

THE PREDICTIVE VALIDITY OF SELECTION CRITERIA FOR PERSONNEL MANAGEMENT STUDENTS AT A TERTIARY INSTITUTION

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ABSTRACT

Tertiary institutions are confronted daily with the issues surrounding the creation of admission requirements for prospective students that ensure academic success. In a changing South Africa, with its increasing emphasis on individual rights, fair and equitable selection techniques are a priority. The target population for this investigation was four consecutive groups of first-year Personnel Management students who were enrolled for the National Diploma: Personnel Management. The survey population consisted of 293 students. The aim of the study has been achieved by the proof that specific factors of fields of the measure instruments do have prediction validity. These findings can be used with fruit in search of a selection model for academic achievement.

OPSOMMING

Tersiêre instellings word daaglik gekonfronteer met die kwessies betreffende die daarstel van toelatingsvereistes vir voornemende studente wat akademiese sukses sal verseker. In 'n veranderende Suid-Afrika, met die toenemende klem op individuele regte, is regverdige en billike keuringskriteria 'n prioriteit. Die teikenpopulasie vir hierdie ondersoek was vier agtereenvolgende groepe eerstejaarpersoneelbestuur-studente wat vir die Nasionale Diploma: Personeelbestuur ingeskryf was. Die opnamepopulasie het uit 293 studente bestaan. Die doel van die studie is bereik deur die bewys dat spesifieke faktore of velde van die meetinstrumente voorspellingsgeldigheid besit. Hierdie bevindings kan met vrug gebruik word in die soeke na 'n keuringsmodel vir akademiese prestasies.

If a valid standard could be found which allowed the prediction of academic success, then personal failure would be restricted, in addition to financial savings on the part of the student and the tertiary institution. This would also hold advantages for the community at large in terms of the financial burden, and the contribution made by training towards the satisfaction of the demands of the labour market according to Naudé-de Jager (1990), Du Plessis (1988) and Malan (1987).

The increasingly changed composition of prospective students and the disparities in school education, not only between the various provinces but also between traditionally white, black, Asian and coloured schools, begs the question as to the viability of using matric results as the only criteria for tertiary selection. This opinion is confirmed by Zietsman and Gering (1985), Jooste (1988), Mitchell and Fridjhon (1987), Du Plessis (1988) and Monteith (1988).

Mitchell and Fridjhon (1987) indicate that only a small percentage of students with matric exemption attend universities or other tertiary institutions and it appears that examinations which have additional benefits for future achievements assist only a minority of students, as opposed to the majority. The most compelling argument is that problem-solving skills and the ability to relate the general to the specific are the skills which must be inculcated by tertiary institutions. It is also these skills which in general are of great value to those students who do not attend tertiary institutions.

Zietsman en Gering (1985) maintain that if one includes the socio-economic realities brought about by environmental constraints in this scenario, then a need exists to investigate the prediction validity of the measuring instruments to be utilised in addition to matric results. This need is confirmed by Naudé-de Jager (1990), Malan (1987) and Du Plessis (1988). Furthermore, Von der Ohe (1990) maintains that the statistical methods used to determine the validity of tests are all related to the relationship between achievements in a test and indepen-

dent observable facts – in other words, criteria relating to the behavioural characteristic which is being studied. The use of the test for a specific purpose is, therefore, validated and not the test itself. Criterion related validity exists as a consequence.

Smit (1991) mentions that prediction validity indicates whether the test can be effectively applied to predict future behaviour. If a test should possess prediction validity, therefore, it would improve the decision making process, which would be of particular importance in selection processes.

This study has been undertaken to search for measuring instruments with which academic success can be predicted. The use of admission tests will always be a controversial matter. Tests must differentiate between suitable and unsuitable prospective students and will not be less controversial until they predict accurately. The purpose of this study is to determine whether matric subjects and specific psychometric tests namely, the 16-PF, the 19-FII and the SAT have any prediction validity regarding the academic achievements of first year Personnel Management students at Technikon Pretoria. This study has been undertaken to determine the validity of the measuring instruments in the selection of Personnel Management students. The psychometric tests have been applied to four consecutive groups, consisting of 293 first year students, who registered for the National Diploma Personnel Management.

RESULTS

The relationship between matric subjects and Technikon subjects is summarised in Table 1.

The table indicates that there is a relatively high positive relationship between Afrikaans and Communications, as well as Business Economics and End-User Computing.

