# Evaluation of selection procedures of an international school 

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#### Abstract

Increasing numbers of Southern African school children seek entrance to international schools. Entrance procedures to these schools are a cornerstone event and should be further investigated. Consequently the current admission procedures used by a southern African international school were evaluated and compared with those of selected other international schools. The research group consisted of 69 learners ( 30 boys and 39 girls) from different racial groups. Multiple regression analysis was used to determine the best combination of predictive variables for academic achievement. Results indicated that the admission procedures compared favourably with those of the other international schools, and that the entrance tests had a significant predictive value. The Culture-Fair Intelligence Test (Scale 2 Form A) appeared to have more predictive value than the MAT-SF for academic achievement. Academic performance was best predicted by a combination of the Culture-Fair Intelligence Test (Scale 2 Form A), the MAT-SF, the English proficiency test and the form (level of progress in school) of students.


## Introduction

Many schools, regardless whether or not they accommodate international pupils, have certain set standards in terms of which candidates are evaluated for admission. These standards reflect core values and to a large extent also define the goals of the school (National Association of Independent Schools, 1980). The diversity in culture, language and educational background of learners applying for admission to an international school presents a challenge to those responsible for psychometric testing, evaluation and selection (Samuda, Feuerstein, Kaufman, Lewis \& Sternberg, 1998)

Multicultural education is a complex process (Hulmes, 1989). It is an approach to teaching and learning that is based upon democratic values and beliefs, and acknowledges cultural pluralism and an interdependent world. It is comprised of four interactive dimensions, namely, the process of becoming interculturally competent, curriculum reform, the movement toward equity and the commitment to combat prejudice and discrimination (Bennett, 1999). Apart from providing ordinary scholastic instruction, international schools also need to facilitate social cohesion and encourage cultural diversity. Lynch (1986) argues that the intellectual and emotional dimensions of human values and behaviour are interwoven, and that it is, therefore, necessary to strive for general competence and higher levels of intellectual functioning among learners. In multicultural education teachers must bear in mind the diversity of the cultural background of learners, and provide equal educational opportunities to all.

The equitable selection of children from diverse cultural backgrounds for admission to an international school is consequently not a simple process. Since the second half of the twentieth century, there has been an increase in the testing/evaluation of people with different cultural backgrounds. Tests are particularly needed for the optimal use of human resources, especially in developing nations. There are no standardised tests that measure potential or aptitude directly, and only indirect deductions could be made from culturally influenced manifest behaviour (Anastasi, 1988; Hopkins \& Stanley, 1981). It is therefore essential to design culturally fair tests, containing items that are familiar in different cultures (Aiken, 2000; Huysamen, 1983).

A child cannot develop his or her potential abilities without being taught to understand, speak, read and write in the language that is normally used as teaching medium (Cohen \& Manion, 1981). The more context-specific and cognitively demanding language skills are, the stronger their relationship with academic achievement (Samuda, Kong, Cummins, Pascual-Leone \& Lewis, 1991). One of the most important characteristics of man is his language ability. With language man is able to en gage socially and communicate with other people and to communicate his ideas and, in so doing, convey his experience, knowledge and culture. By the age of four most children have learned the structural characteristics of their mother tongue, and by age six they can speak it with a reasonable amount of grammatical accuracy.

Lenneberg (quoted in Behr, 1980) was of the opinion that a second language can be automatically acquired through mere exposure to it before age of puberty. According to Cohen and Marion (1981), a child cannot develop his or her potential abilities or learn specific skills before he or she has learned to speak, understand, read and write the language that is used as the teaching medium.

Cummins (quoted in Baker, 2001) looks at the interconnection between academic achievement and language ability from a developmental perspective. He proposes two dimensions of communicative proficiency, namely the amount of contextual support available to the student and the level of cognitive demands required in communication. The two dimensions interact to form four quadrants, ranging from basic interpersonal communication skills which are context embedded and cognitively undemanding, to cognitive/academic language proficiency which is cognitively and academically more advanced.

The variables influencing academic achievement are numerous and complex. Among the most influential of these are social factors, intellectual ability, motivation, self-concept, and variables related to the classroom such as expectations of the teacher. These variables appear to interdependently influence academic achievement.

