

THE DESIGN OF A DIFFERENTIAL SELECTION MODEL FOR SPECIFIC STUDY DISCIPLINES AT A TECHNIKON

By

SONIA SWANEPOEL

submitted in fulfilment of the requirements for the degree

DOCTOR COMMERCII (HUMAN RESOURCES MANAGEMENT)

in the

FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES

at the

UNIVERSITY OF PRETORIA

PRETORIA

FEBRUARY 2002

ACKNOWLEDGMENTS

I would like to thank the following people for their help, support, encouragement, and interest:

- Prof SW Theron, my supervisor, mentor and friend who has instilled in me the passion for research;
- My husband, Fanie and children, Christél, Zander, Divan and Sonika for their patience;
- My parents and in-laws;
- Peggy Ahrense for the professional language editing;
- Petrus Nel for the statistical calculations;
- My colleagues at the Department of People Management and Development;
- My dean, Prof Maynard van der Merwe for continuous pressure;
- My colleagues in the Faculty of Economic Sciences; and
- The NRF for financial support.

THE DESIGN OF A DIFFERENTIAL SELECTION MODEL FOR SPECIFIC STUDY DISCIPLINES AT A TECHNIKON

INDEX	PAGE
LIST OF TABLES	VIII
LIST OF FIGURES	XII
CHAPTER 1 INTRODUCTION AND AIM	1
1.1 INTRODUCTION	1
1.2 PROBLEM	2
1.3 AIM OF STUDY	2
1.4 METHODOLOGY	3
1.4.1 Theoretical research	3
1.4.1 Empirical research	3
1.5 CHAPTER OUTLINE	4
CHAPTER 2 SELECTION	5
2.1 INTRODUCTION	5
2.2 DEFINITION AND DESCRIPTION	6
2.3 RATIONALE OF SELECTION	7
2.4 VALUE OF SELECTION	9
2.4.1 Organisation	9
2.4.2 Employee	10
2.4.3 Society	10
2.4.3.1 Micro-level	11
2.4.3.2 Macro-level	11
2.5 SCIENTIFIC SELECTION	11
2.6 DESIGNING A SELECTION MODEL	13
2.7 SELECTION DECISIONS	21
2.7.1 Selection strategies	24
2.7.1.1 Traditional approach to selection	24



2.7.1	Selection strategies	24
2.7.1.1	Traditional approach to selection	24
2.7.1.2	Efficiency of linear models in selection	26
2.7.1.3	Moderator variables	26
2.7.1.4	Suppressor variables	27
2.7.2	Alternative prediction models	27
2.7.2.1	Simple regression	28
2.7.2.2	Multiple regression	29
2.7.2.3	Multiple cut-off	30
2.7.2.4	Compensatory selection	30
2.7.2.5	Multiple-hurdles selection	31
2.8	SELECTION IN A 'NEW' SA	31
2.8.1	Introduction	31
2.8.2	Selection at tertiary institutions	34
2.9	SELECTION AT TECHNIKONS	36
2.10	SELECTION AND DIVERSE CULTURES	37
2.11	TERTIARY SELECTION IN OTHER COUNTRIES	37
2.12	POTENTIAL	39
2.13	LEGISLATION	41
2.14	CONCLUSIONS	42
CHAPTER 3 CRITERION OF SUCCESS		44
3.1	INTRODUCTION	44
3.2	CONCEPTUAL VERSUS ACTUAL CRITERIA	45
3.3	DISTAL VERSUS PROXIMAL CRITERIA	47
3.4	COMPOSITE VERSUS MULTIPLE CRITERIA	47
3.5	ERRORS AND CRITERION OF SUCCESS	48
3.6	STANDARDS FOR CRITERIA	50
3.7	CRITERIA DIMENSIONS	51
3.7.1	Temporal dimensions	51
3.8	TYPES OF CRITERIA	52
3.8.1	Objective criteria	53
3.8.2	Subjective criteria	53
3.8.3	Performance criteria	53
3.8.4	Research design and criterion theory	54
3.9	CRITERIA FOR TERTIARY SELECTION	56
3.10	CONCLUSIONS	59

