ACADEMIC JOURNAL
ISSN 2697-2212

Academic Journal of Digital Economy and Stability
Volume 39, Issue 4 | October-2026

Available Online:
https://journal.academicjournal.online/index.php/economics

Article

Counting Heads or Measuring Internationalisation? Weighting and Normalisation in Uzbekistan's National-Ranking Indicator of International Students

Mamajonova Mukhlisakhon Muzaffar kizi[*1]

1. PhD in Economics, Senior Lecturer, Department of Economics and Management, Tashkent State University of Economics, Tashkent, Uzbekistan

* Correspondence: mukhlisamamajonova0080@gmail.com

Abstract: This article evaluates the international-student indicator used in Uzbekistan's national ranking of higher education institutions. The indicator, K = (3T1 + 2T2 + T3)/Tt, weights international students by country group and converts the result into points by dividing each institution's value by its category maximum. Using official institution-level data for the 165 scored institutions in 2025, the study decomposes K into an unweighted share and a composition factor, tests alternative and random weights, compares four normalisation rules, and examines sensitivity to small numbers and the relation between points and diversity. The unweighted share explains almost all variation in K: the variance of the log composition factor is about 3% of the variance of log K, and the rank correlation between K and the unweighted share is 0.99. Rank orders are robust to the weights (mean within-category ϱ between 0.948 and 0.998), although alternative weights move up to 36 institutions by more than 0.25 points. The normalisation rule matters more: under the official rule, 69.1% of institutions receive less than 10% of the available points. Three quarters of institutions host fewer than 30 international students; five additional students can add up to 0.79 points, and the number of students needed for one point ranges from 6 to 3,782. Points are unrelated to diversity (ϱ = 0.01). The indicator thus measures the volume of international enrolment rather than internationalisation more broadly. The article proposes a minimum-support rule, a less outlier-driven normalisation, a separate diversity component and annual sensitivity reporting.

Keywords: Internationalisation, International Students, Composite Indicators, National University Ranking, Uzbekistan

Citation: Muzaffar kizi, M. M. Counting Heads or Measuring Internationalisation? Weighting and Normalisation in Uzbekistan's National-Ranking Indicator of International Students. Academic Journal of Digital Economics and Stability 2026, 39(4), 980-992.

Received: 20th Aug 2026
Revised: 15th Sep 2026
Accepted: 10th Oct 2026
Published: 31st Oct 2026

Copyright: © 2026 by the author. Submitted for open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/)

1. Introduction

Internationalisation has become one of the main dimensions on which universities are compared. Global rankings reward the share of international students and staff, and national governments increasingly use these indicators in their own assessment and funding systems [1]. Global competition for status and students has made such indicators a central part of national higher education policy [2]. Once an indicator is linked to reputation or money, it does more than describe: it changes what institutions do, and it rewards whatever the formula happens to count [3], [4]. The design of an indicator, that is, what it counts, how it weights the parts and how it turns values into points, is therefore a question of governance as much as of measurement.

Uzbekistan offers a clear case. Its national ranking of higher education institutions, established by the Regulation approved by Order No. 8 of the Director of the National Agency for Quality Assurance in Education and registered by the Ministry of Justice on 28

February 2026 under No. 3783, includes an indicator of the share of students who are foreign citizens [5]. The indicator weights international students by the country group they come from: students from high-income countries (group T1) count three times, students from Central Asian countries (T2) twice, and students from all other countries (T3) once. The weighted sum is divided by total enrolment, and the result is converted into points within each institutional category. Presidential Decree No. PF-58 of 10 April 2026 introduces, from 1 January 2027, a system of financial incentives based on national ranking results [6]. The same decree introduces admission of international students through the "Study in Uzbekistan" platform from the 2026/2027 academic year [6]. Under the decree, institutions in each category are assigned to three levels according to their ranking results: the top 20% to level 1 and the next two groups of 40% to levels 2 and 3, with incentives depending on the level [6]. From 2027, therefore, each design choice in the indicator will have a monetary value for universities, at a time when the government is actively seeking to expand international enrolment.

The official report on international students in 2025 presents the weighted formula as a way to capture not only the number of international students but also their geographic composition and the attractiveness of an institution in the international education market [7]. Whether the formula achieves this is an empirical question. A weighted indicator can only reward composition if composition varies enough between institutions to change their scores. A normalisation rule can only reward improvement if institutions can earn a meaningful share of the available points. These conditions have not been tested for the Uzbek indicator.

1.1. Measuring internationalisation

Internationalisation is commonly defined as the process of integrating an international, intercultural or global dimension into the purposes, functions and delivery of higher education [8]. The definition stresses process and purpose, not numbers. In practice, however, internationalisation is usually measured through a few countable inputs, above all the share of international students. Brandenburg and de Wit [9] warned that this reduces a qualitative process to a set of numbers and turns means into ends. De Wit and Altbach [10] similarly note that recruitment of fee-paying international students has often been treated as an aim in itself rather than as part of a broader educational strategy.

