

Title: An analysis of the impact of winter schools on the academic performance of Economics students

Authors: Lorraine Greyling* and Naiefa Rashied**

Affiliations: Lorraine Greyling* is a professor of Economics at the University of Johannesburg
Naiefa Rashied** is an Economics lecturer at the University of Johannesburg and is the corresponding author (naiefar@uj.ac.za)

Abstract

In most Bachelor of Commerce degrees in South Africa, Economics is a compulsory module. Thus, it is important for students to exit fundamental Economics modules with a reasonable understanding of the content. One would expect that a reasonable understanding of the Economics content would lead to good student retention and enhanced individual student success in Economics. Seidman (2005) stipulates that student retention is dependent on the level of at-risk student identification and distinguishes between early, intensive and continuous identification and intervention. Van Zyl and Blaauw (2012) and Greyling and De Villiers (2013) proved that early and continuous identification of at-risk students improved both student retention and student success in Economics. The aim of this study is to test whether intensive interventions, in the form of winter schools, improve the success rate of Economics students. The study conducts a descriptive analysis of three cohorts of second year Economics students who participated in an intensive academic intervention, in the form of winter schools, offered by the Department of Economics and Econometrics at the University of Johannesburg. The findings suggest that students who participate in intensive interventions, in the form of winter schools, experience a higher level of student success when compared to students who do not participate in these interventions.

JEL Codes: A22

Keywords: Economics education, retention, intensive identification, winter school

1. Introduction

The South African higher education system currently faces a number of concerns. Among other concerns, the general success rate of university students in South Africa is problematic and there seems to be an increasing need for additional interventions in higher education to address persistent academic challenges related to numeracy and literacy faced by previously disadvantaged students (Horn and Jansen, 2009; Smith, 2009). These interventions are designed to help students who face certain disadvantages to achieve their full academic potential (Smith and Ranchhod, 2011: 431).

In the discipline of Economics, a large proportion of South African literature has focused on the factors that influence the academic success of first year university students. Studies by Pretorius and Blaauw (2014), Greyling and de Villiers (2013), Van Zyl and Blaauw (2012), Horn and Jansen (2009), Smith (2009), Smith and Edwards (2007), Parker (2006), Van Der Merwe (2006), Van Walbeek (2004) and Edwards (2000) among others, examine factors such as student characteristics, student abilities, academic interventions, lecture attendance, tutorial attendance, academic constraints and even student happiness.

The success of second year Economics' students is the subject of a relatively smaller proportion of the literature. In the South African context, Horn, Jansen and Yu (2011) and Smith and Ranchhod (2012) assert that similar factors influence student success in Economics in their second year of study. Furthermore, Smith and Ranchhod (2012: 431) argue that educational interventions certainly influence the success of second year students in Economics. Internationally, Seidman (2005) argues that student retention is dependent on the level of at-risk student identification, in general, and distinguishes between early, intensive and continuous identification (and subsequent intervention).

The aim of this study is to contribute to the growing body of knowledge around the success of second year Economics' students. To the best knowledge of the authors, this study does this in two ways. Firstly, this study uses three different cohorts of students to examine the impact of a very specific academic "intensive" intervention, in the form of a winter school, on the success of second year Economics students. Secondly, the study confirms the theory of Seidman (2005), in a South African context, by examining the impact of an intensive intervention on student success.

The remainder of the paper will explore the characteristics of the relevant winter school and the literature associated with winter schools and second year economics students, nationally and internationally. This is followed by a discussion of the research methodology used in this study, an analysis of the results and conclusion successively.

2. Characteristics of the Economics 2A Winter School offered by the Department of Economics and Econometrics at the University of Johannesburg

Changes in the higher education context are placing much greater demands on teaching staff at South African universities. There is a growing need to support, develop and ensure more holistic management of students in order to maximize the effectiveness of teaching models and enhance student success rates.

