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Predictors of academic performance in an adult education degree at a Business School in South Africa

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ABSTRACT

In South Africa under apartheid, higher education was unavailable to a large segment of the population. Many who enrol for an undergraduate degree today are thus mature students or 'adult learners' 25 years or older who are in full-time employment. Since these students learn differently from their younger peers, institutions need to know what factors influence their academic performance, so as to target interventions and support services accordingly. Performance in the first year is a significant predictor of final year performance. We explored the role of cognitive abilities and personal competencies in the academic performance of 207 adult education students enrolled in the first year of an undergraduate degree at a Business School in South Africa. We found that for these adult learners cognitive abilities, particularly verbal reasoning, were a more consistent predictor of academic success than personal competencies.

Introduction

In apartheid South Africa, quality higher education was unavailable to a large segment of the population. Thus, preventing them from enrolling for undergraduate degrees at tertiary education institutions. This has led to a situation where presently, many aspiring, as well as experienced managers in private and public organisations do not have any formal post-secondary school qualification. In order to deliver and equip a new generation of formally qualified and innovative managerial leaders, the Business School of the University of the Free State developed an undergraduate degree for working adults (open to both previously disadvantaged and advantaged applicants). The Bachelor of Management Leadership (BML) degree aim is to develop managers to become change agents in their workplace. 'Adult learners', sometimes referred to as 'mature students', or 'nontraditional' learners, are usually 25 years or older and often have previous work experience (Markle, 2015). Therefore, the programme was designed on the basis of adult education learning principles (Merriam, Caffarella, & Baumgartner, 2007), and was launched in 1999. The first intake consisted of 48 students of which 23 students graduated in September 2002 (Massyn, 2009). By the end of 2017, 784 students completed the degree since the start of the programme and a success rate of 83.8 percent was reported.

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Despite the success of the programme, the factors contributing to students being successful or unsuccessful with regards to the completion of the programme have not yet been investigated. Many kinds of ability and competency determine whether a student will perform well academically and obtain a degree. Since the learning principles in adult education differ from those of the mainstream learning environment (Merriam et al., 2007), it is important to identify the factors that influence the academic performance of these mature students in order to target interventions and support services for those likely to have academic problems. Previous academic performance has been identified as a significant predictor of final success, particularly academic performance in the first year, with the effect becoming evident even after two and three years of study (Baker, 2003; Busato, Prins, Elshout, & Hamaker, 2000). Therefore, it is especially important to identify those factors influencing students' performance in the first year.

The adult education undergraduate degree in Management Leadership (BML)

The BML is an undergraduate degree – presented in English – and usually takes four years to complete. The admission requirements stipulate that applicants must be at least 23 years of age, have a Senior Certificate (school-leaver's qualification) and be in full-time employment. Approximately 70% of the students are funded by employers. In South Africa adult learners are defined as 23 years or older (Buchler, Castle, Osman, & Walters, 2007).

The BML degree is based on the principles of adult learning as incorporated in the framework developed by Merriam and Cafferrella (1999). These principles look at adult learning from three angles, the *adult learner*, the *learning process* and the *context*.

One of the aspects that distinguishes *adult learners* from their younger peers is the richer life and work experience they bring to the classroom. This gives them a resource to tap into and influences their self-identity. Who they are, is determined by what they have experienced. But mature students also want to *understand* their experiences and will therefore explore them in the learning environment to gain new perspectives or plan their future behaviour. Adults are also at a different developmental stage from their younger peers. While the life tasks of these younger peers focus on physical maturation and preparation for adulthood, those of the mature student focus on how to function well as an adult, for example how to manage a career. Past experiences lead to adjustments in the way the adult has been functioning. These experiences and adjustments – that can be career- or family-related – motivate adults to change and develop, and lead to meaningful learning (Merriam et al., 2007). The programme has three delivery modes: face-to-face, modular and online. Students can enrol for any of the three, depending on their work and personal circumstances. Face-to-face students attend a one-day contact session each week, modular students attend four one-week contact sessions per year. Between contact sessions students are supported through a learning management system. Online students attend weekly online sessions, consisting of lecturer and peer interaction on various topics. All students are divided into study groups, representing different race and gender groups, as well as various employers.

