are not significantly different).

3 Matscore 1 has the lowest mean GPA for five of the faculties (Health Sciences, Medicine, Education, Humanities and Law). For Science and Management, matscore 2 has the lowest mean.

4 The mean GPA for matscore 3 varies from being near the lower end (Science, Medicine, Education, Humanities, and Management) to the middle (Health Sciences) and upper ends (Law). Table 4 and Figure 1 provide an overview of these results (See Table 5 for an illustration of the patterns of these results).

From an SLA perspective, this illustrates that livelihood assets at university in the form of matric scoresplay a salient role in determining the pattern of GPA in different faculties. The exception is the Faculty of Engineering.

Mean GPA per faculty

Table 6 shows the order of mean GPAs for the eight faculties analysed in this study. A closer look at the analysis exhibits two identifiable patterns as shown next:

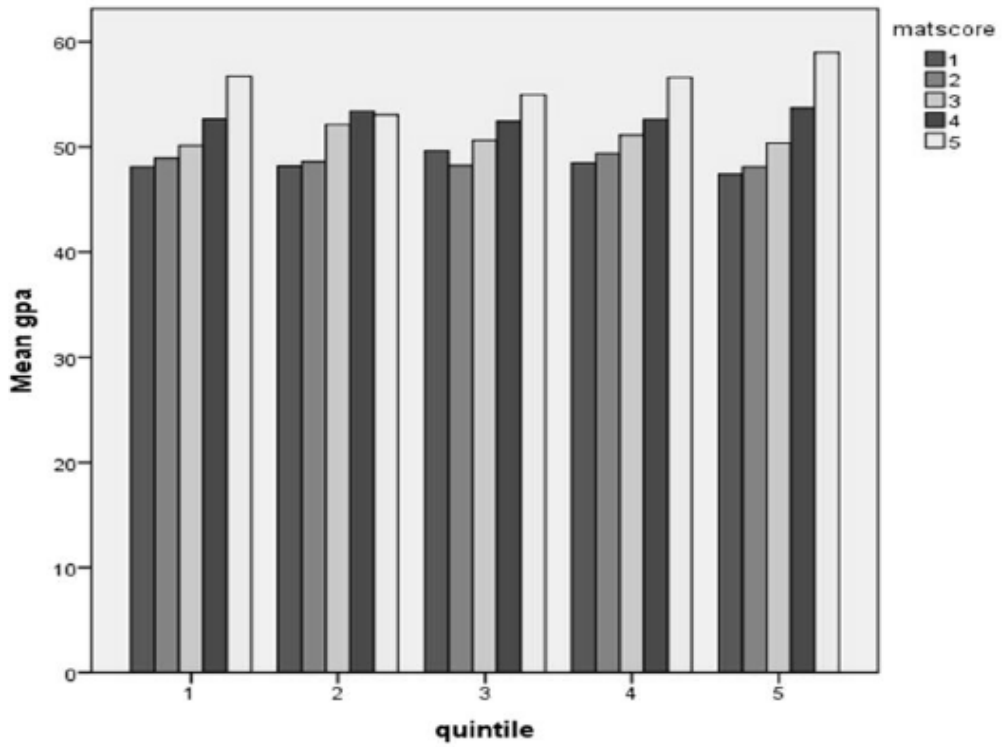

Fig. 1. Bar chart of mean GPA per faculty for each matscore category

Table 5: Analysis of mean GPA per matscore for each faculty

Faculty	*Difference between GPA means*
Engineering	No difference between matscore categories
Science	matscore 5>matscore 4>matscore 1 and3>matscore 2
Health Sciences	matscore 5>matscore 4>matscore 3>matscore 2>matscore 1
Medicine	matscore 5>matscore 4>matscore 2and3>matscore 1
Education	matscore 5>matscore 4>matscore 2>matscore 1; matscore 5 >matscore 3 matscore 2and3>matscore 1
Humanities	matscore 5>matscore 4>matscore 2and3>matscore 1
Law	matscore 5>matscore 3and4>matscore 2>matscore 1
Management	matscore 5>matscore 4>matscore 1and3>matscore 2

1 Health Sciences>Medicine>Education> Engineering> Law, Science, Humanities, Management.
2 The only significant difference between the bottom four faculties is that Law> Management (see Table 6).

