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Quality Indicators for Engineering and Technology Education

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AC 2010-2111: QUALITY INDICATORS FOR ENGINEERING & TECHNOLOGY EDUCATION

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Quality Indicators for Engineering & Technology Education

Abstract

In recent years the development and use of university rankings, comparisons, and/or league tables has become popular and several methodologies are now frequently used to provide a comparative ranking of universities. These rankings are often based on research and publication activity and also not uncommonly focus on indicators that can be measured rather than those that should be measured. Further, the indicators are generally examined for the university as a whole rather than for university divisions, departments or programs. Implicit also is that placement in the rankings is indicative of quality. This paper provides an overview of the methodologies used for the more popular rankings and summarizes their strengths and weaknesses. It examines the critiques of rankings and league tables to provide appropriate context. The paper then examines the issue of how a university (or a college or program) could be assessed in terms of the quality of its engineering and technology programs. It proposes a set of indicators that could be used to provide relative measures of quality, not so much for individual engineering or technology programs, but rather of the university.

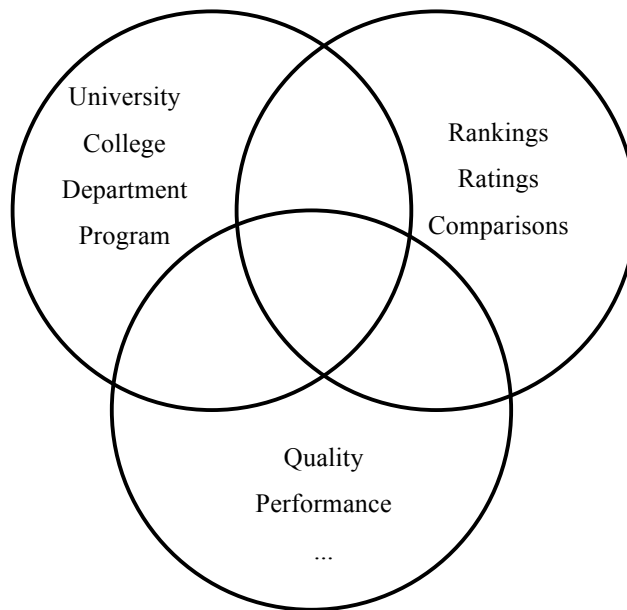
Introduction & Methodology

Today's world, and by all indicators the world of the future, seems to be increasingly competitive^[1] and demanding. Resource scarcity, an increasing imperative for efficiency and effectiveness, manifestly more available information and escalating expectations for quality are but some of the factors that have caused universities, colleges, departments and programs to attend to evaluation, accreditation and invariably rankings and comparisons^[2,3]. Furthermore, increased global and intra-national mobility as well as widespread access to information has created the opportunity for individuals to more carefully research their selection of universities to attend^[4].

Perhaps in response to such pressures, there seems to have been an upsurge in the number of agencies, centers, corporations and others concerned with rankings and comparisons (see Appendix A). The International Observatory on Academic Ranking and Excellence (IREG), The Institute for Higher Education Policy (IHEP), The University of Illinois Education and Social Science library has compiled an extensive set of resources on rankings, which are reproduced in the appendices with permission. There have been numerous conferences addressing this topic as well^[5,6]. Notably, many of the most significant players in the ranking/comparison field have agreed upon a formal set of principles that define quality and good practice for rankings and comparisons^[7]. These are presented in Appendix B.

The authors, in collaboration with their university reference librarians and institutional researchers, conducted an extensive review of the periodical, book, and conference literature. This activity surfaced over 20 different ranking/rating/comparison schemes with significant presence [samples are provided in Appendices C and D] and undoubtedly a multitude of additional ones exist. But, the authors are compelled to ask – What purposes are served by such comparisons^[3,8,9,10] and why so many?

In terms of methodology, this paper resulted from a Search ⇨ Identify ⇨ Analyze ⇨ Synthesize ⇨ Report approach. This began with the co-authors generating a concept map of the key ideas and terms central to their understanding of the problem – i.e., the misunderstandings and misuses of ranking and rating systems. Because the authors operated on both sides of the Atlantic, two significantly different contexts formed the backdrop to this study. The general concept map we used is shown below:



These concepts were used to search the large array of databases, currently well over 100, accessible through the Purdue University Library portal. Conventional Boolean logic was employed. Similarly directed searches of contemporary literature occurred in Europe.

To begin, it seemed prudent for the authors to begin by asking the prior question, namely to what end do universities exist? Why has society established universities? Here we discovered the root of our problem, i.e., the purposes served by universities are diverse, pluralistic, varied and sometimes contradictory ^[11]. Among the purposes with critical mass are such purposes as:

- Liberal education
- Professional education
- Knowledge development/research
- Public service
- Economic development

A salient starting point should be an examination of the role and aims of the university. There is great diversity in higher education today, and many universities' aims are quite different. Thus definition and contextual understanding are important. For example, the American philosopher Robert Paul Wolff speaking from the context of the Vietnam War, addressed the question of the role of the ideal university ^[11]. He questioned whether the university should serve as a 'training camp' for professionals. Wolff directed his criticism against the ideal type of a university of professions towards its lack of intellectual inquiry and critique. He viewed the relationship between professional bodies and academic professionals as being inherently in conflict with the

independent pursuit of knowledge within the ideal university. According to this argument, accreditation is prejudiced because the people who are doing the accrediting likely owe a greater allegiance to the profession than to the university: an inherent conflict of interest.

Consider John Henry Newman's core ideas regarding the value of liberal education put forward in his 19th century book *The Idea of a University* ^[12]. Newman argued that the university is a hybrid educational environment which serves to educate students for life by means of "collegiality", "enlargement of mind" and "acquisition of a philosophical habit of critical thinking". To use 21st century educational jargon, Newman is thus concerned with the learning outcomes of skills and competencies and not primarily with the content of what students learn. But where and how should students attain these skills within the walls of the 21st century university and how should their attainment be measured?

The 21st century world that we live in today is quite different than that of Newman's 19th century. To take the perspective of Rosalind Williams, in speaking on engineering education, she observes, "What engineers are being asked to learn keeps expanding along with the scope and complexity of the hybrid world. Engineering has evolved into an open-ended Profession of Everything in a world where technology shades into society, into art, and into management, with no strong institutions to define an overarching mission. p. 70 ^[13]"

For the complex world that our (engineering and technology) students live in today, we must educate "active, rigorous and flexible individuals, rather than skilled workers for pre-established jobs". To provide an example of such transferable skills, consider the European program outcomes required by EUR-ACE which is an accrediting body for national engineering accreditation agencies. These include the skills to communicate effectively with society at large; the skills to understand the impact of engineering solutions in a societal and environmental context, to recognize the need for, and have the ability to engage in independent, life-long learning.

It therefore seems that the modern university choosing to educate students in the professions must question, purely on pedagogic grounds, whether traditional teaching and research activities provide a sufficient learning environment for those students. It then must influence the debate on the role of the university and its education of the professions.

Additionally, when the various national/country perspectives overlaying these purposes are also considered, the authors were left with the inevitable conclusion that the within group variance of such expectations/aspirations was just too large to permit any precise, rigorous and reproducibly valid comparisons. Note, this does not mean that we do not believe that comparisons cannot and should not be made, but only that every such comparison that has so far been conceived is susceptible to honest and valid criticisms as to its validity.

Once this fact was acknowledged, the authors then employed the time honored academic tradition of "drilling down" and delimiting the analysis. Typically this tactic results in reduced within-group variance and enables greater precision and validity. If there exists too much variance in what various cultures and peoples believe is the purpose of the university, perhaps there is less variance in their beliefs about the nature and purpose of the university's divisional

unit/college/school focusing on engineering and technology? Here the increasingly convergent accreditation guidelines of organizations such as ABET and its international collaborators such as documented by the Washington Accord, Sidney Accord, Dublin Accord, etc. ^[14]. [<http://www.washingtonaccord.org/>] give support to the hope that there is more commonality of purpose among colleges of engineering and technology than there is for universities. Furthermore, if this increased focus demonstrated positive movement towards precision, would an even sharper focus on departments and/or programs yield an even greater likelihood of success in comparisons?

Although the trend line, at least in terms of viability of valid comparisons, seems supportable, an interesting contradiction emerges. Despite the fact that it should be easier, and arguably more valid, to compare programs than universities, the authors found significantly fewer studies and/or systems to do so. Notably, some high volume programs, such as the MBA, have engendered disciplinary based comparison/ranking schemes ^[15], but there are considerably fewer of these than there are of university comparisons ^[16, 17]. One possible reason for this might be a lack of consensus as to the metrics used to evaluate programs. Leaders in our various fields of study seem to have difficulty in reaching a consensus on criteria and how to create a ranking system for their discipline. This challenge is direct evidence of the fundamental observation posited earlier in this paper, i.e., that there is too much variability in the methodologies and metrics of current ranking systems.

Another nagging question, beyond that of the focus of the unit of comparison, remains however. This question asks: For what purpose is the comparison being made? The literature review yielded a whole range of purposes including:

- Comparison of institutions
- Evaluation of institutions/colleges/programs
- Assessing progress towards strategic plan goals
- Accreditation
- Performance assessment, e.g., for promotion and tenure decision, of faculty
- Guiding individual decision making

The complexity of the problem of assessment and comparison is depicted by the illustration depicted in Figure 1. It shows that the challenge of the task is complicated by the interaction of at least three sets of variables, namely the Unit of Focus (UoF), the Purpose to be Served, and the Criteria to be employed. For whatever purpose or UoF or criterion is intended, a congruent selection must be made from the balance of the model otherwise an invalid ranking/comparison/assessment will result ^[18]. Of course, the selection of a coherent and congruent set of variables is only a necessary first step. Subsequently, it is equally important that equivalent attention be paid to actual data specification, collection and conditioning.

Data specification refers to the selection of variables/measures/data points to describe the particular criterion being looked at. Here, researchers have to exercise considerable restraint in order to secure measures that actually represent the criterion – often very difficult to collect – instead of more easily accessed but potentially invalid proxy measures. For example, salary data of alumni would be a more easily secured proxy measure for alumni

success than more direct measures of the latter. Clearly salary data, unless carefully conditioned, would reflect the large inequities and differential pay scales of varying careers.

Data collection refers to the process and source of the actual numbers and descriptors being used in any assessment. Here it is important to recognize the limitations and delimitations of the instruments used, databases being accessed, the scope of coverage, and the specific procedures used for entering data into those database. In the case of Colleges of Engineering and/or Technology for example, are the quality journals that the faculty publish in actually indexed by the database being employed as a source for the particular assessment? And, what constitutes a "quality" journal anyway? Is a "blind" review necessarily the sole criterion of quality? Is there a real difference between a "reviewed" journal and a "refereed" one? Are these terms used consistently in Europe, the Americas, Asia, the Arab countries, and Africa?

Data conditioning refers to the process of examining the secured data and validating that it all meets quality standards and that no mistakes have crept in. For example, impossible dates, numbers out of range, missing data, null data, and the like.

Finally, the question of how to combine and weight the selected variables/indicators must be considered. This will be addressed in a subsequent section of this paper.

The UoF refers to the target of the ranking/comparison/Assessment and is depicted on the z-axis of Figure 1. Although there are numerous UoFs that could exist, the authors noted the following were most prevalent in the literature:

- Universities
- Colleges/Schools/Divisions
- Departments
- Degree Programs
- Faculty
- Students
- Alumni

The second dimension of the ranking/comparison/assessment complex pertains to: Why are we ranking/assessing/accrediting, i.e., What purposes are being served? Analysis of the literature revealed the following:

- Accreditation
- Performance assessment
- Self improvement
- Progress assessment towards strategic plan goals
- Selection guidance (for potential students/faculty)

The third and last dimension of the proposed model pertains to the all important selection of indicators and criteria.

