THE USE OF FIRST YEAR AS AN ACADEMICALLY DIAGNOSTIC YEAR: A RE-EXAMINATION

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The academic achievement over three consecutive years of 1,300 students attending two C.A.E.'s and a university was examined to test the proposal that the first academic year be used as a diagnostic year. Optimally-predictive combinations of first year results with matriculation score were obtained in an attempt to improve existing diagnostic techniques. Comparisons between different university faculties and between university and colleges were made, employing controls for the effect of sex of student upon academic achievement. Although some differences were found between faculties, first year examination performance appears to be the best single predictor of success in the later years of a course. Significant gains in diagnosis can be made over prior methods, however, by evaluating the first year performance of males and females separately, rather than applying the same standards of achievement to each sex. Although the relationship between first and second year results is strong, third year achievement does not correlate very highly at all with first year performance and nor does second year work. There seems to be a notable lack of scholastic or cognitive predictors of third year achievement. The combination of matriculation and first year results does not appear to improve prediction of later year performance beyond that obtained with the use of first year results alone.

Introduction

Most Australian universities use the first year of a student's course as an academically-diagnostic year, a policy which seems quite justified in view of the strong relationship between the first year and later year examination results. Comparatively little research has been done with students at other tertiary institutions, however, to test whether the same approach could be used there. Even those institutions which rely on the use of first year results in some faculties for student selection beyond first year still find the need to experiment with various approaches from time to time in order to improve their methods (Hogben, 1965; Loftus, 1973).

It has generally been established that the matriculation result is the best single school background factor for the prediction of later academic performance, with correlations on average of 0.55 to 0.63, depending on the method of treatment of the data. Correlations between first year tertiary and later year results, however, are considerably higher. Sanders (1958) obtained product-moment correlations of 0.49 between matriculation and first

year results, compared with 0.69 between first year and later year performance.

A later study of medical students at the same institution (Hogben, 1965) calculated rank-order correlation coefficients between first and second year performance for all students who passed first year, for the years 1957 to 1960. The coefficients obtained were 0.59, 0.79, 0.52 and 0.62 for the 1957, 1958 and 1960 entrants, respectively, each coefficient being significant at the 1% level. Although these results reflected a tendency for the second year failures to come from the low-ranking first year students, an analysis of the first year ranks of those students who failed second year showed that 5 of the 26 second year failures came from the upper halves of their respective first year groups.

An alternative method of representing first year performance was then investigated in the same study to find whether it would improve selection for second year entry, since the selection of students for entry into the second year of medicine was based on their first year results. Students who had passed first year and then taken the second year examinations were placed into four groups on the basis of the quality of their first year passes. The four categories used were; one or more "A" passes, one or more "B" passes but no "A"s; all "C" passes; one or more supplementary passes. Second year performance was shown by students who had required supplementary examinations in order to pass their first year. The overall second year pass rate of these students was only either all "C" passes or some "B"s but no "A"s. Significantly, the second year pass rate for students who achieved at least one "A" among their passes was 98%. If the students who required first year supplementary examinations were eliminated from the analysis then the overall second year pass rate rose from 83% to 91%. The "cost" of this method was that 8% of the total second year pass students were lost. However, this would need to be balanced against the fact that 55% of the total failures were excluded also. First year results were also related to third year performance. The third year survival rates of students from each of the categories of first year performance were as follows; one or more "A" passes, 94%; one or more "B" passes but no "A"s, 73%; all "C" passes, 70%; one or more supplementary passes, 23%. These findings certainly seem to support the strategy of using the first year examinations as a selection device in Medicine for second and later year entry.

The performance of first year repeat students was also investigated by Hogben (1965) in an attempt to solve the problem that such students present for the selection committee. The decision which faces such a committee is to decide in what rank order to place students who pass first year at the first attempt, compared with those who have had to repeat first year. That is, is a repeat student who obtains, say, two "B" level passes at his second attempt at first year a better prospect for second year than a student who obtains only "C" level passes in first year but requires only one year to achieve this standard? Hogben found that the first year pass rate of students who repeated the year was only 59%, compared with a pass rate of 69% for students sitting for the first year examinations for the first time. Furthermore, the second year pass rate of students who had repeated first year was only 67%, compared with 83% for those who did not require a repeat year. It would appear, then, that a student who passes first year at the first attempt is a better second year prospect than a first year repeat student, irrespective of the quality of that student's second set of first year results.

