

## UAI 2001 *a special report*

Inside this issue there is a report on the UAI 2001 prepared by Professor George Cooney, Chair, Technical Committee on Scaling.

A full report on the UAI 2001 will be circulated to schools during term 1, and additional material will be published through the *UAC News* and placed on the UAC web site.

Visit [www.uac.edu.au/admin/2001uai.html](http://www.uac.edu.au/admin/2001uai.html) to access media releases, articles and the preliminary technical report on UAI 2001.

## For your *information*

### ► Reference copies - UAC 2002 Guide

Boxes of Guides from last year are available to schools to use as class sets or reference copies. Each box contains 20 Guides (max. of 3 boxes per school). Call (02) 9330 7200 to reserve your copies.

The boxes can be collected from UAC's office until **22 March 2002** at 3 Rawson Street, Auburn at no charge, or sent to you for \$22 per box (incl GST) - send a cheque or money order or pay by credit card over the telephone.

### ► UAI cut-offs for 2002 admissions

You can view and download copies of the UAI cut-offs used for the Main and Late Round of offers from UAC's web site. Look under '2002 UAI cut-offs' on the home page or under 'Course search'.

### ► Offer lists

Enclosed with this issue of *UAC News* are offer lists for each NSW and ACT school. The list shows the names of 2001 Year 12 students from the school who received an offer through UAC to study at a NSW or ACT university in 2002.

The names of students who have requested UAC not to release their details are not included on the list.

### ► 2002 Mid-year admissions

UAC will be accepting applications for mid-year admissions in April 2002.

The *2002 Mid-year Admissions Supplement*, which contains details of all the courses being offered and an application form, will be available from UAC in April. The UAC web site will also contain mid-year admission information at that time.

Although not relevant to current Year 12 students, it is important that careers advisers are aware of mid-year admissions as they keep in touch with ex-students and other people in the community who may be interested in applying.

### ► UAC key dates for 2002

early August	Applications for 2002 Year 12 students open
27 September	On-time applications close
31 October	Closing date for late applications with \$77 late fee
29 November	Closing date for late applications with \$88 late fee

The final closing date for late applications, the release of the 2002 UAI, closing dates for changes of preference and the dates for offer rounds will be confirmed in the next issue of *UAC News*.

### ► Coming up...

In our next issue in April 2002 we'll be asking you to order copies of the *University Entry Requirements 2005 Year 10 Booklet*. The Booklets cost \$3.30 each and will be distributed to schools at the end of May 2002.

*The Report on the Scaling of the 2001 NSW HSC* is planned to be sent to schools during term 1.

## UAC is on the move to *Homebush Bay*

From 25 March 2002, the Universities Admissions Centre (NSW & ACT) Pty Ltd will be located at our new premises in Homebush Bay.

Listed below are our new contact details. Please amend your records accordingly, and pass this information onto the relevant people in your school/organisation.

We have also included a flyer for your school noticeboard with this issue of *UAC News*.

Location: Quad 2, Australia Centre  
8 Parkview Drive  
Homebush Bay NSW

Postal address: Locked Bag 112  
Silverwater NSW 2128

Telephone no: (02) 9752 0200

Web site: [www.uac.edu.au](http://www.uac.edu.au)

## UAC STATISTICS FOR 2002 ADMISSIONS

Applications totalled more than 76 000 with more than 37 000 from NSW Year 12 students and more than 2 000 from ACT Year 12 students.

Almost 34 000 applications were received from non-current Year 12 applicants and more than 3 000 from interstate.

A total of 60 873 offers were made.

## A copy for the:

- Principal
- Careers Adviser
- Year 12 Adviser
- Curriculum Adviser

# UAI 2001

by Professor George Cooney,  
Chair, Technical Committee on Scaling

## Introduction

As the Universities Admission Index (UAI) is the index that universities use to rank school leaver applicants for most courses it is not surprising that it is the focus of attention from students, teachers and parents alike. It is also not surprising that students will adopt strategies which they perceive will maximize their UAIs. The main reason for the continued controversy about the UAI and its predecessors has not to do with the index itself but with the inability of universities to provide places in certain courses. While there are more applicants who regard themselves as being qualified for certain courses than available places, there will be stress associated with the selection measure whatever form it takes.

