

The Tertiary Entrance Rank – an Endangered Species?

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1. Introduction

The Universities Admission Index (UAI) and controversy seem to be inexorably linked, and each year brings its own story. This is not surprising as the UAI is the index that NSW universities use to rank the majority of school leaver applicants for most courses. In this regard, NSW universities are no different from their interstate counterparts. While interviews, portfolios, principals' recommendations and special tests are used where appropriate, a Tertiary Entrance Rank (TER) has a dominant role in university admission of school leavers in Australia.

This paper examines its role and the likelihood of its survival into the 21st century.

2. Background – the first 150 years.

Since the establishment of the first university in Australia admission has been based on achievement in the final year of secondary schooling for most school leavers. The actual practice changed little from the 1850s to the 1960s at which time quotas were introduced.

Admission to any university course was open to students who matriculated and who could afford the university fees (Gale, 1999). Matriculation required a "pass" in a specified number of subjects that included English. Subjects included in the matriculation basket were deemed to have sufficient cognitive demand to provide a suitable preparation for future university study, and which could normally be studied further at university. A subject "pass" was defined in terms of the standard required for study of a comparable subject at university.

Underlying this practice were the assumptions that a broad education was the most appropriate background for students entering university, there were clear linkages between matriculation subjects and university courses, and it was possible to define matriculation standards in terms of likely success at university level.

One can see the genesis of a standards referenced HSC in this approach to examining and reporting.

Despite the longevity of matriculation as the dominant means of admission and the rather modern approach to assessment, university admission practices and the examination system were not free from criticism. One hundred years ago Anderson, professor of Philosophy at the University of Sydney spoke in terms of the “dead hand of the universities on the secondary curriculum”. Half a century later Connell (1961, pp73-74) asked whether it was time to inquire whether the “educational system had become an auxiliary to the examination system instead of the examination system acting as an adjunct and servant to the secondary education program”. Concerns were also evident about standards – in 1950 the Matriculation Committee of the University of Sydney asserted that a pass in English did not ensure a suitable level of literacy for first year university students.

The introduction of quotas in the 1960s changed the landscape (Pascoe, 1999). Because of unmet student demand, a two-step process was introduced whereby applicants who had matriculated were ranked using an aggregate of marks in matriculation subjects. This practice continued for several years at some universities, but by the 1970s the first step, that of determining matriculation status, had disappeared.

The use of a selection index such as the TER has been criticised severely for its alleged effect on the subjects students choose to study at school, and the course they choose to study at university (Pascoe, McClelland & McGaw, 1997). Students, it is alleged, study subjects that will yield a high TER, irrespective of the suitability of those subjects for their future careers. The perception is that rote learning is encouraged in order to gain high marks, and there is little emphasis on developing independent learners. At university level there is some concern that the quality and prestige of university courses are determined largely by their published TER cut-offs, leading to students selecting university courses on the basis of their TERs; what Pascoe et al (1997) describe as a “siphoning effect on each cohort of matriculating students, taking the most talented into a narrow range of traditional professions when the national interest would be better served otherwise.”(p xiii)

While it is easy to dismiss such criticisms as being uninformed, modifications to the structure of the NSW Higher School Certificate Examination in the period from 1967

to 1990 were strongly influenced by shifts in enrolment patterns in years 11 and 12, shifts caused by student perceptions about the TER. From 1967 to 1975 the perception was that the curriculum structure advantaged students attempting the highest levels in subjects. Following changes in 1976, the perception was that the new structure favoured students taking the lower levels, except for the highest level Mathematics course. It was little wonder that assessment was seen to be the “tail that wagged the educational dog”.

Throughout this period, however, despite the increasing retention rate, HSC examined courses were generally academic in nature and all were used in the calculations of the TER (Gale, 1999).

Despite the criticism, the TER continues to dominate university admission procedures in most Australian universities for the majority of school leavers. This raises two questions:

1. Why has it survived?
2. In the context of changes that have occurred in the last decade is it, or should it be, an endangered species?

