Honours degree performance as predictor of achievement on Master’s degree level

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Abstract

This research was undertaken in the context of the increasing demand in higher education in South Africa to improve the delivery of high quality Master’s and doctoral graduates. A measure frequently applied to improve the slow completion and high dropout rate of these students is to select for admission. In many cases the selection for admission to Master’s degree studies relies very heavily on performance at Honours degree level. The question addressed in this research is whether performance at Honours degree level is a reliable predictor of success at Master’s degree level where research is the predominant activity. It was found that a set of predictors, representing performance in the Bachelor of Education (BEd) (Hons) degree, proved to be very limited with regard to the prediction of achievement in the Master of Education (MEd) programme. Some thoughts were expressed based on this conclusion.

INTRODUCTION

According to the National plan for higher education (Department of Education 2001:76), the Ministry of Education of South Africa is concerned about the high dropout rates and slow completion rates at Master’s and doctoral level, especially given that postgraduate students are a highly qualified group. One of the Ministry’s intended strategies to rectify this alarming tendency is to require higher education institutions, which in future would be allocated student places at the Master’s and doctoral level, to indicate the strategies (including time frames) to improve their graduate outputs at the Master’s and doctoral levels in their three-year rolling plans (Department of Education 2001:78). Furthermore, the funding of higher education institutions will be directly linked to the approval of these institutional rolling plans. It is evident that the Ministry also intends reducing the proportion of the higher education enrolment cake comprising by the humanities in the long term.

The massification of higher education in Africa since the eighties has resulted in selection becoming an integral part of admission to more and more fields of study. It is evident that although equality of opportunity, including equality of educational opportunity, is a basic human right, open access to higher education

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does not imply unconditional open access. Moreover, it seems that the Size and Shape model for higher education probably implies conditional access to even more fields of study than in the past.

Numerous studies to date have been undertaken regarding the prediction of success at the undergraduate level of higher education. Hou (1998), McKenzie and Schweitzer (2001), Huysamen (2000; 2001), Ting and Robinson (1998), Dawes, Yeld and Smith (1999) and Smith, Edminster and Sullivan (2001) are only a few of those who have published on this topic. However, not many researchers investigated the prediction of success on postgraduate level, especially performance in research degrees at Master’s and doctoral level. It is also evident that in cases where selection for Master’s degree study is applicable, many departments/disciplines in South African higher education institutions rely very heavily upon Honours degree performance as admission criterion. In the context of this practice the question arises whether performance at Honours degree level is a reliable predictor of success on Master’s degree level where research is the predominant activity.

PREDICTORS OF ACADEMIC ACHIEVEMENT

As mentioned in the introductory paragraph, considerable research has been done regarding the prediction of academic achievement at school level, as well as undergraduate level of higher education. Besides previous achievement, various cognitive factors such as ability, aptitude, cognitive drive and cognitive development, as well as non-cognitive factors such as motivation, self-esteem, interest, attitude, goal setting and study habits were identified as possible predictors of academic success/failure. From this research it is evident that academic performance is influenced by a broad spectrum of factors which constitute a complex interdependent unit. It is also clear that predicting performance in higher education expresses only probabilities in the sense that no matter how accurate and reliable earlier measures, it does not account for later changes in a student’s interests, attitudes, career aspirations and social settings.

A review of research, which has been undertaken on the relationship between the prediction of success and the actual performance on Master’s and doctoral degree level, shows that the vast majority of these research efforts focused on investigating the validity of admission tests and previous qualification point averages (mainly undergraduate mean marks concerning the rest of the world) as selection instruments. It is also evident that the results from these investigations are contradictory and proof of the mentioned two measures as reliable predictors of achievement at Master’s and doctoral level seems rather inconclusive. For example, Holmes and Beishline (1996:939) state that ‘[r]esearch on the predictive validity of the Graduate Record Examination (GRE) now covers a 45-year span’ and while a variety of criteria was used, ‘the results remain inconclusive and contradictory’. In the same vein Yang and Lu (2001:16) mention that although it
has been recognised that both undergraduate point average (GPA) and graduate management admission test scores (GMAT) are needed as key admission criteria, ‘previous studies have revealed mixed results regarding the relative impacts of these two variables on graduate academic performance’. They add that ‘[s]everal authors have noted correctly that there are far more important variables in determining academic performance in an MBA program than those used regularly in admission practices. It would be inaccurate to assume that prior academic performance is the single best predictor of performance in a management education program.’ Suffice it for us to mention Willingham’s statement that ‘the accuracy of predicting which students will succeed in a particular graduate school is often no better than modest, especially if such predictions are based only on a test score or a grade’ (Kluever & Green 1992:420). In interpreting these publicised results it must also be kept in mind that the majority of the research was undertaken to predict achievement in Master’s degree programmes which comprise mainly course work and not research.

