Exploring the Role of Environmental Quality and Time Perspective in the Academic Performance of Grade 12 Learners

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Abstract

The aim of this study was to determine to what extent environmental quality and time perspective can account for the variance in the academic performance of Grade 12 learners. Time perspective was assessed utilising the Zimbardo Time Perspective Inventory (ZTPI). Environmental quality was measured by means of a self-compiled questionnaire. A total of 413 Grade 12 learners from four English medium-schools in the Mangaung area of the Free State Province in South Africa were involved in the study. It was found that time perspective together with environmental quality accounts for approximately 14% of the variance found in the academic performance of Grade 12 learners. Although statistically significant relationships were found between time perspective and academic performance, these relationships were concluded to be of little practical importance.

The academic performance of Grade 12 learners is of great importance as the results obtained from their final examinations are generally viewed as primary selection criteria for access to higher education institutions (Swartz, 1998; Uys, 1993; Huysamen, 2001). Various cognitive, personal and environmental factors have been found to influence learners' academic performance (Moller, 1995; Louw, Van Ede & Louw, 1998; Malefo, 2000). Only a limited number of researchers have investigated the influence of environmental quality as well as time perspective on academic performance within the South African context. It is the aim of this study to explore the concepts of environmental quality and time perspective and their role in the academic performance of Grade 12 learners.

Academic Performance

According to Jansen (2004) and Swartz (1998) academic performance and academic success are problematic concepts to define. Jansen (2004) defined academic performance as the cognitive and associated abilities that enable the learner to master academic information to a given standard to subsequently be able to be promoted to the next year of study. Plug *et al*. (1997) defined achievement as the attainment of the goal of a specific action; that is, the completion of a task or the standard of success obtained with a specific undertaking. For the purpose of this study, academic performance can be defined as the degree of success obtained as determined by the criteria set within the academic context.

Three major factors may influence the academic performance of learners. These are cognitive factors, personal factors and environmental factors.

Cognition refers to the processes and products of the intellect and involves numerous

cognitive factors such as concentration, perception, memory and reason (Louw, Van Ede & Louw, 1998), aptitude and intelligence (Swartz, 1998; Myburg, Grobler & Niehaus, 1999), verbal as well as non-verbal scholastic aptitude (Grobler, Grobler & Esterhuyse, 2001), learning styles and strategies (Ross, Drysdale & Schulz, 2001; Bosch, Boshoff & Louw, 2003). Additional factors that currently receive attention in research are language proficiency (Marais, 1993; Van Eeden, De Beer & Coetzee, 2001; Jansen, 2004;) as well as reading-related skills such as visual cognition and verbal cognition (Watson *et al.*, 2003).

As found in Moller (1995) personal factors refer to factors that are associated with the learner's individual functioning and may directly or indirectly have an influence on the learner's academic performance. These may include the individual's self-concept, time perspective and emotional intelligence (Swartz, 1998; Myburg *et al.*, 1999; Grobler & Myburg, 2001; Grobler, 2005).

Malefo (2000) found that environmental factors might also have an influence on learners' academic performance. Environmental factors can either be of a psychosocial or physical nature. Psychosocial factors include parental involvement (Moller, 1995), parental interest (Cherian & Cherian, 1997; Hong & Lee, 2003), parents' level of education and occupation (Jubber, 1994), as well as parents' educational aspirations and values (Moller, 1995). These factors all contribute to the creation of an environment which will either support or hinder a learner's academic performance. Physical factors refer to the quality of the physical environment and may include housing quality (Evans, Saltzman & Cooperman, 2001). From the available literature it has become clear that little information is available concerning the effect of the environment or environmental quality on academic performance. One reason for this tendency might be the lack of information concerning the concept of the environment and specifically environmental quality as it applies to the South African situation.