16-PF: A large concentration of the test group displayed the following characteristics: realism, conservatism, conscientiousness, social uninhibitedness, assertiveness, a carefree attitude and an outdoor inclination. The abovementioned findings reinforce the general opinion regarding the personal characteristics of individuals in the personnel management field.

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TABLE 1
CORRELATION BETWEEN MATRIC SUBJECTS AND TECHNIKON SUBJECTS

	Personnel Management I	Business Economics I	Financial Accounting/Statistics	Communication	Computer End-user
Afrikaans	0,31 0,0557	-0,07 0,6885	-0,02 0,9029	0,61 0,0001	0,22 0,1970
English	0,19 0,2499	0,15 0,3602	-0,26 0,1702	0,34 0,0454	0,26 0,1380
Mathematics	0,55 0,0086	-0,17 0,4407	-0,26 0,29504	0,05 0,8267	0,34 0,1395
Science	0,48 0,1116	0,41 0,1866	-0,37 0,3311	0,28 0,4125	0,17 0,6395
Biology	0,21 0,3435	-0,09 0,6795	0,02 0,9343	0,32 0,1398	0,06 0,7782
Accountancy	0,02 0,9274	-0,002 0,9926	-0,21 0,3990	-0,14 0,5623	-0,23 0,3432
History	0,30 0,2707	0,27 0,3319	-0,03 0,9401	0,43 0,1164	0,45 0,1057
Geography	0,59 0,0927	0,48 0,2337	-0,10 0,8151	0,51 0,1975	0,45 0,2273
Business Economics	0,30 0,2104	0,47 0,0355	-0,11 0,6790	0,41 0,0885	0,59 0,0104
Economics	0,96 0,1743	0,52 0,4760	- -	1,00 0,000	0,52 0,6520
Other Subjects	0,05 0,9194	0,40 0,5093	0,95 0,2054	-0,51 0,3005	0,17 0,7519
Third Language	0,21 0,7916	-0,14 0,8554	-1,00 0,000	-0,46 0,5356	0,76 0,2360
Technical Drawings Typing	- 0,33 0,2659	- 0,17 0,5978	- 0,42 0,2293	- 0,22 0,4831	- 0,02 0,9445
Computer Science Bible	- -	- -	- -	- -	- -

19-FII: The fields of interest of a large number of the test group indicate the following tendencies:

- High interest in action, social, creative, rights and business.
- Low interest in welfare work, performing arts, historic aspects and nature.

SAT: The figure series indicates that the test group shows a high capacity for the general reasoning factor.

Relationship between measuring instruments and Technikon major subjects

Pearson's product moment correlation coefficient was calculated for the factors of the various measuring instruments and the results are indicated in Table 2 to 4.

Table 2 indicates that there is a negative relationship (although not strong) between both Personnel Management I and Business Economics I, and the Sociability factor (Factor A), and to a lesser degree the Conscientiousness (Factor G) and Emotional Sensitivity (Factor I) factors.

Table 3 indicates that the only significant positive relationships are to be found between both Personnel Management I and Business Economics I and Active-Passive, as well as between Business Economics I and Practical-Female.

The only significant positive relationship is found between Memory: Paragraph and Personnel Management I.

Multiple Regression Analysis

The relationship between two or more independent variables and the dependent variable can be determined by means of multiple regression analysis. In this fashion, the relationship of a number of factors, such as the 16-PF, for example, on academic achievement can be determined. The calculation of

the relative weight of each of the predictors in the regression model is based on both the single correlation between each predictor and the criterion, and on the inter-correlation between predictors.

Personnel Management as a dependent variable

Regression analysis (which is concerned with the quantification of the underlying structural relationship between variables) has been carried out on the various measuring instruments in order to enable predictions regarding the Personnel Management I mark. The following results were obtained in respect of the measuring instruments:

16-PF: After the outliers were examined and some excluded from the data-set, it was found that a logarithmic transformation of the normal linear model described the data-set most accurately. Log X (logarithmic transformation) is conducted when the variances are proportional to the square of the averages. The following results were obtained:

SOURCE	DEGREE OF FREEDOM	SUM OF SQUARES (SS)	MEDIAN SUM OF SQUARES (MS)	F	Pr>F
Model	16	0,0795	0,0050	12,62	0,000 0
Error (E)	14	0,0055	0,0004		
Total	30	0,0850			