COMPETENCES ASSOCIATED WITH RESEARCH SUCCESS

According to Lessing and Schulze (2002:140), postgraduate research has an intellectual as well as a psychological component. Although it is true that internal and external conflicts influence the research process negatively, it is almost impossible to verify the psychological component in predicting whether a person will be a successful researcher. It also seems a bit simplistic to argue that students ‘need determination and perseverance (rather than brilliance) to complete their research’ (Smith et al. in Lessing & Schulze 2002:141). While the supervisor plays a very important role in the successful completion of a dissertation or at least the time that is needed to complete it, the ability of the student surely remains the most important variable.

To be a researcher implies the mastering of specific skills such as the ability to apply appropriate research techniques, to analyse data and to write reports that are coherent and show critical depth and originality. It seems especially true on master’s degree level to expect a student not to be merely a graduate but a real intellectual. That is a person who, according to Jansen (2001), inter alia, questions, seeks and proposes alternatives, is restless about the status quo and traces connections between the disciplines.

Pegging qualifications on the South African National Qualifications Framework (NQF) is, inter alia, based on a principle that the level descriptors for a specific level should be understood as cumulative in the sense that each level subsumes the levels below it. This implies that higher/different cognitive functioning is required on a specific NQF level than on the preceding levels. The application of this principle is consequently found in, for example, the formulation of foundation competences for the Master’s degree level where one finds competences such as ‘challenge orthodox theory and redefine existing
knowledge’ and ‘handle contradictions and make value commitments’ (Luckett 2000). In line with this, the critical cross-field outcomes which are formulated for MEEd degree programmes usually deal with, *inter alia*, requirements that a graduate must be able to identify, analyse, formulate and solve convergent and divergent problems creatively and innovatively.

In addressing the issue of excellence, or even just success, when it comes to research activities, it seems worthwhile to reflect upon cognitive requirements of another kind which could possibly be applicable to the execution of research activities. We believe, although many lecturers involved in higher education would probably claim differently, that a student with a good ability to memorise, can go a long way towards achieving high marks in many subjects or disciplines in the humanities up to Honours degree level. In a research capacity this ability is surely one of the less important attributes. Considerable research concerning the issue of certain levels of academic discourse becoming inaccessible to individuals due to an inability to function on a certain cognitive thinking level, was undertaken as far back as the 1970 and 1980s. Some of these researchers claimed, *inter alia*, that a person who makes use of formal operational thinking (as defined by Piaget) in dealing with a particular task, does not necessarily have the ability to apply formal operational thinking in the solving of all tasks. The work of Callis (1976), Nagy and Griffiths (1982), Hale (1983) and Shayer and Adey (1981), to name a few, could be consulted. Since we have no intention to scrutinise different learning and developmental theories in the scope of this research, it is enough to mention just one other pronouncement from that period. According to Shayer and Adey (1981:16), the difference in academic achievement between a sample of formal operational thinkers and one consisting of those who think in essentially concrete terms, is not just a matter of steps to the same end.

**RESEARCH QUESTIONS**

The research problem ‘Is performance on Honours degree level a reliable predictor of success on Master’s degree level where research is the predominant activity?’ gave rise to the following research questions:

- To what extent are the following BEd (Hons) marks valid and reliable predictors of achievement in the MEEd programme: average mark, Research Methodology module mark, Philosophy of Education module mark, mark obtained in the module accordant to the discipline in which the MEEd is undertaken? While the inclusion of the first two as well as the last-mentioned independent variables in the equation is obvious, the Philosophy of Education mark was added because this module has always been considered a foundation module. As such it is included in the BEd (Hons) programme as a compulsory module. The name Philosophy of Education is used although the name of this
module has changed over the past 20 years from Fundamental Pedagogics to Philosophy of Education to Theoretical Frameworks in Education.