Global rankings reinforced the numerical approach. QS includes an International Student Ratio indicator and reports an International Student Diversity indicator that takes into account the variety of students' countries of origin [11]. THE includes the proportion of international students in its International Outlook pillar and, in its current methodology, normalises its international indicators by the population of the country in which the university is located [12]. Ranking-based internationalisation indicators thus capture mainly the volume and, to a lesser degree, the spread of international enrolment. They also shape how the global geography of higher education is perceived, because they determine which institutions and places appear as centres of excellence [13].

1.2. Composite indicators: weights and normalisation

A national ranking is a composite indicator, and the literature on composite indicators identifies three design steps that determine results: normalisation, weighting and aggregation [14]. Each step involves choices that cannot be derived from the data alone. The OECD/JRC handbook recommends that the effect of these choices be tested through uncertainty and sensitivity analysis before an index is used for policy [14]. Greco et al. [15] review the methods for weighting and aggregation and show that each method rests on assumptions that need to be justified and tested for robustness.

Ranking studies show that such tests matter. Saisana et al. [16] found that the positions of many universities in global rankings change substantially under plausible

alternative assumptions, and that only the top of the distribution is robust. Paruolo et al. [17] showed that the nominal weights of a composite index can differ greatly from the actual importance of each component, because importance also depends on the variance of the components and their correlation. A component with a large nominal weight but little variation contributes little to the final ranking. This argument is central to the present article: a weight attached to a country group can only influence scores if the share of that group varies between institutions.

Normalisation has received less attention than weighting, although it can be equally consequential. Dividing by the maximum value preserves the rank order but makes all scores dependent on the leading institution, so that a single outlier compresses the scores of everyone else [14]. Classifications and scoring rules are never neutral: they make some differences visible and others invisible [18]. Indicators should therefore be read with attention to context and should not replace judgement [19].

1.3. International students in Uzbekistan

International enrolment in Uzbekistan is substantial in absolute terms but highly concentrated. According to the official report, 24,647 international students were enrolled in bachelor's and master's programmes in 2025 [7]. Of these, 4.7% came from high-income countries (T1), 29.7% from Central Asian countries (T2) and 65.6% from other countries (T3). More than half of all international students were citizens of India, and the ten institutions with the largest international enrolments accounted for 81.96% of the total. The report links the dominance of the T3 group mainly to demand from South Asian countries for medical education [7].

This structure has two implications for indicator design. First, the country groups used in the formula are very unequal in size, so a weight attached to the smallest group can only affect a few institutions. Second, the concentration of international students in a small number of institutions means that most institutions, whatever their strategy, start from a very low base. An indicator that is meant to create incentives for all institutions must therefore work well at the bottom of the distribution, not only at the top.

1.4. Research gap and objective

The official report documents the growth of international enrolment and its concentration in medical education in detail [7]. What has not been examined is how the national indicator behaves at the level of individual institutions: whether its weights change scores, how its normalisation distributes points and how robust it is to small numbers. These questions are especially relevant because the indicator is applied to many small institutions and will soon carry financial consequences. The present article addresses this gap.

The objective of this study is to assess whether the weighted indicator measures internationalisation beyond the volume of international enrolment, and how its weights and normalisation rule shape institutional scores.

This article tests them. It asks four research questions:

- RQ1. To what extent does the weighted indicator K differ from a simple, unweighted share of international students?
- RQ2. How sensitive are institutional scores and rank orders to the choice of weights?
- RQ3. How does the normalisation rule shape the distribution of points within categories?
- RQ4. Is the indicator sensitive to small numbers of students, and does it reward the diversity of international enrolment?

The analysis uses the institution-level data published in the official 2025 report for all 165 institutions that receive points on the indicator. The article makes two contributions. Empirically, it provides, to the author's knowledge, the first institution-level assessment

of the indicator's internal behaviour. Methodologically, it applies standard tools for testing composite indicators, decomposition, weight sensitivity and normalisation analysis, to a single national indicator, and shows that these tools can identify design weaknesses before the indicator is linked to funding.

2. Materials and Methods

2.1. Data

The data come from the official report "International students in higher education institutions: Results of 2025", prepared by the National Agency for Quality Assurance in Education on the basis of the HEMIS information system [7]. The report covers 168 institutions participating in the national ranking and lists, for each institution, the number of international students in groups T1, T2 and T3, total bachelor's and master's enrolment, the value of the indicator and the points awarded. Group T1 consists of citizens of countries classified by the World Bank as high-income economies, T2 of citizens of Central Asian countries and T3 of citizens of all other countries.

