International Journal of Strategic Management and Economic studies (IJSMES)
ISSN: 2791-299X

National University performance: towards a new ranking system for Moroccan universities

NAYME Farah[1], ZOHRI Abdelaziz[2], FAHMI Sanaa [3]

[1] PHD Student, Hassan 1er University, National Scool of commerce and Management, Morocco (Settat)

[2] Professor, Hassan 1er University, National Scool of commerce and Management, Morocco (Settat)

[3] Professor, Hassan 1er University, National Scool of commerce and Management, Morocco (Settat)

Abstract: This article addresses university ranking systems. Building on several comparative and critical analysis of world university rankings, as well as the identified shortcomings in the ranking methodologies and the interpretation of their results, and based on the striking geographical disparities produced by world university rankings, this study uses an experimental design, with a mixed research method to investigate the applicable criteria for ranking Higher Education Institutions in Morocco. The study raises the following question: what framework can be used to rank HEIs in Morocco, using a comprehensive field-based approach that can offer a representative picture of the classification of national university performances?

In the present study, we have derived the criteria for ranking the Moroccan HEIs from the National Reference framework for Evaluation and Quality Assurance of Higher Education Institutions, issued by the ANEAQ, a nationally renowned and acknowledged organization. We have ensured, to the extent possible, that the majority of the criteria are quantitative and therefore measurable. These criteria cover four areas:

- Training ;
- Research, cooperation and partnership ;
- Services rendered to society ;
- And student life.

The proposed ranking methodology we have developed was tested on 10 Moroccan HEIs, it intends to limit the disparities that may exist between the different HEIs and to give a more comprehensive overview of the Moroccan university landscape.

The ranking system we have developed is based on three principles:

- Clearly defined ranking criteria that provide global rankings by universities but also by disciplinary field or by institution.
- The ranking can be presented both globally and by indicator, which allows the user to customize the ranking according to their needs rather than relying on a global score.
- The ranking is displayed by class of universities, with scores that are fairly close.

Keywords: Quality; Performance; Ranking; Universities; Morocco, Evaluation; Criteria

Digital Object Identifier (DOI): https://doi.org/10.5281/zenodo.7699128

Published in: Volume 2 Issue 1

1. Introduction

The first rankings of higher education institutions (HEIs) were initially formulated in the United States of America in the early 20th century [1] . The intent was to list the backgrounds of famous or prominent people in society.
In Alick Maclean's article 'Where We Get Our Best Men' published in 1900' [2] , he based the ranking of Colleges and Universities solely on the number of famous or prominent people who attended, graduated from, or taught at these institutions. He eventually created a first listing of universities ranked by the number of prominent alumni [3]. A second list of university rankings was published by Havelock Ellis in 1904 [4] , likewise, based on the number of distinguished people attending these universities. In 1925, Raymond Hughes released a report [5] in which he ranked U.S. HEIs based on the relevance of the curriculum [6].
Over the years, the standards for ranking American Universities have evolved, becoming reliant on the reputation given to them by their peers and published sporadically until 1983, when the 'US News and World Report' began ranking Universities on a regular basis, a ranking that became an annual event starting in 1987 [7].
While university evaluation and rankings are a standard practice in American university environments, they have only recently been introduced in Europe, where the notion, or rather the culture, of evaluation emerged in the early 1990s.
Prior to that date, European universities (apart from those located in the United Kingdom), which are mostly government-funded, were always, to varying degrees and depending on the countries, controlled by the public authorities but never really evaluated or ranked. It was not until the early 1990s that full-scale evaluation missions began to be carried out in universities in Europe [8] [9][9] [10] [11] [12] [13], combining both peer review and quality assurance [14] [15] [16], [17].
Today, there are multiple university ranking systems at the national, regional, and international scales. The most renowned and prestigious systems internationally are:
- the Academic Ranking of World Universities (ARWU) developed by Shanghai Jiao Tong University;
- Quacquarelli Symonds (QS) World International Journal of Social Sciences & Educational Studies;
- the Webometrics ranking created by the Spanish National Research Council;
- and the 'Times Higher Education World Ranking (THE)', published annually by 'Times Higher Education' in coordination with Thomson Reuters.

The ranking frenzy and its resulting evaluation practices have often been questioned by several critics, as to their relevance and their value. They are often accused of using a narrow definition of quality to compare institutions with divergent natures and missions [18], of using inappropriate indicators, and adopting methodologies that are not based on quality or performance but on the reputation of institutions [19].

In their study investigating geographies of higher education, Jons and hoyler display the strighking geographical disparties produced by world university rankings, portraying clusters of « world class universities » located in Europe and the United States [20], thus confirming the under representation of emerging countries, in Asia pacific and Africa, or HEIs which conform least to Anglo-American academic standards [21].

Additionally, the limitations stressed by different critics [22] [20] [19], underline whether the different assessment exercises are effectively measuring the key elements of academic excellence, and the extent to which the performance indicators consider the interdisciplinarity and recognize social and economic impacts, as well as national contexts. According to a comparative analysis of global and national university ranking systems [21] it is revealed to be challenging for international ranking systems to obtain accurate data at the national level, which may explain why bibliometric factors, research-intensive indicators, size-dependent criteria are highly weighted in international rankings. The analysis further supports the belief that the development and spread of national and regional ranking practices, especially in the emerging countries, will accelerate and facilitate the potentiality of improving current positions in international rankings and their methodologies.

While the university ranking exercises are currently in vogue, there is limited research carried out on how to suitably rank HEIs in developing countries, such as Morocco, where the rapid growth of private HEIs, the rise of foreign university branches throughout the country, and the implementation of new public-private partnership universities alongside the public universities, are all driving a growing demand and appetite among students - their parents - and researchers for information about the quality and performance of the HEIs in which they are likely to study or with which they wish to collaborate.

This demand - combined with the public authorities' expectations of Moroccan universities, to strive for excellence in training and research, to contribute to the country's economic and social prosperity, to promote lifelong learning, to be a place of exchange and community involvement, etc. - requires, for more visibility and transparency, the implementation of a reliable and realistic ranking system, inspired by those already existing but taking into account the particularities of the national education and training system and the Moroccan university landscape.
Based on the discussion above, this paper aims to contribute to this emerging field by proposing an alternative approach to a comprehensive national ranking system, which identifies reliable and rational criteria, both qualitatively and quantitatively, and considers the environment and context in which Moroccan HEIs being ranked are operating, which cannot be adequately considered by other international rankings. This study begins by a literature review of league table rankings and the global definition of education quality, and the generic challenges in performance indicators employed in the international rankings. We will then propose a set of measurable criteria to measure the academic performance of Moroccan universities and establish a national ranking system, we will next provide a statistical analysis to test the defined set of indicators and discover what factors- substantive or methodological- that make our proposition reliable.