Environmental Quality

Definitions regarding the environment variously focus on either the physical conditions (Reader's Digest, 1987) or the social or psychological conditions (Evans, 2004) that surround the individual. Rapoport (1982:59) provided a general definition of the environment when stating that 'the environment can be seen as a series of relationships between things and things, things and people and between people and people'. There are four distinct aspects within the environment that determine the way individuals experience these relationships. These are space, time, communication and meaning (Rapoport 1982).

It can be stated that the environment contributes to physical, social and psychological need satisfaction by the structuring of space, time and communication through the organisation of meaning. The extent to which these needs are satisfied by the environment will depend on the success with which environmental elements can be structured and organised to contribute to need satisfaction (Rapoport, 1982).

Maslow's (1968) basic human needs theory provides a summary of needs; it is, however, unclear how the environment can influence these needs. Evans, Wells and Moch (2003) identified five psychosocial processes that are influenced by the environment, which might

partially account for linkages between the environment and the psychological wellbeing of individuals. These are stress, control, social support, parental behaviour and identity. By reviewing the processes identified by Evans *et al.* (2003) within the context of Maslow's (1970) hierarchy of basic needs, the link between the environment and the basic need satisfaction can partially be explained.

In low-quality housing, concerns about safety and hygiene could reasonably elicit considerably anxiety and worry in both adults and children (Wells & Evans, 2003). The following elements are also associated with increased stress levels and decreased psychological wellbeing in children in particular: inaccessibility to outdoor play areas (Bartlett, 1998), lack of access to green and outdoor spaces (Taylor *et al.* 1998), and the inability to spend time in natural areas (Wells, 2000; Wells & Evans, 2003). Where inadequate residential space is available, adults (Evans *et al.*, 2000) and children (Evans *et al.*, 2001) exposed to chronic residential crowding and noise tend to have strained interpersonal relationships and diminished motivation associated with learned helplessness. Parental behaviour was found to be influenced by the quality of the home environment as parents living in substandard housing may attempt to exert tighter, more rigid control over their children's activities to minimise problems. The cumulative demands of dealing with the disturbances associated with substandard housing might well lead to frustration and irritability that could manifest in more punitive parenting (Evans *et al.*, 2001). Parental self-esteem and confidence as well as feelings of self-efficacy might be impacted on by chronic housing problems (Evans *et al.*, 2001). As regards children, poor housing quality can directly affect children's self-esteem, particularly as they interact with peers (Evans *et al.*, 2001). From this it is clear that the environment can influence the satisfaction of the individual's esteem needs.

From the preceding examples it is apparent that the environment can influence individual need satisfaction and psychological wellbeing. Evans *et al.* (2000; 2001) documented the changes that occurred after individuals moved from low quality to better quality housing. After relocating, psychological wellbeing, social relations with neighbours, and children's school performance improved significantly in relation to residents who did not relocate. The group that relocated showed reduced symptoms of depression and anxiety in comparison with the group that remained behind (Evans *et al.*, 2000; Evans *et al.*, 2001).

Time Perspective

The nature and different types of time perspective will be addressed in the next paragraphs. The exact nature of time perspective is a matter of disagreement as it has diversely been identified as a motive, a personality characteristic and a cognitive schema (Pienaar & Bester, 1996; Lennings, Burns & Cooney, 1998; Zimbardo & Boyd, 1999; Hall & Fong, 2003). For the purpose of this study, time perspective will be understood as being of a cognitive nature, underlying and influencing the individual's personality as well as motives on numerous levels.

A distinction can be made between past, present and future time orientations, or time perspectives. Within the framework of past, present and future time perspective, Zimbardo and Boyd (1999) further distinguish between five different kinds of time perspectives, namely:

future time perspective, present–fatalistic, present–hedonistic, past–negative and past–positive time perspective.

Future time perspective is defined as the timing and ordering of personalised events (Wallace, 1956) as well as a general concern for future events (Platt & Eisemann, 1968). Gjesme (1983) conceptualised future time perspective as a searchlight which helps illuminate events ahead. Future time perspective therefore refers to a general future orientation with behaviour that is dominated by striving towards future goals and rewards.