CHAPTER 4	MATRIC RESULTS	61
4.1	INTRODUCTION	61
4.2	MATRIC RESULTS AS A PREDICTOR OF ACADEMIC SUCCESS	61
4.3	SWEDISH FORMULA	65
4.3.1	Introduction	65
4.3.2	Technikon Pretoria	65
4.3.3	Natal University	67
4.3.4	RAU (Rand Afrikaans University)	68
4.3.5	University of the Witwatersrand	69
4.3.6	University of Durban–Westville	70
4.4	CONCLUSION	71
CHAPTER 5	SELECTION TECHNIQUES	74
5.1	INTRODUCTION	74
5.2	TRADITIONAL TESTS AS SELECTION TECHNIQUES	74
5.3	TRADITIONAL TESTS IN THE UNITED STATES	76
5.4	TESTING FOR COMPETENCE	78
5.5	CONCLUSION	81
CHAPTER 6	SELECTION TECHNIQUE: DISCUSS	83
6.1	INTRODUCTION	83
6.2	BACKGROUND	85
6.3	PERSONALITY	86
6.4	THE DEVELOPMENT OF THE DISCUSS	87
6.5	TWO AXES OF THE PERSONALITY	87
6.6	ASSERTIVENESS AND PASSIVITY	88
6.6.1	Assertiveness	89
6.6.2	Passivity	89
6.6.3	Openness	89
6.6.4	Control	89
6.7	THE BIAxIAL MODEL OF DISC	90
6.8	THE BASICS OF DISC GRAPHS	91
6.8.1	The internal profile	91
6.8.2	The external profile	92

6.8.3	The summary profile	92
6.8.3.1	D for Dominance	92
6.8.3.2	I for Influence	93
6.8.3.3	S for Steadiness	94
6.8.3.4	C for Compliance	95
6.9	STRESS	96
6.10	VALIDITY AND RELIABILITY	97
6.11	CONCLUSION	97

CHAPTER 7 SELECTION TECHNIQUE: NOWICKI-STRICKLAND & LEFCOURT I/E SCALES **98**

7.1	INTRODUCTION	98
7.2	DEFINITION AND DESCRIPTION	98
7.3	LOCUS OF CONTROL AND INFLUENCE	102
7.4	LOCUS OF CONTROL AND STRESS	104
7.5	LOCUS OF CONTROL AS AN ENDURING ATTITUDE	105
7.6	LOCUS OF CONTROL AND THE PROCESS OF MODERNISATION	105
7.7	LOCUS OF CONTROL AND CULTURE	105
7.8	LOCUS OF CONTROL AND INTELLIGENCE	107
7.9	LOCUS OF CONTROL AND ACADEMIC SUCCESS	107
7.10	LOCUS OF CONTROL AND MOTIVATION	108
7.11	LOCUS OF CONTROL, PERFORMANCE INCENTIVES AND PARTICIPATION	109
7.12	LOCUS OF CONTROL AND JOB COMPLEXITY	110
7.13	LOCUS OF CONTROL AND JOB SATISFACTION	110
7.14	LOCUS OF CONTROL AND JOB PERFORMANCE	111
7.15	LOCUS OF CONTROL AND MANAGEMENT STYLE	111
7.16	SKILL-UTILISATION, ALIENATION AND LOCUS OF CONTROL	112
7.17	LOCUS OF CONTROL AND LEADERSHIP	114
7.18	LOCUS OF CONTROL AND ENTREPRENEURSHIP	114
7.19	TOP EXECUTIVE LOCUS OF CONTROL AND ITS RELATIONSHIP TO STRATEGY- MAKING, STRUCTURE AND ENVIRONMENT	115
7.20	CRITIQUE ON LOCUS OF CONTROL	115
7.21	CONCLUSIONS	117