From these results it can be seen that the model in its entirety is statistically significant. Approximately 94% of the variation of the Personnel Management I mark is explained by the

logarithmic relationship with X (the factors of the 16-PF). There is, therefore strong statistical evidence that the explanatory variables are in relation to the expected value of log (Personnel Management I). The regression model: $\text{Log (Personnel Management I)} = 1,788 - 0,006\text{PFA} + 0,0036\text{PFB} + 0,0016\text{FC} - 0,003\text{PFE} + 0,0124\text{PFF} - 0,009\text{PFG} - 0,017\text{PFH} + 0,0143\text{PFI} - 0,005\text{PFL} - 0,009\text{PFM} + 0,0109\text{PFN} + 281e^{-7}\text{PFO} - 0,013\text{PFQ1} - 0,006\text{PFQ2} + 0,012\text{PFQ3} + 0,0137\text{PFQ4}$

19-FII: It was found, by means of a maximum acceptability analysis, that the most suitable model was located by means of an inverse transformation of Personnel Management I.

$R^2=0,9048$		Root MSE=0,0014			
Adapted $R^2=0,7049$		CV=7,582			
SOURCE	DEGREE OF FREEDOM	SUM OF SQUARES (SS)	MEDIAN SUM OF SQUARES (MS)	F	Pr>F
Model	21	0,0002	$848e^{-8}$	4,525	0,0089
Error (E)	10	$187e^{-7}$	$187e^{-8}$		
Total	31	0,0002			

The model in its totality fits fairly well and 90,48% of the variation of the Personnel Management I mark variance can be explained by the inverse relationship with X (the factors of the 19-FII). There is, therefore, strong statistical evidence that the explanatory variables relate to the expected value of the inversion of Personnel Management I. The regression model: $(\text{Personnel Management I})^{-1} = 0,0419 - 92e^{-6}\text{FII1} + 596e^{-7}\text{FII10}$

TABLE 2
RELATIONSHIP BETWEEN 16-PF AND TECHNIKON MAJOR SUBJECTS

16-PF	PERSONNEL MANAGEMENT 1	BUSINESS ECONOMICS 1
Factor A: Sociability	-0,42 0,0094	-0,43 0,0075
Factor C: Intelligence	0,10 0,5580	0,20 0,2436
Factor D: Ego-strength	-0,18 0,2683	-0,22 0,1904
Factor E: Dominance	-0,19 0,2485	-0,10 0,5638
Factor F: Carefree	0,05 0,7913	0,29 0,0828
Factor G: Conscientiousness	-0,33 0,0410	-0,33 0,0410
Factor H: Social Adventurousness	-0,30 0,0729	-0,30 0,0729
Factor I: Emotional Sensitivity	0,38 0,0219	0,38 0,0219
Factor L: Mistrust	0,04 0,8218	0,04 0,8218
Factor M: Bohemian Unconventionality	-0,21 0,2105	-0,21 0,2105
Factor N: Shrewdness	-0,11 0,5223	-0,10 0,5453
Factor O: Tendency towards feelings of guilt	0,18 0,2828	0,26 0,1151
Factor Q1: Radicalism	-0,004 0,98148	0,02 0,9348
Factor Q2: Complacency	0,09 0,5892	0,18 0,2916
Factor Q3: Self-control	-0,17 0,3213	-0,16 0,3531
Factor Q4: Stress	0,28 0,0880	0,06 0,7248

TABLE 3
RELATIONSHIP BETWEEN 19-FII AND TECHNIKON MAJOR SUBJECTS

16-PF	PERSONNEL MANAGEMENT 1	BUSINESS ECONOMICS 1
Fine Arts	-0,03 0,8600	0,02 0,9253
Performing Arts	0,10 0,5384	0,03 0,8679
Language	-0,02 0,9073	0,02 0,8966
Historical	-0,25 0,1441	-0,24 0,1737
Service	-0,16 0,3570	-0,13 0,4625
Welfare Work	-0,16 0,3458	-0,27 0,1107
Conviviality	-0,17 0,3158	-0,13 0,4455
Actions in Public	-0,30 0,0673	-0,08 0,6467
Law	-0,29 0,0790	-0,20 0,2302
Creative Thoughts	-0,19 0,2720	-0,02 0,9074
Science	0,01 0,9861	-0,03 0,8558
Practical - Male	-0,24 0,1580	-0,07 0,6853
Practical - Female	-0,32 0,0534	-0,38 0,0253
Numeric	-0,11 0,5006	-0,16 0,3359
Business	0,001 0,995	-0,31 0,0653
Clerical	-0,08 0,6384	-0,15 0,3677
Travel	-0,05 0,7931	-0,21 0,2280
Nature	-0,03 0,8656	-0,20 0,2342
Sport	-0,05 0,7714	-0,05 0,7562
Work-hobby	0,16 0,3563	0,27 0,1033
Active - Passive	0,45 0,0054	0,37 0,0203

