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In Search of a Different Accounting Graduate: Entry-point Determinants of Students' Performance in an Undergraduate Accountancy Degree Programme in Singapore

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**IN SEARCH OF A DIFFERENT ACCOUNTING GRADUATE:
ENTRY-POINT DETERMINANTS OF STUDENTS'
PERFORMANCE IN AN UNDERGRADUATE
ACCOUNTANCY DEGREE PROGRAMME IN SINGAPORE**

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Abstract

This study investigates the association of prior academic achievement, admission interview, critical thinking, mathematical aptitude, gender and age with successful academic performance in an undergraduate accountancy degree programme at a Singapore university. The purpose of revisiting the determinants of academic performance is twofold: firstly, university accounting education in Singapore has changed greatly since Koh and Koh's earlier study (1999), so this study examines if determinants previously identified as significant continue to be so in the new setting; secondly, the study tests the usefulness of admission interview in identifying applicants who achieve subsequent academic success. All the data on students' performance throughout the whole degree programme are obtained from the university students' records database. Results indicate that prior academic performance, admission interview, critical thinking and gender are significantly associated with successful academic performance in the accountancy degree programme. However, mathematical aptitude and age are not significantly associated with successful academic performance.

Keywords: determinants of academic performance; accountancy degree programme

Introduction

Examining the variables that affect the academic performance of accounting students in undergraduate accountancy programmes has attracted significant research interest for almost thirty years. Much of the work has focused on programmes in the US (Bergin, 1983; Buckless et al., 1991; Clark and Sweeney, 1985; Doran et al., 1991; Krausz et al., 1999) and the UK (Bartlett et al., 1993; Byrne and Flood, 2008; Gammie et al., 2003; Gracia and Jenkins, 2002, 2003) although studies have also been done in Australia (Cooper, 2004; Hartnett et al., 2004; Rohde and Kavanagh, 1996), Hong Kong (Gul and Fong, 1993), Malaysia (Ayob and Selamat, 2011; Tho, 1994), New Zealand (Keef and Roush, 1997) and Singapore (Koh and Koh, 1999).

The motivation underlying this whole area of research has been to identify factors associated with successful academic performance, whether in entry-level accounting modules or over a whole accountancy degree programme. Given the limited places available in university-level accountancy programmes, understanding the relevant variables that influence the achievement of accounting students might significantly impact university admission policies to reduce the likelihood of admitting unsuitable students. Results might also serve to guide student choices about degree programmes, to prevent unsuitable students from embarking on an education path that might cause them frustration and eventual disappointment.

Our literature review highlighted three areas that the present study aims to address. Many of the previous studies have focused on performance in the first or final year of an accountancy degree programme (Duff, 2004; Gammie et al., 2003), or the second and final year (Gracia and Jenkins, 2002, 2003). Some have focused on performance in only specific accountancy modules in a particular year of study (Bergin, 1983). Only a few studies have examined performance over the whole accountancy degree programme (Bartlett et al., 1993; Koh and Koh, 1999). Thus the present study examines variables (prior academic achievement, admission interview, critical thinking, mathematical aptitude, gender and age) that are associated with successful academic performance over an accountancy degree programme.

Although Koh and Koh's (1999) study was also based on an accountancy degree programme in Singapore, the present study represents an extension in two ways. Firstly, university-level accountancy degree programmes in Singapore are now very different

from the programme studied earlier, thus raising the research question of whether the variables identified in the earlier study are still significantly associated with successful academic performance.

Secondly, the variables examined in the present study include admission interviews. Several studies have highlighted the association between admissions tests and students' subsequent academic performance. Zwick (2007) suggests that admissions tests are more useful in predicting subsequent academic success than relying on prior grades alone. West and Gibbs (2004) suggest several ways of assessing students' potential that include interviews together with student portfolios, essays, grades and class ranks. Burton and Ramist (2001) contend that admission policies that include a combination of such measures admit better quality students with more successful subsequent academic performance. Despite the recognition of the importance of more varied admissions tests, our literature review suggests a lack of empirical study on the association of admissions interviews with subsequent academic performance.

Context of the present study

A Different Style of University and Accountancy Programme

Over the period of the previous studies, changes in the business world, the accountancy profession and the body of accounting knowledge have been accompanied by changes in the scope and style of university accounting education. The present study was motivated by the desire to ascertain, as suggested by Byrne and Flood (2008), if the results of previous studies, undertaken in different countries, at different times, with different education systems, continue to hold true.