For our purposes, i.e., those involved with engineering and engineering technology education programs, and with our focus on quality, the pre-eminent question is: *What should be measured to assess the quality of engineering and technology education programs at undergraduate and graduate levels?*

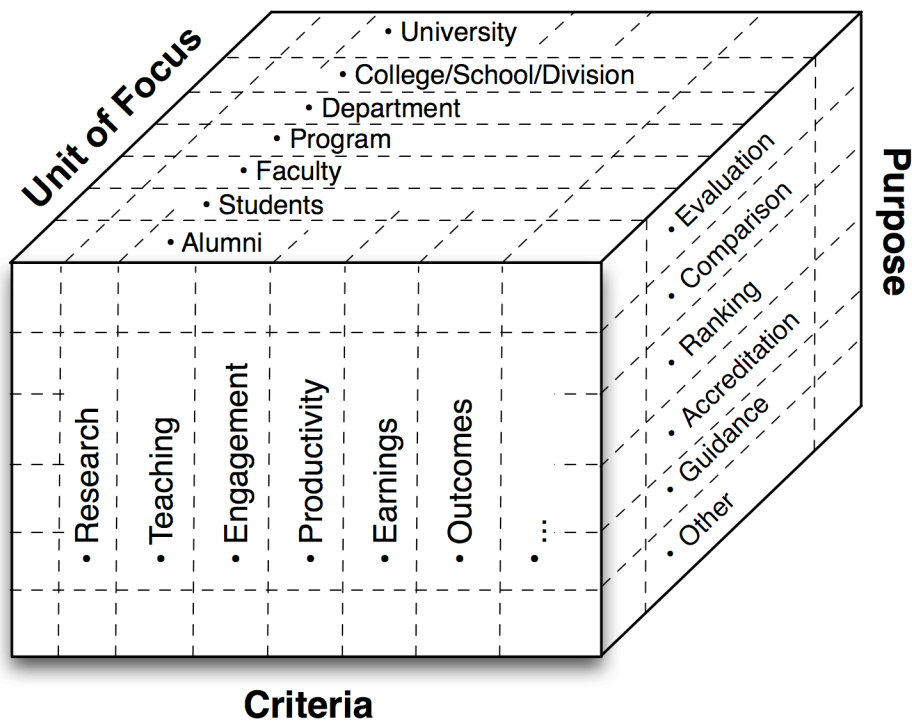


Figure 1. The complex describing rankings and comparisons

It is very likely that most engineering and technology members of the academy have been involved in a number of different exercises to demonstrate that what we teach engineering students, the environment in which they learn and the programs in which they are enrolled are of high quality. The most common objective measure of this is the accreditation process that we undergo on a regular basis. Whether this is the ABET criteria and process within the United


States or a comparable process in other countries – such as the accreditation of engineering and technology programs by Engineers Ireland in Ireland – we have become comfortable with, or perhaps used to, trying to describe what we teach and how we teach in terms of discrete ‘learning outcomes’. Satisfying these learning outcomes is then interpreted as our program, or more importantly the graduates of that program, having met a minimum threshold, or minimum quality standard, to be classified as acceptable to an external body. The key word in the previous sentence, “minimum”, will focus the reader on the key weakness of using an accreditation agency as some form of quality measure. Although accreditation is important and offers some level of quality assessment, simply meeting minimum standards offers no basis for comparison of quality between accredited programs.

One of the causes that triggered the writing of this paper was a conversation that one of the author’s had around the kitchen table with a niece who was in high school and considering studying engineering in college. There was nothing new or profound in the points discussed. Indeed what was remarkable was how straightforward and ordinary the questions were. It is likely that every engineering member of the academy has been asked the same questions. Questions asked included: what’s a good college for engineering? What do you mean when you say that some colleges teach engineering differently than others? Is it better to study an engineering technology program? Does everybody not agree on the best way to teach engineering? What’s the best thing that I should do next? Yet the answers were generally qualitative in nature rather than definitive and quantitative and often began with that very useful phrase “well, it depends”.

Clearly this conversation was illustrative of an attempt on the part of one high-school student to compare, contrast and understand a tremendous variety of input variables and distill them down into one simple output: what’s best for me?

What rankings are out there?

A careful search reveals that far more rankings and comparisons exist than the ubiquitous and much maligned *U.S. News and World Report* annual list^[19, 20, 21]. The following list of rankings, presented in no particular order, has been compiled from a variety of sources including the Purdue University Library portal, the University of Illinois Library's ranking compilation, Google Scholar, Wikipedia, Paked.com (an unidentified website in Lahore, Pakistan), and others as cited below. The authors provide this list to demonstrate that there have been numerous attempts to address this task but that there remains more ambiguity and uncertainty than light. Furthermore, it should be noted that there are few discipline specific approaches, in comparison to overall university rankings.

- ***U.S. News & World Reports*** publishes rankings of universities using the categories of national universities, master's universities, business programs, liberal arts colleges, baccalaureate colleges, and engineering programs. In addition, their site includes a number of other rankings and lists.
 <http://colleges.usnews.rankingsandreviews.com/best-colleges>
- The ***Times Higher Education*** listings include a table ranking the world's top 200 universities, and specialized lists for institutions focusing on Engineering and IT universities, Life Sciences & Biomedicine universities, Natural Sciences, Social Sciences,

and Arts and Humanities. Recently they have dropped involvement with QS and now together with Thompson Reuters, the Times will establish its own methodology for its new ranking of world universities.

 <http://www.timeshighereducation.co.uk/story.asp?sectioncode=26&storycode=408908&navcode=105>

 <http://www.timeshighereducation.co.uk/>

- Shanghai Jiao Tong University (SJTU), The Center for World-Class Universities issues the **Academic Ranking of World Universities (ARWU)**. In addition to their listing of the 501 top universities overall, they also rank by subjects (Mathematics, Physics, Chemistry, Computer Science, Economics/Business) and fields (Natural Sciences & Mathematics, Engineering/Technology & computer sciences, Life & agricultural sciences, Clinical medicine & pharmacy, Social Sciences). According to their website, since 2009 this is published by the Shanghai Ranking Consultancy.

 <http://www.arwu.org/>

- **Higher Education Evaluation and Accreditation Council of Taiwan (HEEACT)**. This organization conducts a performance ranking of scientific papers for world universities as their approach to comparison. They report overall university performance rankings and additionally performance in six fields: Clinical Medicine, Life Sciences; Social Sciences fields; Engineering, Computing & Technology; Natural Sciences; Agriculture & Environment Sciences.

 [http://ranking.heeact.edu.tw/\(S\(hcbqkauptdz13f55ybdpb4yh\)\)/Page.aspx?RankYear=2009&Title=methodology](http://ranking.heeact.edu.tw/(S(hcbqkauptdz13f55ybdpb4yh))/Page.aspx?RankYear=2009&Title=methodology)

 <http://www.heeact.edu.tw/public/Attachment/982510445014.pdf>

- **Professional Ranking of World Universities 2008** is generated by the École des Mines de Paris – MINES (ParisTech) and is based on number of alumni among CEOs of the world's 500 largest corporations. Based solely on this criterion, they report the top 375 universities in the world.

 <http://www.ensmp.fr/Actualites/PR/EMP-ranking.html>

- **Webometrics ranking web of world universities**. According to their website, the "Webometrics Ranking of World Universities is an initiative of the Cybermetrics Lab, a research group belonging to the Consejo Superior de Investigaciones Científicas (CSIC), the largest public research body in Spain." Using only web-derived criteria of size, visibility, files, and scholarship they report a listing of the world's top 6000 universities. In addition they report the top 100 universities for the following continent-based regions: USA & Canada, Latin America, Europe, Cent. & East. Europe, Asia, South East Asia, South Asia, Arab World, Oceania, and Africa.


 <http://www.webometrics.info/about.html>


 http://www.webometrics.info/about_rank.html


- The **Global Language Monitor** ranks and reports on the top 225 universities and colleges in the USA "according their appearance in the global print and electronic media, on the Internet throughout the blogosphere, and including social media such as Twitter." Based on this they list the 125 top universities, the top 100 colleges and rankings by momentum, velocity and state.


 <http://www.languagemonitor.com/college-rankings>


- **Leiden Ranking.** According to their web site, "The Centre for Science and Technology Studies (CWTS), Leiden University, has developed a new ranking system entirely based on its own bibliometric indicators." These include size, i.e., the number of publications; a "ranking by the size-independent, field-normalized average impact", a "ranking by the size-dependent 'brute force' impact indicator, the multiplication of P with the university's field-normalized average impact", and a "ranking by the 'simple' citations-per-publication indicator (CPP), but here we caution that this indicator is not a field-normalized one, therefore, particularly, technical universities will almost always suffer because in engineering and applied fields of science the number of citations per publication is mostly considerably lower than in, for instance, the medical fields". They list, both for Europe and the world, the top 100 and 250 universities.


 <http://www.cwts.nl/ranking/LeidenRankingWebSite.html>
- **SCImago Institutions Rankings: 2009 world report.** This is a research group headquartered at the University of Granada in Granada, Spain. They report a "ranking with more than 2000 of the best worldwide research institutions and organizations whose output surpass 100 scholarly publications during 2007. The ranking shows 5 indicators of institution research performance, stressing output (ordering criteria), collaboration and impact. Analyzed institutions are grouped into five research sectors: Government, Higher Education, Health, Corporate and Others. The resulting list includes institutions belonging to 84 countries from the five continents."

 <http://www.scimagoir.com/>
- **Asia Week's** rankings of Asian universities is apparently no longer being published. The 2000 issue is the last the authors have been able to locate.

 <http://cgi.cnn.com/ASIANOW/asiaweek/features/universities2000/schools/multi.overall.html>
- **CHE-Excellence Ranking (CHE)** ranks selected disciplines (Biology, Chemistry, Physics and Mathematics, Political Science, Economics and Psychology) at German universities and some in adjoining countries.

 <http://www.excellenceranking.org/eusid/EUSID>
- **Royal Melbourne Institute of Technology University (RMIT).** A ranking of global university cities is offered by RMIT in Australia.

 <http://www.rmit.edu.au/browse;ID=mnw9osj6o6x9;STATUS=A?QRY=global%20university%20city%20index&STYPE=ENTIRE>
- **Newsweek** (weekly magazine) presents annually a listing of university ranks by subject (Art & Design College Rankings, Criminal Justice College Rankings, Education Programs College Rankings, Engineering College Rankings, Health & Nursing Programs College Rankings, IT & Computer Programming College Rankings, Law & Legal College Rankings, MBA & B-school Rankings, Music College Rankings, Pharmacist and Pharmacy Technician College Rankings, and Psychology College Rankings). In addition they list specialty rankings (Canadian University Rankings, Distance Learning & Online University/College Rankings, England & UK University Rankings, University Accreditation Rankings, and the World University Rankings).

 <http://bestcollegerankings.org/>

- **QS**, the Quacquarelli Symonds Ltd enterprise headquartered in London, England, publishes the World University Rankings™, the Asian University Rankings, European rankings, UK rankings, and Irish Rankings as well as subset rankings focused on engineering/technology or life sciences or natural sciences, social sciences.
 - 🖱 <http://www.topuniversities.com/world-university-rankings>
 - 🖱 <http://www.topuniversities.com/university-rankings/asian-university-rankings>
 - 🖱 <http://www.topuniversities.com/university-rankings/world-university-rankings/2009/subject-rankings/technology>
- **The Princeton Review** publishes compilations of data and rankings of universities. It breaks out lists for colleges, business schools, law schools, graduate schools and medical schools.
 - 🖱 <http://www.princetonreview.com/college-rankings.aspx>
- **StudentsReview**. This site, presents a relatively comprehensive appearance even though they report that it is run only "by a couple of guys". They present dynamic (monthly) rankings for the Top 50 Colleges & Universities, Top Engineering Schools, Top Schools for an Education, Top Creative Schools/For Smart People, Most Beautiful Campus, and the Best Social Life. Apparently the ranks are solely based on voluntary student reports.
 - 🖱 <http://www.studentsreview.com/>
- *Forbes* publishes **America's Best Colleges** based on variables such as student satisfaction, post-graduate employment success, the likelihood of graduation from college within four years, the estimated average four-year student loan debt, student and faculty success in winning national and international awards. They refer to both affordability and productivity criteria.
 - 🖱 http://www.forbes.com/lists/2009/94/colleges-09_Americas-Best-Colleges_Rank.html
- The **Global Universities Ranking** seems to be a newly emerging and rudimentary attempt at ranking based on self-reported data. It does, however seek to include information from Russia, CIS and Baltic country institutions. It provides country rankings in terms of their university positions and it provides a separate listing for CIS and Baltic country institutions.
 - 🖱 <http://www.globaluniversitiesranking.org/>
- **McLean's Magazine** ranks Canadian colleges and universities. In addition to an overall ranking, they provide focused lists for: Medical Schools, primarily undergraduate universities, and law schools. Notably they provide a tool for individuals to build a personalized ranking based on their own criteria and weightings.
 - 🖱 <http://oncampus.macleans.ca/education/2009/11/05/our-19th-annual-rankings/>
- Elsevier has released **SciVal Spotlight**, an alternative system for depicting the performance of a university in terms of its position within a set of subject areas (disciplines [author added]) in distinctive and emerging research competencies as indicated by faculty publications. Heavily graphic in its depictions this system is based on content contained with the Scopus database. The heart of its methodology involves co-citation analysis of the scholarly output of university faculty ^[22].
 - 🖱 <http://info.spotlight.scival.com/>