$$- 89e^{-5}\text{FII11} - 68^5\text{FII12} + 0,0007\text{FII13} + 0,0012\text{FII14} - 14e^{-5}\text{FII15} - 0,001\text{FII16} - 14e^{-5}\text{FII17} + 0,0002\text{FII18} - 42e^{-5}\text{FII19} - 21e^{-5}\text{FII2} - 25e^{-5}\text{FII3} - 44e^{-5}\text{FII4} - 1e^{-4}\text{EFII5} - 49e^{-5}\text{FII6} + 0,0004\text{FII7} - 49e^{-5}\text{FII8} + 0,0006\text{FII9} - 0,001\text{FIIA/P} - 76e^{-5}\text{FIIW/S}$$

SAT: A maximum acceptability analysis indicates that a logarithmic transformation of Personnel Management I provides better results than the original linear model.

$R^2=0,4426$		Root MSE=0,0568			
Adapted $R^2=0,1772$		CV=3,2505			
SOURCE	DEGREE OF FREEDOM	SUM OF SQUARES (SS)	MEDIAN SUM OF SQUARES (MS)	F	Pr>F
Model	10	0,0538	0,0054	1,668	0,1553
Error (E)	21	0,0677	0,0032		
Total	31	0,121			

The model in its totality is thus not statistically significant as only 44% of the Personnel Management I mark variance is explained by the logarithmic relationship X (the factors of the 16-PF).

TABLE 4
RELATIONSHIP BETWEEN SAT AND TECHNIKON MAJOR SUBJECTS

SAT	PERSONNEL MANAGEMENT 1	BUSINESS ECONOMICS 1
Verbal Comprehension	0,11 0,5306	0,05 0,7773
Calculations	0,12 0,4818	0,31 0,0623
Phraseology	-0,13 0,4461	-0,12 0,4685
Comparison	-0,10 0,5393	0,14 0,4072
Completion of Pattern	0,05 0,7810	0,07 0,6825
Figure Series	-0,20 0,2525	-0,13 0,4528
Spacial 2-D	-0,08 0,6541	-0,17 0,3114
Spacial 3-D	0,09 0,5866	-0,12 0,4819
Memory: Paragraph	0,37 0,0271	0,32 0,0573
Memory: Symbols	0,01 0,9510	-0,13 0,4650

Business Economics as dependent variable

16-PF: A normal linear equation was found with the following results:

SOURCE	DEGREE OF FREEDOM	SUM OF SQUARES (SS)	MEDIAN SUM OF SQUARES (MS)	F	Pr>F
Model	16	1 672	104,5	9,956	0,0000
Error (E)	16	168,0	10,5		
Total	32	1 840			

The model in its totality is statistically significant and there is strong statistical evidence that the explanatory variables are in proportion to the expected value of Business Economics I.

19-FII: A regression analysis with the factors of the 19-FII as independent variable and Business Economics I as dependent variable, indicated the following results:

SOURCE	DEGREE OF FREEDOM	SUM OF SQUARES (SS)	MEDIAN SUM OF SQUARES (MS)	F	Pr>F
Model	21	1 450	69,05	0,871	0,6247
Error (E)	10	793,2	79,32		
Total	31	2 243			

The model is not significant and there is no statistical evidence that the independent variables are in proportion to the expected value of Business Economics I.