Much of the debate about scaling is not about reality but about perception, and urban myths abound. At different times the scaling procedures have been criticised for encouraging students to take "harder" subjects, encouraging students to take "easier" subjects, favouring humanities, being biased towards the sciences, favouring boys, and now discriminating against boys. The data from 2001 do not support these perceptions.

The HSC presents a profile of student achievement across a very broad range of subjects, including both academic and vocational, and achievement is described against standards. The standards for a course are based on the syllabus outcomes and range of skills examined in that course, and represent the range of achievement that could be expected in that course. It follows that HSC marks in different courses cannot be compared, and that the percentages of students in the performance bands will differ across courses.

On the other hand the UAI is an index used for ranking school leaver applicants for tertiary places so focuses on a narrower range of courses, those that are considered relevant for university study. As communication skills are fundamental, English is included, and a limit is placed on the number of vocational courses that can be included. The UAI does not attempt to "summarise 13 years of schooling into a single score", that is left to the profile of HSC marks. It is a single number simply because it is a rank.

The UAI is based on an aggregate of scaled marks, and indicates the rank of a student relative to their age group. Each UAI corresponds to a range of marks - the students who received a UAI of 100 had aggregates spread across a 14 mark range. They did not have to gain a "perfect score" of 500.

The scaling process takes the raw marks provided by the Board of Studies and estimates what the marks would have been if all courses

had been studied by all students. The scaling algorithm is designed to encourage students to take the courses for which they are best suited, and which best prepare them for their future studies. The principle underlying the algorithm is that a student should neither be advantaged nor disadvantaged by choosing one HSC course over another.

UAIs are calculated on behalf of the universities in NSW by the Technical Committee on Scaling - a committee set up by the NSW Vice-Chancellor's Conference.

The conditions under which the universities receive HSC data from the NSW Board of Studies require that UAIs are confidential and released by the Universities Admissions Centre (UAC) only to students who have requested a UAI and universities. UAIs cannot be provided to the Board of Studies or to individual schools.

## UAI 2001 - an overview

A total of 61,716 students completed at least one HSC course in 2001; 58,242 received an HSC and 49,784 a UAI. Of those who received UAIs 53.1% were females, no different from the percentage in 2000.

Sixteen percent of students received a UAI of 90 or above, 31% of 80 or above, 45% of 70 or above, 58% of 60 or above, and 69% of 50 or above (Table 1). These figures are the same as for 2000.

**Table 1: Percentage of students receiving specific UAIs and above in 2000 and 2001**

UAI	2000	2001
99.00	2	2
95.00	8	8
90.00	16	16
80.00	31	31
70.00	45	45
60.00	58	58
50.00	69	69

Twenty two students received a UAI of 100, 15 males and 7 females, of whom 12 came from government schools and 10 from independent schools. In 2000 an equal number of males and females gained a UAI of 100. While these students completed a wide range of courses, 14 included both Extension 2 Mathematics and Extension 1 English.

There were very few courses where no student gained a UAI higher than 95, and in the vast majority of courses at least one student gained a UAI of 99 or above. This is similar to results from previous years.

Data from a number of schools, independent and government, have been analysed. The

patterns of UAIs based on the HSC 2001 did not differ from patterns of UAIs gained in the two previous years.

A table showing the distributions of scaled marks, together with some explanatory material, is available on the UAC web site, at [uac.edu.au](http://uac.edu.au). Look under '2001 Year 12 UAIs' on the home page.

In general it is difficult to compare the patterns of scaled marks from the 2001 HSC with those from the 2000 HSC because of the changes in curriculum structure and course enrolments. Where comparisons could be made, it was found that the scaled means for 2001 were similar to those from previous years.

## Issues

During 1999 and 2000 two criticisms were made about the way the UAI was to be calculated: the first concerned the possible effect on males because of the inclusion of two units of English, and the second was the way the maximum mark was to be set.

Since the publication of the HSC results and the release of the UAIs the criticisms have been different, focusing on the disparity between HSC marks and UAIs. The UAI Advice Notice contained, for the first time, details of which units were included in the UAI. This prompted questions as to why one course was included and not another. Specific questions were also asked about the effect of standards referenced reporting on UAIs and the scaling of English and Extension 1 Mathematics.

