URAP 2020-2021 WORLD UNIVERSITY SUBJECT RANKING PRESS RELEASE

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URAP (University Ranking by Academic Performance)

URAP is a non-profit organization established at the Informatics Institute of the Middle East Technical University Turkey in 2009.

URAP team members are METU researchers voluntarily participating in URAP Research Lab as a public service. The main objective of URAP is to develop a ranking system for the world universities based on academic performance indicators that reflect the quality and the quantity of their scholarly publications. In line with this objective, URAP has been annually releasing the World Ranking of Higher Education Institutions since 2010 and Field Rankings since 2011. The most recent rankings include 3000 HEIs worldwide, as well as 62 different specialized subject areas. As of 2018, URAP has increased the number of universities in the world's general ranking to 3,000 and the number of subjects in subject ranking from 43 to 62.

Introduction

As globalization drives rapid change in all aspects of research & development, international competition and collaboration have become high-priority items on the agenda of most universities around the world. In this climate of competition and collaboration, ranking universities by their performance has become a popular and debated research area. All universities need to know where they stand among other universities in the world to evaluate their current academic performance and develop strategic plans to strengthen their progress. To address this need, several ranking systems have been proposed since 2003, including ARWU-Jiao Tong (China), THE (United Kingdom), Leiden (The Netherlands), QS (United Kingdom), Webometrics (Spain), HEEACT/NTU (Taiwan) and SciMago (Spain) which rank universities worldwide based on various indicators. The use of bibliometric data obtained from widely known and credible information resources such as Web of Science, Scopus, and Google Scholar has contributed to the objectivity of these ranking systems. Nevertheless, most ranking systems cover up to the top 700-1000 universities worldwide, representing institutions located in developed countries. Universities from other countries also deserve and need to know where they stand among different institutions at global and national levels. This motivated us to develop a multi-criteria ranking system that is more comprehensive in coverage so that more universities will have a chance to observe the state of their academic progress.

Aim and Scope

For World university general rankings and subject rakings URAP focuses on academic quality. For geneal rankings URAP gatheres data for 3,500 Higher Education Institutes (HEI) to rank these organizations by their academic performance. The overall score of each HEI is based upon its performance over several indicators described in the Ranking Indicators section. The ranking includes HEIs except for governmental, academic institutions, e.g., the Chinese Academy of Science and the Russian Academy of Science.

The data for 3,500 HEIs is processed, and the top 3,000 of them are scored for general ranking of world universities. Thus, URAP covers approximately 15% of all HEIs globally, for general rankings making it one of the most comprehensive university ranking systems in the world. For subject ranking 62 subjects are covered.

URAP ranking system for general and subject rankings is entirely based on objective data obtained from reliable open sources. The system ranks the universities according to multiple criteria. As of 2017, URAP employed a new filter for the article and citation indicators to promote publication quality by focusing on articles published in journals listed within the first, second, and third quartiles regarding their Journal Impact Factor within their respective subject areas.

The goal of the URAP ranking system is not to label world universities as best or worst. Instead, our intention is to help universities identify potential areas of progress concerning specific academic performance indicators. Like other ranking systems, the URAP system is neither exhaustive nor definitive and is open to new ideas and improvements. The current ranking system will be continuously upgraded based on our ongoing research and the constructive feedback of our colleagues.

World Ranking Indicators

URAP 2020-2021 World University Subject Ranking is based on six academic performance indicators. Since URAP is an academic performance-based ranking, publications constitute the basis of the ranking methodology. Both quality and quantity of publications and international research collaboration performance are used as indicators. The indicators, the data sources, and the duration of coverage are summarized in the table below.

Indicator	Objective	Coverage	Source
Article	Current Scientific Productivity	2020	InCites
Citation	Research Impact	2016-2020	InCites
Total Document	Scientific Productivity	2016-2020	InCites
Article Impact Total	Research Quality	2016-2020	InCites
Citation Impact Total	Research Quality	2016-2020	InCites
International Collaboration	International Acceptance	2016-2020	InCites

Data Collection & Scoring

For 2020-2021 Subject Ranking data was gathered from Web of Science and InCites. We combined the sub-headings in the Web of Science Categories field with 62 upper fields and rank them accordingly. The main lists of these fields can be reached from the addresses given below.

https://images.webofknowledge.com/images/help/WOS/hp_subject_category_terms_tasca.html
https://incites.help.clarivate.com/Content/Research-Areas/wos-research-areas.htm

Web of Science uses two different terms as "category" and "research area"
Their explanation is given below.
"Journals and books covered by Web of Science Core Collection are assigned to at least one Web of Science category. Each Web of Science category is mapped to one research area."