- **Research Assessment Exercise (UK)** uses UK institution submitted information to generate a quality assessment for each institution. This subsequently impacts the research funding received by the university in future years.
<http://www.rae.ac.uk/>
- **National Research Council (NRC) Assessment of the research doctorate.** They have recently released the methodology ^[23] for their very carefully constructed study assessing the quality of research doctoral programs in the USA. The assessment is based on a combination of institutional reports, available databases and careful analyses.
<http://sites.nationalacademies.org/pga/Resdoc/index.htm>
- **4 International Colleges & Universities** is an international higher education search engine and directory reviewing worldwide accredited Universities and Colleges. 4icu.org includes 9000 Colleges and Universities ranked by web popularity in 200 countries.
<http://www.4icu.org/top200/>

Rankings of Engineering and Technology Universities & Programs: Benchmarking, Quality Reviews and Accreditation

But, of the preceding, or other ranking/comparative systems out there, which are applicable to or have specifically focused on or dealt with the issues of engineering and technology specialties? U.S. News & World Report, the THES, ARWU, HEEACT, Newsweek, QS, SciVal and the StudentReview have all attempted to provide engineering specific feedback to their readers. Notably, none of these have addressed distinctions between engineering and engineering technology programs and the authors suspect, in the absence of any literature identified facts to the contrary, that none of the rating systems have made any cogent attempt to systematically include engineering technology programs in their ranking systems.

Universities commonly choose to benchmark themselves against a group of peer universities to assess how they perform relative to their selected peers. Such benchmarking exercises generally examine university-wide metrics and are self-initiated by the university. In other situations, universities have been subjected to quality audits in which the auditing team is composed of an independent, typically international, experienced team of academics. An example of the former case is that Purdue University benchmarks itself against other US Land Grant universities. An example of the latter is that Dublin Institute of Technology underwent an academic quality process review conducted by the European University Association at the request of the Irish Higher Education Authority. In both situations, a reasonably standard approach is taken to determine – at the university level – whether improvements should be made to the activities of the university. Such benchmarking and quality reviews do not examine how the university is delivering on specific disciplines, such as engineering or engineering technology. This is typically achieved via an accreditation process.

Accreditation is a quality assurance process ^[24, 25] in which universities and other providers of engineering and engineering technology education are visited periodically, typically every 5 or 6 years, to ensure that their engineering and engineering technology programs meet a set of criteria established by the accrediting agency. The process is generally one of peer review at an academic unit level within the university, i.e., at department level or school level. Today, many of the accrediting agencies themselves cooperate at an international level and thus the

accreditation criteria can also be described as meeting international standards. An example of such international criteria is the EUR-ACE label which provides a quality mark to national engineering accrediting agencies in Europe. The accreditation process establishes whether the university's engineering or engineering technology programs meet the established minimum criteria. But accreditation panels do not, nor is it their purpose, comment on the comparative value of the programs under accreditation.

With little comparative information it was only a matter of time before attempts were made to compare universities. One of the earliest examples was the annual August edition of *U.S. News & World Report* which provides a series of comparative tables and informational sidebars designed to help the reader select an appropriate university. Later the *Times Higher Education Supplement* (THES) developed a set of quality indicators and used these to generate a ranking of world universities. A slippery slope in moving from quality indicators to comparative analyses to rankings has resulted. Today there are a number of well-known university ranking methodologies being published. Criticisms of these are many and valid^[26,27], but these rankings are clearly addressing an information need on the part their readers: the desire to know how their university ranks against others. The fundamental problem with these rankings is that they measure what they can measure, or what they can access, rather than what should be measured. Subsequently, an arbitrary ranking methodology is applied against the measured data.

It is important to also examine the extent to which the university should react and respond to questionable studies or inappropriate comparisons. Typically a university has its own mission to which it should adhere. However, conducting its own benchmarking or quality reviews and ignoring what the popular media reports is becoming increasingly difficult to do. Should the university instead not engage in the debate and attempt to influence and moderate the way universities are compared and consequently ranked?

The authors argue strongly that universities must attempt to ensure that they are measured and compared against a set of meaningful measures that captures the full extent of what they contribute. This is particularly true for engineering and technology education because of the growing awareness of importance of the social and ethical dimensions to engineering and technology education.

Typical Critiques of University Rankings and Comparisons

Clearly there have been many well-intentioned attempts at ranking and comparisons. But, it is also true that other approaches exist that seem to be weak in their conceptualization or execution^[26,28]. Furthermore, comparisons inevitably raise the question about the motivation of those generating them. A summary overview of some of the key critiques is presented in the following paragraphs.

1. Are the motives of the organization or individuals generating the ranking inappropriate or otherwise suspect? For example, those in the academy are typically suspect of those generating rankings for commercial/financial gain-related reasons. When rankings are generated by an institution or organization, the question arises whether the intent is to make their entity look good. Notably, as increasing international ratings arise, there is reason to

question whether national pride or policy justification becomes a motivator affecting the process and its results.

2. Major publishers, e.g., Thomson Reuters, with a significant stake in rankings and comparisons have recognized the potential market value of data mining their holdings. Laudably they have also recognized the need to generate valid and unbiased comparisons and indicators as is evidenced by their research into such processes. In a survey^[29] for the Times Higher Education, Thomson Reuters (<http://surveys.globalepanel.com/wix/p546045654.aspx>) summarized some of the more frequently raised critiques that needed to be addressed:
 - a. "appropriate metrics are not included when compiling institutional comparisons"
 - b. "Only institutions that have always been ranked highly continue to be ranked highly"
 - c. "Gives an unfair advantage to institutions in the English speaking world"
 - d. "Quantitative information ("hard statistics") mislead institutional comparisons because they attract undue confidence"
 - e. "Methodologies and data uses are neither transparent nor reproducible"
 - f. "Some institutions manipulate their own data to move up in the rankings"
 - g. "Has too much of an effect on where students apply"
 - h. "Makes institutions focus on these numerical comparisons rather than on educating students"
 - i. "The comparisons vary unrealistically on an year-by-year basis."
3. The ranking methodologies are subject to manipulation. Are the actions of those providing the information for the rankings suspect? The recent furor caused by a Clemson University official publicly admitting to "gaming" the *U.S. News & World Report* rankings in an effort to raise their ranking^[30]. In addition, *The Chronicle of Higher Education* in a 2007 report^[1] noted that the magazine's ranking had become the tail wagging the higher education dog as many colleges changed their institutional priorities to better their rankings. For example, some colleges began to solicit even very small donations from alumni to raise their giving percentage, encouraged more students to apply even though they had little chance of being admitted to raise their selectivity score. The *Chronicle* report also found that the magazine overwhelmingly favored private institutions and hurt public institutions.

Variables & Indicators Employed by Various Rankings

As might be expected, given the number of rankings that exist, and the complexity of the system being assessed, a multiplicity of variables and indicators have been used to attempt comparisons and rankings. The authors have attempted to compile a representative set of these to inform colleagues but it should be noted that undoubtedly some indicators have been missed or some distinctions may have been obscured by consolidation and summary.

Our compiled overview and categorization of what variables/indicators have been used is presented in the following list. Items referenced with^[29] are quoted from the *THE* Thomson Reuters Survey and those with^[31] from the ARWU.

1. Financial indicators
 - a. Income from research grants and awards (may be intramural or external)^[29]
 - b. Total expenditures^[29]
 - c. Income from teaching^[29]

- d. Analysis of income sources (government, private, competitive, industry) ^[29]
 - e. Analysis of expenditures (staff salaries, teaching, reserch, library, real estate) ^[29]
 - f. The size of the resource supporting the program
 - i) Size of the endowment
 - ii) Number and state of equipment of the laboratories and facilities
 - iii) Square footage of labs and offices and support facilities
 - g. Total engineering related research expenditures ^[31]
2. Reputation indicators
- a. External perception among peer researchers ^[29]
 - b. External perception among employers ^[29]
 - c. External perception among administrators ^[29]
 - d. External perception among alumni and the community ^[29]
 - e. Graduate satisfaction rate
 - f. Employer satisfaction rate
 - g. Student satisfaction rate, e.g.:
 - i) Student satisfaction: Useful knowledge and skills
 - ii) Student satisfaction: Quality of learning experiences
 - iii) Student satisfaction: Quality of facilities and resources
 - iv) Student satisfaction: Quality of services
3. Teaching indicators
- a. Graduate programs offered ^[29]
 - b. Number of classes taught ^[29]
 - c. Graduate degrees awarded ^[29]
 - d. Number of students enrolled ^[29]
 - e. Graduation rate
 - f. Effectiveness of teaching
4. External engagement indicators
- a. Community engagement ^[29]
 - b. Collaborations – industry, international, multidisciplinary ^[29]
 - c. Amount of technical assistance activity to external communities, e.g., industry, community agencies, etc.
 - d. Amount of \$ from industry for applied research
5. Research and scholarship indicators
- a. Faculty output: research publications ^[29]
 - b. Faculty Impact: citations and major scholarly ^[29]
 - i) Papers indexed in Science Citation Index-expanded (in SCI or ENG or LIFE or MED fields) ^[31]
 - ii) Papers indexed in Social Science Citation Index (in SOC fields) ^[31]
 - iii) Books
 - c. Research awards received ^[29]
 - d. Patents, licenses and other commercialization, such as spin out companies ^[29]
 - e. Amounts of grant \$ received (sometimes only federal)
 - f. Number & significance of publications by faculty
 - g. Faculty awards, e.g., Number in National Academies, Guggenheim, or Fulbright awards

- i) Faculty winning Fields Medals (Mathematics) or Nobel Prizes (Chemistry, physics, physiology, medicine, economics) ^[31]
 - ii) Faculty qualifying as highly cited (Mathematics, physics, chemistry, geosciences, space sciences, engineering, computer science, materials science, biology & biochemistry, molecular biology & genetics, microbiology, immunology, neuroscience, agricultural sciences, plant & animal science, ecology/environment, clinical medicine, pharmacology, social sciences (partly), economics/business) ^[31]
- 6. Institutional characteristics indicators
 - a. Number of faculty ^[29]
 - b. Faculty/student ratios ^[29]
 - c. Demographics of faculty and student populations (international, gender, race/ethnicity) ^[29]
 - d. Faculty activity ratios (teaching income/research grants/publications per staff) ^[29]
 - e. Accessibility to students
 - f. Number of degrees awarded
 - i) UG
 - ii) MS
 - iii) PhD
 - g. Number of faculty
 - h. Percentage of international faculty
 - i. Number of post-doctoral appointments
 - j. Number of support staff
 - k. Size of library
 - l. Number of accredited programs
 - m. Percentage of international students
 - n. Number of programs offered
 - o. Average scores of students on standardized tests
 - i) UG: SAT or ACT or other
 - ii) Grad: GRE, GMAT, etc.
 - iii) Number of students with awards, e.g., National Merit, National Achievement scholars
- 7. Outcome Measures
 - a. Graduate employment rate
 - b. Placement rate of graduates into related jobs
 - c. Long term earnings of graduates
 - d. Positions of graduates and alumni
 - e. Alumni winning Fields Medals (Mathematics) or Nobel Prizes (Chemistry, physics, physiology, medicine, economics) ^[31]
- 8. Constructed indices
 - a. FSP by Academic Analytics ^[32]
 - b. Distinctive competencies By SciVal ^[22]
 - c. H-index of faculty publications ^[33]
 - d. Impact factors of journals faculty publish in ^[34]
 - e. Citations/faculty
 - f. Faculty/Student ratios

- g. Percentage of papers published in top 20% journals of SCI fields to that in all SCI journals^[31]
- h. Percentage of papers published in top 20% journals of ENG fields to that in all ENG journals^[31]
- i. Percentage of papers published in top 20% journals of LIFE fields to that in all LIFE journals^[31]
- j. Percentage of papers published in top 20% journals of MED fields to that in all MED journals^[31]
- k. Percentage of papers published in top 20% journals of SOC fields to that in all SOC journals^[31]

Ranking Methodologies

The noted scholar Ed Zlotkowski in an internal recommendation to DIT stated that “Over the last fifteen years, much has been written about the need to rethink the role higher education can and should play in building a diverse democracy – a democracy whose graduates are not only capable of participating successfully in a knowledge-based economy but also of assuming their responsibilities as citizens in an increasingly interconnected world. ... Engagement points beyond student academic activities to describe the degree to which all academic activities – on the level of individual students and instructors, modules and programs of study, even entire institutions – have succeeded in creating educationally and socially productive partnerships with community-based organizations, especially organizations that address needs not met by private sector interests.”