The three local universities ranked in the top 1,000 of international rankings form a separate category in the national ranking and receive no points on this indicator [7]. They are therefore excluded. The analytical sample consists of the 165 scored institutions in four categories: Applied (40), Medical (14), Social-Humanitarian (99) and Creative/Sport (12). These institutions enrol 19,617 international students, 79.6% of the national total of 24,647.

The institution-level values were transcribed into a structured dataset and checked against the report. The indicator value and the points recalculated from the student counts reproduce the published values for every institution (maximum absolute difference 0.005 percentage points for K and 0.0005 points for the score). The analysis therefore uses exactly the official inputs and the official scoring rule.

2.2. The indicator and the scoring rule

The indicator is defined as

$$K = \frac{3T_1+2T_2+T_3}{T_t} \quad (1)$$

where T1, T2 and T3 are the numbers of international students in each country group and Tt is total enrolment [5]. Points are awarded within each category by dividing an institution's K by the highest K in its category and multiplying by the maximum score, which is 3 points in the Applied, Medical and Social-Humanitarian categories and 2 points in the Creative/Sport category. The recalculation confirms this rule.

2.3. Analytical steps

The analysis proceeds in five steps.

(1) Decomposition. K can be written as the product of the unweighted share of international students, s = (T1 + T2 + T3)/Tt, and a composition factor, c = (3T1 + 2T2 + T3)/(T1 + T2 + T3), which equals 1 if all international students are in T3 and 3 if all are in T1. Hence ln K = ln s + ln c, and the variance of ln K can be divided into the variance of ln s, the variance of ln c and twice their covariance. The decomposition uses the 148 institutions with at least one international student.

(2) Weight sensitivity. Points and within-category ranks were recalculated under five alternative weighting schemes: equal weights (1, 1, 1), a high-income premium only (3, 1, 1), a regional premium only (1, 2, 1), steeper weights (5, 3, 1) and inverted weights (1, 2, 3). In addition, 5,000 weight vectors were drawn, each weight independently and uniformly from the interval [1, 3]. For each scheme, the mean Spearman correlation with the official scores across the four categories, the number of institutions whose rank changes and the number whose score changes by more than 0.25 points were recorded.

(3) Normalisation. Points were recalculated under three alternatives to the official rule: values capped at the 90th percentile of the category, a logarithmic transformation, ln(1 + 1000K), divided by its category maximum, and the percentile rank within the category, with zero for institutions without international students. The median score, the share of institutions receiving less than 10% of the maximum and the Gini coefficient of points within categories were compared.

(4) Small numbers. For each institution, the score was recalculated after enrolling five additional international students in group T3: five students were added to both the numerator and total enrolment (Tt + 5), holding all other institutions constant. The same assumption, that new international students also increase total enrolment, is used for the "price" of a point in Section 3.5.

(5) Diversity. For institutions with at least 30 international students, diversity was measured by the normalised Shannon index over the three groups, $H = -\Sigma\, p(i) \ln p(i) / \ln 3$, where p(i) is the share of group i [20], dividing by ln 3 gives Pielou's [21] evenness measure, which ranges from 0 to 1. The threshold of 30 avoids treating very small numbers as meaningful compositions. Spearman correlations between H, the official score and the unweighted share were computed.

All calculations were carried out by the author in Python on the official data.

3. Results

3.1. Distribution of international students

Table 1 summarises the data by category. International enrolment is small in most institutions: the median scored institution has 9 international students, 17 institutions have none and 125 of 165 (75.8%) have fewer than 30. Medical institutions are the exception, with a median of 247.5 international students and 15,656 students in total, 79.8% of all international students in the scored sample. As a result, the median value of K is 7.26% in the Medical category but below 0.4% in the other three.

Table 1. International students and indicator scores by institutional category, 2025

Category	n	No international students	Fewer than 30 international students	Median international students	International students, total	Median K, %	Max K, %	Median score, % of max
Applied	40	3	34	8	680	0.27	8.48	3.2
Medical	14	0	2	247.5	15,656	7.26	26.52	27.4
Social-Humanitarian	99	11	77	10	3,211	0.29	8.19	3.5
Creative/Sport	12	3	12	6	70	0.39	9.48	4.1
All scored institutions	165	17	125	9	19,617	-	-	-

Note: the three institutions in the top 1,000 of international rankings are not scored on this indicator and are excluded. Source: compiled by the author based on Mullayev and Daliyev [7].

The scoring rule converts these values into a strongly skewed distribution of points. In the Applied category, 30 of 40 institutions receive less than 10% of the maximum score, in the Social-Humanitarian category, 74 of 99, in the Creative/Sport category, 8 of 12. Only in the Medical category does the median institution receive a substantial share of the points (27.4% of the maximum).

3.2. RQ1: weighted indicator and unweighted share

Figure 1 plots K against the unweighted share for the 148 institutions with at least one international student. All points lie between the two reference lines, K = s and K = 3s, as the formula requires. The range of the composition factor is therefore at most a factor of 3, while the unweighted share varies by more than three orders of magnitude, from below 0.01% to above 26%.