The primary goal of selection is the identification of those pupils possessing the necessary skills and potential to satisfy the academic requirements for successful completion of the school programme. The present study aims to ascertain whether or not the current admission procedures of a specific international school are comparable to those being used by various other international schools, and whether the measuring instruments in the test battery have a suitable predictive value. A specific goal was to determine the extent to which the form (stage of school progress), gender, age, score obtained on the basis of Matrix Analogies Tests (MAT-SF), achievement in the mathematical competence test, achievement in the essay, achievement in the comprehension, and the score attained on the Culture-Fair Intelligence Test (Scale 2 Form A) could be used as predictive variables for school achievement in the specific environment of an international school. Analyses were also done to determine whether or not there could be a multiple linear relationship between achievement in English or mathematics and the above predictor variables.

## Method

Firstly, current admission procedures used by a southern African international school are examined and compared with those of various other international schools. Thereafter the predictive validity of various methods of evaluation is determined, some of which are used for selection by the relevant southern African international school.

## Participants

After a number was allocated to each of the 190 new learners admitted to the international school in a specific year, a random sample -
consisting of 69 learners ( 30 boys and 39 girls) from different racial groups - was drawn by using random tables. The composition of the participating group, with the median age for the year group, was as follows: Form 1, $n=42$ ( $60.9 \%$ ), 11 years; Form 2, $n=15$ (21.7\%), 12 years; Form $3, n=7(10.1 \%), 13$ years, and Form $4, n=5(7.2 \%), 14$ years.

## Measures

The Matrix Analogies Tests (MAT-SF) consist of 34 items and were developed with the aim of measuring non-verbal reasoning among individuals or groups (Naglieri, 1985). The MAT-SF correlates significantly with the Wechsler Intelligence Scale for Children - Revised, and the Kaufman Assessment Battery for Children. It is also positively correlated to the academic achievement ofordinary and gifted students (Prewett, Bardos \& Naglieri, 1989). The MAT-SF conforms to a large extent to the requirements of construct validity in that most items had loadings above 0.40 on the construct 'general ability', and the testretest reliability of the MAT-SF is given as 0.83 (Prewett et al., 1989). These findings indicate a test which may be viewed as relatively reliable and valid, and it could thus be useful as a screening test (Prewett, 1995).

The Culture-Fair Intelligence Scales were developed by R.B. Cattell and published by the Institute for Personality and Ability Testing (IPAT, 1973). There are three scales (according to degree of difficulty), each of which consists of two parallel forms (Anastasi, 1988). Scales 2 and 3 each consist of 4 subtests and can be administered in a group. Scale 2 may be used with children as young as 8 years and is equally applicable to older children and most adults. The validity of scales 2 and 3 is compared to a general intelligence factor $(g)$ and is largely investigated using correlations with other tests, as well as factor analyses (IPAT, 1973). Evaluation of the content validity of Scale 2 (Form A) produced an average correlation coefficient of 0.81 and the construct validity is given by an average correlation coefficient of 0.70 . Reliability coefficients of Scale 2 (Form A) were evaluated using three methods: consistency of item content $(r=0.76)$, consistency between two forms of the test $(\mathrm{r}=0.67)$ and consistency over time $(r=0.73)$. These indicate an acceptable reliability for the Culture-Fair Intelligence Test (Scale 2 Form A). The Culture-Fair Intelligence Test (Scale 2 Form A) is used for selection by the United Nations International School (UNIS) (New York) and is described as a widelyused, culturally fair test (Aiken, 2000; Anastasi, 1988; GrothMarnat, 1997; Sattler, 1982; 1988). Although this test does not constitute part of the selection process of the international school involved, it was decided to administer this for the purpose of this study. If the findings showed a stronger correlation to academic achievement than with the MAT-SF, it could well be used as a possible alternative to the MAT-SF.

An English competence test. This test was compiled internally by the English Second Language staff of the international school. It consists of an essay and a comprehension test; according to the judgement of the staff. The degree of difficulty of this test conforms to that required of a learner in that form (grade).