But in engaging in such activities, should the university not be recognized and acknowledged for doing so? These activities carry weight regarding the intrinsic value of the university to its local, regional and indeed wider community. But how should that value be described, perhaps for comparative purposes? The rankings approach taken by Shanghai Jiao Tong University is quite narrow and strongly research biased, and that of the QS-THE also ignores activities outside of first and second mission. Such rankings fail to describe the contribution and value of the full spectrum of activities that universities engage in and indeed must engage in today.

In addition to the critically important question of which variables are employed as components of the ranking/assessment/comparison, there remains equally critical about weighting and combining the variables to yield the overall result. Also are the rankings normative or criterion referenced?

Because of space limitations, only a selected few methodologies will be highlighted in this paper's body, but Usher & Savino^[35], Hattendorf-Westney^[36] and Appendices E and F provides additional ranking/comparison systems and links to secure further detail. The following paragraphs, however highlight some of the major approaches employed, i.e., common ranking methodologies and how they are compiled and used. These include *U.S. News & World Report*; *THES* World Rankings, Shanghai Jiao Tong (ARWU), CHE and Webometrics. It notes some strengths and weaknesses for each, either in isolation or in comparison to one of the other methodologies.

To generate their list, the ARWU employs what seems upon examination to be a carefully constructed ranking methodology as depicted in Figure 2. Although the ARWU demonstrates

scholarly care, when their limited selection of variables is noted, it becomes clear that there remain many non-included but obviously important variables/characteristics/indicators that could and probably should affect the ratings.

Ranking Methodology

[Selection of Universities](#) | [Definition of Broad Subject Fields](#) | [Ranking Criteria and Weights](#)
[Definition of Indicators](#) | [Scoring Procedures](#) | [Data Sources](#)

Selection of Universities

The ranking list for ARWU - FIELD includes every institution that has any Nobel Laureates, Fields Medals, and Highly-Cited Researchers. In addition, major universities of every country with significant amount of articles indexed by Science Citation Index-Expanded (SCIE) and Social Science Citation Index (SSCI) are also included. In total, more than one thousand institutions have been actually ranked in each broad subject field.

Definition of Broad Subject Fields

Institutions are ranked by five broad subject fields, including Natural Sciences and Mathematics (SCI), Engineering/Technology and Computer Sciences (ENG), Life and Agriculture Sciences (LIFE), Clinical Medicine and Pharmacy (MED), and Social Sciences (SOC). Arts and humanities are not ranked because of the technical difficulties in finding internationally comparable indicators with reliable data. Psychology/Psychiatry is not included in the ranking because of its multi-disciplinary characteristics.

Ranking Criteria and Weights

Similar to ARWU, institutions are ranked according to their academic or research performance in each broad subject field. Ranking indicators include alumni and staff winning Nobel Prizes and Fields Medals, Highly Cited Researchers, articles indexed in Science Citation Index-Expanded (SCIE) and Social Science Citation Index (SSCI). Two new indicators were introduced, one is the percentage of articles published in the top 20% journals of each field, and the other is the engineering research expenditure.

Indicators and Weights for ARWU - FIELD

Code	Weight	SCI	ENG	LIFE	MED	SOC
Alumni	10%	Alumni of an institution winning Fields Medals in mathematics and Nobel Prizes in Chemistry and Physics since 1951	Not Applicable	Alumni of an institution winning Nobel Prizes in Physiology or Medicine since 1951	Alumni of an institution winning Nobel Prizes in Physiology or Medicine since 1951	Alumni of an institution winning Nobel Prizes in Economics since 1951
Award	15%	Staff of an institution winning Fields Medals and Nobel Prizes in Chemistry and Physics since 1961	Not Applicable	Staff of an institution winning Nobel Prizes in Physiology or Medicine since 1961	Staff of an institution winning Nobel Prizes in Physiology or Medicine since 1961	Staff of an institution winning Nobel Prizes in Economics since 1961
HiCi	25%	Highly cited researchers in 5 categories: I. Mathematics II. Physics III. Chemistry IV. Geosciences V. Space Sciences	Highly cited researchers in 3 categories: I. Engineering II. Computer Science III. Materials Science	Highly cited researchers in 8 categories: I. Biology&Biochemistry II. Molecular Biology&Genetics III. Microbiology IV. Immunology V. Neuroscience VI. Agricultural Sciences VII. Plant&Animal Science VIII. Ecology/Environment	Highly cited researchers in 3 categories: I. Clinical Medicine II. Pharmacology III. Social Sciences, General(Partly)	Highly cited researchers in 2 Categories: I. Social Sciences, General(Partly) II. Economics/Business
PUB	25%	Papers Indexed in Science Citation Index-Expanded in SCI fields	Papers Indexed in Science Citation Index-Expanded in ENG fields	Papers Indexed in Science Citation Index-Expanded in LIFE fields	Papers Indexed in Science Citation Index-Expanded in MED fields	Papers Indexed in Social Science Citation Index in SOC fields
TOP	25%	Percentage of papers published in top 20% journals of SCI fields to that in all SCI journals	Percentage of papers published in top 20% journals of ENG fields to that in all ENG journals	Percentage of papers published in top 20% journals of LIFE fields to that in all LIFE journals	Percentage of papers published in top 20% journals of MED fields to that in all MED journals	Percentage of papers published in top 20% journals of SOC fields to that in all SOC journals
Fund	25%	Not Applicable	Total engineering-related research expenditures	Not Applicable	Not Applicable	Not Applicable

Note: SCI for Natural Sciences and Mathematics, ENG for Engineering/Technology and Computer Sciences, LIFE for Life and Agriculture Sciences, MED for Clinical Medicine and Pharmacy, SOC for Social Sciences

Figure 2. ARWU Ranking Methodology <http://www.arwu.org:80/FieldMethodology2009.jsp#6>

At least two notable alternative approaches to rankings and comparisons were identified by the authors' review. These were the SciVal methodology^[22] based on co-citation analysis of the contents in Scopus, which is an electronic database that includes over 16,000 peer-reviewed journals, 600 trade publications, 350 book series and millions of conference papers [<http://www.info.scopus.com/scopus-in-detail/facts/>]. The other novel approach is produced by

Academic Analytics and is called the Faculty Scholarly Productivity Index (FSP). According to the *Chronicle of Higher Education* ^[30] this index "rates faculty members' scholarly output at nearly 7,300 doctoral programs around the country. It examines the number of book and journal articles published by each program's faculty, as well as journal citations, awards, honors, and grants received." Appendix G provides, with permission of the University of Illinois' Education and Social Science Library, an outstanding compilation of annotated references relevant to rankings and methodologies.

On the Relationship between Rank and Quality

In recognition of the complexity of the challenge of ranking/comparing the authors noted a promising approach to the task of ranking institutions for the purpose of advising individuals as to recommended universities for their individual study program. This approach, pioneered by several enterprises, e.g., *McLeans* and the *Swiss University Ranking Forum* among others, involved the individual's specification of criteria that are important to him/her and their subsequent assignment of weights to each of these criteria. Once these factors have been specified, the application accesses the database and generates a ranking customized to the user's specifications.

Such an approach, when applied to universities or other UoFs such as depicted in our model would seem to offer much potential for generating more valid rankings/comparisons for the specific purpose intended. It would, however, require more ready access to information databases, many of which are proprietary. The irony of this is that the bulk of the information contained in these databases originated within the academy and whose members have apparently consummated a Faustian bargain with commercial entities to trade ownership of their information for "publication".

Assessing the Quality of Engineering & Technology Programs

In this section we examine the issue of how a university could be assessed in terms of the quality of its engineering and technology programs. The paper proposes a set of indicators that could be used to provide relative measures of quality, not so much for individual engineering or technology programs, but rather of the university.

William Thomson, Lord Kelvin, once observed: "I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind." At its heart developing and applying quality indicators to engineering and engineering technology education should be with the intent of understanding in order to improve. Quality indicators should not be chosen and a methodology developed that is not aligned with the mission and values of the university.

An excellent set of principles, called the *Berlin Principles* [Appendix B], was developed by the International Ranking Expert Group (IREG) founded in 2004 by the UNESCO European Centre for Higher Education (UNESCO-CEPES) regarding methodologies that might be used for ranking purposes. The use of these principles will mitigate the issues and criticisms of rankings discussed in this paper's section on *Typical Critiques of University Rankings and Comparisons*.

The Berlin Principles are paraphrased and abbreviated as follows:

- Ranking should be one of a number of diverse approaches to the assessment of higher education. The purpose of ranking should be clear as should be their target groups.
- The design and weighing of indicators should be transparent regarding the methodology used for creating the rankings. Indicators should be chosen according to their relevance and validity and changes to the indicators and weights should be limited.
- Audited and verifiable data should be used whenever it is possible. Include data that are collected using proper procedures for scientific data collection, and apply measures of quality assurance to the ranking processes themselves.
- The presentation of ranking results should provide consumers with a clear understanding of all the factors used to develop a ranking.

Next, and importantly, the objectives for developing an appropriate set of quality indicators must be determined (Note that the methodology described below is based on a European project titled European indicators and ranking methodology for university third mission - E3M) ^[19]. These should include some or all of the following:

1. Create a standard set of indicators to measure the effectiveness of engineering and technology programs. This standard set will allow interested parties to share a common understanding of excellent practices and enable a wider dialogue using a common language to improve engineering and engineering technology education.
2. Validate the standard indicators. This will ensure that actions taken to improve the indicator values will result in improving the effectiveness of the engineering and technology programs.
3. Create a methodology that will allow interested parties to better understand university activities and enable a reasonable ranking methodology based on performance. The standard indicators developed will also enable the academic leaders of universities to continually assess and improve their performance.
4. Stimulate excellence and improve the visibility of engineering and technology activities to society and industry.

The methodology proposed in this paper involves characterising engineering and technology education via a number of dimensions. For each dimension a number of processes are identified. Examples of dimensions and processes are provided below. These are indicative and do not represent either the complete set of dimensions or all of the associated processes.

1. Financial Dimension:
 - a. Income from teaching and Expenditure on teaching
 - b. Analysis of income sources (e.g., government, private, competitive, industry)
 - c. Analysis of expenditures on engineering and technology education (e.g., staff salaries, teaching, research, library, real estate)
 - d. Number, condition and relevance of lab equipment and facilities
 - e. Square footage of teaching labs, classrooms and support facilities
 - f. ...

2. Reputation Dimension:
 - a. External perception among peer universities
 - b. External perception among alumni and the community
 - c. Graduate satisfaction rate
 - d. Employer satisfaction rate
 - e. Student satisfaction rate
 - f. ...
3. Teaching Dimension
 - a. Average class size
 - b. Support and mentoring programs
 - c. Graduate programs offered
 - d. Number of students enrolled
 - e. Graduation rate
 - f. ...
4. External Engagement Dimension
 - a. Community engagement
 - b. Collaborations – industry, international, multidisciplinary
 - c. Amount of technical assistance activity to external communities, e.g., industry, community agencies, etc.
 - d. Social involvement
 - e. Service Learning
 - f. ...
5. Research and scholarship Dimension
 - a. Faculty output: research publications
 - b. Faculty Impact: citations and major scholarly works
 - c. Research awards and grants received
 - d. Patents, licenses and other commercialization, such as spin out companies ^[9]
 - e. Number and significance of publications by faculty
 - f. Relevant Faculty awards, e.g., Number in National Academies, Guggenheim, Fulbright
 - g. ...
6. Institutional Character Dimension
 - a. Demographics of faculty (international, gender, race/ethnicity)
 - b. Demographics of student population (international, gender, race/ethnicity)
 - c. Access, Transfer and Progression of students
 - d. Number of degrees awarded at UG, MS and PhD
 - e. Size of library
 - f. Number of accredited programs
 - g. Average scores of students on standardized tests
 - h. ...
7. Outcome Dimension
 - a. Graduate employment rate
 - b. Placement rate of graduates into related jobs
 - c. Average starting salaries for graduates
 - d. Long term earnings of graduates
 - e. Positions and standing of graduates and alumni
 - f. ...