- What is the relationship between the number of times a BEd (Hons) module was failed and achievement in the MEd programme?
- What is the relative importance of the time lapse between BEd (Hons) completion and MEd enrolment as possible variable in predicting achievement in the MEd programme?

RESEARCH DESIGN

The literature study was followed by employing a non-experimental, correlation research design. This design was used in order to investigate the predictive validity of the previously mentioned predictor variables regarding achievement in the MEd programme. The sample consisted of all students who enrolled for the MEd degree programme at the University of South Africa (Unisa) from 1984 to 1999 and whose BEd (Hons) results were available. The enrolment cut of date (1999) was decided upon to make provision for a four-year completion period for the 1999 enrolments. In all, 788 students were included in the sample.

Three criterion variables were used as manifestations of achievement in the MEd programme namely, whether or not a student completed the MEd degree; the percentage a student obtained for the MEd degree; and the number of years he or she was enrolled for the degree. We are aware that research degree results are probably more influenced by factors such as supervisor’s input and examination practices than results obtained in course work programmes which do not include a research dissertation of some kind. However, we agree with Huysamen (1999:133) that it makes little sense to apply measures to correct for the unreliability of criterion variables when in practice only unreliable criteria or predictors are the reality. The prediction variables included the following BEd (Hons) marks: The average mark for the degree, the mark obtained in the module accordant to the discipline in which the MEd was undertaken, the Research Methodology module mark and the Philosophy of Education module mark. The number of times a BEd (Hons) module was failed as well as the number of years between BEd (Hons) completion and MEd enrolment was added to this category of variables. This set of variables was used to determine their contribution in explaining the variance of each of the three criterion variables.

ANALYTICAL PROCEDURE

The analysis of the data commenced by computing Pearson-Product-Moment correlations to determine the magnitude and significance of the relationships between the predictor and criterion variables. The Statistical Analysis System (SAS), version 8.2, was used to perform stepwise multiple regression analyses to assess the relative importance of each predictive variable, as well as combinations
of these variables, in accounting for the variance in the criterion variables *MEd marks* and *number of years registered for an MEd degree*. A logistic regression analysis, using the SPSS statistical package, was performed to determine the relative importance of the set of prediction variables in accounting for the variance in the criterion variable *completed/did not complete the MEd degree*.

**RESULTS**

As mentioned in the previous paragraph, two stepwise multiple regression analyses were carried out. A summary of the results of the first one, which was performed to determine the relative importance of the set of prediction variables in predicting the marks which students obtain in their MEd degree, is reported in Table 1.

**Table 1: Multiple regression analysis with MEd degree marks as criterion variable**

<table>
<thead>
<tr>
<th>Model summary</th>
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</thead>
<tbody>
<tr>
<td>Corrected total</td>
<td>308</td>
</tr>
<tr>
<td>Multiple R</td>
<td>0,386</td>
</tr>
<tr>
<td>R Square</td>
<td>0,149</td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0,132</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proportion of the variance explained by predictor variables</th>
<th>Correlation coefficient (r)</th>
<th>Contribution to $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEd (Hons) average %</td>
<td>0,362</td>
<td>0,131</td>
</tr>
<tr>
<td>Years between BEd (Hons) and MEd enrolment</td>
<td>0,044</td>
<td>0,018</td>
</tr>
<tr>
<td>BEd (Hons) Research Methodology module %</td>
<td>0,272</td>
<td>*</td>
</tr>
<tr>
<td>BEd (Hons) Philosophy of Education module %</td>
<td>0,215</td>
<td>*</td>
</tr>
<tr>
<td>BEd (Hons) module accordant to MEd</td>
<td>0,282</td>
<td>*</td>
</tr>
<tr>
<td>Number of times BEd (Hons) module failed</td>
<td>-0,149</td>
<td>*</td>
</tr>
</tbody>
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* Variable does not meet the 0,15 significance level for entry into the model

Significance level for predictor variable 1: $p<0,0001$

Significance level for predictor variable 2: $p=0,0114$
Firstly, from Table 1 it is evident that only two prediction variables met the significance level for entry into the model, even with a very lenient 15 per cent significance setting. This implies that besides these two variables, BEd (Hons) average mark and the number of years between the completion of the BEd (Hons) degree and first enrolment for the MEd degree, none of the other variables in the model contributed significantly (statistically speaking) to the variance in MEd marks already explained by the mentioned two.