A Mathematics competence test. This test was compiled by the Mathematics staff of the international school. The degree of difficulty conformed to the minimum knowledge that the school requires.

## Procedure

The tests used for selection by the international school are administered by the staff involved with admissions. All applicants are not tested on the same day, while selection takes place on different occasions throughout the year. The Culture-Fair Intelligence Scale (Scale 2 Form A) was administered by the researcher and a teacher in the school on one day during the second month of the first school year after admission. The participants' average achievement in the final examinations and their achievements in two compulsory subjects in their new school, namely English and Mathematics, were compared with scores attained on the measures. Both Pearson-product-moment correlations
and stepwise multiple regression analyses were performed. The latter calculations were carried out to determine the optimal combination of predictor variables for academic achievement.

## Results

Admission procedures
The relevant head of department provided information about admission procedures. Learners are normally admitted to the school at the age of 11 or 12 years (Form 1), based on satisfactory achievement in the tests that form part of the selection process. Admission to Form 6 is based on the recommendation of the previous principal and an interview of applicants by the staff members involved with selection. The minimum age of learners admitted to Form 1 is 11 years on 1 January of the relevant school year, 12 years for admission to Form 2, 13 years for admission to Form 3, and 16 years for admission to the first year of Form 6.

The admission process proceeds as follows:

1. Prospective students fill in an application form that requests personal, educational and family information. All this information is used as a basis, given the composition and qualities of the present learners, to determine whether the student's age is suitable for the form (grade) for which entry is being sought. If it proves to be suitable, the student is invited for testing and an interview.
2. The Matrix Analogies Test - Short Form (MAT-SF) and an English competence test are then administered by the teacher concerned.
3. As the school's teaching medium is English, candidates are required to be fluent in spoken and written English. Competence in written English is evaluated by means of a comprehension test and an essay. The comprehension test evaluating the student's level of literacy in English is set internally by the English Second Language teachers. For admission to Form 1, the emphasis is on the prospective student's potential to communicate in written English. These abilities are evaluated on the basis of an essay written about a subject chosen by the student from a selection of topics.
4. A Mathematical competence test is set by the Mathematics staff of the school. This is regarded as an important test for admission, as Mathematics is a compulsory subject.
5. The principal and other staff members involved in selection then conduct an individual interview in order to further evaluate the learner's competence in spoken English. His or her appearance and general tidiness are also noted. Information about the school and the hostel are provided to the learner, and the learner's ability to adapt to a multicultural situation is evaluated by means of a series of questions relating to traditions, and possible prejudices towards other groups.
6. A final decision is taken by the principal in conjunction with other staff members involved in selection. This is based on the information collected in steps 1 to 5 , in addition to a confidential report from the prospective learner's previous principal. This report includes information concerning the learner's intellectual abilities and behaviour. Previous academic achievement is evaluated based on school records, which the learner has to provide.

## A comparison with admission procedures of selected other schools

The admission procedures of the following schools were obtained by means of available literature (Malu, 1989; Supramaniam \& Sahraie, 1986): Maru a Pula (Botswana), Waterford Kamhlaba United World College of Southern Africa (Swaziland), United Nations International School (UNIS) (New York) and the International School of London.

The other schools, with the exception of the International School of London, use a test for general intellectual ability as part of the selection process. The following tests are used: The MAT-SF, the Normal Battery Multiple Choice and the Culture-Fair Intelligence Scale.

The determination of the prospective student's competence in English forms an important part of the selection process and English Second Language testing is done at all schools. At UNIS students are, however, not tested if English is their mother tongue or if English was the medium of instruction used at their previous school. At the International School of London learners are subjected to English Second Language testing, but achievement in the test does not play a role in admission because the school offers an extensive programme in English as a second language. Tests set up internally by staff of the schools concerned are widely used. Learners at UNIS who have progressed beyond Grade 6 are required to write a standardised test. Most schools require the evaluation of a prospective learner's competence in English through a personal interview.

As is the case at the southern African international school in question, personal interviews are also conducted with prospective students at Maru a Pula and Waterford. At Maru a Pula the interviews are conducted in groups. Aside from providing information about the school to the applicants, their motivation to study, and adaptability to a multicultural situation, are evaluated by means of questioning.