Each process must be defined and will have one or more indicators assigned to it. The indicators will subsequently be evaluated for relevance and feasibility. Relevant and feasible indicators will be assigned weights and a ranking generated from feasible indicators. This is shown schematically in Figure 3.

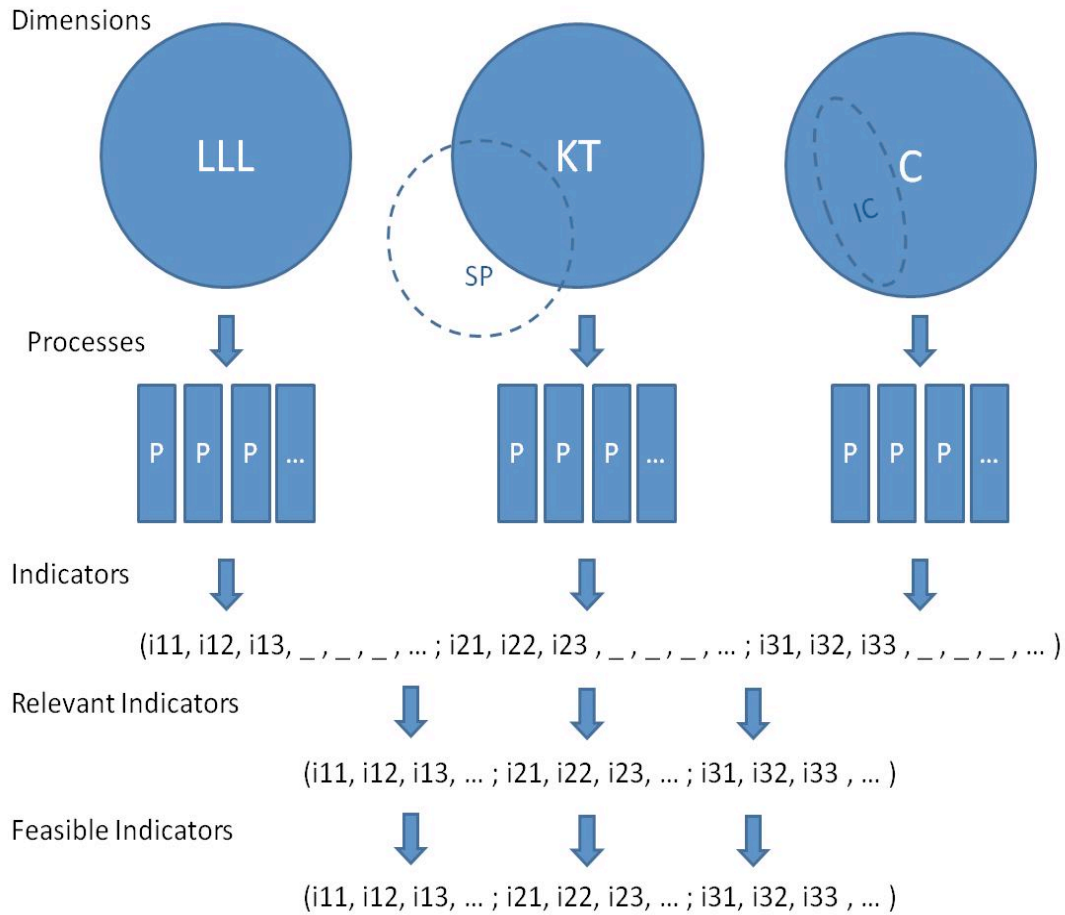


Figure 3. A Methodological Approach to Ranking^[19]

It is important to bear in mind the old adage that “not everything that counts can be counted, and not everything that can be counted counts.” For some universities, some dimensions will be more important than others, and likewise processes within those dimensions. But this methodology will allow the university to focus in on its mission and the measure of whether it is fulfilling that mission. For one university it may be theoretically oriented engineering degrees characterised by highly successful research active faculty and state of the art research facilities. For another university it may be a strong teaching ethos characterised by low student to staff ratio, a practise-based approach underpinned by numerous hands-on labs and design studios.

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Appendix A: Selected Web Sites Relevant to Rankings

These listings are compiled from several sources including the Education and Social Science Library, University of Illinois at Urbana-Champaign (source: <http://www.library.illinois.edu/edx/rankings/rankbib.html>) All is directly quoted. Contact Nancy O'Brien, Education and Social Science Library, University of Illinois at Urbana-Champaign.

1. **Australian Universities Quality Agency (AUQA)**
<http://www.auqa.edu.au/>
2. **McLeans.ca – University Rankings:** describes a tool to produce a personalized assessment of Canadian universities.
http://www.macleans.ca/article.jsp?content=20070411_171925_6556. "An online tool allowing the creation of customised rankings. The mandate to develop this Rankings tool was given to Mclean, a publishing company, by the Canadian government."
<http://tools.macleans.ca/ranking2007/selectindicators.aspx> [Quoted from <http://www.universityrankings.ch/information> Scimetrica]
3. **European Commission (2004). Mapping of Excellence in Economics. Luxembourg:** Office for Official Publications of the European Communities.
<http://www.cordis.lu/indicators> [Quoted from <http://www.universityrankings.ch/information> Scimetrica]
4. **Institute for Higher Education Policy (IHEP):** College and University Ranking Systems
A monograph containing papers that comment on the methodology of rankings and their impact on the academic landscape. <http://www.ihep.org/assets/files/publications/A-F/CollegeRankingSystems.pdf> [Quoted from <http://www.universityrankings.ch/information> Scimetrica]
5. **World Education News and Reviews:** World Education Services (WES) is the leading source of international education intelligence. WES is a not for profit organization with over thirty years' experience evaluating international credentials. WES provides more than 50,000 evaluations each year that are accepted by thousands of academic institutions, employers, licensing and certification boards and government agencies in the U.S. and Canada. <http://www.wes.org/ewenr/PF/06aug/pfpractical.htm> [Quoted from <http://www.universityrankings.ch/information> Scimetrica]
6. The University of Illinois Education and Social Library has compiled an excellent and comprehensive set of resources relevant to university rankings.
<http://www.library.illinois.edu/edx/rankings/index.html>
7. **The Center for World-Class Universities of Shanghai Jiao Tong** University in conjunction with the ShanghaiRanking Consultancy publishes the **Academic Ranking of World Universities (ARWU)**
<http://www.arwu.org:80/RankingResources.jsp>
8. **IREG International Observatory on Academic Rankings and Excellence (IREG Observatory** in short) an international not for profit association.
http://www.ireg-observatory.org/index.php?option=com_frontpage&Itemid=1

Appendix B: The Berlin Principles

<http://www.cepes.ro/hed/Meetings/berlin06/Berlin%20Principles.pdf>



Berlin Principles on Ranking of Higher Education Institutions

Rankings and league tables of higher education institutions (HEIs) and programs are a global phenomenon. They serve many purposes: they respond to demands from consumers for easily interpretable information on the standing of higher education institutions; they stimulate competition among them; they provide some of the rationale for allocation of funds; and they help differentiate among different types of institutions and different programs and disciplines. In addition, when correctly understood and interpreted, they contribute to the definition of “quality” of higher education institutions within a particular country, complementing the rigorous work conducted in the context of quality assessment and review performed by public and independent accrediting agencies. This is why rankings of HEIs have become part of the framework of national accountability and quality assurance processes, and why more nations are likely to see the development of rankings in the future. Given this trend, it is important that those producing rankings and league tables hold themselves accountable for quality in their own data collection, methodology, and dissemination.

In view of the above, the International Ranking Expert Group (IREG) was founded in 2004 by the UNESCO European Centre for Higher Education (UNESCO-CEPES) in Bucharest and the Institute for Higher Education Policy in Washington, DC. It is upon this initiative that IREG’s second meeting (Berlin, 18 to 20 May, 2006) has been convened to consider a set of principles of quality and good practice in HEI rankings—the **Berlin Principles on Ranking of Higher Education Institutions**.

It is expected that this initiative has set a framework for the elaboration and dissemination of rankings—whether they are national, regional, or global in scope—that ultimately will lead to a system of continuous improvement and refinement of the methodologies used to conduct these rankings. Given the heterogeneity of methodologies of rankings, these principles for good ranking practice will be useful for the improvement and evaluation of ranking.

Rankings and league tables should:

A) Purposes and Goals of Rankings

1. *Be one of a number of diverse approaches to the assessment of higher education inputs, processes, and outputs.* Rankings can provide comparative information and improved understanding of higher education, but should not be the main method for assessing what higher education is and does. Rankings provide a market-based perspective that can complement the work of government, accrediting authorities, and independent review agencies.
2. *Be clear about their purpose and their target groups.* Rankings have to be designed with due regard to their purpose. Indicators designed to meet a particular objective or to inform one target group may not be adequate for different purposes or target groups.

3. *Recognize the diversity of institutions and take the different missions and goals of institutions into account.* Quality measures for research-oriented institutions, for example, are quite different from those that are appropriate for institutions that provide broad access to underserved communities. Institutions that are being ranked and the experts that inform the ranking process should be consulted often.
4. *Provide clarity about the range of information sources for rankings and the messages each source generates.* The relevance of ranking results depends on the audiences receiving the information and the sources of that information (such as databases, students, professors, employers). Good practice would be to combine the different perspectives provided by those sources in order to get a more complete view of each higher education institution included in the ranking.
5. *Specify the linguistic, cultural, economic, and historical contexts of the educational systems being ranked.* International rankings in particular should be aware of possible biases and be precise about their objective. Not all nations or systems share the same values and beliefs about what constitutes “quality” in tertiary institutions, and ranking systems should not be devised to force such comparisons.

B) Design and Weighting of Indicators

6. *Be transparent regarding the methodology used for creating the rankings.* The choice of methods used to prepare rankings should be clear and unambiguous. This transparency should include the calculation of indicators as well as the origin of data.
7. *Choose indicators according to their relevance and validity.* The choice of data should be grounded in recognition of the ability of each measure to represent quality and academic and institutional strengths, and not availability of data. Be clear about why measures were included and what they are meant to represent.
8. *Measure outcomes in preference to inputs whenever possible.* Data on inputs are relevant as they reflect the general condition of a given establishment and are more frequently available. Measures of outcomes provide a more accurate assessment of the standing and/or quality of a given institution or program, and compilers of rankings should ensure that an appropriate balance is achieved.
9. *Make the weights assigned to different indicators (if used) prominent and limit changes to them.* Changes in weights make it difficult for consumers to discern whether an institution’s or program’s status changed in the rankings due to an inherent difference or due to a methodological change.

C) Collection and Processing of Data

10. *Pay due attention to ethical standards and the good practice recommendations articulated in these Principles.* In order to assure the credibility of each ranking, those responsible for collecting and using data and undertaking on-site visits should be as objective and impartial as possible.
11. *Use audited and verifiable data whenever possible.* Such data have several advantages, including the fact that they have been accepted by institutions and that they are comparable and compatible across institutions.
12. *Include data that are collected with proper procedures for scientific data collection.* Data collected from an unrepresentative or skewed subset of students, faculty, or other parties may not accurately represent an institution or program and should be excluded.
13. *Apply measures of quality assurance to ranking processes themselves.* These processes should take note of the expertise that is being applied to evaluate institutions and use this

knowledge to evaluate the ranking itself. Rankings should be learning systems continuously utilizing this expertise to develop methodology.

14. *Apply organizational measures that enhance the credibility of rankings.* These measures could include advisory or even supervisory bodies, preferably with some international participation.

D) Presentation of Ranking Results

15. *Provide consumers with a clear understanding of all of the factors used to develop a ranking, and offer them a choice in how rankings are displayed.* This way, the users of rankings would have a better understanding of the indicators that are used to rank institutions or programs. In addition, they should have some opportunity to make their own decisions about how these indicators should be weighted.
16. *Be compiled in a way that eliminates or reduces errors in original data, and be organized and published in a way that errors and faults can be corrected.* Institutions and the public should be informed about errors that have occurred.