The reliability of ranking depends mainly on the quality of the data used. To provide reliable data, pre-processing and data cleaning techniques were employed. Statistical analysis indicated that the raw bibliometric data underlying our indicators had highly skewed distributions. Therefore, the indicator values above and below the median are linearly scored in two groups. The Delphi system was conducted with a group of experts to assign weighting scores to the indicators. A total score of 600 is distributed to each indicator as follows:

- Article: %21
- Total Document: %10
- Citation: %21
- Article Impact Total: %18
- Citation Impact Total: %15
- International Collaboration: %15

The pandemic process, which started in China in December 2019 and is continuing, has had a global impact, negatively affecting almost all universities. As the URAP team, we hope that all countries will overcome the adverse developments as soon as possible with minor damage and that the education and research activities in the universities will start to be carried out without any problems.

For university candidates, world field rankings are critical in their university preferences to study abroad. All over the world, university administrators, academics, students and parents, and press and media organs monitor world rankings closely. Ranking results are frequently featured in the media and social media. The universities, which have been criticized for their insufficient academic production, have begun to highlight scientific publication and citation issues in their strategic plans. Especially the universities in developing countries have started to give importance to the scientific articles of the candidates and the number of citations they received in terms of appointment and promotion criteria to rise in the rankings. For this reason, the URAP team deemed it necessary to increase the number of fields to 62 in the world subject rankings to provide detailed information to candidates and universities. In addition, some universities that focus on a specific field such as Social Sciences and Fine Arts seem to be behind in the general rankings. By increasing the number of subjects in the URAP rankings, we hope to help successful universities focus on sub-fields to stand out.

In the last ten years, universities in developed countries, such as the USA, Netherlands, England, Germany, France, Australia, Switzerland, Belgium, Canada, and China, have been at the top of almost all subjects of the URAP world subject rankings. On the other hand, universities of developing countries take place in relatively few subjects. Unfortunately, universities of some developing countries cannot

enter any of the 62 subject ranking lists. The main reason underlying this situation is that many academicians in developing countries cannot publish scientific articles in internationally respected journals.

The fact that the share of national income allocated to R&D in developing countries is much lower than in developed countries is one of the most important reasons they cannot enter world university subject rankings. Another reason why most universities in developing countries cannot enter the world subject rankings is that the average education level of society is still deficient.

The moves to increase the average education level of countries were observed globally in the last century, including most of the developed countries in Europe. After the 1st and the 2nd World Wars, the implemented policies aimed to increase education quality in primary, secondary, and higher education institutions despite the economic difficulties. While prioritizing scientific research and raising the average education level, they focused on knowledge and technology production in their well-established universities. By exporting the information and technologies developed in universities, these countries managed to increase their national income in a short time. South Korea was one of the Far East countries that achieved the success observed in the developed countries of Europe. After the World War 2, Japan, Singapore, and China implemented strategies to improve the quality of education and increase their R&D budgets. For developing countries to be among the economically developed countries, as in the examples of Europe and some Far East countries, they need to increase the quality of education and raise the average education level of the society, increase the knowledge production in their universities, and bring the technologies produced in universities and technology parks to a level that can be exported.

Unfortunately, although it is claimed to be scientific in recent years, many journals operating primarily for commercial purposes and scientific standards are kept in the background have emerged. The articles published in these journals cannot be cited because scientists do not read them. Especially academics at universities in some developing countries publish many articles in such journals with low or zero impact value. Therefore, universities whose academics tend to such journals cannot take place in world rankings. Universities that want to enter the world's general and subject rankings or rise to higher levels in these rankings should increase the number of articles in journals with high impact value and not publish articles in journals with low or zero impact value. Especially, the number of citations per publication decreases as the number of uncited articles increases, pushing the university down in the rankings since the number of citations per publication is a crucial indicator like the number of articles in the rankings. Accordingly, universities that can prevent academics from publishing articles in journals with low impact will increase their chances of being ranked higher in rankings based on scientific productivity and publication quality.

EVALUATION OF URAP 2020-2021 URAP SUBJECT RANKING RESULTS

URAP 2020-2021 world university subject Ranking tables are available at the address below https://urapcenter.org/Rankings/2020-2021/fields

The URAP subject ranking uses the data provided by Clarivate Analytics InCites for articles and citations. No subjective data is taken into consideration, based on personal comments obtained through surveys and similar methods. The URAP subject rankings provide an assessment of the academic performance of the last five years. The effect of the articles, total documents, and citations of universities in the relevant field and international cooperation indicators are used in the rankings. Articles with 1,000 or more authors in the URAP field ranking are not taken into consideration.