Present time perspective can be divided into two distinct subtypes, namely present–fatalistic time perspective and present–hedonistic time perspective (Zimbardo & Boyd, 1999). Present–fatalistic time perspective refers to a general fatalistic, helpless and hopeless attitude towards the future and life. Present–hedonistic time perspective refers to a hedonistic risk-taking attitude towards time and life.

Past time perspective can similarly be divided into two sub-types, namely past–negative time perspective and past–positive time perspective. Past–negative time perspective refers to a general negative, aversive view of the past; while past–positive time perspective refers to a general positive view towards the past (Zimbardo & Boyd, 1999).

Various researchers investigated the influence of time perspective on the individual (Pienaar & Bester, 1996; Seijts, 1998; Zimbardo & Boyd, 1999). Concerning the effect of these dimensions on individuals, it was found that high academic achievers seem to be characterised by more optimistic attitudes and a greater concern for future goals (Teahan, 1968; Athawale, 2004). Regarding locus of control, shortened time perspectives are related to a belief in external control of reinforcement. The person who sees the consequences of his/her actions as being under the control of outside forces seems less capable of conceptualising segments of personal and impersonal time, whether past or future, and sees their personal future as being populated with fewer events than does the person who believes in control over the consequences of his or her own behaviour (Platt & Eisenmann, 1968). Individuals with internal control of reinforcement had more active, fuller time perspectives, were better adjusted and were less anxious. Internally orientated individuals are generally more future orientated in their time perspectives, more capable of conceptualising segments of time and might perceive the passage of time in a different manner than externally orientated persons. It is further stated that highly optimistic learners were also more future-orientated than the generally more pessimistic learners (Platt & Eisenmann, 1968).

Various researchers found that time perspective plays an important role in learners' academic performance. Grobler (2005) stated that the dominant way of viewing time in a specific situation will play a role in the way in which the individual experiences and treats the demands of time restrictions. This is also true in the case of academic performance where more efficient time management may lead to better academic performance. Simons, Dewitte and Lens (2000) found that individual motivation is influenced by time perspective. This finding is supported by Lennings *et al.* (1998) who found that time perspective has an influence on decision-making as well as goal-setting. Seijts (1998) stated that time perspective determines, to a large extent, the kind of goals that are set or accepted, and whether goal conflict is likely to occur. This may account for the extensive influence of time perspective on numerous aspects of individual functioning.

Methodology

The aim of this study was to determine to what extent environmental quality and time perspective can account for the variance in the academic performance of Grade 12 learners.

Sample

Four English-medium schools from the Mangaung area in South Africa's Free State province were selected by making use of the incidental cluster sampling method. A total number of 413 Grade 12 learners participated in the study. Of these, 165 learners were male and 243 female. Five learners did not indicate their gender on the questionnaire. The vast majority of learners were black while a small minority were coloured. All learners indicated that they were able to read and comprehend Sesotho as well as English, which is supported by the fact that these are all English-medium schools.

Ethical considerations

Permission to conduct the research was obtained from the Department of Education, as well as the respective principals and the learners. The aim of the research as well as the voluntary nature of participation was explained. An informed consent letter was attached to each questionnaire. By signing this letter, learners granted the researcher the necessary permission to use their survey information and academic results. Learners were able to withhold permission, without any negative consequences, by simply not completing the letter.

   A further ethical consideration was the fact that learner participation could not be anonymous as individual academic performance had to be associated with the appropriate time perspective and environmental quality scores. Although this might have had an effect on the research results, no other appropriate method that was practical for the specific situation existed in matching the academic performance of the learners with the time perspective and environmental quality scores. Learners were further assured that, to protect their privacy, no identifying information was to be published in the final research report.

Measuring instruments

Academic performance refers to the degree of success obtained by Grade 12 learners as determined by the academic average each learner obtained in the record mid-year examination. Papers written in this examination were set by the Free State Department of Education.

   Two bilingual questionnaires, in English and Sesotho, were used to record information regarding the environmental quality and time perspective of the individual learners. The complete questionnaire battery was originally compiled in English after which it was translated to Sesotho by using the method of back translation.