The *learning process* may be similar to that of the younger peers, but adult learners typically will not engage in learning if they do not find the learning will add value to their work or personal circumstances. Research must therefore focus on *how* adults learn. According to Mezirow (1997), for adults the learning process should be one where transformative

learning can happen. 'Transformative learning is the process of effecting change in a frame of reference' (Mezirow, 1997, p. 5). Life experiences are the frame of references that define an adult's world. Transformative learning is usually triggered by significant or critical events in one's life. The process involves psychological changes (new understanding of the self), convictional changes (revision of belief systems) and behavioural changes (alterations in lifestyle). For transformative learning to occur in a learning situation, a learning process must be designed that allows for group interaction and opportunities for critical reflection. Therefore, the BML degree is designed to foster greater autonomy and self-regulation and create an environment where learning activities and content are seen as a shared responsibility in reaching goals (Kiely, Sandmann, & Truluck, 2004).

From the angle of *context*, learning is seen as a social process. Although learning begins with the individual adult learner it is also influenced by interaction with others. Merriam et al. (2007) distinguish two dimensions of context: interactive and structural. The *interactive* dimension involves the relationship between the adult learner, the social surroundings and the learning environment. The theory of 'situated cognition' (Merriam et al., 2007) is relevant here. It states that learning takes place through social interaction with others, the specific learning environment that is created and the tools (objects, technology) that the learner has available. Learning must therefore be set in real-life contexts and the learner must understand these contexts (Wilson, 1993). The *structural* dimension involves the social structures of power, across race, gender and class, that affect adult learners who represent these structures (Kiely et al., 2004). The structural dimension is often unseen and unacknowledged, but it influences learning. Educators of adult learners must address these structural dimensions and ensure that adult learners interact with others from different social groups to expand their worldviews (Merriam et al., 2007). The teaching philosophy of the BML emphasises experiential learning and is designed to include active and collaborative learning. The programme emphasises reflection on real-world scenarios and experiences of students in the development of knowledge. No examinations are written in the programme and assessments focus more on application than rote learning. The content and assessments are the same, irrespective of the mode. Continuous assessments encourage students to learn from previous experiences (Massyn, 2009). Formative assessments offer feedback to the students to help them learn from the assessments and prepare them for the final assignment that integrates all the learning from the specific module through applying the learning to the workplace, analysing cases or solving practical problems.

Factors influencing academic performance of adult learners

In the field of Adult Education, three kinds of factors help or hinder completion of a programme. The first kind of factor is institutional, such as the location of the institution, the lecturers' teaching styles, the quality and contents of the curriculum, the types of assessment and the management practices (Goings, 2016; Sogunro, 2015). The second is situational, such as peer support, finance and family responsibilities, (Genco, 2007; Goings, 2016). The third is personal, such as the level of self-efficacy, self-directedness and self-confidence, and whether the student is anxious or apprehensive about returning to formal education as an older student (Genco, 2007; Golden, 2003; Sogunro, 2015; Whitten, 2013).

At a personal level, it has been proposed that both cognitive and non-cognitive factors should be taken into account in predicting success in tertiary education (Noftle & Robins,

2007). These include skills and behaviours of the kind used for succeeding in a job, which is relevant to the participants in this programme. Since measuring various cognitive abilities and personal competencies is useful for assessing adults in the workplace for selection and job placement it may also be useful to assess these cognitive abilities and personal competencies for acceptance for academic programmes designed for working adults. Of the various theories of intelligence, the individual differences theory, grounded in the psychometric tradition, has had a particularly strong influence on the study of adult intelligence (Merriam et al., 2007). This theory conceptualises intelligence in two ways: first, as general intelligence (the 'g' factor), a single underlying ability that explains an individual's performance on one or more scales (Jensen, 2002), and second as multiple factors, such as perceptual speed and verbal and numerical reasoning (Anastasi & Urbina, 1997). Cognitive abilities such as verbal and numerical reasoning can be measured by specific tests, while IQ tests measure a broader spread, as an overall score. Cognitive ability measures are seen as samples of 'a repertoire of intellectual (or cognitive) skills' (Humphreys, 1989, p. 194) that are available to an individual at any point in time. Those who have acquired a more advanced or larger repertoire of cognitive abilities are likely to have more of the knowledge and skills needed for a job or academic tasks (Humphreys, 1989; Kotzé & Griessel, 2008; Merriam et al., 2007).

