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Problems in higher education teaching quality measurement

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Abstract

In world practice the idea of rating of higher education institutions has been admitted that must serve to characterize a HEI. However, in different countries the idea of rating comprises its different components and their totality makes a certain combined number, which according to its forming conceptions must numerically reflect those advantages of HEI to permit its comparison with other schools. In fact, rating is a combined complex estimation containing a number of independent parameters forming according to a certain algorithm, the qualitative estimation of a HEI. Yet this obtained estimation is seldom able to reflect the real possibility of a certain, chosen specialty for studies. Indeed, HEI and the greatest number of HEI offer not only one but a much greater number of programs for studies. HEI comprise a number of faculties and institutes with a great number of programs, which may have a different numerical estimation – the rating of a HEI. It has been suggested that a framework can be used to describe how HEI transform inputs into outputs (Astin 1993; Cave et al. 1991; Borden and Botrill 1994).

Keywords: higher education, education quality measurement

1 Introduction

Therefore one numerical estimation may reflect the quality of training for certain specialties, while for other specialties the estimation will show either reduced or increased estimation of training according to the accepted principle of counting the rating at a certain HEI. Thus only one type HEI can be compared according to rating and it is categorically impossible to compare HEI with a different number of faculties and training programs. Moreover, even in the case of identical or similar set of programs for training specialists, one and the same numerical estimation of HEI rating does not permit to compare the training for one particular specialty, because the parameters characterizing one and the same program may differ, but the similarity or closeness of rating estimation is obtained on account of other parameters included in the rating estimation. Some researchers have argued that the quality of training should be measured by learning outcomes, student attitudes, and the behaviors changed through education (Brew 1995; Elton 2001).

2 Methodological issues in evaluating quality

By estimating the potential possibilities of the HEI according to the quality of training a graduate besides the characterization of the professors' and teaching staff a number of other indicators are used when forming the HEI rating, such as the laboratories and library and also lecture-halls (the number of m² per student). A great role is played by the organization of the study process, teaching plans and programs, methodical work and the system of guiding the tuition process in general. Each of the above mentioned characterizations may be presented by the vector-parameter (R_i) and all these vectors form a multicomponent vector

$$\overline{R} = \overline{R}(\overline{R}_1, \overline{R}_2,..., \overline{R}_i,..., \overline{R}_n)\,, \qquad (1)$$

that shapes the concept of the HEI rating. Each of these vectors R_i has its own specific gravity in forming the resultant vector of the rating $\overline{R}$.

It is impossible to give a well-grounded estimation to the numerical importance of every component R_i, because of the lack of direct methods to make such measurements. To get it the method of expert estimates must be used. The qualified experts in this field form estimates for every component R_i, and later shape the common resultant vector $\overline{R}$, according to which the comparison of HEI can be made.

The formation of every estimate R_i must be realized according to the preliminary worked out criteria. For example, the range of numerical importance from min to max is determined by means of which parameter can be estimated. Each expert gives his own quantitative estimation. Next the opinions of all experts are summed up and the summary expert estimate R_i is given.

The generalized result R_i, by using the expression (1), can be presented like:

$$R = \lambda_1 R_1 + \lambda_2 R_2 + \ldots + \lambda_i R_i + \ldots + \lambda_n R_n, \qquad (2)$$

where λ_1 – is a weight ratio of the contribution R_i to the joint sum of the rating $\overline{R}$.

The expression (2) will be correct only when the regulations of standardization will be performed:

$$\sum_{i=1}^{n} \lambda_i = 1\,. \qquad (3)$$

The determination of every weight ratio is also made by the method of expert estimates. To obtain the indisputable expert estimate, the necessary number of experts must serve to secure the required precision of the estimate. Let us carry out this estimate. Let us suppose that the real meaning of the evaluated parameter is equal to x_o. Every expert gives his own estimate x_k. Let us present x_k as the sum of the real meaning x_o and the mistakes ($x_o + \Delta x_k$). Summing up all expert estimates and dividing them by the number of experts N, we will get the expert estimate $\hat{x}$:

$$\hat{x} = x_0 + \frac{\sum_{k=1}^{n} \Delta x_k}{N} . \quad (4)$$

Considering that all experts are chosen rather close as regards their qualification, in this case Δx_k may be considered a random variable with mean squared deviation that is similar to all components $\sigma_1 = \sigma_2 = \ldots = \sigma_i = \sigma_n = \sigma$.

As every expert gives an independent estimate, then in the expression (4) we will have the sum of random variables as a kind of deviation divided by the number of experts N. It is generally known that in this case the evaluating the mean squared deviation will be [5].

$$\hat{\sigma} = \frac{\sigma}{\sqrt{N}} . \quad (5)$$

By analyzing (5) it is obvious that the average estimate of the summary mistake is smaller than the mistake when estimating one expert. However, by choosing the number of experts the level of their competence must be considered. It is also essential to consider the work concerning the co-ordination of their estimates and bear in mind that the work of a highly qualified expert is a costly affair.

The above-described model concerning receiving the estimation of vector $\overline{R}$, as the HEI rating, by means of getting separate estimates of the vectors R_i, permits to draw the conclusion that they may occupy a number of uninterrupted meanings, each of them in its certain range, e.i. they may accept an infinitive number of sizes.

In practice it is preferable to divide the possible range of ratings into a number of discreet estimates (classes) and operate with the conception depending to which class, according to the rating, a certain HEI belongs.

In all the amount of the above-described parameters of the rating R_i, there are undoubtedly those that play the main role in the formation of the generalized parameter $\overline{R}$. Therefore the insignificant parameters may be discarded, but those playing the main role could be called the decisive parameters.

The approaches to the division into insignificant and decisive parameters may be different including those obtained by expert methods. One of the possible numerical approaches may be considering λ_i in (2) and quantitative meanings of the specific R_i. In the case of small λi and the quantity of R_i, being smaller than the mistake determining the estimates R_k if $\lambda_k > \lambda_i$, such components may be disregarded.

The examined approach to determining the HEI rating can be easily propagated to HEI departments and separate programs for training specialists. Fixing the rating for them according to (4) permits to draw the conclusion that various R_i, different in meaning, permit to make one and the same rating.

3 Conclusions

Thus the above mentioned declaration is confirmed about illegality of comparing HEI concerning the possibility of training specialists in a specific specialty only according to the generalized rating of the HEI. When introducing the analogical conception it is necessary to compare the ratings of programs for training specialists.

Such approach allows one to deal with the criticism, often made to league tables and rankings systems that rankings are presented as if they were calculated under conditions of certainty while this is rarely the case. Thus we deviate from the classic approach to build a composite indicator by a simple weighted summation of indicators.

Upon propagating uncertainties the HEI rank is no longer a simple number, but a distribution of values. Thus, the ranking system might be seen to lose relevance if a high fraction of HEI were to overlap with one another. In fact if a high number of HEI overlap (wide range of ranks), this casts doubts on the relative position of the HEI. In general, there is a trade-off between the level of uncertainty that is included in the ranking system and its worthiness, which is herein considered as the capacity of the system to discriminate effectively between HEI.

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