Hogben's results were supported recently in another rigorous investigation by Loftus (1973) of the examination performance of students at another university. The correlation between first year Arts results and final degree performance in Arts was high and positive (0.71), indicating that students who do well in their first year tend to perform similarly in their graduating year. Although this relationship was partly due to the effects of withdrawal of some of the failing students there was still a strong relationship when this factor was eliminated from the analysis. Of

those students who obtained all Honours passes in their first year (N = 13), 85% went on to graduate in minimum time. From 51 students with a mixture of Honours and Ordinary passes in their first year, 89% completed their degree in minimum time. This percentage dropped to 69% in the case of students who only obtained pass grades in their first year. Notably, and in complete agreement with Hogben's findings, there is a clear discrepancy between the results of students who obtain passes or higher grades in their first year and those who experience any failure. In the latter group only 30% went on to graduate in minimum time, although another 17% graduate if given another year. Similar relationships were demonstrated for Economics and Commerce students and for Science students.

For Australian universities then, it would appear that the first year examinations are the chief selecting agency for academic success in later years. The present investigation extends the scope of the previous studies on the topic in that it incorporates a much larger student population drawn from three separate institutions and also introduces controls which were not previously applied in other studies.

Method

Subjects:

The study group consisted of all the students who matriculated for tertiary entry at the 1970 South Australian Matriculation Examination and enrolled full-time in 1971 for courses at the University of Adelaide and the Adelaide and Salisbury Colleges of Advanced Education. Table 1 indicates the composition of the study group.

Table 1

The Study Group: Numbers of Students in Selected Courses at the University of Adelaide and Adelaide and Salisbury C.A.E.s (Full-time 1971 entrants)

Course	Number of Students		
	Males	Females	Total
Arts	91	142	233
Agricultural Science	41	4	45
Architecture	34	3	37
Dentistry[1]	14	3	17
Economics	69	10	79
Engineering	136	2	138
Law	47	23	70
Medicine[1]	23	6	29
Music[1]	4	8	12
Science	234	82	316
Diploma of Teaching (Adelaide C.A.E.)	29	27	56
Diploma of Teaching (Salisbury C.A.E.)	79	155	234
	902	465	1367

[1] Eliminated from the analysis because numbers too small.

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Table 3

Data Collection and Procedure:
Examination results were obtained over three consecutive years of a course. The academic performance criterion used was the average of the examination marks (percentages) obtained in each year of the course.

First year results were related to performance in the later years of a course and then combined with matriculation score in an attempt to derive optimally-predictive combinations of variables. Controls were introduced for the effects of sex of student upon academic achievement.

Results and Discussion
(a) First Year Performance as Related to Second Year.
For all the faculties studied, with the exception of Adelaide C.A.E., the correlations between first and second year performance were much higher than between matriculation and second year performance (Table 2). The highest correlation between first and second year results was for the Engineering Faculty (0.70), suggesting a large degree of similarity in the skills and knowledge required in the first two years of that course.

Table 2

Correlation of First Year Results with Second and with Third Year Examination Performance[1]

	Correlation Coefficient[2]		
Course	First and Second Year	First and Third Year	Second and Third Year
Arts	.59***	.22**	.29***
Agricultural Science	.48**	—.10	—.01
Architecture	.65**	—.38	—.11
Economics	.53***	.40	.12
Engineering	.70***	—.21	—.11
Law	.59***	.12	.14
Science	.68***	.06	.13
Diploma of Teaching (Adelaide C.A.E.)	.50**	n.a.	n.a.
Diploma of Teaching (Salisbury C.A.E.)	n.a.	n.a.	n.a.

[1] Males and females combined
[2] Pearson Correlation Coefficient
Statistical significance levels: .1% *** / 1% ** / 10% *
n.a. Analysis not conducted because of small numbers

As the above correlational analysis did not discriminate between males and females a more detailed analysis was performed for each sex, employing multiple regression, in which first year results were combined with matriculation to determine whether any improvement in prediction could be obtained over that provided by the use of first year results alone. Table 3 contains the multiple correlation coefficients which were generated this way.