Table 6: Ranks of mean GPAs per faculty

Faculty	*Mean GPA*	*Rank*
Health Sciences	61.03	1
Medicine	59.74	2
Education	55.71	3
Engineering	54.17	4
Law	51.3	5
Science	50.43	6
Humanities	50.36	7
Management	49.87	8

The results show that GPA performance according to faculty varied to some extent. This variation could be due to a number of factors such as the admission criteria (matric scores) and remedial programmes in place, especially for underprepared students, as well asthe number of students enrolled. The difference between the faculties of Law and Management is based on the fact that the former admits students with the highest matric scores and had some 'good' access programmes for their new students. Livelihood assets (matric score and quintile) are the likely explanation for these variations in the GPA performance of faculties.

Matric Scores

For all the matscore categories except 1 and 2,the mean GPA for a higher matscore category is significantly greater than that for one matscore category lower. There is no significant difference between the GPA for matscore 2 and matscore 1. The order of the GPAs according to matscore is:

Matscore 5 >matscore 4 >matscore 3 > matscore 2, matscore 1.

This suggests that an increase in matric score results in a concomitant increase in mean GPA and that, students in all eight faculties perform according to their high school achievements. Thus, contrary to the findings of other studies that did not find a link or relationship between matric score and academic performance at university (Department of Management Information 2010), matric score was a key predictor of academic progress. Furthermore, matric score was at the centre of academic disadvantage at university among students from low quintile schools.Based on the matric codes in Table 2, a low matric score is a capability constraint to students' academic progress; this suggests a low asset base for low quintile students. This is not true for upper quintile students. This further suggests the inseparability of the matric*quintile affinity, because if one talks aboutthe matric score, there is a high likelihood that one is also talking about the quintile system (the SES of the school and surrounding communities).

Quintiles

For all the quintiles except 1,2 and 3, the mean GPA for a higher quintile is significantly greater than that for one quintile lower. There is no significant difference between the mean GPAs for quintiles 1, 2 and 3 (low quintile schools). Based on this analysis, the order of the mean GPAs according to the quintiles is:

Quintile 5 > quintile 4 > quintile 1, quintile 2, quintile 3.

Students from low quintile schools (1, 2 and 3) performed marginally in terms of mean GPA compared with those from other quintiles (4 and 5). However, an important finding is that students performed according to their school quin-

tile; an indication that there is a correlation between school SES and students' academic progress at university. This finding resonates with the international literature (refer to the section on livelihood context, assets and academic progress) (Considine and Zappala 2002). It should be noted, however, that there is an anomaly in the performance of quintile 1, which could be explained by the wrong classification of quintiles. On the other hand, it might be that the university is doing well in terms of addressing disadvantage in higher education by providing support programmes.

Analysis of Quintile*Matscore Effect

Table 7 shows the mean GPAs according to the quintile for each matric score category. The upper quintiles had a higher mean GPA than those on the lower rungs. Based on the analytical approach used in this paper, livelihood assetsas subsumed in the quintile system play an important role in students' academic progress at university. Thus, students with a higher asset base (students in quintile 5) performed better than those in the lower asset base (students in quintiles 1, 2 and 3) with quintiles 2 and 3 performing better at times. This discrepancy in quintile performance in terms of GPA is affected by imperfections in the quintile classification, where some schools are placed in wrong quintile categories due to spatial factors (Kanjee and Chudgar 2009).This does not suggest that the quintile system is not useful.Nonetheless,most academic performance patterns were consistent.

The analysis of the quintile*matric score yielded the following results:

1 The higher the quintile, the better the separation of the mean GPA according to matscores 1, 2 and 3. Only for quintile 5 is the order of the mean GPAs matscore 5>matscore 4>matscore 3.
2 There is no difference between the mean GPAs for matscores 1 and 2 for all quintiles.
3 The mean GPA for matscore 3 varies from being near the lower end (quintiles 1 and 3) to the middle (quintiles 4 and 5) and upper ends (quintile 2). These results are summarised in Table 8 and Figure 2.

Interestingly, further examination of the quintile*matric analysis showed that the GPA is poorest for students from quintiles 1 and 3 schools with a matric score with code 3 (33-36). For students from quintiles 4 and 5 schools with this matric score, the GPA is in between and the GPA is best for students from quintile 2 schools with this matric score.