Koh and Koh (1999) was based on data pertaining to students who graduated from Nanyang Technological University (NTU) in 1990, from a style of accountancy programme that no longer exists in Singapore. Up to the year 2000, NTU and the National University of Singapore (NUS) were the only two universities in Singapore, and NTU provided the country's only accountancy degree programme. However, Singapore Management University (SMU) opened its doors in 2000 as Singapore's first private university, with the explicit purpose of providing a different university experience and education compared to NTU and NUS which were then public universities. Although NUS and NTU are well-regarded internationally, with graduates

of acknowledged high technical competence, SMU was established specifically “to be an experiment in diversity” (SMU, 2006) with the goal of producing “different” graduates. Besides technical competence, SMU students are educated to be creative, versatile and articulate team-players and leaders – qualities that have been identified as crucial for graduates to contribute effectively to the knowledge-based global economy of the twenty-first century.

SMU signed a Memorandum of Understanding with the University of Pennsylvania’s Wharton Business School in 1999, and its initial programmes in Business Management and Accountancy borrowed heavily from the Wharton model. It was a bold experiment to implement a tested US model of broad-based but focused education in an Asian setting, with the goal of producing graduates of international relevance. More specifically, SMU accounting students are required to read a total of thirty-six subjects over four years, including a core curriculum of seventeen subjects in addition to their traditional accounting subjects. The core curriculum comprises a university core (including courses such as Analytical Skills and Creative Thinking, Business, Government and Society, Ethics and Social Responsibility and Leadership and Team Building), general electives in Arts and Sciences, global and regional studies, technology and entrepreneurship electives and career skills electives. All these courses are taught over a 16-week term, sometimes by different faculty, who are encouraged to adopt an interactive pedagogy and given the freedom to administer different continuing assessments and final examinations. Beyond academic studies, all SMU students must also complete a minimum of 12 weeks of internship, consisting of ten weeks with a business or professional organization and two weeks of community work, before graduation.

In contrast, the NTU programme covered by Koh and Koh (1999) comprised 24 subjects taught over three years through a combination of lectures and tutorials, culminating in a final examination for each subject. Academic performance was measured solely in terms of these final examinations.

As such, the SMU accountancy programme and pedagogical environment covered by the present study are very different from the NTU accountancy programme studied in Koh and Koh (1999). Results from the present study would therefore provide evidence as to whether a different type of university accountancy programme, designed

to produce a different type of graduate, requires students with different qualities to be successful, as compared to the previous study conducted in Singapore.

A Different Set of Entry-Point Variables

Besides the curriculum changes, SMU was also deliberately different in its approach to selecting its students. In 2001, when SMU recruited its first batch of accounting students, both NUS and NTU relied solely on grades earned by applicants in the national General Certificate of Education (GCE) Advanced Level examinations (“A” level) to offer places on its programmes. The “A” level is an internationally recognized national examinations conducted jointly by the Singapore Ministry of Education and University of Cambridge (UK). It is a two-year pre-university education programme. Students were admitted to the “A” level programme based on their results in the lower Ordinary “O” level examinations. Students sit for the “O” level after completing six years in the primary school system and four years in the secondary school system.

In contrast, SMU’s Office of Student Admissions (OSA) went beyond “A” level examination performance to consider the applicants’ achievements in other areas such as sports, community service and the arts. Each applicant shortlisted by OSA was then interviewed by either two faculty members of SMU’s School of Accountancy (SOA) or a faculty member and a senior student from the School. The shortlisting and interview process is very time-consuming. However, the literature suggests that interviews are useful as part of a more diversified approach to student selection, compared to relying on grades alone. Greater diversity in selection criteria has been shown to be better able to identify applicants who perform successfully subsequently (Zwick, 2007). Thus the results of the present study would provide empirical evidence on how useful interviews are in identifying students who perform successfully on an accountancy programme.

The remainder of this paper is organized as follows. The next section reviews relevant literature and develops the hypotheses. The subsequent sections describe the research method and present the results. The final section discusses the implications of the results, the limitations of this study, and opportunities for future research.