2. Literature review

2.1 University rankings and education quality

Often defined by experts as lists of HEI's compared within a country, region or worldwide [22] [23] [24], university rankings order HEIs using a variety of different indicators, each of which is weighted individually depending on the ranking's methodology [19] thereby compiling institutions with a wide spectrum of natures, missions and activities into ordinal positions. The university ranking compilers obtain the necessary data from three main sources:

- HEIs sources,
- Independent third parties such as publicly available government databases.
- Surveys of opinions of various stakeholders.

The methodologies adopted by each league table complier is different, according to the report to Higher Education Funding Council for England by the Centre for Higher Education Research and Information [25] the ranking processes should consider the following steps:

- Selection of indicators that are reliable (measures or data points that are not prone to inaccuracy or error) and valid (effectively measuring what it intends to assess).
- Definition of the inclusion/ exclusion criteria: preselection criteria for including certain HEIs and excluding other may vary from a ranking system to another. The Shanghai ranking list, for instance, includes all institutions with Nobel laureates, Fields Medals, and frequently cited researchers. Large universities with a significant number of Science Citation Index Expanded (SCIE) and Social Science Citation Index (SSCI) papers are also included, on the other hand The QS World University Rankings included in their list for the 2007 rankings 30 institutions nominated by 5,101 experts indexed in the Quacquarelli Symonds (QS) database, who are considered excellent in their field (not including their own institutions).
- Collection of the data from different sources, ranging from available research databases, national agencies, HEIs contact people, surveys of opinions of the different stakeholders, etc.
- Normalization of indicators, which is the process of scaling metrics of different units of measurement, to make them comparable on an equal footing.

- Conversion into scores: regardless of being normalized or not, raw data is converted to scores, to provide a more intuitive or meaningful way of interpreting the results, or to allow the universities to be more easily compared to one another.
- Standardization: In statistics, standardization is a method that is used to transform a variable to have a mean of 0 and a standard deviation of 1. This aims to facilitate the comparison of values of different variables, or to compare the values of a single variable across different groups or populations.
- Attribution of weights: the different weights are assigned according to the relative importance or value of the indicator. This importance is attributed by expert judgement, statistical methods, and ranking compilers.
- Aggregation of scores: Following the weighting of the individual indicator scores, they are combined to generate a total rating for every institution in the list.
- Ranking of overall scores: generally, an institution with the top aggregate score has secured the first rank, the institution with the second highest score is ranked second, and so forth.

Undoubtedly, university rankings are considered valuable in measuring higher education quality [22] [26], and providing accountability [19], while the term "quality" itself, in the management literature has been described as "excellence" [27], "meeting the standards" [28], or "conveying prestige" [29] the definition of education quality is a controversial concept in higher education ranking systems and policy circles [30] [31] [21] [32] and so are the indicators used to describe it [33] [34].
Borrowing from the definition of educational quality of Don Adams, the concept of education quality can be tackled from at least six standpoints:

« Quality as reputation; quality as resources and inputs; quality as process; quality as content; quality as outputs and outcomes; and quality as "value added". » [35].

The use of a range of combinations of the aspects of quality as reputation, inputs, outputs, process, content and value added, is common in all HEIs ranking systems [30] [36] and are frequently translated into performance indicators, resulting in substantial advancements in institutional quality and efficiency [37].

2.2 Performance indicators in university ranking systems :

The concept of "performance indicators" might very well appear basic, but even a cursory inspection of the literature indicates that this term has been given many different interpretations. Cuenin suggests a practical description for a performance indicator: Quantitative data that reflects a system's performance. Once the indicator exhibits variations in whichever direction, the system's performance is either improving or deteriorating [38].
Several critics argue that performance indicators oversimplify the complexity of a system, to make it easier to analyse [37]. This oversimplification of complex performance indicators is at the heart of the university ranking exercise, assumed by the ranking producers with the students' market in mind [39].
In their "Global survey of university league tables" Usher and Savino divided the performance indicators into seven categories [24]:
1) Beginning characteristics (attributes and skills of incoming students);
2) Indicators of Learning Inputs (Staff);
3) Indicators of Learning Inputs (Resources);
4) Indicators of Learning Outputs;
5) Indicators of Final Outcomes;
6) Indicators of Research;
7) Indicators of Reputation.

Comparative studies of international university rankings across employed performance indicators reveal a strong correlation between research performance and global quality [40] [20] [33] [41]. The international rankings rely heavily on research performance indicators [21] and they display many methodological issues concerning weight discrepancies [42] [43] when assigning a relative importance to an indicator to obtain an easy to communicate rank. Additionally, the allocation of rank is hardly ever supported by statistical evidence [20] [31].

2.3. Education quality assessment in Morocco:

The evaluation of the higher education and scientific research system in Morocco is a fairly recent practice. Two governmental organizations monitor it:
- The National Authority for the Evaluation of the Education, Training and Scientific Research System (l'Instance Nationale de l'Evaluation INE);
- and the National Agency for Evaluation and Quality Assurance (ANEAQ).

2.3.1. The National Authority for the Evaluation of the Education, Training and Scientific Research System:

The INE is the assessment organism of the Higher Council for Education, Training and Scientific Research (article 16 of law 105.12). It aims to:
- Inform the Higher Council for Education, Training and Scientific Research, the actors of the educational system, society, the socio-economic sectors, international organizations and the media on the situation of the education, training and scientific research system (state of the school, the University and scientific research) and on its financial management;
- To improve the government's action through the evaluation of initiated policies;
- To produce reliable and credible information on the education, training and scientific research system.

INE's evaluation activities concern several levels of the education, training and scientific research system
- Macro evaluation: evaluation of the system as a whole (public policies, training programs and tracks, educational sectors and cycles, governance and financing methods);
- Meso evaluation: evaluation of education, training and scientific research institutions
- Micro-evaluation: evaluation of learners and their achievements.

In all these missions, INE uses international evaluation standards and recognized scientific tools and favors participatory approaches by conducting evaluation actions involving all the stakeholders of the education, training and scientific research system.