3. The past decade

The 1990s saw the landscape change again with a widening in both the number and nature of HSC courses offered, which resulted from the increase in retention rates during the eighties and the obvious need for curriculum reform. The growth of outcomes based curricula during this time also led to changes to HSC syllabuses, examining and reporting practices.

A parallel development was the growth of competency based education and assessment in the training sector (National Training Board, 1991) and the identification of a set of generic competencies (Mayer, 1992) that school leavers should be able to demonstrate. The end of the decade also saw the identification of a set of generic skills that university graduates should possess (), and support for the inclusion of these competencies in all university courses.

With VET courses based on training modules being offered as part of the senior school curriculum, two forms of assessment are now used for school courses – ungraded assessment for VET courses and graded assessment for other courses.

The 1990s saw a change in the level of demand for university places leading to a change in the concept of admission. Student demand for courses such as Medicine and Law increased, whereas the demand for some generalist courses decreased dramatically. Consequently, for courses where there is unmet student demand admission relies on formal selection, choosing the best applicants from those deemed qualified. In contrast, for courses with low demand, some universities are actively recruiting students rather than selecting out unsuitable applicants (Pascoe et al, 1997).

Because of the altered landscape, university admission procedures have again been in the spotlight. Debate has centred on the place of a TER and the subjects that should be included in its calculation, in particular the place of VET courses. The decade has also seen an increase in the number and diversity of admission procedures, some of which use additional measures to supplement the TER while others ignore the TER entirely.

In addition to the focus on admission procedures, the 1990s saw a renewed interest in the transition from school to university, with a focus on non academic factors that contribute to persistence and success in university study. Evans (2001) provides a useful review of published research, especially in Australia, and a summary of the relevant factors. Her work complements the large amount of US research in this area (Willingham & Brerland, 1980; Willingham, 1985; Willingham, Lewis, Morgan & Ramist,1990).

The challenge to the university sector then is, given the diverse range of courses now available to school students, how they can sustain a general selection index based on the senior secondary school curriculum. Indeed, some critics would argue that the real challenge is not how to sustain a TER, but to find a suitable replacement or replacements.

4. Why has the TER survived?

The TER has survived because, even in the view of some of its critics (eg Pascoe et al, 1997), it is efficient, transparent and has considerable predictive power for university success especially in first year studies.

There is no argument about the first two attributes. A TER provides a ranking of applicants that allows the selection process to be completed without human intervention. Although many would claim that the method of calculating a TER is arcane and incomprehensible, the process itself is clear.

Although a meta-analysis of prediction studies is difficult because of the lack of comparability of the applicant pool and outcome measures, there is general agreement (Dobson, 1999) that a TER does predict first year performance reasonably well. When allowance is made for truncation of the TER, approximately 50-60% of the variability in first year performance as assessed by GPA can be explained by variability in the TER (Cooney, 1974, 1975). The predictive validity varies across different areas with, not surprisingly, highest validity in science-based faculties because of the continuity of content between final year at school and first year university.

When the predictive validity of a TER is compared to that of ability tests such as the ASAT, research, both local and overseas (Everett & Robin, 1991; Manning, Killen & Taylor, 1992; Willingham, 1985; Willingham et al, 1990), has shown that an achievement measure based on the last year of schooling is the best single predictor of subsequent success at tertiary study. While Australian studies can be criticised to some extent because of the relative utility of ASAT compared to the that of the HSC, the Australian and US research findings are consistent. A meta-analysis of US research (Willingham et al, 1990) concludes that a combination of ability and achievement measures provide the best predictor.

A reason for such findings can be found in the achievement motivation literature (eg Pintrich (1986), which shows that achievement is a function of personal attributes apart from ability: motivation, utility, cognitive and meta-cognitive factors and effort. It is likely that non-academic attributes that influence achievement in the final years of secondary schooling are similar to those that affect subsequent achievement at university. This has support from Australian research on transition (Evans, 2001).