Literature Review

As accounting issues become more complex in today's dynamic business environment, demands on higher education institutions in preparing qualified accounting graduates become increasingly important (Potter and Johnson, 2006). Significant attention has been given in recent years to examine the determinants of accounting students' academic performance (Ayob and Selamat, 2011; Barsky et al., 2003; Byrne and Flood, 2008; Duff, 2004; Gammie et al., 2003; Gracia and Jenkins, 2002; 2003; Guney, 2009; Koh and Koh, 1999; Krausz et al., 1999; Levy and Murray, 2005; Potter and Johnson, 2006) as these variables may have significant impacts on admission policies of accounting programs at universities (Byrne and Flood, 2008; Koh and Koh, 1999; Levy and Murray, 2005; Mckenzie and Schweitzer, 2001). For instance, understanding the determinants of academic performance may minimize the likelihood of admitting students that are not suited to the accountancy program and identify existing students who are at risk of academic failure (Byrne and Flood, 2005; Gammie et al. 2003; Koh and Koh, 1999). To date, the variables that have been examined are prior academic achievement (Hartnett et al., 2004), critical thinking (Bethune and Jackling, 1997; Burton and Ramist, 2001; West and Gibbs, 2004), mathematical aptitude (Gist et al., 1996), age (Guney, 2009), gender (Duff, 2004; Gammie et al., 2003), prior knowledge of accounting (Koh and Koh, 1999), working experience (Guney, 2009) and country of origin (Hartnett et al., 2004). This section summarizes the main findings of the previous research on determinants of accounting students' academic performance and indicates the main lines of our study.

Prior Academic Achievement

Several studies contend that accounting students' prior academic achievements are positively related to their future performance (Gist et al., 1996; Koh and Koh, 1999). The logic is past performance may be used as a proxy for students' commitment level, diligence and intelligence (Guney, 2009). For example, Gammie et al. (2003) suggest that previous academic performance is a significant indicator of university performance. Similarly, the National Audit Office in the UK (2002) identifies prior academic achievement as an important predictor of performance at university. Duff (2004) also suggests prior academic achievement remains the best predictor of academic

performance. Others even went on to suggest prior academic achievement is the most significant determinant of performance throughout the three years of accounting students' degree studies (Byrne and Flood, 2008; Koh and Koh, 1999).

Critical Thinking

According to Bethune and Jackling (1997), the critical thinking skills students bring with them on entering university courses will have significant impacts on their academic performance. Burton and Ramist (2001) suggest it is increasingly important for accounting students to engage in critical thinking. Browne and Freeman (2000) identify intellectual and practical skills, including critical thinking, inquiry and analysis as elements of the essential learning outcomes that students should gain across their college experiences. West and Gibbs (2004) highlight many universities have adopted a more holistic approach to admissions that include essay and SAT scores which may give an indicative ability of critical thinking skills.

Mathematical Aptitude

In terms of mathematical aptitude, several prior studies have indicated mixed findings in existing literature. For example some studies found accounting students with strong mathematical aptitude perform significantly better in an accountancy degree program as the programme demands strong quantitative and numerate skills (Gul and Fong, 1993; Guney, 2009; Koh and Koh, 1999). Other studies, however, do not find a link between mathematical aptitude and academic performance in an accountancy degree programme (Bartlett et al., 1993; and Gist et al., 1996).

Gender

Previous studies that assessed the relationship between accounting students' gender and their academic performance report contradictory findings (Duff, 2004; Lipe, 1989; Tyson, 1989). While some studies indicated that gender is an important determinant of accounting students' academic performance (Koh and Koh, 1999), the majority of research on gender has, however, found no gender difference (Auyeung and Sands, 1994; Keef and Roush, 1997). For example, Koh and Koh (1999) suggest males outperformed the females in examinations over three years of the accounting students'

tertiary education. Doran et al. (1991) however, partially support Koh and Koh's (1999) findings as they argue males outperformed females only in introductory accounting courses but not advanced accounting courses. For studies that found female students outperformed their male counterparts, they attribute unfavorable sex ratio that led to higher motivation on the part of female students (Mutchler et al., 1987). Disagreeing with gender's impact on academic performance, Gammie et al. (2003) suggest gender is not a differentiating factor in respect of final year accounting undergraduate performance.

Age

To date, several studies have explored the impact of age with mixed results (Al-Mutairi, 2011; Byrne and Flood, 2008; Gracia and Jenkins, 2003). While Koh and Koh (1999) contend that academic performance and age are negatively correlated, Guney (2009) and Lane and Porch (2002) produced reversed results. For instance, Guney (2009) argues mature students exercised more commitment and discipline in their studies and hence, achieve better academic results.