This study shows that the livelihood assets (quintile and matric scores) are both strong predictors of GPA. For low quintile students, removing the capability constraintsrequires improving the school system (quintile) and matric scores simultaneously at the pre-university

Table 7: Mean GPA per quintile for each matscore category

	Quintile 1	*Quintile 2*	*Quintile 3*	*Quintile 4*	*Quintile 5*
Matscore	*Mean*	*Mean*	*Mean*	*Mean*	*Mean*
1	48.11	48.18	49.64	48.47	47.4
2	48.92	48.6	48.25	49.4	48.1
3	50.12	52.14	50.66	51.14	50.35
4	52.67	53.43	52.47	52.61	53.75
5	56.73	53.05	54.96	56.61	58.98
Total	50.73	50.33	50.58	51.71	53

Table 8: Analysis of mean GPA per matscore for each quintile

Quintile	*Difference between GPA means*
1	matscore 5> matscore 4 >matscore 1,2 and 3
2	matscore 3, 4 and 5> matscore 1 and 2
3	matscore 5> matscore 4> matscore 1,2 and 3; matscore 3> matscore 2
4	matscore 5> matscore 3 and 4> matscore 1 and 2
5	matscore 5> matscore 4>matscore 3>matscore 1 and 2

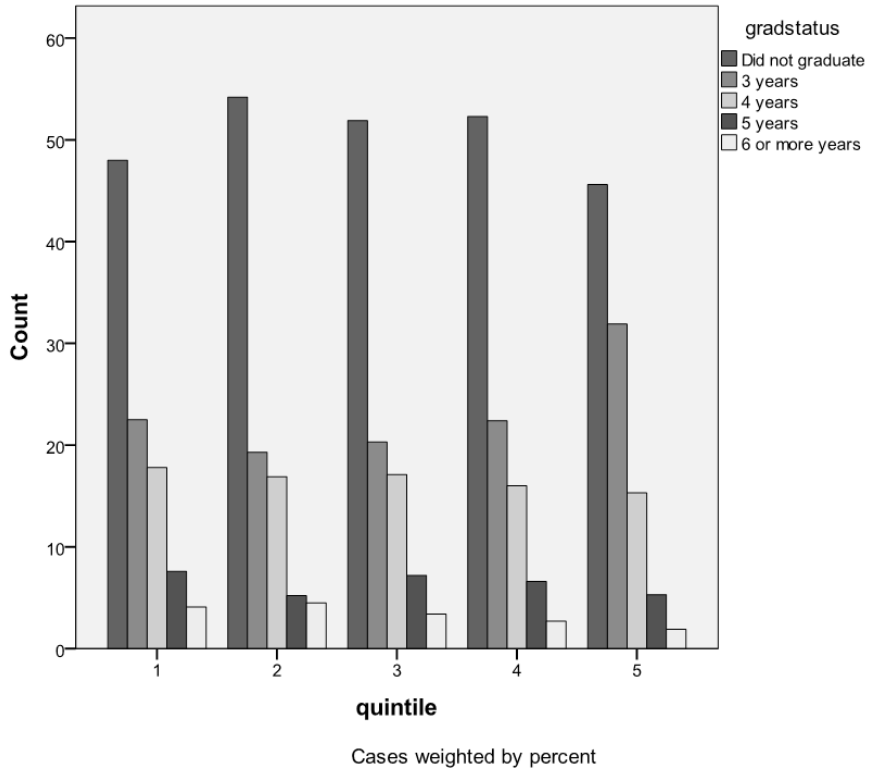

Fig. 2. Bar chart of mean GPA per quintile for each matscore category

stage. The findings also emphasise the importance of remedial processes at university level. The recent CHE report examines some of the remedial processes in place at university level (CHE 2013).

While theabove analysis provided a detailed account of the relationship between GPA and livelihood assets such as matric score and quintile, it did not present a full account of academic progress. The following section examinesthe graduation and attrition rates of students from different quintiles.

Graduation and Attrition Rates of Students from Different Quintiles

The previous analyses showed that that faculty, quintile and matric score, single or paired, havea significant influence on the GPA of students at university. This section analyses the number of students who either graduated or dropped out of university before completing their studies, and the time taken to complete their studies. The academic records of 54 143 students whoregistered for three- or four-year degrees, were analysed.

Time-to-Degree and Graduation Rates for Three-Year Degrees, 1990-2004

Figure 3 illustrates the distribution of the number of years a student was registered for a three-year degree before graduating per quintilefor the period understudy.