Considering male and female students separately then, the results altered to some extent. The highest multiple correlation between first and second year performance was for male Architectural students (0.76) and most of the other correlations were reasonably high at 0.50 to 0.60. The coefficients differ for males and females from one course to another and from one institution to another. These differences reflect differences in first year performance between the sexes, females generally obtaining higher grades (t-test for significance of a difference between sample means), the only

exception being Adelaide C.A.E. students. For each faculty and for both sexes, first year performance correlated more highly with second year results than with matriculation.

The purpose of the remainder of the analysis was to combine first year marks with matriculation score and test predictive efficiency. In not one case did the addition of matriculation to first year results improve prediction significantly over that obtained by the use of first year results alone (Table 3). Admittedly, it would be unlikely that matriculation could provide an independent contribution toward the prediction of later year performance when it is combined with a variable with which it is already correlated at a level of about 0.50. In addition, matriculation bears almost no relationship to performance beyond first year so its contribution could only be minimal.

(b) First Year Performance as Related to Third Year.
At third year level, for all of the courses studied, first year achievement is of little value in prediction, although it is generally still better than matriculation (Table 2). The highest correlation between first and

Table 3

Multiple Correlation Coefficients for the Prediction of Second Year Examination Results from First Year Performance

	Multiple Correlation Coefficient[a]		
Course	First and Second Year	Matriculation and Second Year	First Year + Matric. and Second Year
Arts:			
Males	.69*	.48*	.69*
Females	.50*	.40*	.50*
Agricultural Science:			
Males	.46	.32	.43
Females	n.a.	n.a.	n.a.
Architecture:			
Males	.76*	.39	.76*
Females	n.a.	n.a.	n.a.
Economics:			
Males	.50*	.29	.50*
Females	n.a.	n.a.	n.a.
Engineering:			
Males	.68*	.42*	.68
Females	n.a.	n.a.	n.a.
Law:			
Males	.55*	.21	.55*
Females	.66*	.56*	.66*
Science:			
Males	.70*	.53*	.70*
Females	.56*	.49*	.56*
Diploma of Teaching: (Adelaide C.A.E.)			
Males	.15	.21	.27
Females	.78*	.82*	.82*
Diploma of Teaching: (Salisbury C.A.E.)			
Males	.47*	.51*	.58*
Females	.65*	.62*	.74*

* Statistically significant at a level of 10% or better
n.a. Analysis not conducted because of small numbers

third year results was for the Faculty of Economics (0.40), although this failed to reach significance. When second year results were correlated with third year performance the situation was no better.

When male and female students were considered separately in a regression analysis the improvement in prediction obtained was minimal. Only two coefficients, female Arts students and males doing Architecture, reached statistical significance and only the latter was sufficiently high for useful prediction. (Table 4)

When matriculation was added to first year results in order to predict third year achievement, in only one case was a significant result obtained (Arts females) but the magnitude of the correlation coefficient was too small to be of much predictive value.

Conclusion
Initial selection for tertiary entry is best made on the basis of academic merit as indicated by secondary school achievement (Otto, 1976) and this practice is widely followed. Once students have commenced studies, prior academic achievement in the form of first year results is still the best indicator of future academic performance, in that students who perform badly in their first year are very likely to have difficulties with the more advanced work and at best will require more time to complete their course than other students.

Current policies which require students in some university faculties to perform to a certain standard before they can continue with their course appear to be justified on empirical grounds and seem to apply

Table 4

Multiple Correlation Coefficients for the Prediction of Third Year Examination Results from First Year Performance

Course	Multiple Correlation Coefficient®		
	First and Third Year	Matriculation and Third Year	First Year + Matric. and Third Year
Arts:			
Males	.24	.21	.25
Females	.23*	.22*	.26*
Agricultural Science:			
Males	.20	.27	.30
Females	n.a.	n.a.	n.a.
Architecture:			
Males	.56*	.42	.56
Females	n.a.	n.a.	n.a.
Economics:			
Males	.33	.17	.35
Females	n.a.	n.a.	n.a.
Engineering:			
Males	.13	.26	.13
Females	n.a.	n.a.	n.a.
Law:			
Males	n.a.	.30	.32
Females	.33	.56*	.55*
Science:			
Males	.01	.04	.05
Females	.21	.06	.23
Diploma of Teaching: (Adelaide C.A.E.)			
Males	n.a.	n.a.	n.a.
Females	n.a.	n.a.	n.a.
Diploma of Teaching: (Salisbury C.A.E.)			
Males	.03	.13	.14
Females	n.a.	.10	.10

*Statistically significant at a level of 10% or better
n.a. Analysis not conducted because of small numbers

equally well to college student populations. The single modification to such selection strategies which is suggested by this study is that the achievement of male and female students ought to be evaluated separately according to the course of study, rather than applying the same standards to each sex.