Prior Accounting Knowledge

Several studies revealed that university students who had studied accountancy at high school perform better in at least some aspects of their first year accountancy courses (Gammie et al., 2003; Koh and Koh, 1999; Krausz et al., 1999; Tho, 1994). Interestingly, some studies highlight superior performance is only apparent in the early stages of university education and that it only confers a temporary advantage (Koh and Koh, 1999). Other studies found that while students with no prior accounting knowledge performed less well in first year, they outperformed their peers in the later years of their degree programs (Doran et al., 1991). This may be explained by the fact that some students find the transition from school to university more difficult than others and this can adversely impact upon their performance (Gammie et al., 2003). In Byrne and Flood's (2008) study, their findings contradict the importance of prior accounting knowledge as they did not find a relationship association between prior knowledge of accounting and students' academic performance.

Work Experience

Some studies indicate that students with prior working experience tend to achieve better academic performance (Hartnett et al., 2004; Koh and Koh, 1999; Krausz et al., 1999). This finding is consistent with Guney (2009) who suggests having prior practical knowledge is beneficial in grasping accounting concepts. Besides prior work experience, having industry attachment during university education is crucial in influencing students' academic achievement. According to Koh and Koh (1999), having compulsory work attachment as part of the undergraduate accounting program may help accounting students to improve observation, analytical and decision making skills. This is echoed by Gracia and Jenkins (2003) that suggest accounting students who undertake a year of supervised work experience perform better in the final year of the accountancy degree program.

Country of Origin

In terms of country of origin, while some studies have indicated the origins of students' education systems, language and cultural background have impacts on students' academic performance (Hartnett et al., 2004), the findings have so far been inconclusive. For example, while Sue and Okazaki (1990) suggest Asian students outperform their counterparts in the US, Guney (2009) and Jackling and Anderson (1998) do not find the country of origin variable affects academic performance.

Research Hypotheses

While our review of the literature suggests several determinants of accounting students' performance, not every determinant stated in the literature is relevant to our context. For example, almost all our students in the accountancy program enter directly into university immediately after the completion of high school. There are very few of them who have much prior accounting knowledge and work experience. In addition, the composition of international students within the accountancy program at SMU is less than 10 percent and the rest of the student population consists of mainly Singaporean students. As a result, the country of origin variable appears insignificant.

Prior studies suggest the use of admission interviews to be included in admission policies (Burton and Ramist, 2001; West and Gibbs, 2004). However, there is a lack of

empirical study in the extant literature on the association of admissions interviews with subsequent academic performance. Thus, this study includes admission interview in the research model. Overall, this study investigates the association of prior academic achievement, admission interview, critical thinking, mathematical aptitude, gender and age with successful academic performance in an undergraduate accountancy degree programme. The hypotheses are as follows:

- H1:** Prior academic achievement is not significantly associated with academic performance.
- H2:** Admission interview is not significantly associated with academic performance.
- H3:** Critical thinking is not significantly associated with academic performance.
- H4:** Mathematical aptitude is not significantly associated with academic performance.
- H5:** Gender is not significantly associated with academic performance.
- H6:** Age is not significantly associated with academic performance.

Research Method

Sample and Data Collection

This study was conducted on data from all students who graduated from the Bachelor of Accountancy (BAcc) programme at SMU's School of Accountancy (SOA) from 2005 to 2010. The University's database of student records provided an initial sample of 2,609 student records spanning the period from 2001 to 2010. As described above, SOA admitted its first batch of accounting students in 2001.

There are several admission pathways to SOA's BAcc programme. During the period from 2001 to 2010, the majority of the students (84 percent) were admitted based on their results obtained in the "A" level, while nine percent were admitted based on their respective Polytechnics' diploma qualifications. There are five Polytechnic institutions in Singapore and each offers its own independent diploma programme. One percent of the students were admitted based on their International Baccalaureate diploma qualifications, and the remaining six percent were admitted based on other international qualifications. Only the "A" level students (2,198 students) were included

in the study sample, as the other three groups of students (411 students) were admitted based on different admission requirements.

The dependent variable in this study is the students' academic performance over the entire BAcc programme in SOA. Thus, the final sample excluded 1,137 students who have yet to graduate and are currently still active in the BAcc programme, four students who were dismissed from the BAcc programme, 188 students who withdrew on their own accord from the BAcc programme and 46 students with incomplete data. This resulted in a final sample of 823 students.