## Why is my UAI low when my HSC marks are high?

This was the question asked by many students at the end of 2001 when they received their HSC marks and their UAIs.

The answer to the question is simple - the method of calculating the UAIs did not change but the HSC marks students received in 2001 were different from what they would have received in previous years.

Prior to 2001 HSC marks were standardised to conform to a set distribution, irrespective of the difficulty of a course or the actual performance of students. The middle mark in most 2 unit courses was set at 60, few students were given marks greater than 90, and 25% of students received marks less than 50.

In 2001, there was a shift to outcomes-based reporting. Course marks were not constrained to a set distribution but students were judged against pre-determined standards. Students demonstrating the highest level of achievement in a 2 unit course were placed in band 6 and received a HSC mark greater than 90. On the other hand, the only students who received a

HSC mark less than 50 were those who did not demonstrate the level of achievement required for band 2. Consequently, in 2001, compared to previous years, more students received marks greater than 90 and far fewer students (less than 10%) received marks less than 50.

This impacted on the average HSC mark. For most 2 unit courses it was between 70 and 80.

Obviously many students who received these higher HSC marks in 2001 anticipated that their UAI would also be higher since they were aware of the pattern of HSC marks in earlier years. But this is not the case - if all marks in a course are increased, for example, the relative positions of individual students are not affected and position is what the UAI is all about.

The UAI is not a mark, but a number that indicates the position (or rank) of a student relative to their age cohort. Their age cohort includes not only the approximately 50,000 students who received a UAI but also those who chose not to complete year 12 or choose courses. Students who perform well enough to be placed in the middle of their HSC cohort receive a UAI of approximately 65, not the 50 that many assume.

In previous years there was some correspondence between average HSC marks and the UAI, since students who received HSC marks in the 60s (around the course average) were also in the middle of the HSC cohort (a UAI around 65). In 2001 this did not apply. To be in the middle of their HSC cohort (and obtain a UAI in the 60s) students still needed to have HSC marks around the average of their courses, but in 2001 these marks were higher, in the 70s rather than the 60s.

While the question, "Why is my UAI so low?" can be answered simply, the question itself reflects a misunderstanding about the UAI and its relationship with HSC marks. Despite all the information distributed about the UAI, many students still perceive it as a mark, and some see it as the average of their HSC marks. Neither perception is correct.

**Why were there differences in the percentage of students gaining performance band 6 and did this affect their UAIs?**

As noted in the introduction, in 2001 the Board reported marks against fixed standards. Standards for a course are based on syllabus outcomes and range of skills examined in that course, and represent the range of achievement that could be expected in that course. It follows that HSC marks in different courses cannot be compared, and that the percentages of students in the performance bands will differ across courses.

There has been considerable discussion in the media about the differences in the percentages of students gaining performance band 6 in

different courses, and speculation as to the effect of this variation on UAIs. UAIs are not, however, based on HSC marks but on raw HSC marks. [A raw HSC mark is the average of the raw mark gained in the examination and a school assessment that has been statistically moderated by raw examination marks.]

Changes in the way the Board reported HSC marks did not, therefore, affect UAIs.

**Why were the top scaled marks in some courses low?**

The scaling procedures used in 2001 were based on the assumption that the maximum Board HSC mark in most courses would be 50 (on a one unit basis), as had been the case in the past. Where the maximum Board mark was not set at 50 the maximum scaled mark was not 50.

In 2001 the Board of Studies Consultative Committee set the top mark at 50 only for those courses where the best student received full marks in the examination, which is consistent with a standards referenced method of reporting. There were few such courses. Consequently, the top scaled mark was 50 in only a small number of courses.

This issue was considered seriously during the calculation of the UAI. For each course the pattern of top marks was examined carefully and the effect on individual students was investigated. It appeared that the variation in the maximum scaled marks was consistent with that observed in the Board HSC marks. This issue will, however, be investigated thoroughly in 2002 and the scaling program modified where necessary.

In light of the variation in the top Board HSC mark, the so-called "capping" of scaled marks was not an issue.