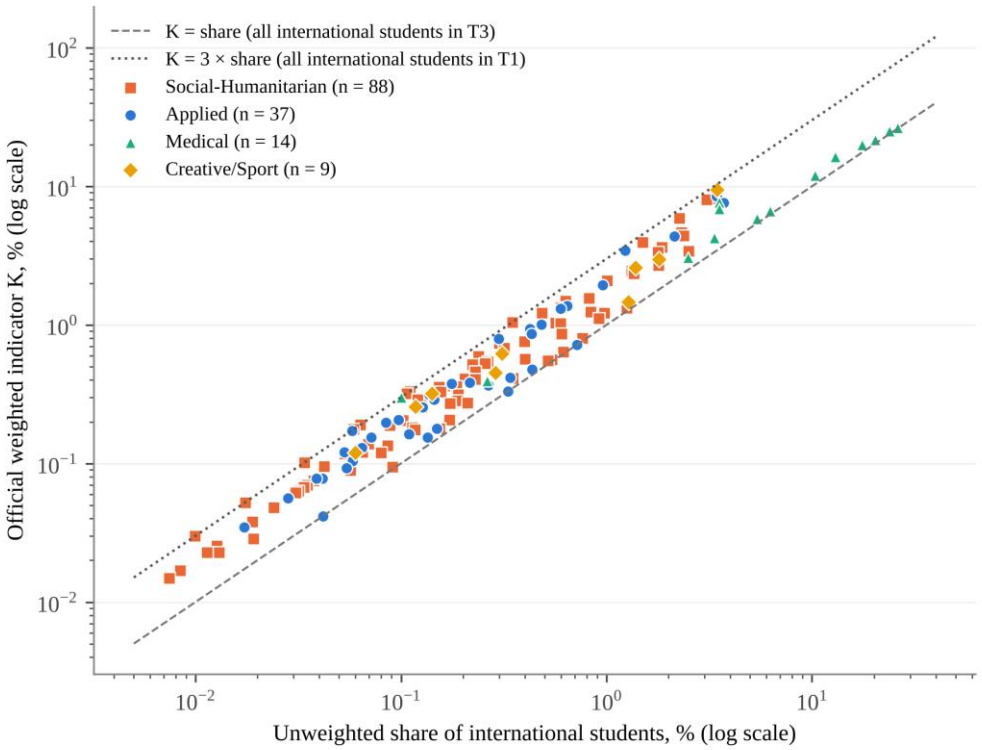


Figure 1. Official weighted indicator K and the unweighted share of international students (n = 148 institutions with at least one international student)

Note: by construction, all institutions lie between the two reference lines. Source: author's calculations based on Mullayev and Daliyev [7].

The variance decomposition makes this precise. The variance of ln K is 2.85. The variance of ln s is 3.13, the variance of ln c is 0.09 and twice their covariance is -0.36. The variance of the composition factor is therefore only about 3% of the variance of the indicator, and the negative covariance shows that institutions with high shares tend to have less favourable compositions. This pattern is mainly driven by medical institutions, whose large international enrolments consist mostly of T3 students. The Spearman correlation between K and the unweighted share is 0.99 across all 165 institutions and between 0.96 and 1.00 within each category. In practice, the weighted indicator ranks institutions almost exactly as the simple share of international students would.

3.3. RQ2: sensitivity to the weights

Table 2 reports the results for the five alternative weighting schemes. Within-category rank orders are robust: the mean Spearman correlation with the official scores ranges from 0.948 for inverted weights to 0.998 for steeper weights. The 5,000 random weight vectors (random seed 2026) give the same picture, with a median correlation of 0.978, a 5th percentile of 0.952 and a minimum of 0.935. The median absolute rank change is one to two places, depending on the random draw.

Table 2. Sensitivity of scores and within-category ranks to alternative weights

Weighting scheme (T1, T2, T3)	Mean Spearman ϱ with official scores	Institutions changing rank	Maximum rank shift	Institutions changing by more than 0.25 points	Maximum score change, points
Equal (1, 1, 1)	0.983	106	12	24	1.01
High-income premium only (3, 1, 1)	0.986	111	12	4	0.81
Regional premium only (1, 2, 1)	0.982	115	19	20	1.30
Steeper (5, 3, 1)	0.998	80	8	4	0.45
Inverted (1, 2, 3)	0.948	124	27	36	1.75
5,000 random weight vectors, each weight drawn from [1, 3]	median 0.978 (5th percentile 0.952, minimum 0.935)	-	median absolute shift 1-2	-	-

Note: the official scheme is (3, 2, 1). Random weights were drawn with seed 2026. Spearman correlations are computed within each of the four categories and averaged. Ranks are within categories (n = 165). Source: author's calculations based on Mullayev and Daliyev [7].