TOP WORLD UNIVERSITIES

The current assessment presented in this report has shown that Chinese universities ranked first in 21 of the 62 subject areas, and the US universities ranked first in 19 subject areas. For the first time in our rankings since 2010, this year, China ranked first in the world in 21 science fields, dropping the USA to second place. While the Netherlands ranked first in 9 subjects, England in 6 subjects, France in 2 subjects, and Brazil in 2 subjects; Singapore, Switzerland and Hong Kong were first in one subject each. Australia and Malaysia, which took place in the ranking with one field last year, did not take place in the tables this year. Table 1 shows the distribution of the universities that ranked first in the URAP 2020-2021 field ranking by country and how many fields the universities were ranked first.

A closer look at the top universities reveals that Harvard University is ranked first globally in 15 of the 62 subjects. Harvard, which was the first in 15 fields in the previous ranking, continued to be the world leader this year. After Harvard University, Tsinghua University from China became the first in the world in 10 fields and added two subject to the first place, which was 8 in our previous ranking. The University of Amsterdam from the Netherlands has maintained its position as the first in the world in 4 subjects. Geosciences University from China and Wageningen University from the Netherlands kept their position in the previous ranking as the world's first in 3 subjects. In the 62 subjects listed, the first places were shared by nine countries. In the previous ranking, the first places were shared among 11 countries.

At least one university in the USA, England, and Australia has managed to take place in 62 of the 62 subjects, suggesting that these countries have the most successful higher education systems globally. On the other hand, as in previous years, no university can take place 50 or more subject rankings among the universities of developing countries this year.

Table 1: Number of countries and universities ranked first in the 2020-2021 URAP subject ranking

Country/University/Subject	Number of first place in the world
CHINA	**21**
Tsinghua University	**10**
Artificial Intelligence	1
Chemical Engineering	1
Electrical & Electronics Engineering	1
Engineering	1
Environmental Engineering	1
Information & Computing Sciences	1
Materials Engineering	1
Mechanical Engineering	1
Sustainable & Renewable Energy	1
Technology	1
China University of Geosciences	**3**
Archeology	1
Earth Sciences	1
Geology	1
Tongji University	**2**
Architecture	1
Civil Engineering	1
University of Science & Technology Beijing	**1**

Metallurgy Engineering	1
Beihang University	**1**
Aerospace Engineering	1
Beijing Jiaotong University	**1**
Transportation Science & Technology	1
Wuhan University	**1**
Library & Information Science	1
Harbin Institute of Technology	**1**
Robotics & Intelligent Systems	1
Shanghai Jiao Tong University	**1**
Industrial & Manufacturing Engineering	1
USA	**19**
Harvard University	**15**
Biological Sciences	1
Biomedical Engineering	1
Chemical Sciences	1
Dentistry	1
Economics	1
Education	1
Human Movement & Sports Sciences	1
International Relations	1
Medical and Health Sciences	1
Molecular Biology & Genetics	1
Neurosciences	1
Pharmacology	1
Political Science	1
Psychology	1
Psychology and Cognitive Sciences	1
University of Washington Seattle	**1**
Marine Sciences & Technology	1
California Institute of Technology	**1**
Astronomy & Astrophysics	1
University of Pennsylvania	**1**
Nursing	1
University of Colorado Boulder	**1**
Meteorology & Atmospheric Sciences	1
NETHERLANDS	**9**
University of Amsterdam	**4**
Film & Digital Media	1
Journalism	1
Language, Communication and Culture	1
Studies in Creative Arts and Writing	1
Wageningen University & Research	**3**
Agriculture	1
Environmental Sciences	1
Food Engineering	1
Delft University of Technology	**1**
Urban Planning	1
Erasmus University Rotterdam	**1**
Business	1
ENGLAND	**6**

University of Oxford	**5**
History	1
Law and Legal Studies	1
Philosophy	1
Sociology	1
Studies in Human Society	1
University College London	**1**
Anthropology	1
BRAZIL	**2**
Universidade de Sao Paulo	**2**
Veterinary Sciences	1
Zoology	1
FRANCE	**2**
Universite Paris Saclay	**2**
Mathematical Sciences	1
Physical Sciences	1
SINGAPORE	**1**
Nanyang Technological University	**1**
Nanoscience & Nanomaterials	1
SWITZERLAND	**1**
ETH Zurich	**1**
Statistics	1
HONG KONG	**1**
Hong Kong Polytechnic University	**1**
Commerce, Management, Tourism and Services	1

Table 2 summarizes the achievements of countries in 62 subjects. The table shows how many subjects the countries are ranked in and how many universities of each country are in these subject rankings. In URAP's 2020-2021 subject ranking, as in the previous ranking, universities from 90 different countries took place in at least one field ranking this year. However, the total number of universities in at least one field ranking decreased from 1,758 to 1,752. While China's 277 universities are included in at least one subject ranking, the number of universities in the USA with at least one ranking is 250. Japan followed China and the USA with 106 universities. Turkey ranked 17th among countries regarding the number of universities in the field ranking, with 31 universities in the field ranking. Since Turkish universities took place in 26 of 62 subjects, Turkey was able to rank 47th in the evaluation made according to the number of countries in the field ranking.