2.3.2. The National Agency for Evaluation and Quality Assurance (ANEAQ):

This national agency created by law (Dahir No. 1-14-130 of July 31, 20141) is endowed with a dual mission: to carry out evaluation missions of the training and scientific research system at all its levels: administrative (governance), pedagogical (evaluation of training courses) and scientific research (evaluation of research programs and projects and scientific productivity) and ensure its quality. It aims to:
- Ensure the assessment of public and private higher education institutions and scientific research institutions, taking into account the specificities of each of them;
- Examine and evaluate training programs and courses in order to accredit them or renewing their accreditation;
- Evaluate the activities of the Centers of Doctoral Studies and to produce a report on the doctoral training and research work carried out in the CEDoc;
- Evaluate scientific research, the effectiveness and efficiency of research structures
- Evaluate the programs and projects of cooperation and partnership in the fields of training and scientific research.

A technical assistance program pertaining to ANEAQ, funded by the European Union, launched from November 2016 to November 2017 to support the implementation of the advanced status of Morocco with the European Union (Succeeding the Advanced Status Program -RSA-), has allowed the development of a quality reference framework for the evaluation of academic performance and scientific research of Moroccan HEIs, a reference framework published in the Official Journal of January 16, 2020 (Decree No. 2-19-16 of July 23, 2019 and Annex of the said decree2).

[1] *Dahir No. 1-14-130 of 3rd of Shaoual 1435 (July 31, 2014) issuing Law No. 80-12 concerning the National Agency for Evaluation and Quality Assurance of Higher Education and Scientific Research.*

[2] *Decree No. 2-19-16 of 19th Kaada 1440 (July 23, 2019) issued for the implementation of Article 5 of Law No. 80-12 regarding the National Agency for Evaluation and Quality Assurance of Higher Education and Scientific Research.*

The evaluation framework thus developed is structured in 5 fields that cover the main missions of the University (governance, training, scientific research, assistance and student life, and services rendered to society) and their total criteria.
Although this reference framework provides a means of evaluating the quality of an institution as a whole, it is not suitable for measuring its academic performance "quantitatively" and ranking universities objectively, given the "qualitative" nature of the evaluation criteria used.

3. The methodology

3.1 Objectives and research design

It is worth reiterating that this study is set out with the objective of proposing an alternative comprehensive national ranking system, inspired from the international ranking systems, that can offer a representative picture when ranking Moroccan universities, that identifies reliable and rational criteria, both qualitatively and quantitatively, and considers the environment and context in which Moroccan HEIs being ranked are operating, which cannot be adequately taken into account by other international rankings.
To meet this objective, the study uses an experimental design, with a mixed research method integrating quantitative sampling and statistical analysis of the data collected, as well as qualitative procedures at the stages of data gathering and the interpretation of the results.

3.2 Case study:

Based on the Moroccan reference framework of evaluation and quality assurance of national HEIs issued by the National Agency for Evaluation and Quality Assurance [44], we identified 69 criteria for ranking Moroccan Universities, that cover the main missions of the University (governance, training, scientific research, assistance and student life, and services rendered to society). To test the proposed ranking method, we generated data on 10 universities numbered from 1 to 10.

3.3 Data collection ana analysis:

The case study used unobtrusive measures, which provide rich data for performance assessment, and investigating the sources of performance problems [45]. Specifically, our secondary data was collected from :
- The websites of the different national universities
- The statistical records of the Department of Higher Education and Scientific Research.

We had to be aware of the importance of maintaining data confidentiality, we made sure to secure the anonymity of the HEIs we studied.

3.4 Procedure:

From the qualitative criteria of the above-mentioned reference framework, we have constructed 69 quantitative criteria, divided into 4 areas: Training (with 25 criteria) to which we have attributed a weighting of 30%, research, cooperation and partnership (with 20 criteria) also with a weighting of 30%, services rendered to society (10 criteria) with 20% and student life (14 criteria), also 20% (Table 1).
For each field, a weighting is given to each criterion, according to the importance given by the ANEAQ.
For the criteria of a purely qualitative nature, we opted for a binary notation: 0 in case of absence of the activity related to the criterion, 1 in case of presence of the activity.
The scoring for each criterion is obtained by multiplying the value of the criterion by the weighting assigned to it. The sum of the scores of all the criteria for the 4 fields defines the total score attributed to the institution.

Annex to Decree No. 2-19-16 of 19th Kaada 1440 (July 23, 2019) issued for the implementation of Article 5 of Law No. 80-12 regarding the National Agency for Evaluation and Quality Assurance of Higher Education and Scientific Research.

Table 1 Criteria Coding, Weighting and Scoring

Criterion	Code	Weighting	Method of calculation
TRAINING	**F**	**30%**	**Score assigned to each criterion**
Number of professional courses developed in collaboration with the socio-economic sector	CF1	8%	CF1 x 0,08
Number of international, joint or double degree courses developed in partnership with foreign universities or training institutions	CF2	8%	CF2 x 0,08
Number of continuing education programs leading to a certificate of qualification or a university degree	CF3	4%	CF3 x 0,04
Ratio of students enrolled in professional courses designed in partnership with the socio-economic world	CF4	4%	CF4 x 0,04
Ratio of students enrolled in international, joint or double degree programs designed in partnership with foreign universities or training institutions	CF5	4%	CF5 x 0,04
ratio of students enrolled in continuing education	CF6	4%	CF6 x 0,04
The programs offered by the University are listed on its website: Number of programs listed on the University's website	CF7	2%	CF7 x 0,02
The programs offered by the University are well defined on its website: Number of programs defined on the University's website with detailed curriculum	CF8	2%	CF8 x 0,02
Number of brochures and/or flyers presenting the University's educational offerings published on its website	CF9	2%	CF9 x 0,02
Number of brochures and/or flyers presenting the training offers produced by the University (admission requirements, programs, methods of validation of prior learning ...)	CF10	2%	CF10 x 0,02
Number of annual meetings organized by the University for the presentation of its educational offer (on-site meetings, meetings in fairs, meetings in high schools with baccalaureate students, etc.)	CF11	2%	CF11 x 0,02
Number of annual announcements, published by the University on its website, related to the organization of its programs (announcements on the timetables, on the exam schedules, on the results)	CF12	2%	CF12 x 0,02
The University has a set of by-laws that include regulations for exams, the management of absences, fraud and discipline, the announcement of results and procedures for student appeal of grades.	CF13	6%	Oui : Score x 0.06 Non : 0
The by-laws are published on the University's website	CF14	2%	Oui : Score x 0.02 Non : 0
Number of studies, surveys and reports published annually by the University that are related to its educational mission	CF15	2%	CF15 x 0,02
Number of physical places offered in proportion to the total number of registered students	CF16	2%	CF16 x 0,02
Pedagogical supervision rate	CF17	6%	CF17 x 0,06
Administrative staffing rate	CF18	6%	CF18 x 0,06
Number of meetings, seminars and training cycles organized annually by the University for the benefit of its staff for the	CF19	4%	CF19 x 0,04