There is still a perception that as we age our cognitive abilities deteriorate (Merriam et al., 2007). However, we could find no studies on the influence of cognitive factors on the academic performance of adult learners. Personal competencies, on the other hand, are the underlying knowledge, skills and personal attributes that are instrumental in the delivery of the desired academic results, such as problem solving, adapting to change and coping with pressure (Coetzee & Schreuder, 2013). Studies have shown that a combination of cognitive abilities and personal competencies is important in academic performance. Busato et al. (2000) found that the cognitive ability and the personal competency of 'achievement motivation' of first-year Psychology students at the University of Amsterdam were positively associated with academic success. A study by Kappe and van der Flier (2012) conducted at a higher educational institution, showed that 33% of the variance in grade point average (GPA) and 30% of the variance in time to graduation of a sample of undergraduate human resource management students was explained by a combination of intelligence, personality and motivational predictors. A study at the Business School at the University of the Free State in South Africa showed that verbal and numerical reasoning and a high score on achieving personal goals and objectives were the best predictors of academic performance in an MBA programme (Kotzé & Griessel, 2008). In a study investigating factors that influenced adult learners' persistence at a US university, Markle (2015) found that grade point average and students' confidence that they would graduate influenced their persistence positively.

Various other studies have found that personal competencies, such as the ability to adapt to the higher education environment, coping effectively with stress, being self-motivated to attain personal goals and able to build relationships with peers and other academic role players are predictors of academic performance (Allen & Zhang, 2016; Baker, 2003; Dass-Brailsford, 2005; Malefo, 2002).

The studies cited above relate mostly to mainstream students entering higher education institutions directly after completing their secondary education. The present study aimed to fill a gap in the adult education literature by examining the role of cognitive abilities and personal (i.e. non-cognitive) competencies to determine how they influence the academic performance of adult learners.

Purpose of study

The study's purpose was to determine which was more important for the academic performance of adult learners in the first year of an adult education undergraduate programme: cognitive abilities or personal competencies. The following research questions were formulated:

(1) Do cognitive abilities enhance the academic performance of adult learners in an adult education undergraduate programme?
(2) Do personal competencies enhance the academic performance of adult learners in an adult education undergraduate programme?

Research methodology

Sample

The sample comprised 207 adult education students enrolled for the first year of the undergraduate degree. Of this sample, 66.2% were male and 85.5% were between 26 and 45 years old. Only four were older than 50. As their highest qualification, about 36% had secondary school education (Grade 12), 58% had obtained a diploma, 3.4% had an undergraduate degree, 1.9% had a postgraduate diploma, and 1% had completed short learning programmes or certificates after completing Grade 12. Almost 50% of the respondents had 11 to 20 years of work experience, about 10% had less than six years and about 24% had six to 10 years. Only 5.3% had more than 25 years of work experience. Respondents represented the following language groups: indigenous African languages including Sesotho, SeTswana, IsiXhosa, IsiZulu, Sepedi, TshiVenda and SiSwati (44%), Afrikaans (42%), and English (14%).

Measuring instruments

Academic performance was measured using the final marks in the four first-year modules: Personal Development (PDCB1511/21) (Module 1), Academic Language (PDCB1512/22) (Module 2), Group Dynamics (PDCB1513/23) (Module 3) and Numeracy and Computer Literacy (PDCB1514/24) (Module 4). In Module 1 students reflect on their lives and who they are and their reasons for enrolling in the programme. They are also assisted to compile a 'recognition of prior learning' portfolio. In Module 2 they learn the techniques of academic writing, referencing and oral presentations. Module 3 focuses on getting to know one another and working in groups. Module 4 provides students with the foundational knowledge that they will need to be successful in the financial and economic modules later in the programme.

Personal competencies were measured using the Occupational Personality Questionnaire 32r (OPQ32r), developed by Saville and Holdsworth Limited (SHL), which determines an individual's preferred behaviour in various work-related situations (Joubert & Venter, 2013). The questionnaire is a forced-choice measure of three domains: 'relationships with people', 'thinking style' and 'feelings and emotions' (Bartram, Brown, Fleck, Inceoglu, & Ward, 2006). The 32 personality attributes that are measured can be grouped into competencies. The following four competencies were included in the study:

Working with people

Shows respect for the views and contributions of other team members; shows empathy; listens, supports and cares for others; consults others and shares information and expertise with them; builds team spirit and reconciles conflict; adapts to the team and fits in well.

Achieving personal goals and objectives

Accepts and tackles demanding goals with enthusiasm; works hard and puts in longer hours when it is necessary; seeks progression to roles of increased responsibility and influence; identifies own development needs and makes use of developmental or training opportunities.

Coping with pressure

Maintains a positive outlook; works productively in a pressurised environment; keeps emotions under control during difficult situations; handles criticism well and learns from it; balances the demands of a work life and a personal life.