Robust rank orders do not mean that the weights are irrelevant for individual institutions. Because many institutions are tied or nearly tied at low values, between 80 and 124 institutions change rank under each scheme, typically by two to four places. Score changes are larger where weights alter the leading institution, which sets the scale for the whole category. Under equal weights, 24 institutions change by more than 0.25 points and the maximum change is 1.01 points, under inverted weights, 36 institutions change by more than 0.25 points. The leaders of the Medical and Creative/Sport categories are the same under every scheme, while the leaders of the Applied and Social-Humanitarian categories change under some schemes. Most of these alternative leaders are small institutions with fewer than 20 international students, in which a few students determine the composition.

The weights therefore have a limited and uneven effect. They hardly change the order of institutions, which is determined by the unweighted share, but they can shift points for a minority of institutions through their effect on the category leader.

3.4. RQ3: the normalisation rule

The normalisation rule has a much larger effect on the distribution of points than the weights (Table 3 and Figure 2). Under the official rule, the median institution receives 0.115 points and 69.1% of institutions receive less than 10% of the maximum. The average Gini coefficient of points within categories is 0.648. Capping values at the 90th percentile of the category raises the median score to 0.383 points and reduces the share below 10% of the maximum to 43.0%. A logarithmic transformation raises the median to 0.957 points and reduces the share to 18.2%. Percentile ranks give a median of 1.5 points and a share of 10.9%.

Table 3. Distribution of points under alternative normalisation rules

Normalisation rule	Median score, points	Institutions below 10% of maximum, %	Mean Gini coefficient within categories	Spearman ϱ with official ranks
Official: value divided by category maximum	0.115	69.1	0.648	1.000
Value divided by category 90th percentile, capped at 1	0.383	43.0	0.560	0.999
Logarithmic: ln(1 + 1000K) divided by category maximum	0.957	18.2	0.363	1.000
Percentile rank within category	1.500	10.9	0.345	1.000

Note: points are on the official scales (maximum 3 points, or 2 points in the Creative/Sport category), n = 165. Source: author's calculations based on Mullayev and Daliyev [7].

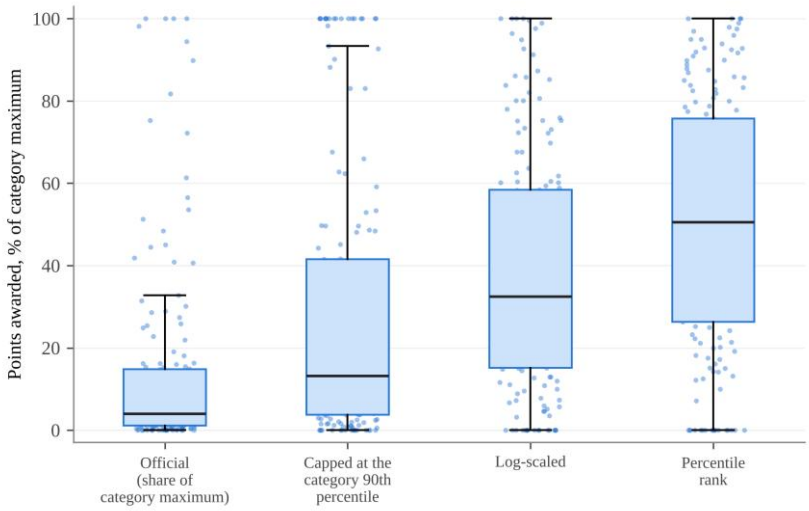


Figure 2. Points awarded under four normalisation rules, % of the category maximum (n = 165)

Note: boxes show the interquartile range and the median, whiskers extend to 1.5 times the interquartile range, dots show individual institutions. Source: author's calculations based on Mullayev and Daliyev [7].

All four rules preserve, or almost preserve, the rank order of institutions within categories (Spearman ϱ ≥ 0.999), the cap at the 90th percentile creates ties among the top 10% of each category. They differ in how many points separate institutions and therefore in how much the indicator contributes to differences in the overall ranking. Under the official rule, the indicator separates a handful of leaders from everyone else, under the alternatives, it also differentiates among the large majority of institutions with modest international enrolment.

The dependence on the leader is clearest in the Creative/Sport category. There, the leading institution has a K of 9.48%, 3.2 times the value of the second institution (2.98%). As a result, the median institution in the category receives 4.1% of the maximum score. If the leader were excluded, the median would rise to about 10.8% of the maximum. In the

other categories, the first and second institutions are close (ratios of 1.02 to 1.11), so the official rule is less dependent on a single value, but the leaders still define the scale for all others.