support and improvement of training activities and pedagogical and administrative supervision			
Number of university libraries.	CF20	4%	CF120 x 0,04
Number of books and publications per number of students	CF21	6%	CF12 x 0,06
The University has an online subscription to documentation resources (size of the resources in proportion to the number of students)	CF22	4%	CF21 x 0,04
Number of structures dedicated to pedagogical innovation implemented by the University for the benefit of its staff (digital pedagogical production center, multimedia resource center for the production of online courses...)	CF23	6%	CF22 x 0,06
The University carries out annual self-evaluations of its training mission (evaluation of teachers and teaching, evaluation of administrative support services)	CF24	6%	Yes : Score x 0.06 No : 0
The University publishes on its website the annual self-evaluation reports of its training mission	CF25	2%	Yes : Score x 0.02 No : 0
Overall score attributed to the training	**25 Σ CF x 0,3 i=1**		**CF** : Score assigned to each criterion

RESEARCH, COOPERATION AND PARTNERSHIP	**R**	**30%**	**Score assigned to each criterion**
The University has a structure for monitoring and prospecting scientific and technological advances	CR1	2%	Yes : Score x 0.02 No : 0
The University has a dedicated structure for the valorization of scientific research results	CR2	2%	Yes : Score x 0.02 No : 0
The University has a research ethics charter	CR3	2%	Yes : Score x 0.02 No : 0
The University has an internal rules of procedure for the organization of research activities within the institution	CR4	2%	Yes : Score x 0.02 No : 0
Number of national research projects (related to national calls for proposals) in proportion to the number of researchers at the University.	CR5	6%	CR5 x 0,06
Number of national research projects (carried out in partnership with companies) in proportion to the number of researchers at the University	CR6	6%	CR6 x 0,06
Number of national cooperation programs and/or projects in proportion to the number of researchers at the University	CR7	4%	CR7 x 0,04
Number of international research programs and/or projects in proportion to the number of researchers at the University	CR8	8%	CR8 x 0,08
Number of international cooperation programs and/or projects in proportion to the number of researchers at the University	CR9	4%	CR9 x 0,04
Number of foreign researchers (research students, university lecturers and researchers) hosted each year by the University in the framework of international research programs and projects, in proportion to the number of researchers at the University	CR10	4%	CR10 x 0,04

Annual budget (from the governmental grant) awarded by the University for the development of research activities in proportion to the number of researchers at the University	CR11	2%	CR11 x 0,02
Annual budget (from the revenues of the University: income from continuing education, from national and international research programs and projects, from provision of services...) awarded by the University to the development of research activities in proportion to the number of researchers at the University	CR12	4%	CR12 x 0,04
Number of scientific events (national and international conferences and seminars with presentation of scientific papers) organized annually by the University in proportion to the number of researchers at the University	CR13	4%	CR13 x 0,04
Number of scientific publications indexed in SCOPUS database in proportion to the number of researchers at the University	CR14	10%	CR14 x 0,1
Number of scientific publications indexed in WEB OF SCIENCE database in proportion to the number of researchers at the University	CR15	10%	CR15 x 0,1
Number of publications other than those indexed by SCOPUS and WEB OF SCIENCE in proportion to the number of researchers at the University	CR16	6%	CR16 x 0,06
Number of patents registered at a national level in proportion to the number of researchers at the University	CR17	6%	CR17 x 0,06
Number of internationally registered patents (PCT) in proportion to the number of researchers at the University	CR18	8%	CR18 x 0,08
Number of startups created annually, in proportion to the number of researchers at the University	CR19	6%	CR619 x 0,06
Number of documents published annually (on paper or on the website of the University) on the research activities of the University (reports on the progress of research at the University, annual list of scientific publications, reports and proceedings of scientific events, documents to disseminate the work of scientific research, especially for the benefit of youth, schools and civil society ...)	CR20	4%	CR20 x 0,04
Overall score attributed to research, cooperation and partnership	**20 Σ CR x 0,3 i=1**		**CR** : Score assigned to each criterion

SERVICES RENDERED TO SOCIETY/REGION	**S**	**20%**	**Score assigned to each criterion**
The University offers continuing education programs adapted to the needs of the Region's economic and social actors (Number of programs and training courses offered and proportion of students in relation to the total number of students enrolled at the University)	CS1	15%	(NP x PA) x 0.15 NP : Nb. Of programs PA : Proportion of students
The University develops useful research, oriented towards the needs of the regional socio-economic sector, within a partnership framework with the Regional Council (Number of projects and amount of funding granted)	CS2	15%	(NP x MF) x 0.15 NP : Nb. Of projects FA : Funding amount (Millions of MAD)

The University participates in the preparation and monitoring of the State/Region plan and program contracts (Number of program contracts in which the University is involved)	CS3	10%	CS3 x 0.1
The University has an intermediary structure with the socio-professional sector	CS4	5%	Yes : Score x 0.05 No : 0
The University puts its infrastructure and the know-how of its teaching and research staff at the service of the economic and social stakeholders and the manufacturing sectors of the Region for provison of services (Annual number of services provided by the University)	CS5	10%	CS5 x 0.1
The University is involved in the managing boards of professional associations at the regional and national levels (Number of associations where the University is involved)	CS6	10%	CS6 x 0.1
The University is involved in the managing boards of local authorities at regional and national levels (Number of local authorities where the University is involved)	CS7	10%	CS7 x 0.1
The University is involved in the managing boards of socio-cultural associations at the regional and national levels (Number of Associations where the University is involved)	CS8	10%	CS8 x 0.1
The University sets up, manages or participates in the management of projects aimed at supporting local communities (Annual number of projects set up, managed or co-managed by the University)	CS9	15%	CS9 x 0.15
The University organizes civic activities for the benefit of the region's stakeholders (Annual number of civic activities organized)	CS10	5%	CS10 x 0.5
Overall score attributed to services rendered to the Society/Region	**10** **Σ CS x 0,2** **i=1**		**CS** : Score assigned to each criterion