Adapting to change

Adapts to changing circumstances; tolerates ambiguity; accepts new ideas and change initiatives; adapts interpersonal style to suit different people or situations; shows an interest in new experiences.

Cognitive ability was measured in terms of two abilities, *verbal reasoning* and *numerical reasoning*. This was done using the 'Verify verbal reasoning and numerical reasoning ability' tests. Both tests measure deductive reasoning, broadly described as 'the ability to work with problems that are bounded and where methods or rules to reach a solution have been previously established' (Burke, van Someren, Tatham, & Downey, 2007, p. 5). The verbal reasoning test measures the ability to understand written information and evaluate arguments about this information. The numerical reasoning test measures the understanding of tables of statistical and numerical data and the ability to make logical deductions from the data. Both these tests are time-limited. The verbal reasoning test consists of 30 items and students have 17 min to complete it and the numerical reasoning test consists of 18 items to be completed in 25 min. For both tests a practice run is available with no time limit. Tests are at supervisory or junior management level and the students' scores were compared with a norm group consisting of South African junior managers.

Data analysis

To report the respondents' demographic statistics, data were generated using the statistical software programme SAS 9.4. To test the research questions, four Ordinary Least Squares (OLS) multiple regressions were conducted, where the two cognitive abilities and four personal competencies were regarded as the independent variables and the final mark obtained for each module separately was used as a measure of academic performance. The four OLS multiple regressions were also conducted using SAS 9.4.

Results

Before interpreting the results of the multiple regressions, we determined whether the model satisfied the basic requirements of regression analysis (Hair, Black, Babin, & Anderson, 2010): the linearity of the phenomenon measured, the constant variance of the error terms, the independence of the error terms, and the normality of the error-term distribution. Three of the assumptions were upheld in each regression model, except the normality of the error-term distribution.

To test the *normality of the error-term distribution* we used the Shapiro-Wilk and Kolmogorov-Smirnov test. In the regression model with the Personal Development module (PDCB1511/21) final mark as the dependent variable, the Shapiro-Wilk test was significant ($W = 0.981$, $p = 0.014$). In the multiple regressions model with the Numeracy and Computer Literacy module (PDCB1514/24) final mark as the dependent variable, both the Shapiro-Wilk test ($W = 0.972$, $p < 0.001$) and the Kolmogorov-Smirnov test ($D = 0.073$, $p < 0.010$) were significant. To address the non-normality in the error-term distribution, we estimated these two regression models using robust standard errors.

We also assessed multicollinearity in each multiple regressions model. Across all four OLS multiple regressions the highest variance inflation factor did not exceed 1.4. Thus multicollinearity was not a threat to the results in any of the regression models.

Results of the OLS multiple regressions

Table 1 presents the results of the four estimated OLS regression models. An important observation from the results is that cognitive abilities and personal competencies are not strong predictors of academic achievement in *any of the four modules*. Indeed, in Module 1 (Personal Development) the predictors explain only 7.4% of the variance in academic performance. The highest variance in academic performance (16.3%) according to the six predictors can be seen in Module 4 (Numeracy and Computer Literacy). The only consistent predictor of academic performance across the four regression models is verbal reasoning ability. The strength of the influence of verbal reasoning ability ranges from 0.153 to 0.271. Only in Module 4 does numerical reasoning ability have a statistically significant influence on academic performance ($\beta = 0.290$, $\rho < 0.001$). And the only instance in which personal competencies influence academic performance is in Module 3 (Group Dynamics); here, the influence of achieving personal goals on academic performance is 0.165 ($\rho = 0.027$), and statistically significant.

To sum up, the results showed that cognitive abilities are a more consistent predictor of academic performance than personal competencies (coping with pressure, adapting to change, achieving personal goals and working with people) in the first year of this undergraduate adult education programme. Verbal reasoning ability was a statistically significant predictor of academic performance in all four modules, while numerical reasoning ability was a statistically significant predictor of academic performance only in Module 4 (Numeracy and Computer Literacy). Only one personal competency, personal goals and objectives, was a statistically significant predictor of academic success, in Module 3 (Group Dynamics).

Table 1. Results of the OLS multiple regressions models.