3.5. RQ4: small numbers and diversity

Because most institutions have very few international students, small changes in enrolment can produce large changes in points. Adding five T3 students raises the score by more than 0.25 points for 11 institutions and by more than 0.5 points for 4 institutions (Table 4). The largest gain, 0.79 points, occurs at a branch of a foreign university that has 5 international students and 216 students in total: five additional students would raise its K from 4.63% to 6.79%, and its score by almost half. Two institutions with no international students at all would gain 0.69 and 0.65 points from five students. With so few students, an ordinary change in a small intake, or a single recording error, would be enough to move the score by this amount.

The same mechanism can be expressed as the "price" of one point, that is, the number of additional T3 students an institution would need to enrol to gain one point, holding the category maximum constant. It is obtained by solving $(W + n)/(Tt + n) = K + Kmax/P$ for n, where W is the weighted sum 3T1 + 2T2 + T3, Kmax is the category maximum and P is the maximum score. This price depends on the institution's total enrolment and on the category maximum. The median price is 196 students (interquartile range 61 to 375), but it ranges from 6 students in the smallest institutions to 3,782 students in the largest medical institutions. By category, the median price is 53 students in Creative/Sport, 126 in Applied, 223 in Social-Humanitarian and 464 in Medical institutions. Because T1 students count three times, the price in T1 students is considerably lower. The indicator therefore offers very different incentives to different institutions: for a small institution, a handful of students is worth as much as several hundred students are for a large one.

Table 4. Institutions whose score is most sensitive to five additional international students

Institution type	Category	International students	Total enrolment	Official score, points	Gain from five additional students, points
Branch of a foreign university	Social-Humanitarian	5	216	1.70	0.79
Branch of a foreign university	Applied	1	231	0.31	0.74
Branch of a foreign university	Social-Humanitarian	0	261	0.00	0.69
Branch of a national arts institution	Creative/Sport	0	156	0.00	0.65
Branch of a foreign university	Social-Humanitarian	4	410	0.45	0.44
Branch of a national arts institution	Creative/Sport	0	243	0.00	0.43
Branch of a foreign university	Social-Humanitarian	0	518	0.00	0.35
Non-state university	Social-Humanitarian	0	592	0.00	0.31

Note: five new students are added to group T3 and to total enrolment for one institution at a time, with all other institutions unchanged. Source: author's calculations based on Mullayev and Daliyev [7].

The indicator also does not reward diversity. Among the 40 institutions with at least 30 international students, the correlation between the official score and the normalised Shannon index of the three groups is close to zero ($\rho = 0.01$, $p = 0.95$). The correlation between the unweighted share and diversity is negative but not significant ($\rho = -0.26$, $p = 0.10$). Medical institutions, which receive the highest scores, have the least diverse international enrolments (median $H = 0.36$, against 0.79 in the Applied and 0.77 in the Social-Humanitarian category). The weights reward the presence of T1 and T2 students, but they cannot distinguish an institution with students from many groups from one with a large number of students from a single group.

4. Discussion

The results answer the four research questions consistently. The weighted indicator is, in practice, a measure of the share of international students (RQ1). Its weights hardly change the order of institutions, although they can shift points for some institutions through the category leader (RQ2). Its normalisation rule concentrates points among a few leaders and leaves most institutions with almost none (RQ3). It is sensitive to very small numbers and does not reward diversity (RQ4).

These findings illustrate a general point from the literature on composite indicators: nominal weights are not the same as effective importance [17]. The weights 3, 2 and 1 suggest that the indicator gives substantial value to the origin of international students. Effective importance, however, depends on how much the composition of international enrolment varies across institutions relative to the variation in its volume. In Uzbekistan, the volume varies by a factor of several thousand, while the composition factor can vary at most by a factor of three. The weights are therefore swamped by differences in volume. This does not mean that the policy priority behind the weights is wrong. Attracting students from high-income countries and positioning the country as a regional education hub are legitimate goals. The point is that the current formula cannot express them, because a multiplier on a small group has little effect when the main differences lie elsewhere.

The normalisation finding is more consequential for policy. Dividing by the category maximum is simple and transparent, but in a distribution where most institutions have almost no international students and a few have many, it produces scores that are close to zero for the majority. If points are linked to funding from 2027, the indicator will reward a small number of institutions and offer weak incentives to the rest. It may also create strong incentives for small institutions, for which a few additional students can be worth almost a full point. This mix of very weak and very strong incentives is the type of effect that the literature on reactive measures warns against [3], [4]. The price of a point shows the problem directly: when one point costs six students in one institution and almost four thousand in another, the indicator rewards size and category position at least as much as effort. Small institutions, including many branches of foreign universities, can raise their scores quickly through marginal recruitment, while large public institutions can do little to change theirs. If the purpose of the indicator is to encourage internationalisation across the system, this asymmetry works against it.

Two features of the current design are nevertheless worth keeping. The formula is simple, transparent and based on administrative data from the HEMIS information system, and the normalisation within categories avoids comparing medical institutions directly with institutions in other fields. The proposals below therefore aim to adjust the design rather than replace it.