Four patterns are observable:

1 The percentage of students who graduated within three years increases from quintile 2 to quintile 5.
2 The percentage of students who graduated within four years decreases as the quintiles increase from 1 to 5.
3 The percentage of students who did not graduate is the lowest for quintile 5.
4 The percentage of students who took six years or more to graduate decreases as the quintile increases (see Figure 3).

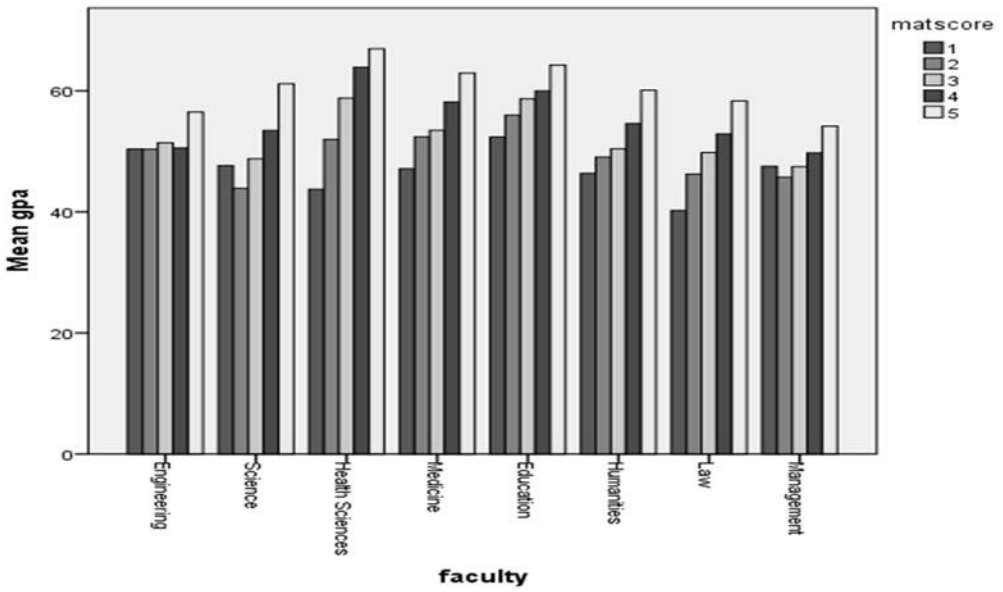

Fig. 3. Graduation percentages for three-year degrees for quintile-rated schools

The odds that a student will graduate after three years of study at university increases as one moves up the quintile categories. Thus, this study demonstrates that there is a strong association between the level of livelihood assets (quintile) and livelihood outcome (time-to-degree measures – graduation and attrition rates). Graduation statistics is a salient variable in higher education, because it tells us how students and higher education institutions are faring in terms of academic performance and this has implications for both parental and institutional investment in students.

The most interesting finding is that quintile has an impact on graduation rates (and also attrition rates). Thus, quintile as a proxy for background in terms of school SES, including community background, is a salient explanatory variable for time-to-degree measures. This is confirmed by the CHE (2013) that argues that, "access to and success in higher education is predominantly (though not solely) affected by socio-economic background of individual students".

Time-to-Degree and Graduation Rates for Four-Year Degrees, 1990-2004

Similar to the performance patterns in three-year degree programmes, the likelihood that a student will graduate within four years of study is strongly hinged on the quintile category.

Four significant trends were observed, as demonstrated in Figure 4:

1. The percentage who did not graduate is lowest for quintile 2.
2. The percentage who graduated within four years is the highest for quintile 5.
3. The percentage who graduated within five years or more is lower for quintiles 3, 4 and 5 than for quintiles 1 and 2.
4. The percentage who took seven or more years to graduate decreases with an increase in quintiles from 2 to 5.