CHAPTER 8	SELECTION TECHNIQUE: MYERS-BRIGGS TYPE INDICATOR	118
8.1	INTRODUCTION	118
8.2	BACKGROUND	119
8.3	PERCEPTION AND JUDGEMENT	120
8.4	SENSING AND INTUITION.	121
8.5	THINKING AND FEELING	121
8.6	COMBINATIONS OF PERCEPTION AND JUDGEMENT	121
8.6.1	Sensing plus thinking	121
8.6.2	Sensing plus feeling	122
8.6.3	Intuition plus feeling	122
8.6.4	Intuition plus thinking	122
8.7	SUMMARY OF THE FOUR PREFERENCES	123
8.7.1	Extroverted thinking types - ESTJ & ENTJ	124
8.7.2	Introverted thinking types - ISTP & INTP	124
8.7.3	Extroverted Feeling Types - ESFJ & ENFJ	124
8.7.4	Introverted Feeling Types - ISFP & INFP	124
8.7.5	Extroverted Sensing Types - ESTP & ESFP	125
8.7.6	Introverted Sensing Types - ISTJ & ISFJ	125
8.7.7	Extroverted Intuitive Types - ENTP & ENFP	125
8.7.8	Introverted Intuitive Types - INTJ & INFJ	126
8.8	RELIABILITY AND VALIDITY	128
8.9	CONCLUSION	128
CHAPTER 9	METHOD OF INVESTIGATION	129
9.1	DATA GATHERING METHOD	129
9.2	PARTICIPANTS	129
9.3	INSTRUMENTS	129
9.4	STATISTIC ANALYSIS	130
9.4.1	Descriptive Statistics	130
9.4.2	Correlations	131
9.4.3	Predictions	131
9.4.4	Reliability	132
9.5	SUMMARY	133

CHAPTER 10 RESULTS	134
10.1 DESCRIPTIVE STATISTICS	134
10.1.1 Comparative descriptives between Industrial Engineering and Personnel Management Students	138
10.2 MULTIPLE REGRESSION ANALYSIS	154
10.2.1 Matric Subjects	154
10.2.2 Major Subjects of Personnel Management as a Dependent Variable	176
10.2.2.1 DISCUSS	177
10.2.2.2 Myers-Briggs	179
10.2.2.3 Nowicki-Strickland & Lefcourt I/E Scales	179
10.2.3.1 DISCUSS	182
10.2.3.2 Myers-Briggs	182
10.2.2.3 Nowicki-Strickland & Lefcourt I/E Scales	183
CHAPTER 11 DIFFERENTIAL SELECTION MODEL	186
11.1 INTRODUCTION	186
11.2 MODEL	187
11.3 CONCLUSIONS	190
11.3.1 Matric subjects	190
11.3.2 Matric subjects and Technikon subjects	190
11.3.2.1 Personnel Management	190
11.3.2.2 Industrial Engineering	191
11.4 MEASURING INSTRUMENTS	191
11.5 RECOMMENDATIONS	193
BIBLIOGRAPHY	194

LIST OF TABLES

Table 4.1:	Conversion table 1 for the Swedish formula – Technikon Pretoria	66
Table 4.2:	Conversion Table 2 for the Swedish formula – Technikon Pretoria	66
Table 4.3:	Conversion Table 3 for the Swedish formula – Technikon Pretoria	67
Table 4.4:	Conversion Table for the Swedish formula – Natal University	68
Table 4.5:	Conversion Table for the Swedish formula – Randse Afrikaanse University	69
Table 4.6:	Conversion Table for the Swedish formula – University of Witwatersrand	70
Table 4.7:	Conversion Table for the Swedish formula – University of Durban-Westville	70
Table 8.2:	Combination of type	123
Table 8.3:	Type Table	127
Table 10.1:	Descriptive statistics of matric subjects	134
Table 10.2:	Descriptive statistics of Discuss	136
Table 10.3:	Descriptive statistics of the Myers-Briggs and Nowicki Strickland & Lefcourt I/E Scales	136
Table 10.4:	Descriptive statistics of the Technikon major subjects	137
Table 10.5:	Frequency distribution of the Industrial Engineering students	137
Table 10.6:	Frequency distribution of the Personnel Management students	138
Table 10.7:	Comparative descriptives between industrial Engineering and Personnel Management students	138
Table 10.8:	Comparative Afrikaans matric marks for Industrial Engineering and Personnel Management students	139