Despite these positive findings, the TER been criticised because of its alleged effects at both school and university levels. These have been described in section 2. There is not the time to discuss these criticisms in depth in this paper. It suffices to note that where there is unmet student demand, the selection process of itself will have an effect on student strategies, irrespective of the actual method of selection. Evidence

for this assertion can be seen in the growth of coaching of students sitting for entrance examinations for selective high schools in New South Wales, and in the US experience where university admission is based in part on the Scholastic Aptitude Test (Willingham, 1990).

There is, however, an obvious concern in parts of the university sector that use of a purely academic measure is limiting the breadth of successful applicants and, in some areas, yielding students who do not possess desired characteristics. Perhaps the most publicised area is Medicine, where criticisms have been made about the inability of medical students to “communicate” (University of New South Wales, 2001). This has led to the widening of the selection process in several universities (Newcastle, Flinders) to introduce a multi-step procedure that includes psychometric test and an interview to assess personal attributes apart from academic performance. A discussion paper from the University of New South Wales (2001) has made similar recommendations for that university.

Another criticism is that the TER, being a single index, cannot be equally valid for a range of university courses so different indices should be used for different courses. There is data to suggest that, while the predictive validity of the TER varies, it is as high as that of specialist selection indices. This issue will be discussed in the following section.

6. One TER or many?

Underlying the TER is the assumption that a single measure of general academic performance can be derived from school marks, which is predictive of success in university study. Essentially this assumes a one factor model for the courses available in the final year of secondary schooling.

Examination of the content of HSC courses suggests that the assumption of unidimensionality is likely to be untenable. Empirical testing of the dimensionality of HSC courses is, however, difficult because of the large amount of missing data in the correlation matrix. Early research (Cooney, 1976) showed that a two factor model (Verbal/Quantitative) was appropriate for the major HSC subjects and that one factor accounted for approximately 60% of the variance. Subjects excluded from the analysis included those with performance components (eg Music, Visual Art) because of missing data, but correlations indicate that these subjects are not likely to

load significantly on either factor. The current structure will obviously be more complicated following the introduction of VET courses.

Despite the evidence for a multi-dimensional structure for the HSC (Cooksey, 1993, Cooney, 1976), all states use a TER based on an aggregate of scaled marks. The number of courses on which the aggregate is based and the scaling procedure differ across the states. In four states (New South Wales, Victoria, Western Australia, South Australia) the scaling procedure assumes that if all courses had a common candidature the mark distributions would be the same, or at least the first two moments would be identical. Queensland and the ACT use an external moderator, and Tasmania uses item response theory to estimate the scaled course marks. With the exception of the ACT, all TERs are based on an unweighted sum of scaled marks, which makes the additional assumption that each course is uniformly correlated with the total score. This can be said to advantage students taking sets of courses which are highly intercorrelated because of the increased variance of the aggregates. ACT uses the first principal component to calculate the aggregate, which takes into account the intercorrelations between the components.

Despite the apparently attractiveness of having different TERs for different university courses, there is little empirical evidence that their predictive validity is higher than that of a general TER. Early research (Cooney, 1975) showed that a Mathematics/Science aggregate did not improve prediction of success in first year studies for Science and Medicine faculties, nor did a Humanities aggregate improve prediction in an Arts faculty. These findings have been supported by more recent research (Manning et al, 1992).

A possible reason for these apparently counterintuitive findings may be the choice available to students. Although several states specify that certain courses be included in the aggregate, there is still considerable choice for students. It follows, then, that two students with the same TER can have completed very different sets of courses that reflect their academic strengths and their future career aspirations. If choice of university course, all other factors being equal, is determined by the match between their demonstrated knowledge and skills and those required by various university courses, applicants for a particular course will have their TERs based on similar academic attributes. This, of course, presupposes a rational approach towards course selection.