**Were males disadvantaged by the inclusion of two units of English?**

A concern expressed by some commentators in 2001 that the inclusion of two units of English in the UAI would disadvantage males was unfounded.

Females did outperform males in the majority of courses and have a higher average UAI, but this was no different from what has been observed in previous years. Where there was a change was in the gender balance of students who gained high UAIs. While there were still more females in the top UAI groups of students, the percentage was less than in 2000 and previous years.

In 2000 57.0% of students who received UAIs of 99 and above were female; in 2001 there were 53.8%. For students who received a UAI of 95 and above the figures were 59.4% and 56.9% respectively. For students who received a UAI of 90 and above the figures were 59.2% and 58.2% respectively (Table 2).

**Table 2: Percentage of students receiving specific UAIs and above who were female in 2000 and 2001**

UAI	2000	2001
99.00	57.0	53.8
98.00	58.4	55.0
95.00	59.4	56.9
90.00	59.2	58.2
80.00	58.6	58.6
70.00	58.5	58.2
60.00	57.9	57.7
50.00	57.2	56.7
40.00	56.4	55.7
30.00	55.6	55.0

This result might be related to the increased participation of males in the high level English courses, Extension 1 and Extension 2. In 2001 32% of the Extension 1 English candidature was male, compared to 25% for the corresponding English course in 2000. Almost the same proportion, 30%, of the Extension 2 English course was male.

The percentage of females attempting the Extension courses in Mathematics was almost the same as in previous years.

**If Advanced and Standard English are scaled as a single group, why does an aligned mark of 38.5 in Standard English become a scaled mark of 38.5 while an aligned mark of 38.6 in Advanced English become a scaled mark of 32.8?**

English was scaled as a single group but Standard and Advanced were separated for purposes of reporting. Neither Advanced nor Standard students were advantaged or disadvantaged as a result of scaling. The apparent anomaly results from the fact that:

- the common scale for Standard and Advanced marks determined on the basis of raw marks differed from the common scale determined on the basis of the Board's aligned marks
- the UAI is based on raw HSC marks rather than the Board's HSC marks that are reported to students.

**In summary:**

1. Raw Standard and Advanced examination marks were placed on a common scale by statistical equating using the common 2 unit paper that all English students completed. School assessments were moderated using these raw examination marks. A raw HSC mark was then calculated as the sum of the examination mark and moderated school assessment.
2. After scaling, a raw HSC mark yielded the same scaled mark, whether from a Standard or Advanced student.

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3. The Board used judges to align the Standard and Advanced examination marks against the standards defined by the Performance Band Descriptors in English.
4. The common scale so determined for the Board's HSC marks was slightly different from that established by statistical equating: the same raw HSC mark corresponded to different Board HSC marks for Standard and Advanced students, with Advanced students receiving the higher mark.
5. Consequently, while the same raw HSC mark yielded the same scaled mark, the same was not true for the Board's HSC marks.

While Standard and Advanced marks were combined for scaling they were separated for the purposes of reporting. As neither schools nor students have knowledge of the raw marks, scaled marks had to be related to the Board's HSC marks reported to students. This led to the misapprehension that Advanced students were disadvantaged in some way by the scaling process - this was not so. Advanced students received due acknowledgment for their achievement both in relation to the UAI and the reported HSC mark.

In 2001 there was less overlap between Standard and Advanced students than between 2 unit General and 2 unit Related in the past: over half of the Advanced students performed better than the top 10% of the Standard students. The data from 2001 suggest that the Advanced candidature comprises the previous 2 unit Related students and the top 40% or so of the 2 unit General students, leaving the bottom 60% of the 2 unit General candidature and the Contemporary students enrolled in Standard.

The lack of Standard students in performance band 6 and the small proportion of Standard students in performance band 5 were entirely consistent with the performance of Standard students on the common paper. Few Standard students received high marks on the common paper and, as markers were unaware of which scripts were from Standard students and which were from Advanced students, there was no bias in the marking of this paper that favoured Advanced students.

### **How was the Mathematics Extension 1 paper scaled?**

Questions have arisen regarding the scaling of the Extension 1 Mathematics paper that is completed by both Extension 1 and Extension 2 students.