At the University of Johannesburg, Economics 2A is identified as a high impact or a priority module. This is because Economics 2A is not only taken by students majoring in Economics, but is also taken as a second or third major by students across many other disciplines such as Law, Accountancy and Education, among others. Thus, Economics 2A comprises of relatively high student enrolment (more than 500 students). In addition to the high student enrolment, the throughput rate of Economics 2A is consistently low and as a result, a relatively large proportion of Economics 2A students qualify for the supplementary exam.

A supplementary examination is usually written by students who either fail their final examination or miss their final examination due to illness, religious or accident related reasons. A winter school, as a form of intensive intervention, is provided to all students who qualify for the supplementary examination. In this study, only the students who failed their final examination and subsequently qualified for the supplementary examination will be examined. This will allow a more focused analysis of whether the winter school had any impact on the students who failed their examination, qualified for the supplementary examination and attended the winter school in preparation for the supplementary examination. All qualifying students write the same supplementary examination, irrespective of their winter school attendance. Winter school attendance is monitored through an attendance register.

According to Seidman (2005), early, continuous and intensive identification and intervention is required in order to obtain ideal levels of student retention. Students who are registered for Economics 2A are provided with an array of early interventions in their first year of study in the form of first year university orientation sessions that cater for the academic and social aspects of university life. Van Zyl and Blaauw (2012) confirm that orientation programmes, such as the one implemented at the University of Johannesburg, is successful as an early intervention since it contributes positively to the academic success of first year students at the University of Johannesburg.

Subsequently, Economics 2A students are exposed to an array of continuous interventions in the form the first and second year curriculum which comprises of lectures, tutorials, formative assessments and summative assessments. Of particular interest are the continuous interventions provided to Economics 2A students. These students are presented with three summative assessment opportunities during the semester (as opposed to the standard practice of two summative assessment opportunities) and one summative assessment at the end of the semester. A summative assessment opportunity is defined as an assessment that is conducted at the end of the learning period (in this case, the first semester) to assess the student's abilities against the module outcomes (University of Johannesburg, 2008:5). In addition, the students are presented with three formative assessments in the form of two class tests and one assignment. Furthermore, the 2014 cohort of Economics 2A students were also provided with three Saturday revision classes that spanned 6 hours each. These revision classes took place prior to the final examination.

Subsequent to failure of the final examination, students were encouraged to attend a winter school which is classified as an intensive intervention. The aim of the winter school was to prepare qualifying students for the supplementary examination. The group of Economics 2A students who attended the winter school was small and students attended additional classes voluntarily. Under the guidance of a lecturer and tutor, discussed and analysed relevant topics and problems that formed part of the module outcomes for Economics 2A. These topics and problems were discussed at random and were in no way modelled on the structure of the supplementary examination. The purpose of the winter school was not to "coach" the students for the supplementary examination, or to duplicate the work done in the formal lectures during the semester. Instead, the winter school allowed students to reflect on the module content and apply it where applicable to as many of the module outcomes as possible which promoted active (as opposed to passive) learning.

It is important to follow a different teaching model to the formal lectures during the winter school and to introduce a mix of learning methods to provide students with the best available opportunities to learn according to their needs and capabilities. To obtain maximum benefit out of the small class environment typical of the winter school, the model of teaching that took place in the winter schools encouraged active learning with a lot of participation, group work and doing, otherwise known as cooperative learning, which forms part of collaborative learning (Johnson, Johnson and Smith, 1998:27).

An important characteristics of cooperative learning is the allocation of work in teams to apply academic content. Positive interdependence is created by establishing groups where members have mutual goals where one student learns the material and makes sure that all group members understand the material, where the sharing of material and information takes place. Favourable educational outcomes occur as a result of this interdependence which is facilitated by interactions among group members, verbal analysis, summarising and peer feedback. Although positive interdependence is an important outcome of cooperative learning, one of the conditions of cooperative learning is that each member must be accountable for learning and preparing all the relevant material. For the purposes of the winter school, individual accountability must be demonstrated in all the sessions through written assessments or by randomly selecting one member to answer for the group. It is also important to change the groups regularly to ensure full participation if all the students and to allow a certain degree of self-selection in terms of grouping.