Table 1 also shows that, besides the statistical significant contribution of the mentioned two variables, the model in its entirety proved to be a rather weak model for predicting marks which students obtain in the MEd degree. It only explained approximately 13 per cent (adjusted R square of 0,132) of the variance in the MEd marks of the students. This implies that approximately 87 per cent of the variance is explained by other factors not included in the model. A closer look at the contribution of the individual variables indicates that the BEd (Hons) average mark was identified as the most prominent of the six factors entered into the model, contributing approximately 13 per cent to the unadjusted square. The time lapse between BEd (Hons) completion and MEd enrolment contributed only an additional 1,8 per cent.

A second stepwise multiple regression analysis was applied in order to determine to what extent the previously mentioned set of six prediction variables predicts the second criterion variable, namely the number of years which a student is enrolled for the MEd degree. The outcome of this analysis is indicated in Table 2.

Table 2: Multiple regression analysis with years registered for MEd degree as criterion variable

<table>
<thead>
<tr>
<th>Model summary</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected total</td>
<td>703</td>
</tr>
<tr>
<td>Multiple R</td>
<td>0,330</td>
</tr>
<tr>
<td>R Square</td>
<td>0,109</td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0,101</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proportion of the variance explained by predictor variables</th>
<th>Correlation coefficient (r)</th>
<th>Contribution to $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years between BEd (Hons) and MEd enrolment</td>
<td>0,330</td>
<td>0,109</td>
</tr>
<tr>
<td>BEd (Hons) average %</td>
<td>-0,030</td>
<td>*</td>
</tr>
<tr>
<td>BEd (Hons) Research Methodology module %</td>
<td>0,024</td>
<td>*</td>
</tr>
</tbody>
</table>
It is evident from Table 2 that only one of the prediction variables met the very lenient significance level setting of 15 per cent for entry into the model. However, this variable, the time lapse between completing the BEd (Hons) degree and enrolling for the MEd, and therefore the model as such explained only 10% (adjusted R square of 0,101) of the variance in the number of years a student is enrolled for an MEd degree. Other factors not included in the model therefore explain approximately 90% of the variance in duration of MEd enrolment.

The last analysis consisted of a logistic regression analysis to determine the value of the set of predicting variables, used in this research, for predicting whether or not a student will successfully complete his/her MEd studies within four years (the categorical dichotomous criterion variable). The results of this analysis are summarised in Table 3.

**Table 3: Logistic regression analysis with completion of MEd degree as criterion variable**

<table>
<thead>
<tr>
<th></th>
<th>Wald chi-square</th>
<th>Significance level</th>
<th>Contribution to adjusted R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEd (Hons) average %</td>
<td>20,57</td>
<td>p&lt;0,0001</td>
<td>0,046</td>
</tr>
<tr>
<td>Years between BEd (Hons) and MEd enrolment</td>
<td>19,69</td>
<td>p&lt;0,0001</td>
<td>0,029</td>
</tr>
<tr>
<td>Number of times BEd (Hons) module failed</td>
<td>6,62</td>
<td>p=0,0101</td>
<td>0,010</td>
</tr>
</tbody>
</table>
The model summary (Table 3) shows that three of the predictive variables met the 5 per cent significance level for entry into the regression model. Their individual contributions in predicting whether a student will complete the MEd degree are, however, very small. The most prominent of the three factors (identified first in the analysis) is the BEd (Hons) average mark which contributed 4,6 per cent to the unadjusted R square. The time lapse between completing the BEd (Hons) degree and enrolling for the MEd degree contributed an additional 2,9 per cent on entry into the model whereafter the number of times a BEd (Hons) module was failed was added to contribute another 1 per cent. The model as an entirety explained only 8,5 per cent (adjusted R square of 0,0847) of the variance in the data.

The second part of Table 3, prediction potentiality of the model, further emphasises that this model is a rather weak and unstable model to utilise in
predicting the outcome of MEd studies in terms of completion or drop out. Even after entering the third variable the model predicted the outcome of the study (complete/not complete) correctly in only 62.6 per cent of the student cases. Even more alarming is that only 44.5 per cent of those who successfully completed the MEd degree was correctly predicted by the model. Compare this figure to the 50 per cent chance one has to predict the outcome correctly by flipping a coin.