SAT: A logarithmic transformation of Business Economics I indicated the following results of the regression analysis with the SAT tests as predictors:

SOURCE	DEGREE OF FREEDOM	SUM OF SQUARES (SS)	MEDIAN SUM OF SQUARES (MS)	F	Pr>F
Model	10	0,0699	0,007	2,917	0,0199
Error (E)	20	0,0479	0,0024		
Total	30	0,118			

The model in its totality is statistically significant and there is sufficient statistical evidence that the explanatory variables are in proportion to the expected value of log (Business Economics I). The regression model: $\text{Log (Business Economics I)} = 1,621 + 0,01\text{SAT1} + 0,0052\text{SAT10} - 0,001\text{SAT2} - 0,013\text{SAT3} + 0,0074\text{SAT4} + 0,0178\text{SAT5} - 0,014\text{SAT6} - 0,002\text{SAT7} - 0,005\text{SAT8} + 0,0143\text{SAT9}$

Validity of Measurements

Validity: Validity means that the data must be unbiased and relevant in respect of the construction which is to be measured. Due to the fact that the evaluated measuring instrument consists of standardised measures of the respective criteria, the theoretical validity (the content and opinion validity) of the measuring instruments is accepted as a given. A factor analysis was conducted on the three measuring

TABLE 5
FACTOR WEIGHTS FOR LATENT VARIABLES – 16-PF (8 factors)

VARIABLE	FACTOR 1 Introversion vs Extroversion	FACTOR 2 Adaptability Anxiety	FACTOR 3 High Super Ego	FACTOR 4 Social Intelligence	FACTOR 5 Social Control	FACTOR 6 Emotional Perception	FACTOR 7 Realistic Creative	FACTOR 8 Free Thinking
PFA	0,430	0,181	0,388	0,255	-0,314	0,393	-0,183	-0,105
PFE	0,835	0,052	0,023	0,026	0,166	-0,154	-0,055	0,003
PFF	0,684	-0,313	-0,028	0,009	-0,290	0,048	0,158	0,159
PFH	0,780	-0,172	-0,170	0,135	-0,201	0,040	-0,027	0,079
PFO	-0,082	0,741	-0,071	0,156	-0,200	0,103	0,108	0,141
PFQ4	0,096	0,831	-0,100	0,027	-0,017	0,056	0,134	-0,096
PFG	-0,110	-0,159	0,712	0,148	-0,343	0,080	0,160	-0,046
PFN	0,162	0,133	0,702	-0,266	0,252	-0,247	-0,103	0,314
PFQ3	0,021	-0,251	0,704	0,151	0,094	0,178	0,010	0,079
PFB	0,099	0,048	0,058	0,845	0,091	0,092	-0,035	0,128
PFL	0,100	0,454	0,115	0,601	0,061	-0,299	-0,083	0,118
PFQ2	-0,162	-0,070	-0,005	0,156	0,826	0,113	0,188	0,014
PFI	-0,071	0,188	0,088	-0,023	0,119	0,862	0,077	0,137
PFC	0,174	-0,650	0,199	-0,035	-0,270	-0,191	0,290	0,064
PFM	-0,003	0,041	-0,041	-0,072	0,159	0,063	0,921	-0,045
PFQ1	0,124	-0,009	0,124	0,200	0,005	0,127	-0,040	0,906

TABLE 6
FACTOR WEIGHTS FOR LATENT VARIABLES – 16-PF (4 factors)

VARIABLE	FACTOR 1 Adaptability Anxiety	FACTOR 2 Intelligence Locus of control	FACTOR 3 Social Adventurousness	FACTOR 4 Creative Control
PFI: Emotional Sensitivity	0,431	0,295	-0,263	-0,007
PFL: Suspicion	0,528	0,207	0,320	0,153
PFO: Guilt feelings	0,757	-0,074	-0,036	-0,100
PFQ4: Stress	0,749	-0,219	0,051	-0,063
PFA: Sociality	0,324	0,447	0,219	-0,542
PFB: Intelligence	0,360	0,388	0,217	0,192
PFC: Ego-strength	-0,662	0,227	0,137	-0,214
PFG: Conscientiousness	-0,118	0,653	-0,258	-0,349
PFN: Incisiveness	-0,097	0,540	0,116	0,123
PFQ1: Radicalism	0,153	0,489	0,352	0,185
PFQ3: Self-control	-0,167	0,756	-0,086	-0,012
PFE: Dominance	-0,033	0,032	0,781	-0,085
FFF: Carefree	0,055	-0,185	0,647	-0,351
PFH: Social Adventurousness	-0,125	0,277	0,674	-0,395
PFM: Bohemian Unconventionality	0,047	0,013	-0,095	0,218
PFQ2: Complacency	0,015	0,131	-0,060	0,799

instruments. Since discriminant validity indicates the ability to differentiate between latent variables, a number of factors, which are equal to the number of latent variables of each instrument, were specified.