The argument being made here is that a TER is in a sense multidimensional, and must be interpreted in terms of both rank and course pattern. It will have greatest predictive validity when there is congruence between the outcomes a student achieves and the knowledge and skills required of the chosen university course. This has implications for universities – they need to identify the academic attributes necessary for their courses, and make them known to school students. To do this a curriculum mapping is required. Specifying a set of pre-requisites is a start but these are usually minimalist.

7. What type of TER?

If a single TER is to be used, should it be curriculum based as at present, or are there other options? Use of an ability measure has been discussed in an earlier section – the conclusion was that it may not encompass non-academic attributes relevant to university study, nor does it necessarily ensure that applicants have demonstrated the necessary pre-requisite knowledge and skills.

For core skills tests to be effective, there must be a match between what is assessed and what is deemed necessary for university study. Where developed, core skills have been derived from the senior secondary curriculum itself, but these have not yet been linked to university study. Because of the way the core skills have been identified, the core skills test is necessarily broad in scope and is likely to have less predictive validity than the current TER. For reasons advanced above, it is unlikely that such a test would avoid the criticisms made of the current TER.

If a curriculum based TER is accepted as a useful predictor then one can ask what type of course should be included in the aggregate. From what has been said above, it is clear that graded assessment is necessary as TER is a rank, the course must have sufficient cognitive demand and must have something in common with other courses included in the TER calculations. This raises questions about VET and performance based courses.

As noted previously, as VET courses are based on training modules, competency based assessment is used. Current research by Griffin (Griffin, 2000) may solve the problem of reliable, graded assessment for VET courses. The question of suitability of the content remains.

Subjects with a large performance component present a challenge, not only for TER calculations, but also for the reporting of achievement in the subjects themselves. The lack of correlation of these subjects with other HSC courses reflects the lack of correlation between the performance and non-performance components within the subjects themselves. From a measurement perspective the optimum solution would be to report two separate grades, one for each component.

Since university admission practices for comparable courses (Art, Music, Design, Performance) are based largely on a portfolio which generally includes the major work/performance as a component, an argument can be made for only the non-performance mark to be included in the calculation of the TER. This would have obvious implications for subject choice as school level and may lead to a reduction in the enrolments in these subjects.

There are no easy solutions.

7. Alternative admission procedures

It is not the purpose of this paper to discuss the diverse range of alternate admission practices (Pascoe, 1999; Rosenman, 1996), but to focus on two classes of multi-stage procedures.

Multi-stage admission practices fall into two classes according to purpose, but each type contains a series of sieves. The first type includes a mix of psychometric tests, portfolios and interviews in addition to the TER. This type arises from a concern that the attributes measured by the TER are too narrow for a particular course of study – that there are non-academic attributes that are either desirable or required. The purpose of the additional measures is to provide information about these attributes. Examples of these admission practices can be found in Medicine, Music, Dram, Art and Design.

The second type arises from a concern about the predictability of the TER near the cut-off. It is asserted that, while students with a high TER have a high probability of success at university there is some doubt about applicants near the cut-off, and that predictions about university performance could be improved by looking at the applicants' profiles. The use of Field Positions in Queensland is an example of this practice. Although the practice has obvious face validity there is little empirical evidence to support the contention that prediction will be improved significantly. To

the contrast, early research (Cooney, 1976) shows that once the TER is fitted into a regression equation, marks in individual subjects do not add significantly to the prediction of subsequent success. There is a need for further research on this issue.

There are other forms of multi-stage procedures that could be formulated but space does not permit discussion of these. Of the two discussed above, the first is perhaps more defensible but is more labour intensive and may not be practicable for large university courses.

8. Conclusion

In the foreword to a study commissioned by the Higher Education Council on selection methods (Pascoe, 1997) Stanley writes that “successful participation opens educational and vocational opportunities not readily available through other paths, the methods used for selecting students for entry to university need to be sound and fair”.

It is clear that if universities are to take Stanley’s comment seriously, there are challenging times ahead. This paper has not offered any easy solutions but has attempted to show that while the TER may be an endangered species, it has still much to offer university admission practices. As Mark Twain was reputed to have said “The report of my death is exaggerated”.

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