STUDENT LIFE	**E**	**20%**	**Score assigned to each criterion**
The University provides a Reception, Information, Orientation and Career Center	CE1	10	Yes : Score x 0.1 No : 0
The University has internal rules of procedure for student life which specify the rights and obligations of students within the institution.	CE2	5	Yes : Score x 0.05 No : 0
Number of brochures (by type) and flyers (by type), other than those promoting the University's educational offerings, available in the Reception, Information, Orientation and Career Center	CE3	5	CE3 x 0.05
Number of elected students present in the University's decision-making bodies	CE4	5	CE4 x 0.05
Number of Student Clubs	CE5	10	CE5 x 0.1
Number of student associations	CE6	10	CE6 x 0.1
Number of artistic workshops provided by the University for the benefit of students	CE7	5	CE7 x 0.05
Number of sports facilities, other than those of « national office of social and cultural university works », installed by the University for the benefit of students	CE8	5	CE8 x 0.05

Annual number of scientific, cultural and sports events organized by students, in proportion to the total number of students at the University	CE9	10	CE9 x 0.1
Annual number of prizes and trophies won by the University's students at scientific, cultural or sports events, in proportion to the total number of students at the University	CE10	10	CE10 x 0.1
Number of health facilities available to students within the University	CE11	5	CE11 x 0.05
The University has a listening and psychological follow-up unit for students	CE12	5	Yes : Score x 0.05 No : 0
Annual budget (in per cent of the University's overall budget) allocated to scientific, cultural and sports events and to the activities of student clubs and associations, in proportion to the total number of students at the University	CE13	5	CE13 x 0.05
University attractiveness: Number of foreign students hosted by the University in the framework of international mobility programs	CE14	10	CE14 x 0.1
Overall score attributed student life	**14** **Σ CE x 0,2** **i=1**		**CE** : Score assigned to each criterion

This method allows a ranking of the universities based on the total of the scores obtained for each university (total of the scores attributed to each criterion for each university, which are compiled from the raw data collected for each university).
From a size point of view (number of establishments, number of courses, number of university lecturers and researchers, number of laboratories, number of scientific articles produced per year, financial means allocated...), larger universities are not systematically more efficient than smaller universities.
In order to mitigate the discrepancies that may exist between large and small universities and that could distort their ranking, we have conducted a ranking process which takes into account the deviations of the raw values from their mean, in other terms, the Standardized Value.
To identify the Standardized Value (z-score) of a given criterion, we proceeded to calculate the arithmetic mean (μ), the variance (σ2) and the standard deviation (σ) of the set of values (x) of the criterion (which is called the sample), collected from all the Universities studied, then we substructed from the raw value of the criterion (x), the mean of the sample (μ), and subsequently divided the found result by the standard deviation (σ) of the same sample :

$$z = (x- \mu) / \sigma$$

$$\mu = (\Sigma x) / n$$

$$\sigma^2 = (\Sigma (x- \mu)^2) / (n-1)$$

4. Results and discussion

To test the proposed method, we generated data on 10 universities numbered from 1 to 10 (Univ. 1 to 10, Table 2). This data was compiled from the websites of the different national universities and from the statistical records of the Department of Higher Education and Scientific Research.

Table 2 Quantifying the criteria

Code/Criterion	Weight.	Univ. 1	Univ. 2	Univ. 3	Univ. 4	Univ. 5	Univ. 6	Univ. 7	Univ. 8	Univ. 9	Univ. 10
F	30%										
Total number of students		101 600	86 700	72 800	69 300	66 500	61 200	59 800	55 000	49 500	42 800
Total number of researchers		2 050	1 820	1 430	960	780	640	530	470	420	396
Total number of administrative staff		980	820	710	650	540	440	350	320	290	260
CF1	8%	62	43	38	31	28	26	24	41	28	25
CF2	8%	3	0	0	2	3	0	1	5	7	2
CF3	4%	24	20	8	12	28	6	34	62	14	0
CF4	4%	1,83%	1,49%	1,57%	1,34%	1,26%	1,27%	1,20%	2,24%	1,70%	1,75%
CF5	4%	0,09%	0,00%	0,00%	0,09%	0,14%	0,00%	0,05%	0,27%	0,42%	0,14%
CF6	4%	1,18%	1,15%	0,55%	0,87%	2,11%	0,49%	2,84%	5,64%	1,41%	0,00%
CF7	2%	178	126	92	90	118	64	118	216	98	54
CF8	2%	25	18	13	13	17	9	17	31	14	8
CF9	2%	13	9	7	6	8	5	8	15	7	4
CF10	2%	19	14	10	10	13	7	13	23	11	6
CF11	2%	4	3	3	2	5	2	3	4	2	3
CF12	2%	13	11	5	8	6	14	6	12	6	7
CF13	6%	1	1	1	1	0	1	1	1	1	0
CF14	2%	1	0	1	1	0	0	1	1	0	0
CF15	2%	1	0	2	0	0	1	0	2	0	0
CF16	2%	59%	48%	62%	56%	58%	62%	69%	61%	66%	74%
CF17	6%	0,020	0,021	0,020	0,014	0,012	0,010	0,009	0,009	0,008	0,009
CF18	6%	0,010	0,009	0,010	0,009	0,008	0,007	0,006	0,006	0,006	0,006
CF19	4%	3	3	2	1	0	2	1	2	3	1
CF20	4%	12	10	10	8	7	7	7	6	5	4
CF21	6%	2,36	2,31	2,75	2,31	2,11	2,29	2,34	2,18	2,02	1,87
CF22	4%	0,031	0,022	0,011	0	0	0	0,009	0,049	0	0
CF23	6%	2	1	1	1	2	0	1	2	0	1
CF24	6%	0	0	0	1	1	0	0	0	0	0
CF25	2%	0	0	0	1	1	0	0	0	0	0
R	30%										
CR1	2%	1	1	0	0	1	1	0	1	0	0
CR2	2%	1	1	1	1	1	0	1	1	0	1
CR3	2%	1	1	1	1	0	1	1	1	1	0
CR4	2%	1	1	1	1	0	1	1	1	1	0
CR5	6%	0,010	0,008	0,006	0,013	0,013	0,013	0,030	0,051	0,019	0,015
CR6	6%	0,003	0,002	0,004	0,008	0,004	0,008	0,008	0,017	0,005	0
CR7	4%	0,002	0,001	0,003	0,006	0,003	0,005	0,005	0,011	0,003	0
CR8	8%	0,004	0,003	0,006	0,013	0,006	0,012	0,011	0,026	0,007	0
CR9	4%	0,004	0,003	0,005	0,010	0,005	0,009	0,009	0,020	0,006	0
CR10	4%	0,012	0,007	0,011	0,021	0,010	0,038	0,023	0,034	0,014	0,010
CR11	2%	7	6	5	4,8	4	4,2	3,8	3,5	1,9	1,4
CR12	4%	1,2	0,7	0,9	1,3	1,1	0	0	5,2	0	0
CR13	4%	0,006	0,004	0,006	0,005	0,005	0,197	0,006	0,011	0,005	0,005
CR14	10%	0,059	0,044	0,042	0,042	0,071	0,102	0,113	0,043	0,024	0,025
CR15	10%	0,070	0,053	0,050	0,050	0,085	0,122	0,136	0,051	0,029	0,030
CR16	6%	0,117	0,088	0,084	0,083	0,141	0,203	0,226	0,085	0,048	0,051
CR17	6%	8	6	2	5	3	1	4	6	0	0