In common with the relevant southern African international school, competence in Mathematics is also evaluated at Waterford and Maru a Pula using competence tests set up internally by the staff of the school concerned. The International School of London and UNIS also take previous academic achievement into account in their selection procedures. The selection procedures at the international schools mentioned (including the southern African international school) are not based on a single evaluation. The aim is to obtain an unprejudiced, comprehensive and complete profile of the candidate before a final decision is made.

## Empirical results

For the sake of completeness, descriptive statistics for the measured variables are given before the correlations between variables are reported. The average scores and standard deviations of the evaluated variables for the learners admitted to grades one to four are as follows: Average end of year achievement (as a percentage) during the year of admission to the international school concerned $\bar{x}=63.24 ; \mathrm{SD}=8.18$, achievement in English $\bar{x}=57.89 ; \mathrm{SD}=9.87$; achievement in Mathematics $\bar{x}=59.52 ; \mathrm{SD}=14.16$, achievement in the Mathematics competence test $\bar{x}=59.32 ; \mathrm{SD}=13.39$, achievement in the essay $\bar{x}=12.13$; $\mathrm{SD}=2.17$ (maximum $=20$ ), achievement in the comprehension test $\bar{x}=11.32 ; \mathrm{SD}=3.38$ (maximum $=20$ ), score attained on the CultureFair Intelligence Test (Scale 2 Form A) $\bar{x}=110.21 ; ~ S D=12.25$ (maximum $=160$ ), score attained on the Matrix Analogies Test - Short Form $\bar{x}=7.01 ; S D=1.40($ maximum $=9)$ and age of the total group of participants $\overline{\times}=13.04 ; \mathrm{SD}=1.24$.

Pearson correlations between possible predictor variables and school achievement variables are reported in Table 1.

Table 1 Pearson correlations between predictor and achievement variables

|  |  |  |  |
| :--- | :---: | :--- | :--- |
|  | School achievement | English | Mathematics |
| Form | $-0.32^{* *}$ | 0.15 | -0.11 |
| Mathematical competence | 0.21 | 0.16 | $0.33^{* *}$ |
| Essay | 0.21 | $0.32^{* *}$ | 0.21 |
| Comprehension test | 0.07 | $0.31^{*}$ | 0.09 |
| Culture-Fair | $0.39^{* * *}$ | 0.10 | $0.24^{*}$ |
| MAT-SF | $0.37^{* *}$ | $0.39^{* * *}$ | $0.42^{* * *}$ |
| Age | $-0.28^{*}$ | 0.13 | -0.11 |
| Gender | -0.02 | $-0.27^{*}$ | 0.04 |
| $* p<0.05 ;$ | $* * p<0.01 ;$ | $* * * p<0.001$ |  |

It follows from Table 1 that the lower the form during school entry and the younger the student, the better the academic achievement, whilst higher scores on the MAT-SF and the Culture-Fair Intelligence Test (Scale 2 Form A) correlate with better average school achievement. As far as achievement in English is concerned, higher achieve-
ment in English correlated with higher scores on the MAT-SF, the essay and the comprehension test. The significant negative correlation be-tween gender and achievement in English was the consequence of girls scoring better than boys in English achievement. The significant posi-tive correlations between achievement in Mathematics and the mat-SF, the Culture Fair Intelligence Test (Scale 2 Form A) and Mathematical competence implied a co-variate of scores on the measures.

## Stepwise Multiple Regression analyses

In order to identify the best possible predictors of school achievement - including achievement in English and in Mathematics - stepwise multiple regression analyses were undertaken. In each case the proportion of variance contributed by the predictor variables is reported. Thereafter the contributions of the variables for each prediction are presented in table form.

The best predictors for average school achievement (39\% of the proportion of variance) were scores attained on the Culture-Fair Intelligence Test (Scale 2 Form A), Matrix Analogies Test Short Form, form of the learner, achievement in the comprehension test and achievement in the essay. The relative contribution of each variable $(\beta)$ and the probability that the variable will exceed the inclusion criteria are indicated in Table 2.