The absence of a relation between scores and diversity shows a gap between the purpose stated for the indicator and what it measures. The official report presents the weighted formula as a way to reflect geographic composition and attractiveness in the international market [7]. The results suggest that the formula measures mainly the volume

of international enrolment, which in Uzbekistan is concentrated in medical education and in a few source countries. QS, for example, reports an International Student Diversity measure alongside its International Student Ratio, although the diversity measure carries no weight in its overall ranking [11]. A national indicator that aims to capture composition could make the distinction more explicit.

The findings also have implications for the government's aim of turning Uzbekistan into a regional education hub. Decree PF-58 adds the "Study in Uzbekistan" platform as an additional admission channel for international students [6]. If the national indicator is meant to support this aim, it should reward institutions that attract students from a wider range of countries and programmes, not only those that enlarge an existing flow. Under the current formula, fifty additional students from ten new countries earn exactly the same points as fifty additional students from a single country in the same group: only the number of students and their group matter. The current design cannot distinguish expansion from diversification, although the policy documents treat them as different goals.

4.1. A revised design

Based on these results, the article proposes four changes. They are intended as options for discussion with the National Agency, not as a finished formula.

(1) A minimum-support rule. Composition-based weights and diversity should be applied only above a minimum number of international students, for example 30, as used in this analysis. Below this threshold, the indicator could use the unweighted share only, or a three-year average to reduce year-to-year volatility. This would also reduce the very low price of a point in the smallest institutions.

(2) A less outlier-driven normalisation. A cap at a high percentile of the category, a logarithmic transformation or percentile ranks would preserve the order of institutions while distributing points more evenly. The choice among these options should be tested against the overall ranking, in line with the recommendation to test composite indicators before use [14].

(3) A separate diversity component. Instead of multiplying the share by group weights, the indicator could combine two components: the share of international students and a diversity measure computed on countries of origin rather than on three broad groups. This would make the policy aim of diversification visible and measurable.

(4) Regular sensitivity reporting. The National Agency could publish, together with the annual results, a short sensitivity analysis showing how scores change under alternative weights and normalisations. This would increase transparency and support the periodic review of the design.

Table 5 summarises the proposed changes, the problems they address and their expected effects.

Table 5. Proposed changes to the indicator design

Proposed change	Problem addressed	Evidence in this study	Expected effect
Minimum-support rule (e.g. 30 students) or three-year averages	Scores driven by a handful of students	125 of 165 institutions below 30 students, up to 0.79 points from five students, one point costs 6 to 3,782 students	Fewer arbitrary score changes, reduced incentive for marginal enrolment
Capped, logarithmic or	Points concentrated among category leaders	69.1% of institutions below 10% of maximum, Gini 0.648	Same rank order, more even

percentile normalisation			distribution of points
Separate diversity component based on countries of origin	Weights do not capture composition	Composition factor variance about 3% of indicator variance, ϱ(points, diversity) = 0.01	Policy aim of diversification becomes visible and measurable
Annual sensitivity report by the National Agency	Design choices untested before use	Weights shift up to 36 institutions by more than 0.25 points	Transparency and an evidence base for periodic review

Source: compiled by the author based on the results of the study.

4.2. Limitations

The study has several limitations. It uses data for a single year, 2025, so it cannot show how stable institutional values are over time. The three-group structure of the data limits the diversity measure, a measure based on individual countries would be more informative, but country-level data by institution are not published. The analysis examines the indicator in isolation and does not estimate how changes to it would affect the overall national ranking, which combines several indicators. The sensitivity analysis covers a reasonable range of alternative weights and normalisations, but not every possible design. Finally, the three institutions in the top 1,000 of international rankings are outside the scope of the indicator and therefore of this analysis.

5. Conclusion

The national-ranking indicator of international students in Uzbekistan was designed to measure more than numbers: its weights were meant to reward the geographic composition of international enrolment. The institution-level analysis shows that, in its current form, it measures mainly the share of international students. The weights have a small effect on the order of institutions, the normalisation rule leaves most institutions with almost no points, a few additional students can change scores substantially, and scores are unrelated to diversity.

These findings matter because the indicator will soon be linked to funding. Before that happens, the indicator can be improved at low cost: by introducing a minimum-support rule, a normalisation that is less dependent on the leading institution, a separate diversity component and a routine sensitivity analysis. More broadly, the case shows that tools developed for testing composite indicators can be applied to a single national indicator and can identify design problems that are not visible from the formula alone.

REFERENCES

[1] E. Hazelkorn, *Rankings and the Reshaping of Higher Education: The Battle for World-Class Excellence*, 2nd ed. London, U.K.: Palgrave Macmillan, 2015, doi: 10.1057/9781137446671.