Berlin, 20 May 2006

Appendix C: Rankings of Technology Universities

TOP 50 UNIVERSITIES FOR TECHNOLOGY				
		Country	Score	Citations
1	Massachusetts Institute of Technology	US	100	4.0
2	University of California, Berkeley	US	94.5	4.2
3	Stanford University	US	84.7	4.3
4	California Institute of Technology	US	80.0	3.7
5	University of Cambridge	UK	75.6	3.4
6	Imperial College London	UK	72.1	2.7
7	Carnegie Mellon University	US	71.0	3.6
8	Georgia Institute of Technology	US	68.0	2.9
9	University of Tokyo	Japan	65.1	2.1
10	National University of Singapore	Singapore	63.8	2.9
11	University of Toronto	Canada	60.4	3.5
12	University of Oxford	UK	60.2	3.7
13	ETH Zurich	Switzerland	59.6	2.5
14	Princeton University	US	59.2	4.7
15	Harvard University	US	58.3	5.1
16	Tsinghua University	China	58.2	1.2
17	Delft University of Technology	Netherlands	57.7	2.6
18	University of California, Los Angeles	US	57.4	4.1
19	University of Illinois	US	57.3	3.5
20	Cornell University	US	56.7	4.4
21	University of Melbourne	Australia	54.1	2.9
22	Tokyo Institute of Technology	Japan	53.8	1.8
23	Hong Kong University of Science & Technology	Hong Kong	53.6	3.1
24	Purdue University	US	53.3	2.7
25=	Technion – Israel Institute of Technology	Israel	53.1	1.8
25=	Nanyang Technological University	Singapore	53.1	2.1
27	McGill University	Canada	52.8	2.4
28	University of New South Wales	Australia	52.5	2.5
29	Kyoto University	Japan	50.7	2.0
30=	University of British Columbia	Canada	50.5	2.6
30=	University of Texas at Austin	US	50.5	2.9
32	University of Michigan	US	50.4	3.6
33	Indian Institute of Technology Bombay	India	49.4	1.6
34	Ecole Polytechnique	France	48.5	2.3
35	University of Waterloo	Canada	48.4	2.0
36	Peking University	China	48.2	1.8
37	Indian Institute of Technology Delhi	India	47.3	1.7
38	University of California, San Diego	US	47.0	3.8
39	Australian National University	Australia	46.4	2.4
40	Technische Universität München	Germany	44.7	2.5
41=	University of Sydney	Australia	44.5	2.3
41=	Texas A&M University	US	44.5	2.4
43	University of Manchester	UK	43.9	2.6
44	Monash University	Australia	42.8	2.0
45	Virginia Polytechnic Institute	US	42.7	2.2
46	Yale University	US	41.7	4.5
47	Ecole Polytechnique Fédérale de Lausanne	Switzerland	41.6	5.3
48	Korea Advanced Inst of Science & Technology	S Korea	41.3	1.9
49	University of Science & Technology of China	China	40.8	1.0
50	Rensselaer Polytechnic Institute	US	40.6	3.3

Source: QS Quacquarelli Symonds

http://www.paked.net/higher_education/rankings/times_2007_technology.htm

Appendix C, continued: Rankings of Technology Universities

















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Academic Ranking of World Universities in Engineering/Technology and Computer Sciences - 2009
[Methodology](#) | [Statistics](#)

World Rank	Institution*	Country	Score on HICI	Score on PUB	Score on TOP	Score on Fund	Total Score
1	Massachusetts Institute of Technology (MIT)		99	78	94	98	100
2	Stanford University		100	65	97	79	92.5
3	University of Illinois at Urbana-Champaign		63	73	89	91	85.8
4	University of California, Berkeley		77	71	90	70	83.6
5	Carnegie Mellon University		53	55	90	100	81.1
6	University of Michigan - Ann Arbor		61	69	90	77	81.0
7	The University of Texas at Austin		73	63	86	71	79.8
8	Georgia Institute of Technology		35	81	86	91	79.7
9	University of California, San Diego		68	58	90	75	78.9
10	Pennsylvania State University - University Park		69	68	84	70	78.8
11	University of Southern California		60	51	91	83	77.4
12	California Institute of Technology		73	53	97	57	75.9
13	University of California, Santa Barbara		80	48	100	50	75.6
14	University of Maryland, College Park		56	60	82	79	75.3
15	Swiss Federal Institute of Technology of Lausanne		55	62	87		73.8
15	University of Cambridge		55	63	86		73.8
17	Purdue University - West Lafayette		51	69	81	71	73.7
18	Cornell University		56	50	93	70	73.3
19	University of Toronto		61	65	84	51	71.2
20	Tohoku University		47	85	64		70.7

<http://www.arwu.org/ARWUFIELD2009ENG.jsp>



Appendix D: Academic Ranking of World Universities 2009

 												
Home About RANKINGS University Profiles Resources Contact												
Academic Ranking of World Universities - 2009 (Methodology Statistics Analysis)												
(Top 100 101-200 201-302 303-401 402-501)												
World Rank	Institution	Region	Regional Rank	Country	National Rank	Score on Alumni	Score on Award	Score on HICI	Score on N&S	Score on PUB	Score on PCP	Total Score
1	Harvard University	Americas	1		1	100	100	100	100	100	74.8	100
2	Stanford University	Americas	2		2	39	78.7	87.1	67.3	70.1	66.9	73.1
3	University of California, Berkeley	Americas	3		3	67.4	77.1	68.4	71.1	69	53.2	71.0
4	University of Cambridge	Europe	1		1	89.4	91.5	53.8	53.9	65.4	65.5	70.2
5	Massachusetts Institute of Technology (MIT)	Americas	4		4	71	80.6	65.7	67.9	62	54.4	69.5
6	California Institute of Technology	Americas	5		5	51.5	69.1	57.1	66.2	47.7	100	64.8
7	Columbia University	Americas	6		6	70.6	67.7	55.7	49.1	69.6	46.5	61.7
8	Princeton University	Americas	7		7	57.8	85.2	61.6	41.5	45.7	61.4	60.2
9	University of Chicago	Americas	8		8	65.8	84.3	49.7	38.6	51.6	41.8	57.0
10	University of Oxford	Europe	2		2	57.6	57.9	48.9	49.8	66.1	45.7	56.3
11	Yale University	Americas	9		9	49.8	43.6	57.6	55.7	62.7	49.5	55.2
12	Cornell University	Americas	10		10	40.5	51.3	54.3	51.7	61.2	39.9	53.1
13	University of California, Los Angeles	Americas	11		11	23.8	42.8	57.4	50.3	74.5	36.2	52.3
14	University of California, San Diego	Americas	12		12	15.5	35.9	60.3	53.9	65.2	48	50.7
15	University of Pennsylvania	Americas	13		13	30.9	34.4	57.6	44.1	69	39.8	49.3
16	University of Washington	Americas	14		14	25	31.8	53.3	48.8	73.7	28.1	48.0
17	University of Wisconsin - Madison	Americas	15		15	37.5	35.5	52.3	39.8	66.7	28.6	46.7
18	University of California, San Francisco	Americas	16		16	0	36.8	53.8	49.7	59.9	46.7	45.9
19	The Johns Hopkins University	Americas	17		17	44.7	27.8	41.7	49.1	67.1	24.9	45.2
20	The University of Tokyo	Asia/Pacific	1		1	34.1	14.1	42.9	49	79.7	34.1	45.1
21	University College London	Europe	3		3	30.4	32.2	40.4	45.2	66	36.1	44.6
22	University of Michigan - Ann Arbor	Americas	18		18	37.5	0	60.3	41.4	77.3	31.4	43.8
23	Swiss Federal Institute of Technology Zurich	Europe	4		1	35	36.3	35.9	41.8	52.6	57	43.6

Academic Ranking of World Universities - 2009

(Methodology | Statistics | Analysis)









(Top 100 [101-200](#) [201-302](#) [303-401](#) [402-501](#))

World Rank	Institution	Region	Regional Rank	Country	National Rank	Score on Alumni	Score on Award	Score on HICI	Score on N&S	Score on PUB	Score on PCP	Total Score
24	Kyoto University	Asia/Pacific	2		2	34.6	34.9	38.4	34.6	67.3	31	42.7
25	University of Illinois at Urbana-Champaign	Americas	19		19	36.2	36.6	42.9	35.9	59.7	26.8	42.4
26	The Imperial College of Science, Technology and Medicine	Europe	5		4	18.1	37.4	40.4	35.9	61.7	39.4	41.9
27	University of Toronto	Americas	20		1	24.4	19.3	39.1	35.1	78.2	27.5	40.5
28	University of Minnesota, Twin Cities	Americas	21		20	31.4	16.3	49.7	35.3	67.5	24.6	40.4
29	Washington University in St. Louis	Americas	22		21	21.9	26	39.1	41.3	55	40.1	39.5
30	Northwestern University	Americas	23		22	18.9	18.9	47	34.8	59.1	38.5	38.7
31	Duke University	Americas	24		23	18.1	0	47	41.7	63	40	37.1
32	New York University	Americas	25		24	33.2	24.5	39.7	33.1	52.9	25.8	36.9
32	Rockefeller University	Americas	25		24	19.7	58.6	29	41.9	21.6	37.6	36.9
34	University of Colorado at Boulder	Americas	27		26	14.5	30.8	39.1	39.8	45.2	30.6	36.4
35	University of California, Santa Barbara	Americas	28		27	0	35.3	41.7	33.8	42.3	35.2	35.0
36	University of British Columbia	Americas	29		2	18.1	18.9	31.6	31.3	64.8	23.7	34.4
37	University of Maryland, College Park	Americas	30		28	22.5	20	40.4	28.1	53.6	26.1	34.1
38	The University of Texas at Austin	Americas	31		29	18.9	16.7	46.5	27.7	54.3	21.6	34.0
39	University of North Carolina at Chapel Hill	Americas	32		30	10.9	16.3	39.1	27	60.4	28.9	33.4
40	Pierre and Marie Curie University - Paris 6	Europe	6		1	35.7	23.6	22.9	27.7	59.3	21.7	33.3
41	The University of Manchester	Europe	7		5	23.8	18.9	28.1	28.5	58.3	29.9	33.0
41	Vanderbilt University	Americas	33		31	18.1	29.6	31.6	22.1	50.1	36.2	33.0
43	University of Copenhagen	Europe	8		1	26.8	24.2	26.2	24.8	54.5	33.2	32.7
43	University of Paris Sud (Paris 11)	Europe	8		2	32.5	46.2	14.5	20.1	50.3	23.9	32.7
45	Pennsylvania State University - University Park	Americas	34		32	12.2	0	45.9	37.6	56.9	24.1	32.5
46	University of California, Irvine	Americas	35		33	0	29.4	37	26.1	48.9	32.8	32.4
46	University of Southern California	Americas	35		33	0	26.8	37.7	27	52.8	27.1	32.4
48	The University of Texas Southwestern Medical Center at Dallas	Americas	37		35	21.2	33.2	30.8	27.8	39.1	31.1	32.2
49	University of California, Davis	Americas	38		36	0	0	46.5	31	62.6	29.9	31.8
50	Karolinska Institute	Europe	10		1	26.8	27.3	31.6	19.4	49.6	25.8	31.7
50	University of Pittsburgh	Americas	39		37	21.9	0	42.3	24.1	62.6	28.7	31.7

Academic Ranking of World Universities - 2009

(Methodology | Statistics | Analysis)

(Top 100 101-200 201-302 303-401 402-501)

World Rank	Institution	Region	Regional Rank	Country	National Rank	Score on Alumni	Score on Award	Score on HICI	Score on N&S	Score on PUB	Score on PCP	Total Score
52	Utrecht University	Europe	11		1	26.8	20.9	28.1	30.5	48.2	25.1	31.5
53	The University of Edinburgh	Europe	12		6	19.7	16.7	27.1	32.2	50.1	30.5	31.0
54	University of Zurich	Europe	13		2	10.9	26.8	24.6	28.5	49	32.5	30.9
55	Rutgers, The State University of New Jersey - New Brunswick	Americas	40		38	13.4	20	40.4	25.8	43.4	23.6	30.4
55	University of Munich	Europe	14		1	32.3	22.9	16.2	24.5	52.5	31.4	30.4
57	Technical University Munich	Europe	15		2	40.1	23.6	25.1	18.1	45.2	30.4	30.2
58	University of Florida	Americas	41		39	19.7	0	37	21.2	64.1	26.4	29.8
59	Carnegie Mellon University	Americas	42		40	30.4	32.8	30.8	14.6	35.1	31	29.6
59	The Australian National University	Asia/Pacific	3		1	15.5	12.6	36.3	27.2	44.1	32.2	29.6
61	University of Bristol	Europe	16		7	9.5	17.9	29	28.6	46.7	33.7	29.5
62	The Ohio State University - Columbus	Americas	43		41	15.5	0	41.7	20.9	61.3	20.2	29.1
63	University of Heidelberg	Europe	17		3	17.3	27.2	17.8	22.5	49	29.5	28.7
64	The Hebrew University of Jerusalem	Asia/Pacific	4		1	28.9	20	24.1	22.6	43.9	28.5	28.6
65	King's College London	Europe	18		8	14.5	23.1	29	15	49.2	30.4	28.5
65	McGill University	Americas	44		3	25	0	32.4	22.8	58.6	24.9	28.5
65	Purdue University - West Lafayette	Americas	44		42	16.4	16.7	29.9	21.9	51.7	20.9	28.5
65	University of Oslo	Europe	18		1	22.5	33.4	17.8	16.1	45.6	29.2	28.5

<http://www.arwu.org/ARWU2009.jsp>

Appendix E: Overview of Selected Ranking Methodologies

Education and Social Science Library, University of Illinois at Urbana-Champaign (source: <http://www.library.illinois.edu/edx/rankings/rankbib.html>) All is directly quoted with permission from Nancy O'Brien, Education and Social Science Library, University of Illinois at Urbana-Champaign.