Variables Definition and Measurement

Dependent variable

The dependent variable in this study is the students' academic performance over the entire BAcc programme in SOA. Following completion of the BAcc programme, students are awarded with a final cumulative grade point average (GPA) score. The GPA is the quotient of total grade points divided by total courses attempted. Students complete 36 courses, and the grade for each course is converted to a grade point. The grade notations are A+ (4.3), A (4), A- (3.7), B+ (3.3), B (3.0), B- (2.7), C+ (2.3), C (2.0), C- (1.7), D+ (1.3), D (1) and F (0).

Independent variables

In this study, the independent variables are prior academic achievement, admission interview, critical thinking, mathematical aptitude, gender and age. For reasons explained above, the final sample only included "A" level students who graduated between 2005 and 2010, for whom we were able to obtain complete records. These students offered either three or four "A" level subjects. Prior academic achievement is measured by the results of the students' best three "A" level subjects. The "A" level subject grades of A to F were converted based on the University's admission point system of A (12), B (9), C (6), D (4), E (2) and F (0) to derive the University admission score. The maximum possible score for prior academic achievement is thus 36 (12 x 3 "A" level subjects).

Students in the sample went through an individual admission interview in order to be accepted into the BAcc programme. Admission interview is measured by the

students' admission interview scores. Each admission interview was conducted either by two faculty members or a faculty member and a senior student. In assessing the candidate, interviewers were specifically instructed to evaluate four qualities: (1) knowledge and passion in matters of interest to the candidate; (2) analytical reasoning; (3) attitude and emotional quotient and (4) ability to communicate. Each interviewer had to complete a separate admission interview assessment report for the interview candidate, awarding a score from 0 to 20) based on four ratings: (1) I strongly recommend the candidate (17 to 20); (2) I recommend the candidate (13 to 16); (3) I have reservations about the candidate (10 to 12) and (4) I do not recommend the candidate (below 10). In addition, interviewers were required to state their reasons to support their recommendation, reservations or rejection.

Critical thinking is measured by the students' results for the General Paper (GP) subject in the "A" level. GP aims to enable students to develop language proficiency and skills such as critical reading, clear and effective communication, and the ability to evaluate arguments and opinions (SMOE, n.d.). Students were awarded grades of A1 to F9 for GP which were converted based on the University's admission point system of A1 (7), A2 (6), B3 (5), B4 (4), C5 (3), C6 (2), D7 (1), E8 (0) and F9 (0).

Mathematical aptitude is measured by the students' results for the Mathematics subject (Maths) in the "A" level. Students were awarded grades of A to F for Maths which were converted as A (5), B (4), C (3), D (2), E (1) and F (0). The gender variable was coded as 1 for male students and 0 for female students. Age is measured by the students' age at the point of entry into the BAcc programme.

Results and Discussion

Descriptive Statistics

Table 1 presents the descriptive statistics of the dependent and independent variables. The final sample of 823 students consisted of 514 female students (62.5 percent) and 309 male students (37.5 percent). The mean students' academic performance in the BAcc programme as measured by the students' final cumulative GPA was 3.38 (std. dev.=0.39, range=4.18 to 2.16). The results of the students' best three "A" level subjects were converted based on the university's admission point system, resulting in an average students' prior academic achievement of 31.37 (std.

dev.=4.51, range=36 to 16). In terms of the performance during the admission interview, the mean admission interview score was 15.33 (std. dev.=2.62, range=20 to 5). The mean for critical thinking as measured by the GP results was 4.25 (std. dev.=1.50, range=7 to 0), while the mean for mathematical aptitude was 4.74 (std. dev.=0.55, range=5 to 1). The age of the students ranged from 18 to 29 years, with a mean of 19.84 (std. dev.=1.07).

[Insert Table 1 about here]

Tests of Hypotheses

Regression analysis was used to investigate the association of the six independent variables (prior academic achievement, admission interview, critical thinking, mathematical aptitude, gender and age) with successful academic performance in an undergraduate accountancy degree programme. The regression analysis results presented in Table 2 show that the model is significant (F-value = 53.446, p-value < 0.001). The adjusted R^2 for the model is 0.277. This indicates that at least 27 percent of the students' academic performance in the undergraduate accountancy degree programme can be explained by the variation in the six independent variables. The model also exhibits low risk of potential multicollinearity problems as all the independent variables have variance inflation factors (VIF) below 10 (Myers, 1990).