Table 10.9: Comparative English matric marks for Industrial Engineering and -Personnel Management students	140
Table 10.10: Comparative Mathematics matric marks for Industrial Engineering and Personnel Management students	140
Table 10.11: Comparative Economics matric marks for Industrial Engineering and Personnel Management students	141
Table 10.12: Comparative Business Economics matric marks for Industrial Engineering and -Personnel Management students	141
Table 10.13: Comparative Typing matric marks for Industrial Engineering and Personnel Management students	142
Table 10.14: Comparative Biology matric marks for Industrial Engineering and Personnel Management students	142
Table 10.15: Comparative Science matric marks for Industrial Engineering and Personnel Management students	143
Table 10.16: Comparative Home Economics matric marks for Industrial Engineering and Personnel Management students	143
Table 10.17: Comparative Art matric marks for Industrial Engineering and Personnel Management students	144
Table 10.18: Comparative Computer Science matric marks for Industrial Engineering and Personnel Management students	144
Table 10.19: Comparative Geography matric marks for Industrial Engineering and Personnel Management students	144
Table 10.20: Comparative History matric marks for Industrial Engineering and Personnel Management students	145
Table 10.21: Comparative Industrial Arts matric marks for Industrial Engineering and Personnel Management students	145
Table 10.22: Comparative Southern Sotho matric marks for Industrial Engineering and Personnel Management students	146
Table 10.23: Comparative Swazi matric marks for Industrial Engineering and Personnel Management students	146
Table 10.24: Comparative Agriculture matric marks for Industrial Engineering and Personnel Management students	146
Table 10.25: Comparative North Sotho matric marks for Industrial Engineering and Personnel Management students	147

Table 10.26: Comparative Accounting matric marks for Industrial Engineering and Personnel Management students	147
Table 10.27: Comparative Technology matric marks for Industrial Engineering and Personnel Management students	148
Table 10.28: Comparative Tswana matric marks for Industrial Engineering and Personnel Management students	148
Table 10.29: Comparative Biblical Studies matric marks for Industrial Engineering and Personnel Management students	149
Table 10.30 Comparative German matric marks for Industrial Engineering and Personnel Management students	149
Table 10.31 Comparative Computer Science matric marks for Industrial Engineering and Personnel Management students	149
Table 10.32 Comparative Woodwork matric marks for Industrial Engineering and Personnel Management students	150
Table 10.33 Comparative Fitting and Turning matric marks for Industrial Engineering and Personnel Management students	150
Table 10.34 Comparative Engineering Sciences matric marks for Industrial Engineering and Personnel Management students	150
Table 10.35 Comparative Motor engineering matric marks for Industrial Engineering and Personnel Management students	151
Table 10.36 Comparative Zulu matric marks for Industrial Engineering and Personnel Management students	151
Table 10.37 Comparative Xhosa matric marks for Industrial Engineering and Personnel Management students	151
Table 10.38 Comparative Electrical Work matric marks for Industrial Engineering and Personnel Management students	152
Table 10.39 Comparative Industrial Electricity matric marks for Industrial Engineering and Personnel Management students	152
Table 10.40 Comparative Electrical Technology matric marks for Industrial Engineering and Personnel Management students	152
Table 10.41 Comparative Tsonga matric marks for Industrial Engineering and Personnel Management students	153
Table 10.42: Comparative descriptive statistics of Industrial Engineering and Personnel Management students	153

Table 10.43: Correlations between matric subjects	155
Table 10.44: Correlations between matric subjects and major Technikon subjects	172
Table 10.45: Residual statistics	177
Table 10.46: Coefficients of the model tested	177
Table 10.47: Coefficients of the model tested	178
Table 10.48: Coefficients of the model tested	178
Table 10.49: Correlations between Discuss and Myers-Briggs	179
Table 10.50: Correlations between Discuss and Nowicki-Strickland & Lefcourt I/E scales	180
Table 10.51: Residual statistics	182
Table 10.52: Coefficients of the model tested	182
Table 10.53: Coefficients of the model tested	182
Table 10.54: Coefficients of the model tested	182
Table 10.55: T-test of Discuss, Myers-Briggs and Nowicki-Strickland & Lefcourt I/E scales	184