Thus, according to this analysis, a substantial number of students who graduated within regulation time came from quintile 5, while those who took longer to graduate came from low quintile schools (quintiles 1 and 2). Aninteresting findingis that students from low quintile schools who take longer to graduate in the four-year degree programmesare susceptible to dropping out of university before completing their studies. However, there were anomalies in the performance patterns of some low quintiles. For instance, the performance of quintile 2 (item 1 above) is somewhat strange as it bifurcates from the norm (that students from low quintile

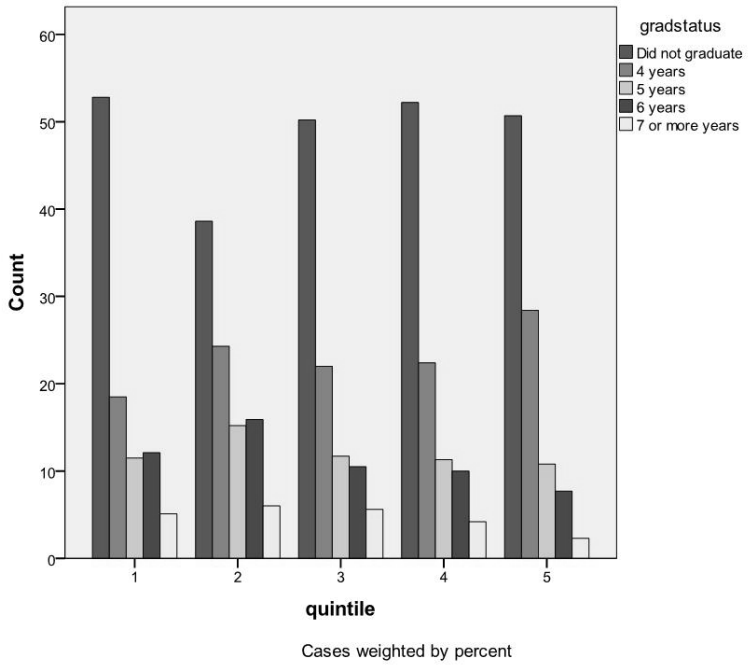

Fig. 4. Graduation percentages for four-year degrees for quintile-rated schools

schools perform on a marginal band). Explanatory variables lay in personality traits such as motivation and an improved university environment, which could not be explored numerically in this paper.

Attrition Rates for Three-Year Degrees per Year per Quintile

From 1998 to 2004, the quintile 5 dropout rate appears to be the lowest and the quintile 2 dropout rate is the highest.An overview of these results isprovidedin Figure 5.

The empirical analysis of attrition rates demonstrates that the dropout rate is related to the level of the quintile (livelihood asset base or capability set). Thus, the higher the quintile category, the lower the attrition rates. An important finding is that upper quintile students are more likely to persist at university and eventually graduate,thanstudents from low quintile schools. This further suggests that quintile is a strong predictor of academic progress with regard to time-to-degree variables. From an SLA perspective, students with a strong livelihood asset base were less predisposed to dropping out of university than students exhibiting a low livelihood asset base (for example students from quintiles 1 and 2). A number of factors are cited as reasons for (high) dropout rates in higher education in South Africa and elsewhere. These include social and academic integration, and individual characteristics (Astin 1984, 1993; Bean and Metzner 1985; Pascarella 1985; Moletsane 1995; Kuh and Hu 2001; Beggs and Smith 2003; Bailey and Alfonso 2005).

Attrition Rates for Four-Year Degrees per Year per Quintile

Figure 6 shows the dropout percentages for four-year degrees per year per quintile for the period 1990-2004.The dropout percentages for quintiles 1 and 2 vary considerably more than those for quintiles 3-5. The mean absolute deviation for the quintiles 1 and 2 percentages is more than twice that for quintiles 3-5 (Fig. 6).

This study revealed that the patterns exhibited for four-year degree programmes are similar to those for three-year degrees. Thus, students from low quintile schools are more prone to dropout than those from upper quintile schools.