   Although various environmental quality measures have been used with success during previous studies (Khattab, 1993), no existing measure seemed relevant for the environment of this study's target population. During an unpublished pilot study performed by the researcher in 2004 a preliminary measure was compiled. This measure was based on information collected after performing a literature review as well as a focus group session with the target group. The

measure resulting from this discussion consisted of 20 items, and had an alpha coefficient of 0.889. For the purpose of this study, the existing measure was revised by referring to existing literature and additional items were added. The final environmental quality measure used in this study consisted of 51 items. All items except two consisted of a five-point Likert scale. These two items provided a space where the learners were required to write down information regarding their environment and required learners to indicate the number of people who share their bedroom and study with them. By using Cronbach's alpha coefficient the internal consistency of the environmental quality measure, for this study, was determined as 0.932.

Time perspective was measured by means of the Zimbardo Time Perspective Inventory (ZTPI). This inventory consists of 60 Likert-scale items, with five different scales of time perspective, namely: future, present-fatalistic, present-hedonistic, past–negative and past–positive time perspective. The reliability of these scales vary between 0.443 and 0.661. Because this study is considered to be an exploratory study it was decided to continue with the statistical analyses even though the alpha coefficients were found to be low.

Results

Table 1 portrays the averages and standard deviations of the criterion variables as well as the predictive variables for the total research group.

Table 1. Averages and standard deviations for criterion and predictor variables

Variable			N	M	s
Criterion variable	Academic performance		413	39.94	9.89
Predictor variables	Environmental quality		373	164.41	31.37
	Time perspective	Present hedonistic	411	49.33	7.29
		Past negative	413	39.42	6.77
		Future	411	52.85	5.82
		Past positive	412	29.74	4.04
		Present fatalistic	412	26.61	5.83

Note: Questionnaires on which items were left incomplete were not taken into consideration and account for the difference in numbers.

The relationships between the predictive variables in regard to each other as well as in regard to the criterion were determined by using of the Pearson product moment correlation coefficients. The result of this for the total group is shown in Table 2.

Table 2. Correlations between determinants and the criterion variable

Variable	2	3	4	5	6	7
1. Academic performance	0.06	0.09	–0.08	0.15★★	0.03	–0.24★★
2. Environmental quality		0.21★★	0.02	0.04	0.20★★	0.11★
3. Present hedonistic			0.34★★	–0.07	0.25★★	0.42★★
4. Past negative				–0.02	0.11★	0.34★★
5. Future					0.19★★	–0.20★★
6. Past positive						0.14★★
7. Present fatalistic						

★ p ≤ 0.05
★★ p ≤ 0.01

From Table 2 it is clear that there are relationships, significant on the 1% level, between the criterion (academic performance) and two of the predictive variables; namely, future time and present fatalistic time perspective. The coefficient between future time perspective and academic performance is positive while this relationship is negative for present fatalistic time perspective.

To determine the extent to which the predictor variables (environmental quality and time perspective) contribute to the total variance found in the academic performance of Grade 12 learners, hierarchical regression analysis was used (Howell, 2007). The percentage of variance which can be explained by a specific set of variables is indicated by the squared multiple correlation coefficient which is $R2$. To determine if a specific variable (environmental quality), or set of variables (time perspective), contributes significantly to the $R2$-value the hierarchical F-test can be used. To determine the practical importance of the contribution to $R2$ of a specific variable or set of variables it is necessary to determine the effect size(f^2) of the contribution of the variable. A value of 0.02 indicates a small effect, a value of 0.15 indicates a medium effect and a value of 0.35 indicates a large effect (Steyn, 1999).