The cooperative learning method of instruction places the responsibility for learning on the student, positively influences their motivation levels and enhances their abilities to work in groups. Johnson, Johnson and Smith (1998:2) suggests that the use of well-structured cooperative learning is more effective in improving student learning than traditional methods. Slavin, Hurley and Chamberlain (2003) and Hancock (2004) also suggest that cooperative learning helps students develop positive relations with one another which could also help them build their confidence. In the case of Economics 2A students, the rebuilding of confidence is needed especially after failure in the final examination.

3. Literature review

A survey of the literature indicates that a few local and international studies have examined various aspects of the student success of second year students in Economics. In South Africa, Horn, Jansen and Yu (2011) find that second-year student success is attributable to lecture and tutorial attendance. The authors further find that second year students who took Additional Mathematics as a subject in their year of matriculation, are more likely to progress to second year Economics. In addition, the study argues that matriculation results, as a proxy for academic ability, very weakly explained academic success in a student's second year of study in Economics.

Smith and Ranchhod (2012:447) find that educational interventions in a first year academic development course in Economics had a positive impact on the academic performance of second year microeconomics students. However, the study also finds that students who are provided with educational interventions did not improve a student's ability to cope with the mathematical component of the second year course in microeconomics. Furthermore, findings suggest that cohorts of students who attended the academic development course workshops did not improve their overall academic performance relative to cohorts of students who did not attend these workshops.

Internationally, studies by Graunke and Woolsey (2005), Gahagan and Hunter (2006), Gump (2007), Tobolowsky (2008), Coghlan, Fowler and Messel (2009) and Hunter *et al.* (2010) examine the "sophomore" years of college education in the United States of America in an attempt to understand the "sophomore slump" (the sophomore year is equivalent to a second year of study in the South African context). Graunke and Woolsey (2005) identify factors such as interaction with faculty (known as "lecturing staff" in the UJ context) and student commitment to any subject as a major are positive predictors for a student's spring GPA but not their fall GPA (semesters one and two respectively, in the UJ context). Coghlan, Fowler and Messel (2009) argue that the costs of college education and levels of social-integration are among the key determinants of sophomore attrition rates. Similarly, the Australian studies by Harrison (2007) and Quinlivan (2010) report on interventions such as peer-monitoring systems, tutorial programmes and university support services to address what they call the "second-year slump".

There are unique differences between this study and the studies mentioned above. Firstly, a large proportion of the international literature focuses on the “second year” or “sophomore” slump in general without necessarily focusing on Economics students. This study focuses on the “sophomore” slump particularly in the discipline of Economics 2. Secondly, the South African studies focus mainly on the of impact of educational interventions made in the first and second year microeconomics courses on academic development students’ final mark in the second-year microeconomics course and whether factors explaining first-year academic success are applicable in the second year or if other factors are relevant. The aim of this study is to establish whether or not an intensive intervention, such as the winter school for Economics 2A students, has had a positive effect on student success in Economics 2A.

This study will analyse the performance of three separate cohorts of Economics 2A students and allows for: 1) an analysis of fluctuations in the module’s success rate between 2012, 2013 and 2014; 2) a more informed understanding of the module’s challenges in terms of the student numbers and final mark distribution; and 3) for a better understanding of whether or not the offering of the winter school has affected the success rate of the module.