Table 2: Success of countries in 2020-2021 URAP subject ranking

Country	Number of subject rankings that the countries took place	Number of Universities that took place in the rankings
USA	62	250
ENGLAND	62	71
AUSTRALIA	62	39
CANADA	61	40
NETHERLANDS	61	13
BELGIUM	61	10
GERMANY (FED REP GER)	60	68
FINLAND	60	10
SWEDEN	59	19
DENMARK	59	7

SWITZERLAND	59	11
NORWAY	57	12
SINGAPORE	57	4
ITALY	56	64
SPAIN	54	54
SCOTLAND	54	10
CHINA	53	277
FRANCE	53	75
PORTUGAL	52	15
JAPAN	48	106
BRAZIL	48	40
HONG KONG	48	6
SOUTH KOREA	47	53
ISRAEL	47	7
AUSTRIA	47	14
WALES	46	5
NEW ZEALAND	44	8
IRELAND	41	7
IRAN	40	41
SAUDI ARABIA	40	11
TAIWAN	39	31
SOUTH AFRICA	38	13
CZECH REPUBLIC	38	13
MALAYSIA	38	11
MEXICO	38	11
POLAND	36	37
CHILE	35	16
NORTHERN IRELAND	35	2
GREECE	32	12
SERBIA	30	3
INDIA	28	61
RUSSIA	27	24
HUNGARY	26	8
ARGENTINA	25	8
SLOVENIA	25	2
CROATIA	24	3
TURKEY	24	31
EGYPT	22	14
MACAU	22	2
PAKISTAN	19	10
QATAR	19	2
TUNISIA	18	8
ESTONIA	17	3
THAILAND	16	10
ROMANIA	16	9
UNITED ARAB EMIRATES	16	4
COLOMBIA	13	4
VIETNAM	12	6
URUGUAY	12	1
LITHUANIA	11	4
SLOVAKIA	11	4
ICELAND	11	1
LUXEMBOURG	11	1
CYPRUS	7	1
ALGERIA	6	2

MOROCCO	6	2
UKRAINE	5	2
KAZAKHSTAN	5	1
LEBANON	5	1
BULGARIA	4	2
JORDAN	3	2
KUWAIT	3	1
OMAN	3	1
ETHIOPIA	2	3
GHANA	2	2
NIGERIA	2	2
CAMEROON	2	1
LATVIA	2	1
UGANDA	2	1
BELARUS	1	1
COSTA RICA	1	1
INDONESIA	1	1
KENYA	1	1
MALAWI	1	1
MALTA	1	1
PERU	1	1
REUNION	1	1
TANZANIA	1	1
ZAMBIA	1	1
ZIMBABWE	1	1

The number of articles published in specific fields can vary greatly. For example, the number of articles published in the world in the field of Law is well below the number of scientific articles in the field of Physics. For this reason, the number of universities in the 2020-2021 URAP World field ranking is determined according to the threshold values determined depending on the publication density in the fields where their publications are located. For example, 50 universities in Law and 1,000 universities in Physics are listed. Some universities are not taken into consideration, not because they do not have publications in the relevant field, but because the number of publications did not exceed the threshold value in that field.

CONCLUSION

In most countries, university administrators, students and their parents, state institutions related to education and research strategies, and press members follow world university rankings. In a significant number of countries, measures are taken by university and country administrators to help universities to rise in world university rankings. Research University status is given to some universities with high academic performance in many countries. By creating a competitive environment with this approach, it is aimed that other universities make more efforts to increase their academic performance. As the academic performance of universities increases, their chances of rising in world rankings increase. World university rankings are essential sources for the public to examine the scientific productivity of universities in all countries. World rankings guide universities with low academic performance to make more efforts to increase their number of scientific articles and citations to avoid criticism. The increase in the academic performance of universities paves the way to the rise in the production of information and technology in their countries. Universities that achieve this contribute to the increase of the national income of their countries. For this reason, university rankings are helpful guides, especially for universities in developing countries.

On the other hand, university rankings also significantly affect the decisions of prospective students and their parents who will choose to enter universities in the country and abroad. For example, a research report published in the USA in 2015 showed that students who want to study abroad benefit most from field rankings when choosing a university. However, as interest in world rankings increases, some problems arise. For example, in some international research centers, articles with 2-5 thousand authors are published with the cooperation of many universities. Such multi-authored articles and citations create unfair university rankings for universities unrelated to those research centers. Therefore, articles with 1,000 or more authors in all fields were excluded from the 2020-2021 URAP Field ranking.

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As Middle East Technical University Informatics Institute URAP Laboratory team; We hope that all universities in the world will overcome the COVID-19 epidemic harmlessly and start their academic activities fully in a short time.

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