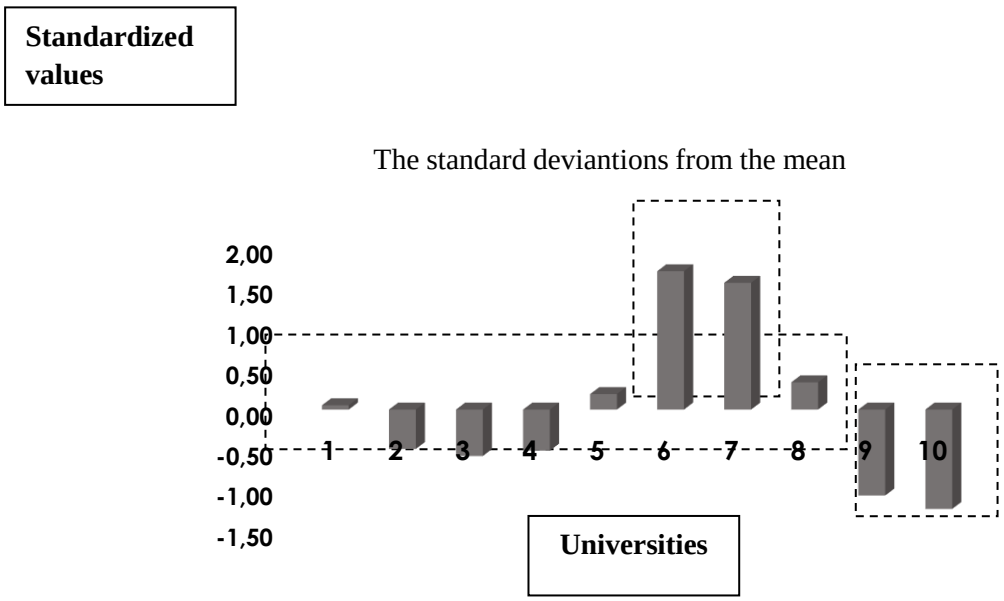
CR18	8%	3	3	2	2	2	2	1	3	0	0
CR19	6%	4	0	0	0	0	1	0	2	0	0
CR20	4%	13	5	4	2	1	6	2	4	1	1
S	20%										
CS1	10%	8	7	3	4	9	2	11	21	5	0
CS2	5%	0,002	0,002	0,001	0,001	0,003	0,001	0,004	0,008	0,002	0,000
CS3	10%	4	3	2	3	2	1	3	4	2	0
CS4	5%	2	1,5	1,2	1,8	2,1	0,6	1,8	2,2	1,1	0
CS5	10%	1	0	0	0	0	0	0	1	0	0
CS6	5%	1	1	1	1	1	1	1	1	1	0
CS7	10%	6	4	3	2	4	1	2	4	1	1
CS8	10%	3	1	1	0	0	2	0	1	0	0
CS9	10%	2	0	0	0	0	0	1	1	0	0
CS10	10%	1	0	2	0	0	0	0	2	0	0
CS11	10%	2	1	0	0	0	0	1	1	0	0
CS12	5%	3	1	2	0	0	2	0	2	0	0
E	20%										
CE1	10%	1	1	0	0	1	0	0	1	0	0
CE2	5%	1	1	1	1	1	1	0	1	1	0
CE3	5%	9	5	0	0	3	0	0	7	0	0
CE4	5%	14	11	10	10	12	11	10	11	8	6
CE5	10%	12	8	8	5	6	4	4	6	2	2
CE6	10%	4	0	2	0	0	0	0	2	0	0
CE7	5%	4	0	3	0	0	0	0	3	0	0
CE8	5%	4	3	3	0	2	0	0	2	2	2
CE9	10%	1E-04	9E-05	1E-04	7E-05	9E-05	7E-05	7E-05	1E-04	4E-05	5E-05
CE10	10%	6	4	4	2	3	0	2	3	0	0
CE11	5%	3	2	2	1	2	1	1	2	1	1
CE12	5%	1	0	1	0	0	0	0	1	0	0
CE13	5%	4,72	2,77	4,12	2,16	2,71	1,96	2,01	4,36	1,21	1,40
CE14	10%	26	8	4	0	0	6	0	12	0	0

The purpose of this exercice is not to rank the Moroccan universities, but to test the proposed methodology : we initially conducted a ranking from the selected criteria on the basis of raw data (Table 3), followed by another ranking on the basis of the standardized value, to mitigate the discrepancies and identify the appropriate number of clusters of universities to retain.

Table 3 University ranking based on raw scores

University	Scores	
	Raw values	Standardized values
Univ. 6	147,49	1,71
Univ. 7	142,09	1,57
Univ. 8	95,76	0,34
Univ. 5	90,29	0,19
Univ. 1	85,05	0,05
Univ. 2	64,70	-0,49
Univ. 4	63,95	-0,51
Univ. 3	61,44	-0,57
Univ. 9	43,03	-1,06
Univ. 10	36,78	-1,23

In the matter of the ranking based on the standardized values and after producing a bar chart comparing the distribution of the scores in relation to the average score of the ten Universities (Figure 1), only three clusters emerge from the chart, which reduces the differences between universities and allows a more coherent ranking.