4. Methodology

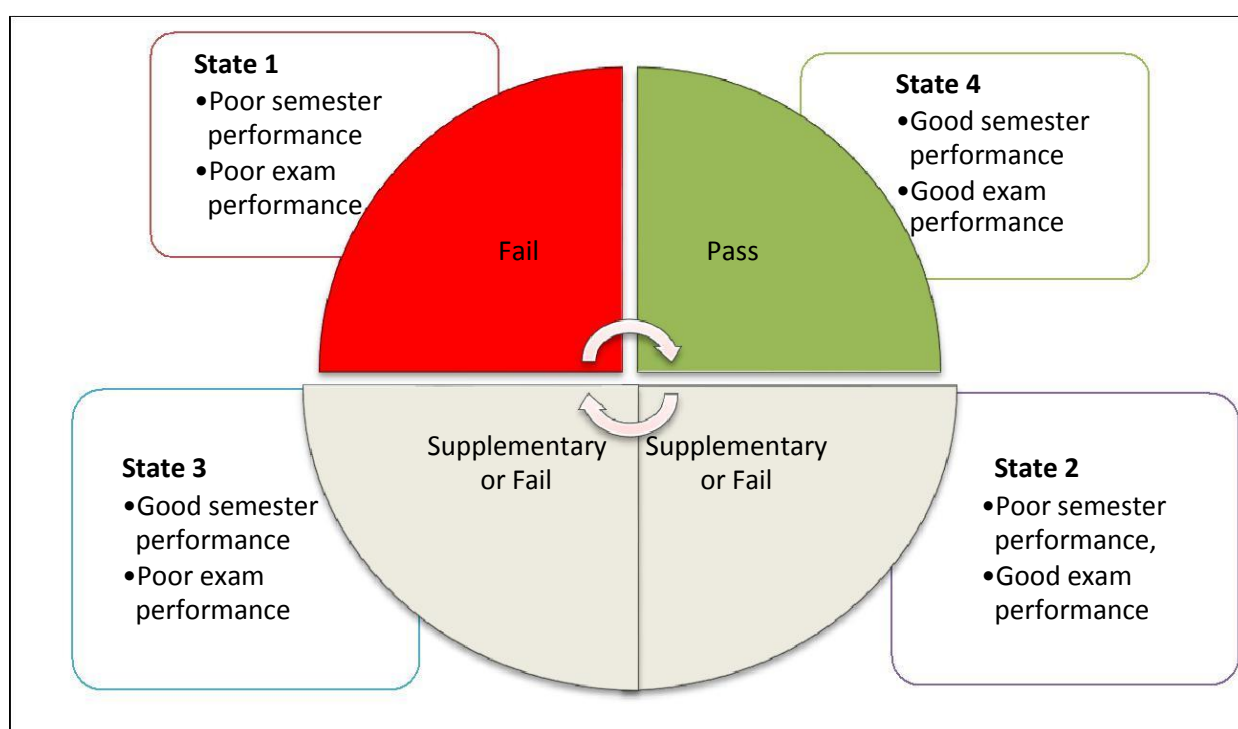
The impact of student attendance to a winter school on their supplementary examination mark versus the traditional method of writing the supplementary exam without winter school attendance will be investigated. A comparison of the grades of students who didn’t attend the winter school to those who did attend the winter school will be conducted. The aim is to determine, through student data, whether their performance did indeed improve as a result of winter school attendance. A univariate statistical analysis supported by visual inspection will be used to make the relevant comparisons.

Figure 1 describes four possible states to bear in mind when analysing a student’s academic performance in Economics 2A:

- State 1: Poor semester performance, poor exam performance
- State 2: Poor semester performance, good exam performance
- State 3: Good semester performance, poor exam performance
- State 4: Good semester performance, good exam performance

In order to examine the impact of the winter school on the performance of the qualifying students, we exclude students who fall into states 1 and 4 because neither group is eligible or likely to write the supplementary examination. Subsequently, we focus exclusively on states 2 and 3. States 2 and 3 indicate the circumstances that would enable the student to qualify for a supplementary examination. If a student qualified for the supplementary examination, there were eligible to attend the winter school upon payment of a small administration fee of R240. The fee was waived for students who could not afford it.