[Insert Table 2 about here]

H1: Prior academic achievement

Hypothesis 1 posits that prior academic achievement is not significantly associated with academic performance. The results in Table 2 show that prior academic achievement is highly significantly associated with academic performance (p-value<0.001), rejecting Hypothesis 1. The results also show that prior academic achievement has the highest standardized beta, indicating that it is the most important determinant of academic performance. The results corroborate the findings of prior studies which show that students who have better prior academic achievement can be expected to perform better in an accountancy degree programme (Byrne and Flood, 2008; Doran et al., 1991; and Koh and Koh, 1999). Hence, students' prior academic achievement appears to be a robust determinant of academic success over different

cultures and time periods. This underscores the importance of attracting students who have performed well in school-leaving examinations into the accountancy degree programme. University administrators thus appear to be justified in using this criterion of prior academic achievement as an efficient and effective method to shortlist applicants.

H2: Admission interview

Hypothesis 2 states that admission interview is not significantly associated with academic performance. Hypothesis 2 is rejected as the results in Table 2 show that admission interview is highly significantly associated with academic performance (p-value<0.001). The positive coefficient indicates that students who performed better during the admission interview graduate with a higher final cumulative GPA. Our literature review suggests a lack of empirical study on the association of admissions interviews with subsequent academic performance. This finding extends the literature by demonstrating that students' performance in the admission interview is significantly associated with academic performance in an accountancy degree programme. Thus, the admission interview appears to add value to the process of student selection and university administrators may consider including admission interviews in the admissions exercise. Since the inception of the BAAcc programme, SOA has made admission interviews compulsory for all applicants. The results provide support for SOA to continue including admission interviews as part of the admission requirements.

H3: Critical thinking

Hypothesis 3 proposes that critical thinking is not significantly associated with academic performance. The results in Table 2 show that critical thinking is highly significantly associated with academic performance (p-value=0.002), rejecting Hypothesis 3. The positive coefficient shows that students who scored higher in critical thinking performed better in the accountancy degree programme. Students' scores on the General Paper subject in the "A" level are taken as a reflection on their ability to analyse and critique issues and write well. This highlights the importance of students' ability to think critically in order to excel in subsequent academic performance. The results corroborate the findings of prior studies which suggest that it is increasingly

important for accounting students to engage in critical thinking (Bethune & Jackling, 1997; Burton & Ramist, 2001; West & Gibbs, 2004). Therefore, potential students should be made aware of the significant association between critical thinking and academic success in an undergraduate accountancy degree programme.

H4: Mathematical aptitude

Hypothesis 4 posits that mathematical aptitude is not significantly associated with academic performance. As shown in Table 2, Hypothesis 4 is supported as mathematical aptitude is not significantly associated with academic performance (p-value=0.759). The findings suggest that students who have a stronger aptitude in mathematics did not perform significantly better in an accountancy degree programme than those who are weaker in mathematics. The insignificant findings may also be explained by the lack of variation for the students' mathematical aptitude in this study. Out of the final sample of 823 students, 647 students (78.6 percent) achieved the grade of "A" and 147 students (17.9 percent) were awarded the grade of "B". Thus, 96.5 percent of the students achieved a grade of "A" and "B".

These results contribute to the mixed findings in the existing literature: some studies did not find any link between mathematical aptitude and academic performance in an accountancy degree programme (Bartlett et al., 1993; and Gist et al., 1996), while other studies suggest that students with a stronger mathematical aptitude performed better in an accountancy programme (Gul and Fong, 1993; and Koh and Koh, 1999). However, the nature of an undergraduate accountancy programme has evolved greatly beyond quantitative and numeracy skills. The results indicate that a strong mathematical aptitude may no longer be an important issue in today's more holistic accounting education.

H5: Gender

Hypothesis 5 proposes that gender is not significantly associated with academic performance. Hypothesis 5 is rejected as the results in Table 2 show that gender is highly significantly associated with academic performance (p-value<0.001). The positive coefficient indicates that male students outperformed the female students. In this study, the male students formed the minority of the student body (37.5 percent).

This general result, where the minority gender outperforms the majority, has been reported in other studies (Koh and Koh, 1999). It has been suggested that the cause is the greater motivation of the minority gender. However, recent studies did not find a link between gender and academic performance in an accountancy programme (Byrne and Flood, 2008; Duff, 2004; and Paver and Gammie, 2005). As gender may be confounded with age in this study, additional regression analysis was conducted by omitting the age variable. The additional results are consistent with those reported in Table 2. Gender is still significantly associated with academic performance ($p\text{-value}<0.001$) after the age variable was omitted.