16-PF: According to Smit (1991) and Cattell, Ebet & Tatsuoka (1982), the sixteen factors of the 16-PF may be divided into eight second order factors. The factor weights of the factor analysis is to be found in Table 5. The final communality estimate or communality factor (total variance explained by the model) is 12,065.

Table 5 indicates that, with the exception of PFC, the highest weighted value of each variable is higher than 0,30. This

indicates that the latent variables are reliable. The variance explained by each factor can be circumspetly interpreted as an indication of the importance of a factor. Table 5 also indicates similarities with the second order factors of the 16-PF, especially in respect of factors 1, 2, 3 and 4. An additional factor analysis for four specified factors was conducted in an attempt to refine the measuring instrument further. These results are indicated in Table 6. The total variance explained by the model is 8,217.

19-FII: The factor weights of the factor analysis of the 19-FII are shown in Table 7. The factor weights of the respective fields of the 19-FII are all very high. The final communality estimation is 13,268. Table 7 also indicates a relatively high

TABLE 7
FACTOR WEIGHTS FOR LATENT VARIABLES – 19-FII (6 factors)

VARIABLE	FACTOR 1 Social Service Clerical	FACTOR 2 Aesthetic Practical - Female	FACTOR 3 Commerce Reasoning	FACTOR 4 Creative Precision	FACTOR 5 Outdoors. Scientific	FACTOR 6 Work-hobby Active-Passive
FII 17: Service	0,628	0,363	0,180	0,298	-0,020	0,032
FII 3: Welfare Work	0,696	0,077	0,306	-0,196	0,229	-0,134
FII 10: Convivial	0,559	0,074	0,483	0,003	-0,057	0,167
FII 2: Clerical	0,847	0,062	0,079	0,084	-0,002	0,015
FII 1: Fine Arts	0,241	0,614	0,143	0,216	0,084	-0,114
FII 5: Performing Arts	0,016	0,768	0,091	-0,059	0,132	0,025
FII 16: Language	-0,166	0,683	0,034	0,256	-0,053	-0,155
FII 13: Practical – Female	0,253	0,711	0,011	0,024	0,154	0,025
FII 7: Historical	-0,122	0,293	0,396	0,066	-0,180	-0,584
FII 19: Business	0,360	-0,190	0,630	0,165	-0,124	-0,152
FII 12: Travel	0,086	0,175	0,694	0,058	0,198	0,079
FII 14: Law	0,160	0,104	0,706	0,073	0,201	0,027
FII 8: Public Performance	0,296	0,192	0,434	0,491	0,065	-0,032
FII 11: Creative Thoughts	-0,177	0,067	0,345	0,688	0,090	-0,117
FII 18: Practical – Male	-0,427	0,281	0,024	0,527	0,283	-0,063
FII 9: Numerical	0,267	0,068	-0,045	0,777	0,048	-0,104
FII 6: Science	0,056	0,233	-0,079	0,423	0,610	-0,184
FII 4: Nature	0,151	0,084	0,216	-0,116	0,733	-0,168
FII 15: Sport	-0,180	0,087	0,222	0,312	0,641	-0,177
FII W/S: Work-Hobby	-0,042	0,072	0,043	-0,111	-0,219	0,805
FII A/P: Active – Passive	-0,008	-0,113	0,161	-0,109	-0,332	0,731

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FII 7: Historical	-0,122	0,293	0,396	0,066	-0,180	-0,584
FII 19: Business	0,360	-0,190	0,630	0,165	-0,124	-0,152
FII 12: Travel	0,086	0,175	0,694	0,058	0,198	0,079
FII 14: Law	0,160	0,104	0,706	0,073	0,201	0,027
FII 8: Public Performance	0,296	0,192	0,434	0,491	0,065	-0,032
FII 11: Creative Thoughts	-0,177	0,067	0,345	0,688	0,090	-0,117
FII 18: Practical – Male	-0,427	0,281	0,024	0,527	0,283	-0,063
FII 9: Numerical	0,267	0,068	-0,045	0,777	0,048	-0,104
FII 6: Science	0,056	0,233	-0,079	0,423	0,610	-0,184
FII 4: Nature	0,151	0,084	0,216	-0,116	0,733	-0,168
FII 15: Sport	-0,180	0,087	0,222	0,312	0,641	-0,177
FII W/S: Work-Hobby	-0,042	0,072	0,043	-0,111	-0,219	0,805
FII A/P: Active – Passive	-0,008	-0,113	0,161	-0,109	-0,332	0,731

similarity with the grouping of the broad fields of interest determined by Smit (1991).