Figure 1: Performance wheel for Economics 2A



Source: Moerane and Greyling (2013:22)

Table 1: Economics 2A enrolment, throughput and supplementary statistics

Year	Enrolment	Throughput rate June exam	Success rate After sup and winter school*
2010	1265	61%	68.7%
2011	1194	59%	60.8%
2012	972	57%	73.9%*
2013	834	61%	68.0%*
2014	777	62%	74.8%*

Source: authors' own

*indicates years when a winter school was implemented

Table 2: Average Marks for Economics 2A prior to the winter school

Assessment	Year		
	2012	2013	2014
	N=972	N=834	N=777
Semester test 1	45%	40%	48%
Semester test 2	56%	53%	49%
Semester Average	49%	46%	48%
Entrance into the June exam	80%	74%	79%
June Exam Average	52%	62%	57%
Full Mark Average	45%	46%	47%

Source: authors' own

Based on the results in table 2, there seems to be very little differences between the average marks across the different cohorts and the full mark average for the module remained consistently lower than 50% in all three years. Bearing in mind the enrolment trends, even a decline in the numbers of students enrolling for the module did not change the average semester performance. In all three cohorts, there were relatively low semester marks and less than 80% of the students qualified to write the final examination. Results from table 2 also indicate that more than 20% of the Economics 2A students fall into state 1, which means poor performance during the semester and the final examination and subsequent module failure. Table 2 also suggests that the students perform better in the examination than in the semester and that on average the entire group could be classified in the state 2 category.

5. Results of the winter school intervention

From table 2, it can be said that the Economics 2A module has consistently experienced low and relatively unchanged semester and final mark results. Thus, the impact of the winter school on the performance of Economics 2A students can thus be analysed.

Table 3 provides semester statistics related to the students who qualified for supplementary examination. The students were divided into a group that attended the winter school and the group who chose not to attend the winter school.

Table 3: Assessment results of Economics 2A supplementary students

	Winter	Non-winter	Winter	Non-Winter	Winter	Non-winter
Assessment	2012	2012	2013	2013	2014	2014
	N= 38	N= 70	N= 17	N= 80	N= 26	N= 58
Semester test 1	39%	36%	47%	51%	44%	44%
Semester test 2	50%	47%	41%	39%	46%	41%
Semester Average	45%	43%	43%	44%	45%	43%
Average June Exam	44%	47%	48%	47%	47%	48%
Average June Final Mark	42%	45%	45%	46%	42%	46%

Source: authors' own

From table 3, we can observe that the students who qualified for the supplementary examination form part of state 1 – although their performance allow them entrance into the supplementary exam. These students performed worst in both the continuous assessment opportunities as well as the final examination and on average, did not pass any of the summative assessment opportunities. There is also no distinct difference in the semester performance of the winter school students and the non-winter school students prior to the winter school.

Table 4 presents the results of the supplementary examination for the winter school and winter school students are presented. It is important to understand that the final mark results are a combination of the semester mark (50%) and the exam mark (50%). Table 4 and figure 2 show that, on average, students who qualified for the supplementary examination and attended the winter school had a higher success rate in Economics 2A when compared to students who qualified for the supplementary examination and did not attend the winter school. 100% of the winter school attendees, who were initially classified in state 1 of the performance wheel now, subsequently moved to state 4. Of the students who did not attend the winter school, only between 60 – 78% wrote the supplementary examination and subsequently moved to state 4 and only showed an improvement between 2 and 7% in their examination mark.

The winter school attendants did exceptionally well in the supplementary examination with averages of 81%, 69% and 68% for the different cohorts respectively, which indicates a fair grasp of the module content. An examination pass rate of 100% has been realised for all three cohorts of students who qualified for the supplementary examination and attended the winter school. The throughput rate was 100% for 2012 and 2013, and 96% for 2014, where only one student failed to pass after the winter school. On average, students who wrote the supplementary examination without attending the winter school failed their supplementary examination.

Table 4: Supplementary assessment results of Economics 2A for winter school and non-winter school students.

