

Rank Group Calculation

U-Multirank applies three distinct rank group procedure which are specific to the three kind of indicators: Quantitative ranking indicator, rating indicators (on contacts to work contact and international orientation of programmes), and student satisfaction indicators.

a) "Regular" Quantitative Indicators

Most indicators used are based on continuous measures on particular scales (e.g. the percentage out of a total; a relation A : B). For those indicators the calculation of the five different groups is referring to the median (per indicator) of the total sample.

The median is the numerical value separating the higher half of a data sample from the lower half. This means that half of the data/cases are below and half are above the median. If there are an odd number of observations the median is exactly the middle number (e.g. out of 1, 2, 2, 3, 4: the median is 2). If there is an even number of observations the median will be calculated by the mean of the two middle numbers (for example 1, 2, 3, 4 the median is $(2+3)/2 = 2.5$).

U-Multirank rank groups are defined in terms of distance of the score of an institution from the median (for a single indicator). Groups range from the best group "A" to the lowest group "E":

- Group A: If the value of the indicator is above the median plus 25 % (value > median + 25 %)
- Group B: If the value of the indicator is less than or equal to the median plus 25 % and greater than the median (median + 25 % \geq value > median)
- Group C: If the value of the indicator is less than or equal to the median and greater than the median minus 25 % (median \geq value > median - 25 %)
- Group D: If the value of the indicator is less than or equal to the median minus 25 % and above zero (median - 25 % \geq value > 0)
- Group E: If the value of the indicator is zero (value = 0).

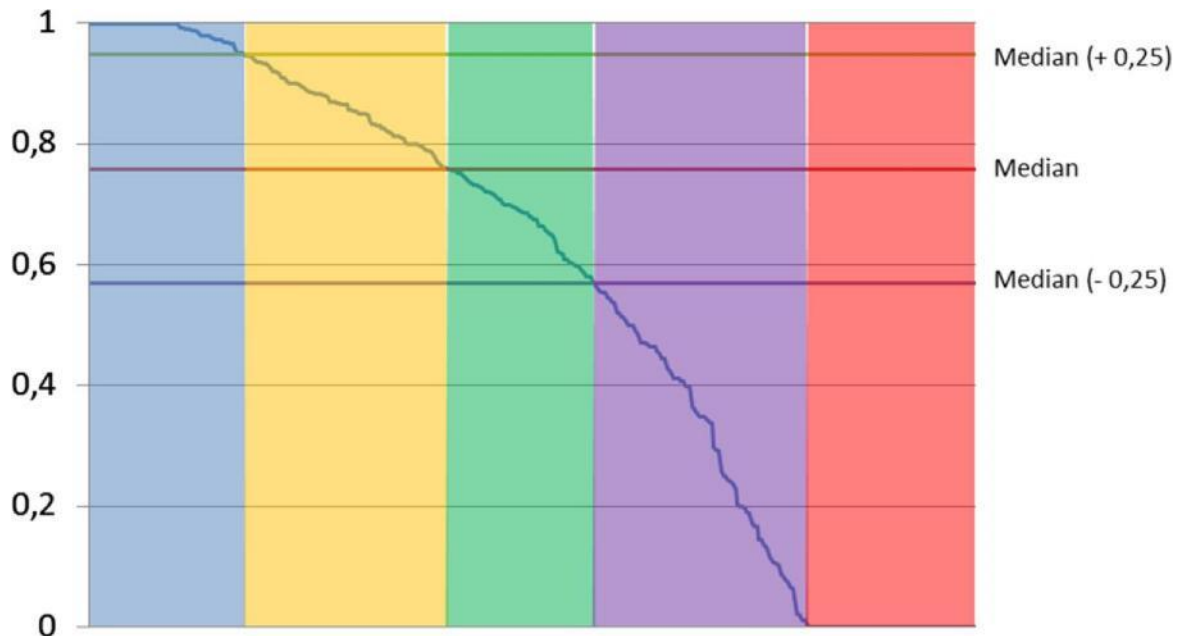
Example: The median of an indicator is 60 %.

- In group A are those with a value above 75 %
- In group B are those with a value between 60 % and 74.99 %
- In group C are those with a value between 45 % and 59.99 %
- In group D are those with a value between 0 % and 44.99 %
- In group E are those with 0 %

The fact that the scores of a number of indicators are not normal distributed causes a problem as the within group variance is very large. Therefore, we applied a method which takes into account the distribution of scores in a better way. Finally after testing and analysing various methods we decided to log normalise the scores for those indicators and apply the standard grouping method on those log normalised scores. To determine whether or not to use the log normalised scores the ratio median/mean is calculated and for all indicators that are outside the 25% bandwidth around 1 (- or + 12,5%) the log normalised score is applied. This procedure is applied for the first time in the 2016 release of U-Multirank both for institutional rankings and the six new subject rankings. In order not to modify rank groups without

changes in the underlying data in the 2014 and 2015 subject rankings, the new methodology will be applied to them when updating their data 2017 and 2018.

Figure 1: Grouping categories in U-Multirank



b) Rating Indicators

In addition we developed a few rating indicators measuring a particular aspect of performance by a multi-measure indicator. Those indicators are used where a single measure cannot adequately reflect complex aspects of performance and more complex indicators are needed. They refer to the international orientation of degree programmes and to the extend degree programmes offer contacts to the work environment to their students. In our view, for example, measuring the international orientation by the number or percentage of foreign students only does not take into account different strategies of internationalisation. Another advantage of those indicators is the fact that they can include yes/no information (e.g. about the existence of joint or dual degree programmes).

In international orientation, for example, the existence of joint degrees, student mobility (incoming and outgoing), international staff, and teaching in foreign language are taken into account. On each of those aspects a certain maximum number of points are allocated. The rank groups are defined in terms of grades of the maximum number of points. For example, the indicator "international orientation" has a maximum of 13 points. The rank groups are then 8+ points = group 1; 5 or 7 points = group 2; 3 or 4 points = group 3; 1 or 2 points = group 4 and 0 points = group 5.

The detailed rating criteria and rank group thresholds can be found in our [description](#) of those indicators.

c) Student Survey Indicators

In the student survey current students enrolled in the degree programmes included in the subject rankings rated various aspects of their teaching experience on a six point Likert scale from "very good" to "very bad" (adding a category "I do not know"). The indicators reflect the average scores per unit (field and institution) on each aspect of assessment (e.g. quality of courses, contacts to teachers, and organisation of the programme). The results for a particular university depend on the judgments of those students who actually responded; compared to the complete sample of students at a university (including the non-respondents), the results are subject to uncertainty. How well the results meet the "true" judgment and score of a department depends largely on the number of respondents and the range of their reviews.

Hence the rank group calculation takes into account not only the mean score of all assessments but also the degree of uncertainty, the number of respondents per institutions and the variance of assessments within a university. How much "trust" you may have in such an average rating is expressed statistically by a so-called confidence interval. These confidence intervals can be utilized to incorporate the uncertainty of the judgment values in the ranking calculation. Instead of fixing limits for the average judgments and then determine the top and bottom groups, the length of the corresponding confidence interval is taken into account in the grouping procedure.

If the confidence interval is completely better than the total mean of all judgements on an indicator, we consider the reviews of the respective department as "better than the average"; if it is located totally on the right side of the mean the reviews are considered to be "below average". If the confidence interval is situated in the middle of the spread of judgements in total the reviews are considered to be intermediate.

A more in depth description of the procedure is available [here](#).