REFERENCES:
Hogben, D. "The prediction of academic success in relation to student selection in Medicine at the University of Western Australia". *Australian Journal of Higher Education*, (1965), 2,2,152-160.
Loftus, A. P. T., et.al. *Prediction and Performance of the 1968 Full-time Intake of Higher School Certificate Students in Arts, Economics, and Science at the University of Newcastle.* University of Newcastle Counselling Service. 1973
Otto, E. P. "A discussion of the theoretical and practical issues involved in selection for tertiary entrance". *The Australian University* (in print).
Sanders, C. "Factors and research problems in the success and failure of University students". *The Educand*, (1958), 3,2,212-219.

WASTAGE AMONG SUCCESSFUL STUDENTS AT THE UNIVERSITY OF NEW SOUTH WALES: 1974-1975

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There seems little doubt that the heavy demand for the relatively limited number of tertiary places during the Fifties and Sixties restricted the chances of entry for undecided, unfinancial, or uncommitted applicants. Now, in the mid-Seventies, the greater accessibility of post-secondary education resulting from the establishment of a large CAE system, university expansion, and the more recent abolition of fees, has opened the door of higher education to many who would not have considered it an alternative to employment.

On the other hand, with the growing interdependence of higher education and a wide range of vocations, the life choices which students see as open to them are rapidly multiplying. Increasing numbers of students no longer see initial enrolment as committing them to completing their course of study: alternatives, which may become preferable, are known to exist. Thus there is now a significant, and perhaps a growing, number of students who fulfil the requirements and pass the examinations for one or more years of their course but who do not re-enrol to complete their degrees.

The principal aims of the project[1] reported upon here were to identify this group at a large vocationally-oriented university and to discover the motives which prompted the decision not to re-enrol. The Registrar supplied a list of all students not re-enrolling in 1975, from which graduates, and those students excluded or given leave of absence, had been stricken. Open-ended questionnaires[2] were then sent to them. Only 335 students, of the 1216 names given us, responded to the questionnaire, of which 204 fell within the survey's area of interest, the remainder either abandoning their course during term, re-enrolling, graduating, or giving insufficient information to allow one to place them anywhere. The responses of 16.75% of those on the original list placed them within the terms of reference of the survey, 10.75% made invalid responses, and 72.5% did not reply.

Respondents were asked to give in as much detail as they wished their reasons for not re-enrolling and to indicate the one over-riding factor which led to their decision. Content analysis of these replies revealed three major aspects of motivation:

I. The effect of the course, degree, School or University on them as individuals: n = 115. (57%)
II. The pressure imposed by employment or distance from the University: n = 44 (21%)
III. Change in personal and family situation since commencing at University: n = 45. (22%)

Each of these will now be considered in more detail.

I. Disillusionment With The University Experience
These comments come from students who tried the University, investigated its worth for them, and found it wanting. They divide easily in five specific areas:

Disillusionment due to:	No. of Students
— incompatibility of course with student's own life-style	38
— student's expectations of the course not met	33
— student's educational needs not met	15
— physical and emotional environment of the University	16
— specific teaching methods and academic conduct	13
Total:	115

Incompatibility — These students mentioned a changed personal orientation and a newly-developed questioning attitude towards the value of an academic course and toward the worth of a degree. In addition, some students referred to changes in their values which they felt were incompatible with university study:

> My whole outlook on life has changed from a material and status satisfaction attained through a Uni. degree to a much simpler and humbler life living off the land. Up until the time I left Uni. I had not seriously thought what I intended doing with my life but had just followed the traditional societal guidelines . . . I guess I'm just a "dropout" of the academic professional career-type system and very, very glad that I dropped out.
>
> Surveying, Year 2

This dissatisfaction was, according to some respondents, produced by the University community. These students — especially those of mature age and others who felt themselves "different" from what they regarded as the average — were most vocal in presenting their fellow undergraduates as cliquish and reserved, their academic instructors as cold and

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