Table 3. Contributions of different variables and sets of variables to R^2 of the academic performance of Grade 12 learners

Variables in analysis	R^2	Contribution to R^2 (total minus decreased model)	F	f^2
1. [environment]+[time perspective]	0.1284	1–7 = 0.1248	12.480★★	0.14
2. [environment]+present fatalistic	0.0708	2–7 = 0.0672	33.600★★	0.07
3. [environment]+past positive	0.0045	3–7 = 0.0009	0.450	
4. [environment]+future	0.0253	4–7 = 0.0217	10.85★★	0.02
5. [environment]+past negative	0.0081	5–7 = 0.0045	2.250	
6. [environment]+present hedonistic	0.0115	6–7 = 0.0079	3.950★	0.01
7. [environment]	0.0036			
8. [time perspective]+[environment]	0.1284	8–9=0.0107	5.350★	0.01
9. [time perspective]	0.1177			

Key: [ ] indicates the sets of variables

★ p ≤ 0.05

★★ p ≤ 0.01

From Table 3 it can be seen that the six predictors result in an R2 value of 0.1284, which is significant on the 1% level [F6;362 = 8.89; p = 0.0001]. From this it can be concluded that the five time perspective factors together with environmental quality account for 12.84% of the variance in the academic performance of the Grade 12 learners. The set of time perspective variables explains 12.48% of the variance in academic performance. Although this finding is statistically significant, [F5;406=12.48; p ≤ 0.01], the associated effect size (f2) of 0.14 is indicative of a finding with moderate practical value.

The contribution of each of the time perspective variables was also investigated. Present fatalistic, present hedonistic and future time perspective respectively contribute significantly to the variance in academic performance (6.72% (F1;410 = 33.6; p ≤ 0.01); 0.79% (F1;410 = 3.95; p ≤ 0.05) and 2.17% (F1;410 = 10.85; p ≤ 0.01) (see Table 3). With the exception of present hedonistic time perspective, which is significant on the 5% level, the other two contributions are significant on the 1% level. The effect size of these three factors is such, however, that the individual contributions of these factors are of little practical importance.

Environmental quality was found to have an R2 value of 0.0107 which indicates a contribution of 1.07% to the variance found in the academic performance of Grade 12 learners. Although significant on the 5% level (F1;410 = 5.35; p ≤ 0.05), this result is indicative of a small effect size and is subsequently of very little practical value.

Discussion

Although it was stated that the environment can influence the individual in various ways (Evans *et al.*, 2001), it was found that environmental quality contributes approximately 1.07% to the variance found in the academic performance of Grade 12 learners. While this contribution is significant on the 5% level, in practice it is of very little value. Regarding this finding, the research hypothesis which states that environmental quality significantly influences academic performance could not be proven in this study. This may indicate that the quality of the environment, as defined in this study, has little influence on the academic performance of the Grade 12 learners. It may also be that the subjective method used in determining environmental quality may not be the most appropriate method to determine environmental quality.

Although of little practical value, statistical significant relationships have been found between academic performance and future time perspective. Academic performance was found to be negatively related to present fatalistic time perspective, and positively related to future time perspective. This finding suggests that learners who score high on future time perspective and low on present fatalistic time perspective are more inclined to higher academic performance. This finding is supported by Zimbardo and Boyd (1999), who found that a general future time perspective is associated with self-reported hours spent studying per week. Teahan (1968) found that optimism was associated with higher academic performance; while Platt and Eisenmann (1968) found that a relationship exists between future orientation and optimism. These findings can be supported by considering the dimensions of future time perspective. Future orientated individuals are more considerate of the future consequences of their actions.

The negative relationship found between future time perspective and present fatalistic time perspective is supportive of Zimbardo and Boyd's (1999) findings. Although evidence was found that statistically significant relationships might exist between the various types of time perspective, these relationships fall beyond the scope of this project and were subsequently not discussed in depth. It was further found that past positive and past negative time perspective had no significant contribution to the variance found in academic performance, and therefore no practical effect on academic performance. The relative importance of present as well as future time perspective over past time perspective supports the idea of Seijts (1998) who stated that although the past may provide important lessons it is of little interest in itself. This idea seems to be supported by the findings of this study.

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Acknowledgement