H6: Age

Hypothesis 6 states that age is not significantly associated with academic performance. The results in Table 2 show that age is not significantly associated with academic performance ($p\text{-value}=0.562$), supporting Hypothesis 6. There is a lack of variation for the students' age in this study as SOA does not accept many matured students. Out of the final sample of 823 students, 469 students (57 percent) were 19 years old and 285 students (34.6 percent) were 21 years old. Thus, 91.6 percent of the students were either 19 years old or 21 years old. The mean age of the students was 19.84 (std. dev.=1.07).

Age may be confounded with the gender variable in this study. After completing the "A" level, students were typically 18 years old. The female students would enrol in the BAcc programme in the following year after the completion of their "A" level. Thus, female students were typically 19 years old at the entry point of the BAcc programme. On the other hand, all males who are Singapore citizens are required to fulfil the National Service (NS) requirements with the Ministry of Defence after the completion of their "A" level. NS is a period of military training to provide defence for Singapore. Due to the two to two and a half years spent on NS, the males are older than the females in the same cohort of students. The male students were typically 21 years old at the entry point of the BAcc programme. As a result, additional regression analysis was conducted by omitting the gender variable. The additional results show that age is significantly associated with academic performance ($p\text{-value}<0.001$) by omitting the gender variable in the original model.

Additional regression analyses

The dependent variable in this study is the students' academic performance over the entire BAcc programme in SOA. Three additional regression analyses were conducted by replacing the dependent variable with the students' academic performance at the end of Year 1, 2 and 3, respectively. The results for Year 1 are reported in Panel A of Table 3. Table 3 (Panel B) reports the results for Year 2. Last, the results for Year 3 are reported in Panel C of Table 3. As compared with the original model in Table 2, there are no significant differences except that age is significantly associated with academic performance in Year 1. All the other results of the additional regression analyses in Table 3 are consistent with the original model reported in Table 2.

[Insert Table 3 about here]

Conclusion

Implications of the results

The results of this study show that prior academic performance, as measured by the SMU University Admission score, has the most significant association with students' GPA on graduation. The significance of prior academic achievement is a consistent result in all previous studies which have included this variable – even when measured in different ways and examined in different countries, programmes and periods. Thus prior academic performance appears to be a robust indicator of subsequent academic success, and university administrators seem to be justified in using this criterion as an efficient method to shortlist applicants.

The SMU admission interview score was also a significant factor associated with GPA on graduation. Although interviews are conducted by a large number of faculty, the score is based on four categories that reflect the applicants' wider knowledge, values and ability to engage verbally. The ability to engage has been shown to be associated with better performance by Gracia and Jenkins (2002). Thus the admission interview appears to add a valuable dimension to the process of student selection, and should continue to be included in the admissions exercise.

Students' scores on the General Paper were used as a reflection on their ability to analyse and critique issues. The results indicate that critical thinking is significantly

associated with their eventual GPA, suggesting that success on an accounting degree programme requires higher level thinking as well as technical competence.

This study shows no significant association between mathematical aptitude and eventual GPA. In the context of this study, this result may not be as counter-intuitive as it at first appears. The vast majority of students (78.6 per cent) scored an “A” for this subject, implying that mathematical aptitude is not strongly differentiated across the sample. In addition, the study examines performance across the whole accountancy degree programme, which includes a wide range of qualitative as well as quantitative subjects in SMU. Thus mathematical aptitude may be regarded as a necessary but not sufficient condition for subsequent academic success.

The study also shows that gender is a significant factor associated with final GPA. In the first five student cohorts which completed the SOA degree programme between 2005 and 2009, male students, who formed the minority of the student body, typically outperformed female students. This result was also reported for students in Singapore by Koh and Koh (1999), and for students in the UK by Duff (2004). However both Byrne and Flood (2008) and Guney (2009) have found gender of no significance for students in the UK. Thus the association of gender with subsequent academic performance has not been established, and may vary depending on context.

Finally, the results of the present study show no significant association between age and subsequent GPA. In Singapore, age is in fact strongly related to gender. The male students are typically older than the female students in the same cohort by two years, due to the period spent in NS.

Limitations

As with any piece of research, the limitations of the present study stem from its particular circumstances of institution, country and period. Within this context, however, the results support what the literature has consistently shown to be important in identifying students who are more likely to be successful in accountancy degree programmes (prior academic performance, however measured); and provide evidence that admission interviews are an additional valuable method of identifying future success.