Class	Scores	Universities
A	> 36 to < or = 73.33	6 and 7
B	> 73.33 to < or = 110.67	1,2, 3, 4, 5 and 8
C	> 110.67 to < or = 148	9 and 10

The ranking is not presented by university but by clusters of universities. This intends to limit the disparities that may exist between the different universities and to give a more comprehensive overview of the Moroccan university landscape.
We no longer approach the ranking from first and last Universities perspective, because all Moroccan Universities are equal and under the same constraints, although to different levels from one region to another, but rather we refer to Class A Universities, Class B Universities and Class C Universities.

The methods applied to rank universities are considerably different from one system to another. Although the criteria are, in most cases, quite similar, discrepancies in the definition of quality criteria and indicators, data collection and measurement methods, and presentation format generate results that are often significantly different and prone to dispute [46].

In the majority of the rankings, a score assessing the academic and scientific performance of each university is awarded. The higher the score, the better the institution is ranked.
Nevertheless, this approach raises the question of how to define the academic and scientific performance of a university ? Can we compare American, European, Chinese, Arab universities, etc ? Those of developed, emerging or developing countries ? Public universities financed by their governments and regions and private universities ? With somewhat different missions ? And do regional and global university ranking systems all perceive academic and scientific performance in a similar light ?

The stumbling block with these rankings, and the organizations that produce them, is the definition they give to the quality of a university, as a starting point of any ranking, and the nature of the data used. On one hand, this definition is drawn up by the organization producing the ranking, without any data on the quality of the decision-makers for such a definition or any argument justifying the choice of this definition,
On the other hand, the criteria and indicators used to measure the quality, the weighting and the methods of calculation applied, vary significantly from one ranking to another, resulting with equally different outcomes.

The results are very divergent if we consider the number of Nobel Prize winners as an indicator of education quality, as is the case for the Shanghai ranking, or the student-to-teacher ratio, as is the case for the THES ranking, or if we assign a weighting of 30% to research, as is the case for the THES, or 40%, as is the case for the Shanghai ranking.

The nature of the data use is open to controversy as well. Some rankings, such as the Webometrics ranking, are based on quantifiable data, on the basis of criteria defined by the ranking organization itself, while others, are based on qualitative data, survey-based, or obtained through expert evaluators, which remain quite subjective, with a lack of disclosure on the origin and quality of the expert-evaluators who perform these assessments.
Many factors make the international and regional rankings of universities - which are complex institutions given the multiplicity of their establishments and the nature of the services offered to their users- very unreliable.

In the present study, we have derived the criteria for ranking the national universities from the National Reference framework for Evaluation and Quality Assurance of Higher Education Institutions, issued by the ANEAQ, a nationally renowned and acknowledged organization. We have ensured, to the extent possible, that the majority of the criteria are quantitative and therefore measurable.

In this approach we have considered the criteria at the University level with a ranking of the Universities as a whole. The same approach, with the same criteria, can be used at the level of disciplinary fields to carry out a ranking:

- by disciplinary field :
  - ✓ Science and Technology and Engineering Sciences: the criteria will be determined for the Faculties of Science (FS), the Faculties of Science and Technology (FST), the National Schools of Applied Sciences (ENSA), the Engineering Schools (EI), the Health Sciences Establishments (Faculties of Medicine and Pharmacy -FMP-, Higher Institute of Health Sciences- I3S-...) and any other establishment, or component of the establishment, with a scientific and technical character;
  - ✓ Humanities: Faculties of Humanities (FLSH); Faculty of Languages, Arts and Humanities (FLASH), Faculty of Education (FSE) and any other institution or component of the institution in the field of Humanities;
  - ✓ Legal, Economic and Management Sciences: Faculty of Legal, Economic and Social Sciences, Faculties of Legal and Political Sciences, Faculties of Economics and Management, National School of Business and Management and any other institution or component of the institution in the field of Legal, Economic and Management Sciences.

- By type of institution (classify the FS or the FST or the ENSA or the EI or the FMP or the I3S or the FLSH or the FLASH or the FSE or the FSJES or the FSJP or the FEG or the ENCG or any other type of institution.

The method we have undertaken appears to be more appropriate, it complies with three principles:
- The clarity of the definition of the ranking criteria allows us to produce global rankings by university but also by disciplinary field or by institution;
- The ranking can be presented both globally and by indicator, which allows the user to customize the ranking according to his needs rather than relying on a global score;
- The rankings are displayed by class of universities, with similar scores, in contrast to what is commonly used by international and regional ranking systems.

The study's discoveries offer fresh insights to address the growing national problem of defining academic excellence, university performance, and transparent systems of accountability for institutions. Refining and implementing the suggested ranking criteria for Higher Education Institutions (HEIs) in Morocco in a progressive manner will produce valuable data that is in demand internationally and stimulate the debate on transparency and accessibility of data, performance metrics, and accountability. However, to ensure significant impact, the ranking system must be accurately formulated, thoroughly verified, and disseminated in an appropriate and useful form, to effectively provide the relevant information to both students, institutions, and policymakers about academic quality.

Reference

[1] Baldock, «University rankings and medical physics.,» Australasian Physical and Engineering Sciences in Medicine, pp. 36(4), 375-378 , 2013.

[2] A. MACLEAN, «Where we get our best men, some statistics showing their nationalities, counties, towns, schools, universities, and other antecedents,» London Editor, 1900.

[3] L. Myers et J. Robe, «College Rankings: History, Criticism and Reform,» Center for College Affordability and Productivity, Washington, 2009.

[4] E. Havelock, «A study of British genius,» Hurst et Blackett Editeurs,, 1904.

[5] R. Hughes, «Une étude des écoles supérieures d'Amérique.,» Miami University Press, Oxford, 1925.

[6] J. Shin, T. Cheol, K. Robert et U. Teichler, University Rankings: Theoretical Basis, Methodology and Impacts on Global Higher Education, The Changing Academy – The Changing Academic Profession in International Comparative Perspective, 2011.

[7] N. A. Bowman et M. N. Bastedo, «Getting on the Front Page: Organizational Reputation, Status Signals, and the Impact of "U.S. News and World Report" on Student Decisions,» Research in Higher Education, 2009.

[8] M. Crozier, «L'évaluation des performances pédagogiques des établissements universitaires.,» Rapport au Ministre. Paris : La Documentation française, 1990.

[9] M. Kogan, «Evaluating higher education.,» Paris/Londres : OCDE/Jessica Kingsley, 1992.