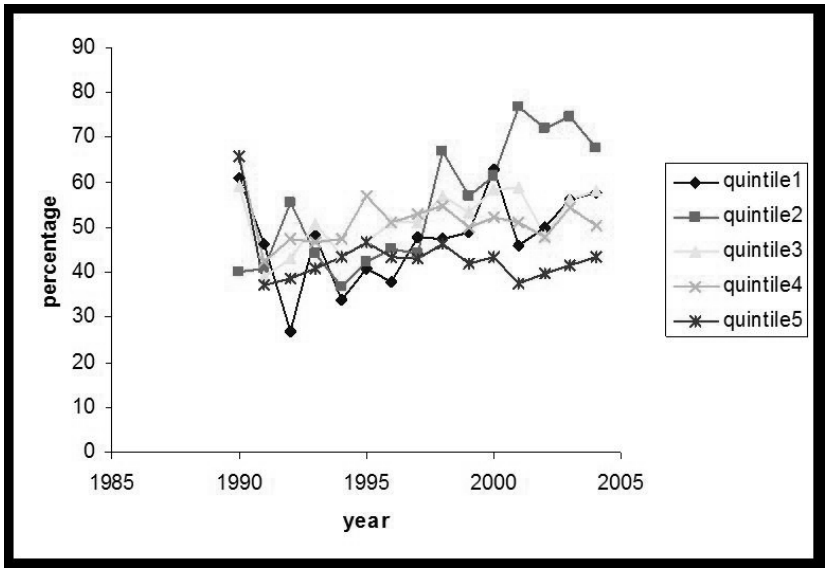

Fig. 5. Dropout percentage for three-year degree per year per quintile, 1990-2004

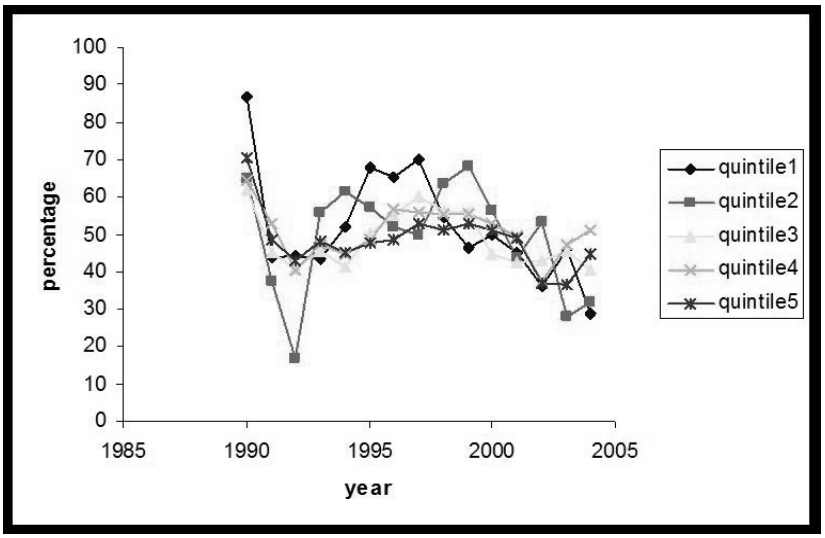

Fig. 6. Dropout percentage for four-year degree per year per quintile, 1990-2004

These results should be interpreted in the context of the significant increase inenrolments and participation rates in higher education since 1994. In 2010, total enrolments stood at 900 000, withblack students constituting 79 percent and women making up 57 percent of the total (CHE 2013). However,"an estimated 55 percent will never graduate" (CHE 2013).There are a number of possible explanations for these performance patterns. Carnevale and Strohl (2013) observed that, in the US, the education system itself acts as a systemic impediment to college for many who complete high school, but are unready for college. They noted that, whileunderprepared-

ness was responsible for low completion rates, financial constraints were the main reason for increasing attrition rates and increasing time-to-degree (Letseka and Breier 2008; Letseka and Maile 2008; Carnevale and Strohl 2013). This reflects the South African experience. Thus, differences in levels of underpreparedness and income inequality (both subsumed in the quintile system) explain differences in livelihood outcomes (academic progress and life outcomes)at universityand life opportunities after graduation. It could also be that the quintile system is good at ascertaining schools at the absolute extremes, that is, between quintile 1 and 5, and not in the middle, between 3 and 4 (Kanjee and Chudgar 2009).

DISCUSSION

This paper underscores the importance of profiling disadvantaged students' academic progress in higher education institutions. The methodological approach used in this paper offers ways of understanding disadvantage in higher education in South Africa. In the sections that follow, the author expands on the contributions of this approach and how the analysis unfolds to argue a case for the articulation of social justice in higher education in South Africa.