Table 2 Variables contributing to the prediction of overall school achievement

| Variables selected | $\beta$ | S | $F$ value | $p$ |
| :--- | ---: | ---: | ---: | ---: |
| Form | -3.35 | 1.05 | 10.11 | $0.002^{* *}$ |
| MAT-SF | 1.76 | 0.58 | 9.06 | $0.004^{* *}$ |
| Essay | 0.68 | 0.39 | 3.01 | $0.088^{*}$ |
| Comprehension test | 0.65 | 0.28 | 5.31 | $0.025^{* *}$ |
| Culture-Fair | 0.18 | 0.07 | 6.54 | $0.013^{* *}$ |
| $* p<0.10 ;$ | $* * p<0.05$ |  |  |  |

For achievement in English the best predictors (31\% of the proportion of variance) were scores attained on the Matrix Analogies Test - Short Form, achievement in the comprehension test, gender of the learner, and achievement in the essay. The relative contribution of each variable $(\beta)$ and the probability of the variables exceeding the inclusion criterion are indicated in Table 3.

Table 3 Variables contributing to the prediction of achie vement in English

| Variables selected | $\beta$ | S | $F$ value | $p$ |
| :--- | ---: | ---: | ---: | :---: |
| MAT-SF | 2.44 | 0.74 | 10.73 | $0.002^{* *}$ |
| Gender | -2.10 | 1.04 | 4.06 | $0.048^{* *}$ |
| Essay | 0.85 | 0.50 | 2.94 | $0.091^{*}$ |
| Comprehension test | 0.61 | 0.31 | 3.67 | $0.060^{*}$ |

* $p<0.10 ; \quad$ ** $p<0.05$

Table 4 Variables contributing to the prediction of achievem ent in Mathematics

| Variables selected | $\beta$ | S | $F$ value | $p$ |
| :--- | :--- | :--- | :--- | :--- |
| MAT-SF | 2.80 | 1.20 | 5.42 | $0.023^{* *}$ |
| Mathematical competence | 0.23 | 0.12 | 3.58 | $0.063^{*}$ |
| Essay | 1.32 | 0.71 | 3.40 | $0.070^{*}$ |
| Culture-Fair | 0.25 | 0.12 | 4.01 | $0.050^{* *}$ |
| $* p<0.10 ;$ | $* * p<0.05$ |  |  |  |

The best predictors of achievement in Mathematics ( $28 \%$ of the proportion of variance) were scores attained on the Matrix Analogies Test - Short Form, the Culture-Fair Intelligence Test (Scale 2 Form A), Mathematical competence and achievement in the essay. The relative contribution of each variable $(\beta)$ and the probability of the variable exceeding the inclusion criterion are indicated in Table 4.

## Discussion and conclusion

The primary aim of this study was to determine whether or not the current admission procedures of a specific international school are comparable to those of other international schools. A secondary aim was to determine whether the measures used in the selection process had acceptable predictive value. Variables, the predictive value of which were investigated, were form (level of school progress), gender, age, score attained on the Matrix Analogies Test (MAT-SF), achievement in a Mathematical competence test, achievement in the writing of an essay, achievement in the comprehension test, and score attained on the Culture-Fair Intelligence Test (Scale 2, Form A).

Students applying for admission at the relevant southern African international school need to complete an application form on which they provide personal, educational and family information. If the student's age is appropriate for the form (grade) applied for, then he or she is invited for assessment and an interview. The following tests are administered: The Matrix Analogies Test - Short Form (MAT-SF), an English achievement test, and a Mathematics achievement test. The latter two tests were devised by the staff of the international school and are in essence a reflection of what is expected academically from students in the relevant form for which they are applying to enter the school. During the individual interview, the student's proficiency in English is evaluated further. The interview is also used for the purpose of providing information about the school and for evaluating certain non-cognitive factors, such as the learner's motivation. The final decision is based on the above-named information, a confidential report from the student's former school principal, and on previous academic achievement.