In an attempt to further refine the measuring instrument, an additional factor analysis with three specified factors was completed, in accordance with Smit (1991). These results are indicated in Table 8. In general very high factor weights were found. The total variance explained by the model was 9,509.

SAT: The factor weights of the factor analysis of the SAT are indicated in Table 9. The final communality estimation was 7,208.

The high factor weights in the table above indicate a true construction.

TABLE 8
FACTOR WEIGHTS FOR LATENT VARIABLES – 19-FII (3 factors)

VARIABLE	FACTOR 1 Incisive Trade	FACTOR 2 Intellectual Scientific	FACTOR 3 Aesthetic
FII 17: Service	0,611	0,031	0,429
FII 3: Welfare Work	0,733	0,028	0,002
FII 10: Convivial	0,736	-0,154	0,098
FII 8: Public Performance	0,525	0,323	0,285
FII 14: Law	0,579	0,230	0,098
FII 19: Business	0,673	0,149	-0,183
FII 2: Clerical	0,712	-0,123	0,097
FII 12: Travel	0,513	0,202	0,170
FII A/P: Active – Passive	0,086	0,655	0,003
FII 7: Historical	0,132	0,396	0,170
FII 11: Creative Thoughts	0,112	0,565	0,190
FII 6: Science	0,041	0,634	0,285
FII 18: Practical – Male	-0,282	0,550	0,369
FII 9: Numerical	0,216	0,417	0,238
FII 4: Nature	0,282	0,457	0,007
FII 15: Sport	0,044	0,693	0,105
FII 1: Fine Arts	0,283	0,211	0,613
FII 5: Performing Arts	0,067	0,053	0,717
FII 16: Language	-0,108	0,243	0,678
FII 13: Practical – Female	0,208	0,043	0,690
FII W/S: Work – hobby	-0,009	-0,653	0,195

TABLE 9
FACTOR WEIGHTS FOR LATENT VARIABLES – SAT

VARIABLE	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
SAT 7	0,772	0,002	0,271	0,103	0,085
SAT 8	0,864	0,175	0,013	0,118	0,120
SAT 2	0,084	0,771	0,262	-0,117	-0,170
SAT 4	0,014	0,749	-0,043	0,339	0,206
SAT 5	0,477	0,565	0,187	0,020	0,114
SAT 1	0,309	0,296	0,647	0,101	0,182
SAT 3	0,085	0,072	0,838	0,223	0,028
SAT 9	0,001	0,095	0,235	0,776	0,252
SAT 10	0,309	0,024	0,116	0,715	-0,299
SAT 6	0,197	0,039	0,126	0,019	0,884

CONCLUSIONS

The following conclusions can be drawn from these results:

Matric Subjects

High, positive relationships were found between the following subjects: Science and History; History and Geography; Mathematics and Business Economics; Business Economics and Economics; Business Economics and Geography; Afrikaans and English. This relationship was expected, as language proficiency is an underlying requirement for all studies. This is confirmed by Landman (1986) in terms of studies which investigated language proficiency as opposed to language deficiency and the foreign language aspect of students, as well as the research conducted by Swanepoel and Pretorius (1995) and Smit (1979) relating to functional language proficiency. A high, negative relationship between Economics and Technical Drawings was found.

Matric and Technikon Subjects

High, positive relationships were found between the following matric subjects and Technikon subjects: Mathematics and Personnel Management I; Economics and Personnel Management I; Business Economics and Business Economics I; Afrikaans and Communication; Business Economics and Computer End-User. A high, negative relationship was found between Third Language and Financial Accounting/Statistics. This indicates possible contrasts in terms of language as opposed to numeric interest. Based upon the regression analysis, it appears that prospective students who achieved good results in the abovementioned matric subjects have a better chance of succeeding in the National Diploma Personnel Management than under-achievers in the abovementioned subjects.

Psychometric tests

16-PF: The following measurements of members of the test group, reinforce the general perception regarding the characteristics of personnel management practitioners:

Factor A: Sociality, Factor E: Dominance, Factor F: Carefreeness, Factor G: Conscientiousness, Factor H: Social Adventurousness, Factor I: Emotional Sensitivity, Factor Q1: Radicalism.