Firstly, the quest has been to use an empirically-supported definition of disadvantage as students coming from no-fee schools as classified by the Department of Basic Education, based on the Household Expenditure Statistics of 2002. Thus, schools have been classified based on the levels of poverty of communities in the school's catchment area. Community poverty is described by the indicators subsumed in the quintile system, namely, income, employment and literacy statistics, including poverty itself. While segmenting student data in terms of race is useful, race is not a *sine qua non* in the quest to define [higher education] disadvantage in South Africa. There are other units of analysis such as quintile that include the socio-economic indicators that have been utilised to explicate and conceptualise disadvantage in higher education vis-à-vis students' academic progress. The quintile factor also brings the notion of class to this analysis. Disadvantage in higher education in South Africa cannot be solely viewed from a racial point of view, but needs to include a classed-based perspective. For the purpose of this paper, students were stratified into quintiles 1, 2, 3, 4 and 5, with quintiles 1, 2 and 3 forming the low quintile category and 4 and 5 the upper category. Students were also stratified into academic progress by matric scores, mean GPAs, quintiles, graduation and dropout. The rationale for this exercise was to examine the full cycle of students' academic progress (from registration to graduation), given their differentiated livelihood assets, which are important for sustainable (student) livelihoods if the outcome is to be positive.

Secondly, the empirical analysis employed ANOVA to test the differences between the means of different variables. Duncan's multiple range test (MRT) was used as a follow-up test to ascertain the extent or magnitude of the differences between the means. In this way, the analysis was able to rank the order of academic progress (mean GPAs) at university by linking it to matric scores and quintile per faculty. This gave rigour to the analysis because it did not end with testing differences between means, but went further to ascertain the extent of the differences of different means.

Thirdly, in order to profile disadvantaged undergraduate students in higher education institutions, a multiple entry (multi-perspective) approach was needed that would allow both numerical and theoretical (qualitative) analysis of the phenomenon understudy. The SLA was employed to achieve this purpose. Even though the qualitative aspect may not be conspicuous in these analyses, it is inferentially subsumed in the quintile factor (Table 1). From the capability approach, the performance trends exhibited in this paper showed that students from disadvantaged schools lacked the basic capability (Sen 1981,1993; Robeyns 2005) to garner high mean GPAs compared with their counterparts in the upper echelons of the quintile ladder.

Fourthly, from the dataset, two sets of samples were available for analysis. While the dataset provided interesting trends in terms of mean GPA patterns and graduation rates, problems arose due to a number of missing values in the dataset. This was the reason for the performance effects for the faculties of engineering and law where it was concluded that lack of significance was due to lack of sufficient evidence (Table 4 and Fig. 1). This speaks to the quality of institutional datasets at universities in South Africa. To profile disadvantaged undergraduate students in higher education institutions in

South Africa, we need reliable data from reliable sources. To the author's knowledge, no university collects data on quintiles in its Student Management System (SMS) which collects data on which school a student comes from. Therefore, the quality of data will be an important factor in determining the kind of programmes that should be in place, and which needs of disadvantaged students, they should address.In order to do this, we need student data to be collected in cohorts, that is, a group of 2009, 2010, etc. Only two influential cohort studies by Scott et al. (2007) and CHE (2013) have attempted to analyse academic progress patterns in South Africa since 1994.The dearth of cohort studies is a serious deficiency that hinders the holistic analysis of the academic progress patterns of students in higher education institutions in South Africa. This paper attempted to fill this gap, despite the challenges in the dataset analysed.

Fifthly, the quintile factor does not reveal complex forms of inequality and how to confront these. Mean GPAs simply mean either enrolment at university or achievement in parochially constructed tests. The SLA together with the capability approach has enormous potential to address the problems of academic equality, quality and measurement. The SLA allows us to analyse students' academic progress patterns beyond narrowly defined lines such as an assessment of education deemed valuable, which neglects an examination of resources and class issues. While the issues of class and education inequality are latently clear in terms of the quintile factor, the scope of this paper did not allow us to explore it overtly. A more nuanced approach that employs both quantitative and qualitative analyses, is required to analyse these issues.

This being the case, based on the quintile classification, a brief note on class issues is useful. Stratification by income (quintile) demonstrates underrepresentation by income (Carnevale and Strohl 2013). While income stratification is a telling variable, this does not nullify the systemic racial stratification in both American and South African higher education systems (Carnevale and Strohl 2013 on the American experience, and CHE (2013) on the South African system. In the context of this study, class-based inequalities are subsumed in the quintile system. Low quintile students are susceptible to class-based economic disadvantage because they are concentrated in the low livelihood asset base (a capability constraint) due to spatial and social isolation from the general society (Carnevale and Strohl 2013). Salient to this paper, is the fact that this income stratification as subsumed in the quintile factor has an impact on the livelihood outcomes of university students as demonstrated by the empirical analysis in this study.