Times Higher Education Supplement. World University Rankings.

 <http://www.timeshighereducation.co.uk/hybrid.asp?typeCode=243&pubCode=1>

This long operating analysis presents numerous tables listing university ranks. The listings include a table ranking the world's top 200 universities, and specialized lists for institutions focusing on engineering and IT universities, life sciences & biomedicine universities, natural sciences, social sciences, and arts and humanities.

According to the Education and Social Science Library, University of Illinois at Urbana-Champaign "In a deliberate attempt to keep things simple, scores were calculated using 5 scales: peer review (based on a survey of faculty throughout the world; accounting for 50% of the total score), research impact (measuring citations per faculty; 20% of total score), faculty/student ratio (20% of total score), percentage of international faculty (5%), and percentage of international students (5%). (<http://www.library.illinois.edu/edx/rankings/rankbib.html>)

Academic Ranking of World Universities

 [<http://ed.sjtu.edu.cn/ranking.htm>]

Methodology: This site offers an explanation of its methods on a page titled **Rankings Methodology**.

This site, created by the Institute of Higher Education at Shanghai Jiao Tong University, ranks the top universities throughout the world. The site also narrows the ratings further, creating lists for the top 100 universities in America, Europe, and Asia. The rankings are based solely on academic or research performance, using five criteria: the number of Nobel laureates, highly cited researchers, articles published in Nature and Science, articles in Science Citation Index-expanded and Social Science Citation Index, and academic performance per faculty at each university. [U of I Library]

Asiaweek: Best Universities 2000

 [<http://www.asiaweek.com/asiaweek/features/universities2000/index.html>]

Methodology: This site no longer offers an explanation of its rankings. To review the methodology for the 1999 rankings, see **About the Rankings**.

(Please note: we have recently been informed that *Asiaweek* will no longer be publishing their annual rankings. We will continue to link to the site as long as it is relevant.)

The third *Asiaweek* annual survey of Asia's top universities is a refinement of previous versions and offers separate rankings of multidisciplinary schools and science and technology schools. Seventy-nine multidisciplinary universities are ranked, led by Tohoku University, and thirty-five science and technology schools are listed, topped by the Korea Advanced Institute for Science

and Technology. All of the schools are judged by five criteria; academic reputation, student selectivity, faculty resources, research output, and financial resources. [U of I Library]


4 International Colleges and Universities Rankings

 [<http://www.4icu.org/>]

Methodology: According to 4ICU, "The ranking is based upon an algorithm including three unbiased and independent web metrics: Google Page Rank, total number of inbound links and Alexa Traffic Rank." For more information see their **About Us** page.

Located in Australia, this site ranks colleges and universities based on their websites' popularity and usage; it does not measure the schools or their programs by quality of education or services. The site offers rankings by worldwide and geographic region. It provides user-created profiles for each school listed, but note the site recommends visiting the institution's websites for updated/accurate information. [U of I Library]

Grade My University

 [<http://www.grademyuniversity.com/index.php>]

Methodology: These rankings are based on student reviews.

This site provides international university rankings based on student reviews of their own university. Only reviews from campus computers are accepted in order to verify current student status. Reviews on individual universities can be found by first selecting the country and then selecting the university and/or city where the university is located. [U of I Library]


Guardian's Guide to Universities

 [<http://education.guardian.co.uk/universityguide2006/0,,1595180,00.html>]

Methodology: See **How the Tables are Compiled**.

This site ranks universities in several different subject areas (e.g. Art and Design, Engineering, Medical Sciences). While heavily UK-oriented, the rankings include listings for schools in the US, Canada and Germany. The *Guardian's main education site* includes subject-oriented news items and much more. [U of I Library]


HEEACT Performance Ranking of Scientific Papers for World Universities

 [<http://ranking.heeact.edu.tw/en-us/2008/TOP/100>]

Methodology: An explanation of this site's methodology can be found on a page titled **Methodology**

The Higher Education Evaluation and Accreditation Council of Taiwan (HEEACT) ranks scientific paper performances of the top 500 Universities in the world. Universities were selected by number of published journal articles from information listed in the Essential Science Indicators. Data used to assess university performance was taken from the Essential Science Indicators, Web of Science, and Journal Citation Reports. Rankings are sorted by overall performance, academic area, continent, and country. [U of I Library]


IHEP Ranking Systems Clearinghouse

 [<http://www.ihep.org/Research/rankingsystemsclearinghouse.cfm>]

Methodology: This site does not create its own rankings.

The Institute for Higher Education Policy's (IHEP) Ranking Systems Clearinghouse provides a road map of the complex rankings landscape, offering annotated links to national and international ranking systems and to research about rankings world-wide. The Clearinghouse is funded by **Lumina Foundation for Education** as part of a larger IHEP initiative to understand how rankings impact decision-making at the institutional and policy levels, the **New Agenda for College and University Rankings**. [U of I Library]

Research Assessment Exercise 2008: the outcome

 [<http://www.rae.ac.uk/pubs/2008/01>] **Methodology:** The site offers an explanation of its methodology at the **About the RAE 2008** page. This site contains the results of the 2008 Research Assessment Exercise, conducted jointly by the four higher education funding bodies in the UK: The Higher Education Funding Council for England, the Scottish Higher Education Funding Council, the Higher Education Funding Council for Wales, and the Department for Employment and Learning - Northern Ireland. University programs in a variety of subjects were awarded a ranking from 1 to 5 based solely on research quality. [U of I Library]


THES QS World University Rankings

 [<http://www.topuniversities.com/home/>]

Methodology: The methodology for this ranking can be found on **THES QS World University Rankings: FAQ**.

The Times Higher Education Supplement ranks the top universities across the globe. The Top 200 world universities are free to view, but registration is required to see the entire rankings (over 500 universities). Each university in the rankings links a brief school description and statistics. [U of I Library]

The Times Good University Guide

 [http://www.timesonline.co.uk/tol/life_and_style/education/good_university_guide/]

Methodology: The site explains its methodology on a page titled **How the guide was compiled**.

The *Times* of London offers its latest ranking of higher education institutions in the United Kingdom. Universities are rated as a whole, and various subject departments are also rated. Several interesting subcategories ("Best For Jobs," "Most Middle Class," "Cheapest to Live In") are available. Click on league tables to find specific rankings. [U of I Library]


Appendix F: Miscellaneous Country and Other Specialized Rankings & Methodologies

Education and Social Science Library, University of Illinois at Urbana-Champaign (source: <http://www.library.illinois.edu/edx/rankings/rankbib.html>) All is directly quoted with permission from Nancy O'Brien, Education and Social Science Library, University of Illinois at Urbana-Champaign.

International Rankings

Note: While these sites may contain information of value to you, the Education and Social Science Library and the University of Illinois at Urbana-Champaign do not endorse the sites or the information they contain. For more information and current research on rankings, we encourage you to read some of the articles listed in our **College Rankings Bibliography** and to see our **Caution and Controversy** page. For questions or comments, please contact **Nancy O'Brien**.


B-School Net

 [<http://www.b-school-net.de/>]

Methodology: This site offers an explanation of its rankings on the opening page.

This site, in German with English in places, offers recent rankings of business schools and leading MBA programs in Germany. There are several rankings including one based on a survey of 13,000 students focusing on several qualities including: Quality of professors in teaching; Support for students by professors; Quality and actuality of library; Quality and availability of IT; Amount and quality of student activities; Usefulness in practice; Internationality; and Cooperation of school with corporations. There are also links to further information. [U of I Library]

B-School Net

 [<http://www.b-school-net.de/>]

Methodology: This site offers an explanation of its rankings on the opening page.

This site, in German with English in places, offers recent rankings of business schools and leading MBA programs in Germany. There are several rankings including one based on a survey of 13,000 students focusing on several qualities including: Quality of professors in teaching; Support for students by professors; Quality and actuality of library; Quality and availability of IT; Amount and quality of student activities; Usefulness in practice; Internationality; and Cooperation of school with corporations. There are also links to further information. [U of I Library]

Business Week Best B-Schools 2006

 [<http://www.businessweek.com/bschools/06/index.html>]

Methodology: This site offers an explanation of its methods on a page titled **How We Came Up With the Rankings**.

Business Week offers its business school rankings, including the **Top 10 International MBA Programs** outside the U.S, at this site. Anyone can view the basic list on the opening page, but you must register with *Business Week* (for free) to view the schools' full profiles. Historical data

for 1996 through 2003 is provided free in separate links found at the bottom of **2006 Full-Time MBA Program Rankings**. [U of I Library]

Financial Times Global MBA Rankings 2007

 [<http://news.ft.com/businesslife/mba>]

Methodology: This site offers an explanation of its rankings in its **Key to Table** (pdf file) and at **How to read the rankings: How the raw data are processed**.

Based on surveys completed by both school officials and alumni, the *Financial Times of London* ranking of MBA programs offers its assessment of the top 100 MBA programs in the world. The rankings are based on relative status in three broad areas: value, diversity, and research. The main component considered as a measure of value is alumni salary. Diversity of faculty and students and availability and use of international opportunities are taken as important measures of a program's diversity. A program's research ranking is measured by the amount of publications in forty international and practitioner journals. In addition to listing the top programs worldwide, the rankings are broken down further to identify the top programs in the United States, Europe, Canada, and Asia and Australia. This site also contains an archive of past rankings. For direct access to their 2007 rankings, see their **Global Rankings Interactive Table**. [U of I Library]

- The Financial Times in London, England publishes Business School rankings focusing on MBA, EMBA (Executive MBA), Master in Management, executive education, and European Business Schools

<http://rankings.ft.com/businessschoolrankings/>


German University Ranking

 [<http://www.university-ranking.org/>]

Methodology: This site offers an explanation of its rankings in a page entitled **Methodology**.

This comprehensive site offers an assessment of over 250 German universities. Rather than offering numerical rankings, schools are given a score of top, middle, and bottom for academic subject areas. Each university is examined and compared using five broad criteria: professor recommendation, student opinion, equipment, research, and duration of study. In addition, the site contains detailed descriptions of each university ranked as well as the opportunity to customize the rankings to fit personal criteria and needs. [U of I Library]


Maclean's Universities Ranking

 [<http://oncampus.macleans.ca/education/2009/11/05/our-19th-annual-rankings/>]

Methodology: This site offers an explanation of its methodology **here**.