Members of the test group thus have the following characteristics: extroversion, assertiveness, competitiveness, enthusiasm, high superego strength, boldness, realism and conservatism.

The relationship between the 16-PF and the Technikon subjects (Personnel Management I and Business Economics I) in respect of the following three factors is indeed meaningful but not strong:

Factor A: Sociality (negative), Factor G: Conscientiousness (negative), Factor I: Emotional Sensitivity (positive). A regression analysis, obtained by using a logarithmic transformation of the normal linear model, indicates a strong statistical

relationship between the 16-PF and the expected value of log (Personnel Management I). In order to predict Business Economics I with the aid of the 16-PF factor, a normal linear equation was found which indicates a strong statistical relationship between the 16-PF and the expected value of Business Economics I.

19-FII: The 19-FII indicates that the test group has a positive interest in the following:

Public Performance, Conviviality, Creative Thinking, Rights and Business. Conviviality, Public Performance and Rights indicate that the test group wishes to make contact with people and requires social intercourse with other people. Creative Thinking indicates a positive relationship with the need to achieve. Interesting negative deviations from the normal distribution indicate that the test group is not interested in the following fields: Welfare Work, Performing Arts, History and Nature.

The test group will not show sympathy and their emotions are not central to the practice of the profession. Both Active-Passive (positive) and Practical-Female (negative) indicate weak relationships with Technikon major subjects, but these relationships are meaningful. The best regression model was found by means of an inverse transformation of Personnel Management I and there is strong statistical evidence that the fields of the 19-FII show a relationship with the expected value of (Personnel Management I)⁻¹. It can thus be used to predict Personnel Management marks. Regression analysis indicates, however, that there is no statistical evidence that the 19-FII correlates with the expected value of Business Economics I. The results of the empirical study indicate that the test group's measurements on the following factors of the 16-PF and the 19-FII correlate with the positive relationship between these two measuring instruments as indicated by Smit (1991): Carefreeness, Social Adventurousness and Conviviality Dominance, Social Adventurousness and Public Performance. Dominance, Carefreeness, Social Adventurousness and Creative Thinking Dominance, Social Adventurousness and Rights Dominance and Business

SAT: The test group's results only indicate a deviation from the normal distribution for the Figure Series (Test 6). Figure series are indicators of general reasoning ability. This indicates that respondents have good reasoning capabilities. Memory: Paragraph (Test 9) of the SAT indicates a relatively strong, positive relationship with Personnel Management I. A maximum acceptability analysis indicates that a logarithmic transformation of Personnel Management I provides the best model fit. The model fit is, however, not statistically meaningful. There is thus very little statistical evidence that the tests of the SAT are related to the expected value of log (Personnel Management I). The regression model with a logarithmic transformation on Business Economics I provides sufficient statistical evidence that the SAT is related to the expected value of log (Business Economics I).

Validity of results

Factor analyses were conducted on all three psychometric measuring instruments.

16-PF: The total variance declared by the model is 12,065 in respect of eight factors. Further factor analyses with four factors explain the total variance as 8,217, which correspond with the groupings as set out by Smit (1991) and Cattell *et al* (1982).

19-FII: Factor weights in respect of six factors indicate the total variance as 13,268. Further refinement with three factors indicates the total variance as 9,509, which corresponds with the groupings of Smit (1991).

SAT: Factor weights in respects of five factors indicate the final communality estimation at 7,208.

RECOMMENDATIONS

It is clear that matric subjects and the Swedish formula which is currently in use at tertiary institutions cannot be used in isolation as selection criteria. The composition of student groups also changes and the milieu-handicap in respect of educational systems, social and economic factors sets new challenges for the selection criteria of tertiary institutions. Matric subjects can be used as a first phase of the selection process. The candidates who are not successful in this first sifting process can be subjected to psychometric measuring instruments. The validity which psychometric measuring instruments show as indicators of academic success can serve as a starting point to establish a model for the selection of students in the new South Africa.

The prediction model determined through statistical analysis for the two main subjects, namely Personnel Management I and Business Economics I, will require further validation. Research on similar models in respect of second year and third year students will provide the opportunity to refine the selection process. The addition of potential testing in accordance with Taylor (1992) as well as a functional language proficiency test (second language) in accordance with Swanepoel and Pretorius (1995) also deserves further investigation.

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