On the basis of this investigation, the conclusion is that the above admission procedure compared favourably to that of other international schools (Maru a Pula, Waterford Kamhlaba United World College of Southern Africa, the United Nations International School and the International School of London). The procedures or resources which are also used in the other schools on which information was obtained, included individual interviews with the applicant (Maru a Pula and the Waterford Kamhlaba United World College of Southern Africa), an English competence test compiled by staff of the school (Maru a Pula and the Waterford Kamhlaba United World College of Southern Africa), and general intelligence (all other schools).

Both the MAT-SF and the Culture-Free Intelligence Test (Scale 2 Form A) had significant positive correlations to average school achievement. Average school achievement was best predicted by a combination of the Culture-Fair Intelligence Test (Scale 2 Form A), the MAT-SF, the English competence test and the level of school progress. It could be deduced from the regression analysis that the lower the form $(\beta=-3.35, p=0.002)$ and the higher the achievement in the MAT-SF $(\beta=1.76, p=0.004)$, the essay $(\beta=0.68, p=0.088)$, the comprehension test $(\beta=0.65, p=0.025)$ and the Culture-Fair Intelligence Test (Scale 2 Form A) $(\beta=0.18, p=0.013)$, the better a student's chance of performing well academically (see Table 2). In combination these measures should, therefore, be included in a selection process that could most accurately predict success in school achievement.

The MAT-SF, $(r=0.39, p<0.001)$; the essay $(r=0.32, p<0.01)$ and the comprehension test $(r=0.31, p<0.05)$ indicated significant positive correlations with achievement in English (see Table 1). The internally developed English competence measure used by the international school thus seems to be a good predictor of achievement in English, but achievement in English is better predicted by a combination of the MAT-SF, the English competence test, and gender $\left(R^{2}\right.$ $=0.31$ ). The following regression equation could consequently be posited for achievement in English: $Y=23.173+2.44$ (MAT-SF) -2.10 (gender) +0.85 (essay) +0.61 (comprehension). The fact that both sections of the competence measure (writing an essay and answering a comprehension test) play a role in the explanation of average school achievement indicates the high predictive value of these measures.

Achievement in Mathematics reflected significant positive correlations with the MAT-SF $(r=0.42, p<0.001)$, the Culture-Fair Intelligence Test (Scale 2 Form A) $(r=0.24, p<0.05)$ and the Mathematical competence test $(r=0.33, p<0.01)$. Although the Mathematical competence test correlated significantly with achievement in mathematics and, therefore, has a predictive value, the MAT-SF appears to be a better predictor of achievement in Mathematics. Achievement in Mathematics was best predicted by a combination of the MAT-SF, the Culture-Fair Intelligence Test (Scale 2 Form A), the Mathematical competence test and the essay $\left(R^{2}=0.28\right)$. The better the students' achievement in the MAT-SF $(\beta=2.80, p=0.023)$, the Mathematical competence test ( $\beta=0.23, p=0.063$ ), the essay ( $\beta=$ $1.32, p=0.07$ ) and the Culture-Fair Intelligence Test (Scale 2 Form A) ( $\beta=0.25, p=0.05$ ), the better their achievement in Mathematics. The following regression equation could proposed for achievement in Mathematics: $Y=-18.23+2.80($ MAT-SF $)+0.23($ Math - Comp $)+$ 1.32 (essay) +0.25 (Cult).

The MAT-SF appears to be a good predictor of both average achievement at school and of achievement in English and Mathematics. It would seem as if the international school in question, as well as other similar schools, could benefit a great deal from the use of this test as part of the battery of tests for selection. Because the CultureFair Intelligence Test (Scale 2 Form A) is also a good predictor of average school achievement, the inclusion of both of these tests in the test battery could well be considered. Because the English competence and the Mathematical competence tests of the school under investigation had a predictive value, the continued use of these two tests in the test battery is certainly recommended.

According to the results of this study, the existing selection process of the southern African international school could be improved by the inclusion of the Culture-Fair Intelligence Test (Scale 2 Form A) and also by the implementation of the calculated regression equations. Although there still remains a considerable unexplained variance in the predictions, the results indicated how selection could be done with a higher degree of certainty. The results of the present study may also serve as a guideline for selection procedures at other international schools.

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