[10] C. THELOT, «L'évaluation du système éducatif : coûts, fonctionnement, résultats,» 1993.

[11] C. GELLERT, «Innovation and adaptation in higher education. The changing conditions of advanced teaching and learning in Europe.,» Paris/Londres : OCDE/Jessica Kingsley., 1994.

[12] COMITE NATIONAL D'EVALUATION, «Évolution des universités, dynamique de l'évaluation : Rapport au président de la République.,» La Documentation française., Paris, 1995.

[13] I. MOSES, «valuation et appréciation du personnel universitaire,» Gestion de l'enseignement supérieur, pp. 8(2), 85-93., 1996.

[14] P. DAUMARD, «Évaluation et management public : le cas des universités,» Revue politiques et management public, pp. 8(1), 47-62, 1990.

[15] A. BARBLAN, « L'évaluation de la qualité : réponses des établissement,» chez Gestion de la qualité : le programme de la Conférence des recteurs européens pour l'évaluation des établissements., 1995.

[16] COMMISSION EUROPÉENNE, «Quality management and quality assurance in European higher education,» Bruxelles, 1993.

[17] F. VAN VUGHT et D. WESTERHEIJDEN, «Institutional evaluation and management for quality.,» chez Conférence des recteurs européens, Genève, 1997.

[18] S. Jamil et S. Alenoush, «Les palmarès d'universités comme moyens d'action : usages et abus,» Politiques et gestion de l'enseignement supérieur, pp. 33-74, 2007.

[19] E. Hazelkorn, «Impact of Global Rankings on Higher Education Research and the Production of Knowledge,» Forum on Higher Education, Research and Knowledge, p. Occasional Paper No. 18., 2009.

[20] V. Goglio, «One size fits all? A different perspective on university rankings,» Journal of Higher Education Policy and Management 38:2, pp. 212-226, 2016.

[21] M. P. çakir, C. Acartürk, O. Alasehir et C. Cilingir, «A comparative analysis of global and national university ranking systems,» Scientometrics, 2015.

[22] G. A. Olcay et M. Bulu, «Is measuring the knowledge creation of universities possible?: A review of university rankings,» technological forcasting and social change, 2016.

[23] U. Teichler, «The Future of University Rankings,» chez The Changing Academy – The Changing Academic Profession in International Comparative Perspective, Springer, Dordrecht, 2011.

[24] A. Usher et M. Savino, «World of Difference: A Global Survey of University League Tables,» Educational Policy Institute, 2006.

[25] W. Locke, L. Verbik, J. T. E. Richardson et R. King, «Counting What Is Measured or Measuring What Counts? League Tables and Their Impact On Higher Education Institutions in England,» Higher Education Funding Council for England, Bristol, UK, 2008.

[26] J. Berbegal-Mirabent et E. Ribeiro-Soriano, «Behind league tables and ranking systems: a critical perspective of how university quality is measured,» Journal of Service Theory and Practice, Vol. 25, 2015.

[27] C. A. REEVES et D. A. BEDNAR, «DEFINING QUALITY: ALTERNATIVES AND IMPLICATIONS,» Academy o/ Management Review, Vol. 19. No. 3, pp. 419-445, 1994.

[28] L. Harvey et D. Green, «Defining Quality,» Assessment & Evaluation in Higher Education, 18:1, pp. 9-34, 2006.

[29] N. PFEFFER et A. COOTE, Is Quality Good for You ? A critical review of quality assurance in welfare services, London: Institute for public policy research, 1991.

[30] J. Salmi et A. Saroyan, «League Tables as Policy Instruments: Uses and Misuses,» Higher Education Management and Policy Volume 19, No. 2, 2007.

[31] D. D. DILL et M. SOO, «Academic quality, league tables, and public policy: A cross-national analysis of university ranking systems,» Higher Education , p. 495–533, 2005.

[32] F. Anowar, M. A. Helal, S. Afroj, S. Sultana, F. Sarker et K. A. Mamun, «A Critical Review on World University Ranking in Terms of Top Four Ranking Systems,» chez International Conferences on Engineering Education, Instructional Technology, Assessment, & E-learning in the 9th Annual International Joint Conferences on Computer, Information, Systems Sciences, & Engineering, University of Bridgeport, Connecticut, USA, 2013.

[33] S. Marginson, «University Rankings and Social Science,» uropean Journal of Education, Vol. 49, pp. 45-59, 2014.

[34] C. Yin Cheong et T. Wai Ming, «Multi-models of quality in education,» Quality Assurance in Education, vol 5, issue 1, pp. pp.22-31, 1997.

[35] D. Adams, «DEFINING EDUCATIONAL QUALITY,» Improving Educational Quality Project, 1993.

[36] B. Longden, « Ranking indicators and weights. In University Rankings,» Springer, Dordrecht., pp. 73-104, 2011.

[37] V. M. H. BORDEN et K. V. Bottrill, «Performance indicators: History, definitions, and methods,» The Evolution of Diversity, Equity & Inclusion, Institutional Research, & Data, 1994.

[38] S. Cuenin, « 'The Case of Performance Indicators in Universities: An International Survey,» International Journal of Institutional Management. Vol 11 No2, pp. pp 117-139, 1987.

[39] B. LONGDEN, «Ranking indicators and weights,» University Rankings, Springer, Dordrecht, pp. 73-104, 2011.

[40] M. Hosier, B. Kumar et A. Hoolash, «The effect of methodological variations on university rankings and associated decision-making and policy,» Studies in Higher Education, 2017.

[41] I. Aguillo, J. Bar-Ilan, M. Levene et J. Ortega, «Comparing university rankings,» Scientometrics. 85, pp. 243-256, 2010.

[42] K. Soh, «Misleading university rankings: cause and cure for discrepancies between nominal and attained weights,» Journal of Higher Education Policy and Management, 35:2, pp. 206-214, 2013.

[43] M. Saisana et B. d'Hombres, «Higher Education Rankings: Robustness Issues and Critical Assessment,» Joint Research Centre, European Commission, Napples, 2008.

[44] ANEAQ, «Critères de qualité : Référentiel national d'évaluation et d'assurance qualité de l'enseignement supérieur,» Janvier 2020.

[45] A. F. Marrelli, «Unobtrusive measures,» The Performance Technologist's Toolbox, Volume 46, Issue9, pp. 43-47, 2007.

[46] J. JOHNES, «University Rankings : What do they really show?,» Scientometrics, pp. 115(1), 585-606, 2018.