	Winter	Non-winter	Winter	Non-Winter	Winter	Non-winter
Assessment	2012	2012	2013	2013	2014	2014
	N= 38	N= 70	N= 17	N= 80	N= 26	N= 58
Semester average	45%	43%	43%	44%	45%	43%
Average June exam	44%	47%	48%	47%	47%	48%
Average supplementary examination	81%	57%	69%	55%	68%	62%
Improvement from June examination	39%	12%	24%	9%	26%	16%
Average June final mark	42%	45%	45%	46%	42%	46%
Average July final mark	64%	50%	57%	48%	57%	53%
July throughput rate	100%	64%	100%	61%	96%	78%

Source: authors' own

Table 5 below provides a univariate analysis of the performance of students who qualified for the supplementary examination and attended the winter school versus those who qualified for the supplementary examination and did not attend the winter school. The students who qualified for the supplementary examination and attended the winter school presented consistently higher examination averages, maximum marks and minimum marks when compared to those students who qualified for the supplementary examination and did not attend the winter school.

Table 5: Univariate analysis of the winter school versus non-winter school performance for Economics 2A

	2012		2013		2014	
	Winter School	Non-Winter	Winter School	Non-Winter	Winter School	Non-Winter
Observations	38	66	12	75	26	55
Mean	81.18421	57.56061	69.00000	54.82667	67.88462	62.09091
Median	82.00000	58.00000	69.50000	57.00000	67.00000	63.00000
Maximum	95.00000	80.00000	78.00000	82.00000	85.00000	77.00000
Minimum	59.00000	27.00000	60.00000	24.00000	51.00000	45.00000
Std. Dev.	8.946856	10.84028	5.656854	13.72153	9.034719	8.138324
Skewness	-0.507055	-0.544848	0.040914	-0.157523	0.127521	-0.091690
Kurtosis	2.719592	3.474396	1.911028	2.234112	2.100108	2.440722
Jarque-Bera	1.752825	3.884343	0.596278	2.143247	0.947757	0.793880

Source: authors' own

6. Conclusion

A univariate analysis was conducted to determine the average success rate of the module before and after the introduction of the intensive intervention in the form of a winter school. The average success rate between 2012 and 2014 improved and it is clear that the module throughput is improved as a result of the winter school. It is particularly interesting to note that the increase in the average success rate for Economics 2A coincides with the introduction of the winter school. The winter school appears to have initiated an upward trend, with the average success rate increasing by 14 percentage points from 60.8% in 2011 (with no winter school) to 74.8% in 2014 with a winter school.

Despite the differences between the years analysed, it appears that the winter school as an intensive intervention has a positive effect on the success rate of students who complete Economics 2A. A steady improvement in success rates and final marks obtained for the module can be observed and we can conclude that the winter school is a good intensive intervention method and provides students with one last opportunity successfully understand and apply the content of the module.

This study has a few limitations which the authors hope to improve upon in the future. Firstly, the sample sizes are relatively small, especially with regards to students to qualify for the supplementary examination and attend the winter school. A more robust way of

analysing whether winter schools do improve student success is to look at the impact of winter schools in modules or subjects other than Economics 2A. Secondly, lecturers changed each year and learning material was modified for each cohort to include the latest information, where applicable, within the discipline. This study was unable to determine whether these changes had any direct impact on the learning process of the students. Thirdly, students who did not pay their university fees were not allowed to view their marks or receive information related to the winter school. This could have hindered many students from benefiting from the intensive intervention and this factor was not incorporated into the univariate analysis in this study. Fourthly, the academic quality of the students in each cohort was not controlled for in this study. The results from the South African National Benchmark Test (NBT) and the South African National Senior Certificate could assist with the understanding of whether there are differences in the academic quality of the students between the different cohorts. Finally, expanding the number of years (and cohorts) is likely to provide a more robust indication of the effectiveness of the winter schools.

7. Reference list

Coghlan, C. L., Fowler, J., & Messel, M. (2009). The sophomore experience: Identifying factors related to second-year attrition. Proceedings of the *National Symposium on Student Retention*, 190-199. Available from: https://studentsuccess.unc.edu/files/2012/11/Proceedings_of_the_NSSR-2009.pdf#page=204

Edwards, L. (2000). An econometric evaluation of academic development programmes in economics. *South African Journal of Economics*, 68(3): 204-215.