[2] S. Marginson, "Dynamics of national and global competition in higher education," *Higher Education*, vol. 52, no. 1, pp. 1-39, 2006, doi: 10.1007/s10734-004-7649-x.

[3] W. N. Espeland and M. Sauder, "Rankings and reactivity: How public measures recreate social worlds," *American Journal of Sociology*, vol. 113, no. 1, pp. 1-40, 2007, doi: 10.1086/517897.

[4] J. Z. Muller, *The Tyranny of Metrics*. Princeton, NJ, USA: Princeton University Press, 2018.

[5] National Agency for Quality Assurance in Education, "Oliy ta'lim tashkilotlarining milliy reytingini yuritish to'g'risidagi nizom" [Regulation on maintaining the national ranking of higher education institutions], approved by Order No. 8 of 6 February 2026, registered by the Ministry of Justice of the Republic of Uzbekistan on 28 February 2026, No. 3783. [Online]. Available: https://lex.uz/docs/8067678

[6] President of the Republic of Uzbekistan, “Oliy ta’lim, fan va innovatsiyalar tizimini takomillashtirishning qo‘shimcha chora-tadbirlari to‘g‘risida” [On additional measures to improve the system of higher education, science and innovation], Decree No. PF-58, 10 April 2026. [Online]. Available: https://lex.uz/uz/docs/-8129755

[7] A. Mullayev and Sh. Daliyev, *Oliygohlarda xorijiy talabalar: 2025-yil yakunlari. Bakalavriyat va magistratura bosqichlari bo‘yicha axborot-tahliliy sharh* [International students in higher education institutions: Results of 2025. Analytical review of bachelor’s and master’s levels]. Tashkent, Uzbekistan: National Agency for Quality Assurance in Education, 2026.

[8] J. Knight, “Internationalization remodeled: Definition, approaches, and rationales,” *Journal of Studies in International Education*, vol. 8, no. 1, pp. 5-31, 2004, doi: 10.1177/1028315303260832.

[9] U. Brandenburg and H. de Wit, "The end of internationalization," *International Higher Education*, no. 62, pp. 15-17, 2011, doi: 10.6017/ihe.2011.62.8533.

[10] H. de Wit and P. G. Altbach, “Internationalization in higher education: Global trends and recommendations for its future,” *Policy Reviews in Higher Education*, vol. 5, no. 1, pp. 28-46, 2021, doi: 10.1080/23322969.2020.1820898.

[11] QS Quacquarelli Symonds, “QS World University Rankings: Methodology,” 2026. [Online]. Available: https://www.topuniversities.com/world-university-rankings/methodology

[12] Times Higher Education, "World University Rankings 2027: Methodology," 2026. [Online]. Available: https://www.timeshighereducation.com/world-university-rankings/methodology

[13] H. Jöns and M. Hoyler, “Global geographies of higher education: The perspective of world university rankings,” *Geoforum*, vol. 46, pp. 45-59, 2013, doi: 10.1016/j.geoforum.2012.12.014.

[14] OECD and European Commission Joint Research Centre, *Handbook on Constructing Composite Indicators: Methodology and User Guide*. Paris, France: OECD Publishing, 2008, doi: 10.1787/9789264043466-en.

[15] S. Greco, A. Ishizaka, M. Tasiou, and G. Torrisi, “On the methodological framework of composite indices: A review of the issues of weighting, aggregation, and robustness,” *Social Indicators Research*, vol. 141, no. 1, pp. 61-94, 2019, doi: 10.1007/s11205-017-1832-9.

[16] M. Saisana, B. d’Hombres, and A. Saltelli, “Rickety numbers: Volatility of university rankings and policy implications,” *Research Policy*, vol. 40, no. 1, pp. 165-177, 2011, doi: 10.1016/j.respol.2010.09.003.

[17] P. Paruolo, M. Saisana, and A. Saltelli, “Ratings and rankings: Voodoo or science?,” *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, vol. 176, no. 3, pp. 609-634, 2013, doi: 10.1111/j.1467-985X.2012.01059.x.

[18] G. C. Bowker and S. L. Star, *Sorting Things Out: Classification and Its Consequences*. Cambridge, MA, USA: MIT Press, 1999.

[19] D. Hicks, P. Wouters, L. Waltman, S. de Rijcke, and I. Rafols, “Bibliometrics: The Leiden Manifesto for research metrics,” *Nature*, vol. 520, no. 7548, pp. 429-431, 2015, doi: 10.1038/520429a.

[20] C. E. Shannon, “A mathematical theory of communication,” *Bell System Technical Journal*, vol. 27, no. 3, pp. 379-423, 1948, doi: 10.1002/j.1538-7305.1948.tb01338.x.

[21] E. C. Pielou, “The measurement of diversity in different types of biological collections,” *Journal of Theoretical Biology*, vol. 13, pp. 131-144, 1966, doi: 10.1016/0022-5193(66)90013-0.