Future research

The present study may be usefully extended in two directions: firstly, by further testing of the significance of admissions interview as a variable associated with academic success in other settings; secondly, by testing variables which reflect other dimensions of student ability, such as their involvement in extra-curricular activities (for example, sports and the arts) and community involvement projects.

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Table 1: Descriptive statistics

Variables ^a	Mean (Std. Dev.)	Frequency (%)
Academic performance ^b (Final cumulative GPA, grade point average)	3.38 (0.39)	–
Prior academic achievement ^c	31.37 (4.51)	–
Admission interview ^d	15.33 (2.62)	–
Critical thinking ^e	4.25 (1.50)	–
Mathematical aptitude ^f	4.74 (0.55)	–
Age ^g	19.84 (1.07)	–
Gender:		
Female	–	514 (62.5%)
Male	–	309 (37.5%)

- a. Higher variable values represent better academic performance, prior academic achievement, admission interview, critical thinking and mathematical aptitude.
- b. The maximum possible score is 4.3. The range was from 4.18 to 2.16.
- c. The maximum possible score is 36. The range was from 36 to 16.
- d. The maximum possible score is 20. The range was from 20 to 5.
- e. The grades A1 to F9 were assigned values of 7 to 0, respectively. The range was from 7 to 0.
- f. The grades A to F were assigned values of 5 to 0, respectively. The range was from 5 to 1.
- g. The range was from 29 to 18.

Table 2: Regression analysis results

	Coefficient	Beta	<i>t</i> -Statistic	<i>p</i> -Value	VIF
Constant	1.511		3.275	0.001	
H1: Prior academic achievement	0.035	0.403	10.714	0.000	1.605
H2: Admission interview	0.020	0.135	4.118	0.000	1.214
H3: Critical thinking	0.026	0.102	3.137	0.002	1.194
H4: Mathematical aptitude	0.008	0.011	0.307	0.759	1.395
H5: Gender	0.175	0.219	3.515	0.000	4.405
H6: Age	0.013	0.036	0.580	0.562	4.444
$R^2 = 0.282$; Adjusted $R^2 = 0.277$; F -value = 53.446; p -value = 0.000					

Table 3: Regression analysis results

	Coefficient	Beta	<i>t</i> -Statistic	<i>p</i> -Value	VIF
<i>Panel A: Academic performance as at end of Year 1</i>					
Constant	0.763		1.630	0.103	
H1: Prior academic achievement	0.037	0.418	11.383	0.000	1.605
H2: Admission interview	0.022	0.144	4.494	0.000	1.214
H3: Critical thinking	0.028	0.104	3.293	0.001	1.194
H4: Mathematical aptitude	-0.003	-0.004	-0.128	0.898	1.395
H5: Gender	0.156	0.188	3.088	0.001	4.405
H6: Age	0.048	0.126	2.062	0.039	4.444
$R^2 = 0.314$; Adjusted $R^2 = 0.309$; F -value = 62.259; p -value = 0.000					
<i>Panel B: Academic performance as at end of Year 2</i>					
Constant	1.036		2.203	0.028	
H1: Prior academic achievement	0.035	0.396	10.613	0.000	1.605
H2: Admission interview	0.022	0.145	4.485	0.000	1.214
H3: Critical thinking	0.027	0.102	3.169	0.002	1.194
H4: Mathematical aptitude	0.011	0.015	0.440	0.660	1.395
H5: Gender	0.165	0.201	3.248	0.001	4.405
H6: Age	0.034	0.091	1.471	0.142	4.444
$R^2 = 0.294$; Adjusted $R^2 = 0.289$; F -value = 56.607; p -value = 0.000					
<i>Panel C: Academic performance as at end of Year 3</i>					
Constant	1.334		2.829	0.005	
H1: Prior academic achievement	0.035	0.399	10.732	0.000	1.605
H2: Admission interview	0.022	0.147	4.537	0.000	1.214
H3: Critical thinking	0.027	0.101	3.137	0.002	1.194
H4: Mathematical aptitude	0.013	0.018	0.522	0.602	1.395
H5: Gender	0.197	0.238	3.872	0.000	4.405
H6: Age	0.017	0.045	0.726	0.468	4.444
$R^2 = 0.297$; Adjusted $R^2 = 0.292$; F -value = 57.593; p -value = 0.000					