**CONCLUDING DISCUSSION**

This research was undertaken in the context of an increasing demand in higher education in South Africa to improve the delivery of high quality master’s and doctoral graduates. Doing justice to this notion implies looking for measures to decrease the number of students who do not complete their degrees (drop outs), to decrease the time taken by many of them to complete and to improve on the quality of those who succeed (produce real intellectuals). One of the most common measures which is utilised to reach this threefold goal is to apply selection in the admission of students. In many cases this selection for admission to Master’s degree studies implies relying heavily on performance on Honours degree level and taking, sometimes, the lapse of time between acquiring the Honours degree and applying for Master’s degree studies into account.

The results of this research provided very little support for the validity of the mentioned selection practice. Without trying to generalise it seems, at least in the case of education and similar disciplines, a very dubious undertaking to rely heavily on the mentioned two factors in predicting success on Master’s degree level. From the five variables which were identified as key indicators of performance on honours degree level, none emerged as a strong predictor of achieving success on Master’s degree level. The same applies to the time lapse between acquiring the BEd (Hons) and enrolling for an MEd programme which was expected to be a significant factor.

Although one could argue that the BEd (Hons) average mark could be used as a selection criterion for admission to Master’s degree studies because it was found to be the most prominent of the six prediction variables, its predictive ability seems to be very limited due to the following:

- It explained only 13 per cent of the variance in MEd marks. Therefore, other factors contributed 87 per cent to the prediction of the MEd marks obtained by students.
- It did not contribute significantly in explaining the variance regarding the number of years students were enrolled for the MEd programme.
- It explained only 4.6 per cent of the variance in predicting whether or not a student would complete the MEd degree. As individual factor it predicted for students who completed the MEd degree, the correct outcome in only 35 per cent of the cases. This implies a smaller success rate in prediction than one.
would expect from flipping a coin which gives one a 50 per cent chance of predicting success.

In all, the potentiality of BEd (Hons) marks to be utilised in predicting success with master’s degree studies, and therefore to be used as selection criteria for admission, seems to be very limited whether it is the average honours degree mark, the mark obtained in the module accordant to the discipline in which the MEd is undertaken, the Research Methodology module mark or the compulsory module which comprises the foundation module. This conclusion re-emphasises the findings of previous studies, such as Yang and Lu (2001) and Kluever and Green (1992), which acknowledged that prior academic performance is not the single best predictor of success with postgraduate studies. In addition to this conclusion, it was illuminating to find, on inspection of the bivariate correlations (Pearson product-moment) between the variables, that the MEd marks obtained by the students show a higher correlation with the BEd (Hons) average mark \((r=0.33; p<0.0001)\) than with the mark obtained in the BEd (Hons) module accordant to the discipline in which the MEd was undertaken \((r=0.28; p<0.0001)\), the Research Methodology module mark \((r=0.28; p<0.0001)\) and the Philosophy of Education module mark \((r=0.26; p<0.0001)\).

The above-mentioned conclusions leave one with the question how to realise the threefold goal with Master’s degree studies mentioned in the first paragraph of this discussion section. Firstly, one should be careful in drawing further conclusions, besides those already made, due to the intervention of factors, such as the role of the supervisor who can contribute greatly in closing the gap, either way, between the Master’s degree results of so-called weak and good students. With this caution in mind it still appears worthwhile to assess current Honours degree programmes in terms of their suitability to prepare students to undertake research degrees. On the other hand the ongoing training of supervisors as mentors is a necessity. Ultimately, it is the supervisors who can provide a support system that is conducive to research. Although it is beyond the scope of this research, the need for a research culture and ongoing research activities in a faculty must also be emphasised in this regard.

As far as selection for admission to Master’s degree studies is concerned, the implementation of a twofold assessment instrument could prove most useful in the case of course work programmes which include a research project of limited scope completed during the last phase of study. This suggested assessment incorporates a language proficiency test as well as a test which assesses a student’s reasoning skills. In cases where students are found below standard regarding these skills, short courses on language proficiency and argument analysis, deductive reasoning, non-deductive reasoning and informal fallacies could be introduced as further preparation for functioning of Master’s degree level. In the case of programmes that consist of research only, the submission of an acceptable extended research proposal is extremely important. Furthermore, it could be worthwhile to require of
a student to justify his/her proposal in a follow-up interview. These recommendations on possible selection criteria are, however, aspects which still have to be explored more thoroughly.

REFERENCES