Sixthly, the approach utilised in this study has implications for social justice. The quintile effect on academic progress reveals that students from low quintile schools do not possess the basic capability to be educated (livelihood assets to succeed in terms of their mean GPAs). Thus, students from low quintile schools perform marginally compared with their counterparts in the upper quintile category because of their low asset base (low matric scores). This status quo underscores that the capability to be educated constitutes a basic entitlement and that its provision becomes a matter of [social] justice because of the:

contribution that the capability to be educated makes to the formation and expansion of human capabilities, and hence the contribution it makes to people's opportunities for leading flourishing lives (Unterhalter and Brighouse 2007).

Students from low quintile schools suffer from a'basic capability failure' (Unterhalter and Brighouse 2007). They are caught in the trap and misery of low matric scores because of poor schooling (low quintile as low SES). This prevents this group of students from achieving important milestones–high matric scores and eventually mean GPAs – the livelihood outcomes at both pre-university and university levels (Table 1).

To advance and articulate the theme of social justice, this author also borrowed from Sabina Alkire's work, that notes that basic needs should be defined with reference to "absolute harm rather than wants, needs, desires or preferences" (Alkire 2002). Thus, disadvantaged students' capability to be educated is harmed by their poor schooling which is a status that they do not choose, but is 'prescribed' by the education system. This fails the litmus test of fair equality of opportunity (FEO).

Therefore, at the pre-university stage, remedial processes are required to improve matric scores in disadvantaged schools and to address

the factors associated with the quintile system. At university level, support or bridging programmes should address the skills levels of students from low quintile schools, facilitating both academic integration and intellectual development. The CHE (2013) has proposed a number of remedial programmes, including an extended curriculum for undergraduate students. If we are aware of or are able to ascertain livelihood assets or capability sets, we will be in a position to offer sustainable (student) remedial processes and render (students') livelihoods sustainable in terms of coping, recovering from stress and shocks, and enhancing capabilities and assets (Chambers and Conway 1992).

The issues raised here prompt serious questions about the role of higher education institutions in improving the school system which contributes to disadvantage in higher education in South Africa. Universities have a role to play at the school level beyond training teachers. While it may be claimed that this is outside their mandate, universities' mission statements, particularly with regard to 'community outreach', belie such claims. Platforms for engagement and active interaction between the school system and higher education institutions need to be created in order to establish best practice and improve the school system.

CONCLUSION

The empirical analysis presented on mean GPAs demonstrates that faculty, matric scores, quintile, faculty* matric scores and quintile* matric scores effects, are significant. Thus, there is a significant relationship between faculty and matric score, quintile and matric, and the academic progress (GPA) of students at university. The GPA patterns are fairly similar for all the faculties except engineering, with matric score 5 having the highest mean GPA, followed by matscore 4. In terms of the graduation measures, the analysis shows that the odds that a student will graduate within the set time for both three- and four-year degrees increased as one moves up the quintile category. This same principle applies to dropouts; students from low quintile schools were susceptible to dropout and took longer to graduate than those from the upper quintiles. However, there were anomalies in the performance patterns of quintile 2. The explanation is that, as shown earlier, the quintile system's strength lies in its ability to identify school quintiles at the absolute extremes.

RECOMMENDATIONS

This study has implications for further research. Based on the results of the empirical analysis in this paper, it is plausible to reduce the quintile system to three categories by combining schools in quintiles 1, 2 and 3 to form one group (low), while the two remaining quintiles are divided into middle and upper, depending on the poverty/wealth of the schools' catchment areas. As it stands, the quintile classification is not a perfect measurement; however,it is a useful tool for classifying schools in South Africa in terms of resource allocation, social stratification and academic progress.

Further, this study revealed a strong relationship between quintile, matric score and GPA. However, it did not illustrate which skills were acquired by low quintile students for both academic progress and life opportunities beyond university. Further research could focus on the study skills acquired by tracking and analysing them. Is there a relationship between acquiring study skills and the academic progress of low quintile students compared with upper quintile students? This paper provides quintile comparisons of outcomes (matric, GPA, graduation) of students from disadvantaged schools and those from higher SES schools. Research is also required into the lived experiences of advantaged quintile 5 students to compare them with those of the lower quintile, disadvantaged students investigated in this study. A comparative study of these issues in two higher education institutions would also be useful.

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