Model		Model 1			Model 2			Model 3			Model 4		
Dependent variable (modules)		Personal development PDCB1511/21 (R^2 = .074)			Academic language PDCB1512/22 (R^2 = .124)			Group dynamics PDCB1513/23 (R^2 = .146)			Numeracy & computer literacy PDCB1514/24 (R^2 = .163)		
Independent variables		β	t-value	p-value (two-tailed)	β	t-value	p-value (two-tailed)	β	t-value	p-value (two-tailed)	β	t-value	p-value (two-tailed)
Cognitive abilities	Numerical reasoning	0.108	1.440	0.151	0.134	1.840	0.067	0.137	1.870	0.063	0.290	4.570	<.001**
	Verbal reasoning	0.198	2.870	0.005**	0.246	3.410	0.001**	0.271	3.710	0.003**	0.153	2.160	0.032*
Personal competencies	Adapting to change	−0.127	−1.610	0.109	0.118	1.490	0.139	−0.101	−1.260	0.208	0.075	1.090	0.278
	Coping with pressure	−0.029	−0.400	0.690	0.007	0.100	0.921	−0.032	−0.430	0.667	−0.096	−1.390	0.167
	Achieving personal goals	0.047	0.600	0.547	0.014	0.190	0.849	0.165	2.240	0.027*	−0.019	−0.260	0.797
	Working with people	0.074	0.870	0.384	−0.039	−0.500	0.615	0.067	0.850	0.396	−0.051	−0.700	0.487

*p ≤ 0.05; **p ≤ 0.001

Discussion

The results are in line with the finding by Busato et al. (2000) that intellectual ability and achievement motivation are predictors of academic performance, and with the finding by Kotzé and Griessel (2008) that numerical and verbal reasoning abilities predict performance in an MBA programme. The results also support the findings by Kappe and van der Flier (2012), Kerka, Jacobsen and Corley (2005), Dass-Brailsford (2005) and Allen and Zhang (2016) that intelligence, self-motivation and goal orientation (respectively) are predictors of academic performance. The personal competency we refer to as 'achieving personal goals and objectives' relates to a key principle in adult education. Adults are goal-directed when they engage in higher education (Kerka et al., 2005). In most cases this is because the qualification can help advance a career. Adults realise that academic success is the key to accomplishing their goals (Allen & Zhang, 2016).

The other personal competencies we assessed (coping with pressure, working with people and adapting to change) had no statistically significant influence on the students' academic performance in any of the modules. These findings are in contrast to those of previous research in mainstream learning environments, where it was found that the ability to adjust and adapt to change (Baker, 2003; Malefo, 2002) and the ability to deal with stress and pressure (Baker, 2003) influence academic performance. Also, despite the emphasis in previous research on the importance of teamwork and the ability to work with others and to network (Allen & Zhang, 2016), the competency 'working with others' was not a statistically significant predictor of academic performance – not even in the Module 3 (Group Dynamics).

There are two plausible explanations for this finding. Firstly, these are the first four modules in the curriculum. Students are eased into the programme so that they will have a better idea of the academic programme and what is expected of them. The pace picks up after these modules when they move on to the more academic modules, amongst others the economics and accounting modules. They are then also enrolled for more modules simultaneously. So it may be that the pressure is still manageable in this early stage of the programme. Secondly, since 50% of the sample in this study said they had between 11 and 20 years of work experience, it can be speculated that these personal competencies did not play a significant role in their academic performance because adult learners are at a different developmental stage from their younger peers and have considerable work and life experience (Merriam et al., 2007) that enable them to adjust more quickly to new circumstances, cope with pressure more easily and relate to others more appropriately.

Conclusion

The present study showed that cognitive ability, particularly verbal cognitive ability, was consistently a statistically significant predictor of the academic performance of this group of ethnically diverse adult learners. However, since the highest variance that verbal and numerical ability and the four personal competencies explained in the performance of any of these academic modules was only 16.3%, it is evident that there are other personal, situational or external variables influencing the academic performance of the students in this adult education programme. We intend to track this cohort of students to determine the influence of these cognitive abilities and personal competencies during the course of their studies. Students in this programme usually report the most pressure during the end of their

second year and the final semester of the fourth year and it would be useful to look at their progress through the whole programme. Furthermore, a qualitative study could shed more light on other factors that may help or hinder academic performance. Research in the field of adult education consistently identifies differences between teaching adults and teaching mainstream students. In developing countries the need for life-long learning has brought an influx of adult learners to the higher education sector. These students bring unique challenges with them. The findings of this study are particularly important in the context of a developing country like South Africa, because they can inform programme coordinators and educators about the unique barriers to success that these adult students may experience.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

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