Gahagan, J., & Hunter, M. S. (2006). The second-year experience: Turning attention to the academy's middle children. *About Campus*, 11(3): 17-22.

Greyling, L and de Villiers, N. 2013. Analysing the impact of interventions on the performance of Economic 1 students. ESSA Conference, Bloemfontein, 25 – 27 September 2013.

Graunke, S. S. and Woolsey, S. A. (2005). An exploration of the factors that affect the academic success of college sophomores. *College Student Journal*, 39(2): 367-376.

Gump, S. (2007). Classroom research in a general education course: Exploring implications through an investigation of the Sophomore Slump, *The Journal of General Education*, 56(2): 105-125.

Hancock, D. (2004). Cooperative learning and peer orientation effects on motivation and achievement. *The Journal of Educational Research*, 97(3): 159-168.

Harrison, G. (2007). Aussie Attrition: The down under experience of sophomore slump in the health sciences. Available from <http://www.sc.edu/fye/events/presentation/sit/2007/files/14-CR.pdf>. (Accessed 12 August 2015).

Horn, P., Jansen, A., & Yu, D. (2011). Factors Explaining the Academic Success of Second-Year Economics Students: An Exploratory Analysis. *South African Journal of Economics*, 79(2): 202-210.

Hunter M., Tobolowsky B., Gardner J., Evenbeck S., Pattengale J., Schaller, M., & Schriener L. (2010). *Helping Sophomores Succeed: Understanding and Improving the Second-Year Experiences*. San Francisco: John Wiley and Sons.

Johnson, D. W., Johnson, R. T., & Smith, K. A. (1998). Cooperative learning returns to college what evidence is there that it works? *Change: the magazine of higher learning*, 30(4):26-35.

Moerane, K. & Greyling, L. (2013). *Analysing the Impact of Winter School on the Performance of Economics Students*. Unpublished honours project. Johannesburg: University of Johannesburg.

Parker, K. (2006). The effect of student characteristics on achievement in introductory microeconomics in South Africa. *The South African Journal of Economics*, 74(1): 137-149.

Pretorius, M., & Blaauw, D. (2014). Happiness among first-year students at a comprehensive tertiary institution-an exploratory study. *Journal of Economic and Financial Sciences*, 7(2): 467-484.

Quinlivan, T. (2010). *Investigating the transition process across the undergraduate degree: implementing a peer mentoring program to address the second year slump*, PhD Thesis, School of Health Sciences, RMIT University, Australia.

Seidman, A. (2005). Minority student retention: Resources for practitioners. *New directions for institutional research*, 2005(125): 7-24.

Smith, L., & Edwards, L. (2007). A Multivariate evaluation of mainstream and academic development courses in first-year Microeconomics. *South African Journal of Economics*, 75(1): 99-117.

Smith, L. C. (2009). An analysis of the impact of pedagogic interventions in first year academic development and mainstream courses in microeconomics. *The South African Journal of Economics*, 77(1): 162-178.

Smith, L. C., & Ranchhod, V. (2012). Measuring the impact of educational interventions on the academic performance of academic development students in second-year Microeconomics. *South African Journal of Economics*, 80(3): 431-448.

Tobolowsky, B.F. (2008). Sophomores in transition: The forgotten year. *New Directions in Higher Education*, 144:59-67.

University of Johannesburg. 2008. Faculty of Economic and Financial Sciences Faculty Undergraduate and Honours Assessment Policy. Johannesburg: University of Johannesburg.

Van Der Merwe, A. (2006). Identifying some constraints in first year economics teaching and learning at a typical South African university of learning. *The South African Journal of Economics*, 74(1): 150-159.

Van Walbeek, C. (2004). Does lecture attendance matter? Some observations from a first year economics course at the University of Cape Town. *The South African Journal of Economics*, 72(4): 861-883.

Van Zyl, A., & Blaauw, P. (2012). An integrated project aimed at improving student success. *Africa Education Review*, 9(3): 466-484.