LIST OF FIGURES

Figure 2.1:	Basic elements in the selection process.	14
Figure 2.2:	Typical selection process	16
Figure 2.3:	Validating the selection process and decision	20
Figure 2.4:	Assessing the usefulness of a predictor	22
Figure 2.5:	Major evaluative standards for personnel selection procedures	23
Figure 2.6:	Traditional model of the personnel selection process	25
Figure 2.7:	Scatterplots illustrating the effect of gender as a moderator variable.	26
Figure 2.8:	Operation of a suppressor variable	27
Figure 2.9:	Scatter plot of IQ against school achievement	28
Figure 2.10:	Schematic representation of a correlation between two variables	29
Figure 3.1:	Criterion deficiency, relevance and contamination	46
Figure 3.2:	The temporal dimension of criterion measurement	51
Figure 3.3:	A modified framework that identifies the inferences for criterion development.	54
Figure 6.1:	An illustration of the Discuss continuum	87
Figure 6.2:	The biaxial model of the Discuss	90
Figure 6.3:	Discuss factors	90
Figure 7.1:	The perceived determinants of success and failure	109
Figure 7.2:	Reciprocal relationship between skill-utilisation, influence, income, and locus of control	113
Figure 8.1:	Type preferences worksheet	119
Figure 11.1:	Selection model for Personnel Management students	188
Figure 11.2:	Selection model for Industrial Engineering students	189

SYNOPSIS

THE DESIGN OF A DIFFERENTIAL SELECTION MODEL FOR SPECIFIC STUDY DISCIPLINES AT A TECHNIKON

"It is in fact nothing short of a miracle that the modern methods of instruction have not yet entirely strangled the holy curiosity of inquiry; for this delicate little plant, aside from stimulation, stands mainly in need of freedom; without this it goes to wrack and ruin without fail." Albert Einstein

by

SONIA SWANEPOEL

Study leader: Prof SW Theron
Department: Human Resources Management
Degree: D Com (Human Resources Management)

In 1999 the Department Human Resources Management received 1 625 applications for admission to the National Diploma course in Human Resources Management and in 2000, 1 750. Only 70 students could be admitted. By comparison the Industrial Engineering Department received only 331 applications in 1999 and 430 in 2000 of which only admit 100 students could be admitted. To date senior certificate results are weighted (Swedish formula) and used as the only method of selection. Given the current problems in education and the environmental constraints of the majority of applicants, the Swedish formula can no longer be used as the sole selection mechanism.

The purpose of this research, therefore, is to design a selection model which can be utilised to select students for the abovementioned courses.

During the theoretical investigation the concept of selection and the compilation of selection models was emphasised in all the forms, as well as validity strategies to determine validity. The problems relevant to the criteria for success were also researched.

Three main categories of predictors were scrutinised, viz. –

- matric subjects,
- Swedish formula,
- traditional psychometric tests, and
- popular tests such as Discuss, Myers-Briggs and the Nowicki-Strickland & Lefcourt I/E scales.

Calculations of the relations between Technikon major subjects and these predictors were done.

A multiple hurdle model for selection is presented (refer to Figures 11.1 and 11.2) for the Human Resources Management and Industrial Engineering programmes.

The first hurdle in the both the selection models is the Swedish formula based on matric subjects.

The second hurdle is internal locus of control, which relates to both Personnel Management and Industrial Engineering subjects.

The third hurdle for Personnel Management applicants is the Discuss while for the Industrial Engineering applicants the Myers-Briggs is used to correlate results.

The aim of the study which has been achieved and has culminated in the presentation of two selection models for the different disciplines. These findings can be fine-tuned in the quest for an ultimate selection model.