In 2001 the Board aligned the marks on this paper, treating the Extension 1 and Extension 2 students as a single group. Why were they not scaled as a single group?

In the scaling program Extension 1 and Extension 2 students are treated separately

because of the different unit values for the paper - 1 unit for the Extension 1 students and 2 units for the Extension 2 students. This is not new: the marks of 3 unit and 4 unit students have always been separated in the scaling program.

Prior to 2001 the scaled marks for the 3 unit students on the 3 unit paper were determined by:

1. Scaling the marks on the 2 unit/3 unit common paper.
2. Determining the mean scaled mark (and standard deviation) for the 3 unit students on the 2 unit/3 unit common paper - this gives the target mean scaled mark (and standard deviation) for these students on the 3 unit paper.
3. Applying a non-linear transformation, which preserves the target mean and standard deviation and which restricts the scaled marks of the 3 unit students to the range 0 to 50, to the Board's marks.

The scaled marks of the 4 unit students on the 3 unit paper were then determined by:

4. Applying the linear transformation used in step 2 above to the Board's marks of these students to calculate their target mean scaled mark (and standard deviation) on the 3 unit paper.
5. Applying the following two transformations to the Board's marks for these students:
  - a) the non-linear transformation used in step 3 above
  - b) a similar non-linear transformation but one which preserves the target mean scaled mark (and standard deviation) of the 4 unit students on the 3 unit paper.
6. Choosing the transformation that gives the higher mean for these students.

The first transformation ensures that a Board mark on the 3 unit paper yields the same scaled mark for both 3 unit and 4 unit students, but the resultant mean of the scaled marks for the 4 unit students could be different from the target scaled mean. The second transformation gives the correct scaled mean, but can disturb the relativity between the 3 unit and 4 unit students on this paper. Prior to 2001 the marks of the 4 unit students were scaled using the transformation that resulted in the higher mean for these students. In recent years this was the first transformation, 5(a), which then gave the correct target scaled mean and the correct relativity between 3 unit and 4 unit students on the 3 unit paper.

In 2001 the marks of the Extension 1 students on the Extension 1 paper were scaled as before. However, two factors combined to make the scaling of the marks of the Extension 2 students on this paper difficult. Raw marks were used and the difference between the

achievement of Extension 1 and Extension 2 students on this paper was greater than in past years. Consequently the distribution of the marks of the Extension 2 students was very different from what had been observed previously.

Application of the non-linear transformation 5(a), which had been used previously, gave a scaled mean for the Extension 2 students that was substantially lower than the target scaled mean. The second transformation, 5(b), was therefore applied. This gave the correct target scaled mean for these students, but the relativity between the Extension 1 and Extension 2 students on that paper was disturbed. Extension 2 students received slightly higher scaled marks than Extension 1 students with the same raw mark.

This issue is being addressed and the scaling program will be modified for the 2002 HSC examination to ensure that a Board mark yields the same scaled mark irrespective of whether the students are Extension 1 or Extension 2.

### **Conclusion - implications of the 2001 experience**

Each year produces its own urban myths, several of which have been discussed above. Other myths include:

- the school a student attends matters
- Extension History is not included
- the increase in university cut-offs is a result of changes to the HSC and UAI
- certain courses are always "scaled down".

These, of course, are not true.

It is obvious that teachers, students and parents need to be educated about the relationship between HSC marks and the UAI - that to achieve a middle UAI, in the 60s, they will need HSC marks in the mid to high 70s.

On the other hand, they need also to be reminded that, despite the concern expressed by many students in 2001, the advice that has been given by good teachers for years - choose what you are interested in, what you do well in, and what will provide a strong base for your future career - still applies. Students should be advised not to try to "work the system" - they are likely to get it wrong.

It is also a timely reminder of the consequences of universities having quotas in certain courses. While there are more qualified applicants who desire entry into certain courses than there are places available, there will always be stress associated with the selection measure, irrespective of whether it is the UAI or another index. Consequently there is a need for teachers and career advisers to provide clear advice to their students on work and study options. Students need to be provided with a set of flexible pathways to allow them to achieve their career aspirations. ■