This site contains information on the Maclean's annual study of Canadian institutions of higher education. Rankings are provided for three groups of institutions: medical-doctoral (broad range of PhD programs and focus on research), comprehensive (significant research activity and wide range of undergraduate and graduate programs), and those focusing primarily on undergraduate education. The schools are evaluated in many areas, including faculty, classes, finances, libraries, reputation, and student body. The complete rankings, including the rankings results, can be located through **EBSCO** (UIUC affiliates only) by searching for the title: OUR 19TH ANNUAL RANKINGS. Maclean's also offers a free **Personalized University Ranking Tool**. [U of I Library]


Marr/Kirkwood Side by Side Comparison of International Business School Rankings

 [<http://www.bschool.com/intlsbys.html>]

Methodology: This site does not create its own rankings.

This site provides a table of side-by-side comparisons of published rankings of the best business schools from around the world. Information for the side-by-side comparison is drawn from several of the ranking services listed at our rankings site. [U of I Library]


Study Choice: Netherlands

 [<http://www.studychoice.nl/web/site/default.aspx>]

Methodology: This site offers an explanation of its methodology on their **About Page**.

Studychoice.nl is an independent and non-commercial website supported by the Ministry of Education of the Netherlands. On this website, students can use over 80 criteria to compare 450 English taught bachelor's and master's programs in the Netherlands. This site provides an overview of which universities and colleges excel in certain areas (for example, the quality of education or the quality of the facilities near the university and in the university's home town). [U of I Library]

Swiss Ranking Group

 [<http://www.universityrankings.ch/>]

The Ranking Forum of Swiss Universities presents a wide range of useful information on several different ranking systems
From the Swiss ranking group <http://www.universityrankings.ch/en/information>

University of Melbourne

 [<http://www.melbourneinstitute.com/publications/reports/uniscope/>]

University of Melbourne, Melbourne Institute published a detailed scholarly paper ranking Australian universities in 2007.

Appendix G: Annotated List of Documents Pertaining to Rankings

Education and Social Science Library, University of Illinois at Urbana-Champaign (source: <http://www.library.illinois.edu/edx/rankings/rankbib.html>) All is directly quoted with permission from Nancy O'Brien, Education and Social Science Library, University of Illinois at Urbana-Champaign.

Items Containing Rankings

Consumers Digest Names 100 Colleges/Universities Top Values. *PR-inside*. May 1, 2007. The article discusses the June 2007 issue of *Consumers Digest Magazine* which rankings the top 100 college and university values in the United States. *PR-inside* highlights the *Consumers Digest's* Top 5 Best Values in Public Colleges, Top 5 Best Values in Private Colleges and Universities and Top 5 Best Values in Private Liberal Arts Schools.

Gourman, Jack. *Gourman Report: Graduate Programs (8th Edition)*. NY: Princeton Review Publishing, 1997. Ranks top graduate and professional programs in over 100 academic areas. Separate sections cover schools of law, medicine, and health-related professions. Also included are lists of "approved" engineering and business management schools, a rating of U.S. research libraries and overall rankings of U.S. and international graduate schools. The methodology of this popular ranking source has been questioned widely. This title is no longer published.

Gourman, Jack. *Gourman Report: Undergraduate Programs (10th Edition)*. NY: Princeton Review Publishing, 1998. Ranks undergraduate programs in over 100 individual disciplines, as well as the top universities in the broader realm of pre-legal and pre-medical education. Includes a section on university administrative areas (e.g., libraries, alumni associations) and international universities. This title is no longer published.

Lombardi, John V., Craig, Diane D., and Capaldi, Elizabeth D. *The Top American Research Universities* An annual publication from the *Center for Measuring University Performance*. It offers their assessment of the best public universities based on total research and development; federally sponsored research and development; national academy members; Guggenheim and Fulbright awards; Ph.D.'s awarded; postdoctoral students; and National Merit and National Achievement Scholars.

National Research Council (U.S.) Committee for the Study of Research-Doctorate Programs in the United States. *Research-doctorate programs in the United States : continuity and change*. Washington, D.C.: National Academy Press, 1995. A very comprehensive study of the research doctorate programs in selected fields. An index to the fields of study covered appears in the back. Statistical information on the program is given, as well as a relative ranking of the schools in the field for the programs included. Education is not covered although many social science fields are.

Parmar, Neil. *The Best Colleges for Making Money*. *SmartMoney*. December 16, 2008. In this article, *SmartMoney* reports on their attempt to quantify the long-term value of a college education, with the goal to spotlight the relationship between tuition costs and graduates' earning power. Their results suggest that public universities may be a better deal than private universities.

Ranking America's Leading Universities on Their Success in Integrating African Americans. *Journal of Blacks in Higher Education*. This site provides an overall ranking of the nation's leading universities on their comparative success in bringing African Americans into the ranks of higher education. Highly quantitative, the rankings are based on thirteen categories including the total black student enrollment (graduate and undergraduate), the five-year progress of the university in black student enrollment, the black student graduation rate, and the university-wide percentage of blacks among the tenured faculty. The article provides the reader with a careful explanation of the purpose and methodology of the rankings. It also contains a brief history of African Americans in higher education both as students and faculty. The article offers results and commentary on the performance for each of the 26 universities and discusses the limitations of the rankings.

Times Higher Education Supplement. World University Rankings. The first edition of a planned annual feature. The centerpiece is a table ranking the top 200 universities throughout the world. In a deliberate attempt to keep things simple, scores were calculated using 5 scales: peer review (based on a survey of faculty

throughout the world; accounting for 50% of the total score), research impact (measuring citations per faculty; 20% of total score), faculty/student ratio (20% of total score), percentage of international faculty (5%), and percentage of international students (5%). A number of short articles in this 15-page feature further elaborate on these rankings, offering discussions of individual scales and regions. (**Note:** This feature is available online, but requires a *Times Higher Education Supplement* subscription.)

U.S. News & World Report. America's best graduate schools. Washington, DC : U.S. News & World Report, 1998- (Annual Publication). This annual, despite its pitfalls, provides a good jumping-off point to the world of graduate rankings. Rankings have been categorized by subject area--Business, Law, Medicine & Health, Education, Engineering, Library Science, and Ph.D.s. Included is a directory of over 1000 graduate programs by subject and state, methodology of their rankings and an index. (See articles below and our own **Caution & Controversy** page for more on critical analysis of *U.S. News & World Report* and rankings in general.)

U.S. News & World Report. America's best colleges. Washington, DC: U.S. News & World Report, 1998- (Annual Publication) Updated annually, this site contains extensive information about colleges and universities in the United States, including selected undergraduate programs. The list is divided both by region and by category (National Universities, Liberal Arts Colleges, Regional Schools and Top Public Schools). Factors such as diversity, specialty schools/programs (ranked and non-ranked), and state-by-state results are ranked separately. A searchable index also provides access to the site's contents. Be sure to check our **Caution and Controversy** page to learn more about the ranking methods utilized by *U.S. News & World Report*. Beginning in 2002, much of the information formerly provided free became available for purchase only from this site.

Items About Rankings

"Annual College Rankings Find Ready Market." *The CQ Researcher*. v6 n8 (1996): p.180.

" Assessing the Shanghai Rankings". *Research Trends*. Issue 4 (March 2008). A brief assessment of the "Academic Ranking of World Universities," a university ranking initiative of the Shanghai Jiao Tong University in China. The Shanghai Rankings were originally developed to compare Chinese universities with others worldwide, with particular reference to academic and research performance. Questions such as how the rankings are perceived by the academic community and how its evaluation criteria differs from the Times Higher Education Supplement's World University Rankings are explored.

Baughman, James C. and Robert N. Goldman. "College Rankings and Faculty Publications: Are They Related?" *Change*. v31 n2 (March/April 1999): p.44-51.

Billaut, J.C., Bouyssou, D., & Vincke, P. (2009). Should you believe in the Shanghai ranking? An MCDM view. Rapport interne n°296. Tours, France: Laboratoire d'informatique EA n° 2101 www.li.univ-tours.fr. Retrieved January 1, 2010 from http://smai.emath.fr/IMG/pdf_RI296_Shanghai.pdf

Bollag, Burton. " Group Endorses Principles for Ranking Universities." *The Chronicle of Higher Education*. (June 9, 2006). This article discusses the Berlin Principles on Ranking of Higher Education Institutions, 16 principles of good practice which are meant to serve as guidelines for groups that produce rankings. These principles were created by an international group of educators, higher-education experts, and publishers.

Carey, Kevin. " College Rankings Reformed: The Case for a New Order in Higher Education". *Education Sector Reports*. September, 2006. According to the author, traditional college rankings often exclude measures that would be most helpful to students, instead focusing on the fame, wealth, and exclusivity of ranked universities. New research and advances in technology in the last few years have lead to new metric and data sources to measure how well universities are preparing undergraduate students. This report explains what the new measures can show, how those measures can be combined into new college rankings, and why the new rankings would benefit both students and colleges.

Carey, Kevin. " College Rankings Will Never Die". *The Chronicle Review's Brainstorm*. March 19, 2009. This article describes a discussion between the author and an official from a North African country about higher education institutions in the United States. The author describes the problems that this official was encountering when comparing U.S. schools, the reasons why people turn to rankings for assistance, and how rankings can help people make informed decisions about schools.

- Carter, Terry. "Rankled by the Rankings." *ABA Journal*. v84 (March 1998): p.46-53.** "Some deans are fed up with law school ratings by U.S. News & World Report and have launched an anti-ranking campaign. Others pay lip service to those efforts while figuring out how to boost their own positions on the list." (from the magazine)
- Chang, Gordon C. and J.R. Osborn. "Spectacular Colleges and Spectacular Rankings: The U.S. News Rankings of American "Best" Colleges." *Journal of Consumer Culture*. v5 n3 (2005): p. 338-364.** Using Guy Debord's "theory of the spectacle" to examine college rankings, the authors identify three processes: abstraction, valuation and legitimation, that place the U.S. News Rankings in the context of spectacle.
- Clarke, Marguerite. "Weighing Things Up: A Closer Look at the *U.S. News and World Report's* Ranking Formulas." *College and University Journal*. v79 n3 (Winter 2004): p. 3-9.** This analysis examines two criticisms commonly leveled against the *U.S. News* ranking methodology: that the weight-and-sum method arbitrarily weighs certain factors higher than others, and that the "false precision" of overall scores creates the impression of fine distinctions among schools where none may actually exist. It finds empirical support for both of these criticisms through statistical analysis, and concludes with suggestions for "improving the interpretability and usefulness of the rankings," including reevaluating the weighting system and doing away with the single overall score.
- Cohen, David. "Magazines Rankings of Asian Universities are Popular With Readers, Not Academics." *The Chronicle of Higher Education*, 45(36) (May 14,1999): p. A51.** This article addresses the college ranking conundrum in an Asian setting by examining the unique and fascinating case of *Asiaweek's* annual survey of Asia's best universities. The extra variables of economic diversity, social history, and national pride all add spice to the normally difficult process of ranking schools. The author addresses these issues in a wide-ranging article, which provides an excellent introduction for the uninitiated.
- Crissey, Michael. "Changes in Annual College Guides Fail to Quell Criticisms on Their Validity." *The Chronicle of Higher Education*, 44 (2) (September 5, 1997): p. A67.**
- Dill, David D. and Maarja Soo. "Academic quality, league tables, and public policy: A cross-national analysis of university rankings systems." *Higher Education*, v49 n4 (June 2005): p. 495-533.** Examines and compares national university rankings systems or league tables from Australia, Canada, the UK and the US, to address the role of public policies concerning the rankings. This article raises the questions: is there an international agreement on the measurement of academic quality across these ranking systems? What impact do the ranking systems have on the university and academic behavior in their countries? What is the role of public policy in the creation and distribution of rankings systems?
- Diver, Colin and Kevin Carey. "Rise and Shine? The ups and downs of the rankings game". *Currents*. v33 n6 (July/Aug 2007). p. 47-52.** This article contains two perspectives on the college rankings debate, written by Colin Diver, president of Reed College, and Kevin Carey, a researcher at Education Sector. Diver discusses reasons why the *U.S. News* rankings are disliked and what colleges should be prepared for if they choose not to participate. Carey discusses the options of accepting these rankings, faults and all, or creating a newer, better, rankings regime.
- Dometrius, Nelson C., M.V. Hood III, Kurt A. Shirkey, and Quentin Kidd. "Bugs in the NRC's Doctoral Program Evaluation Data: From Mites to Hissing Cockroaches." *PS: Political Science and Politics*. v31 n4 (December 1998): p.829-835.** This article examines the data used in the often cited National Research Council (NRC) publication, *Research Doctorate Programs in the United States, Continuity and Change*. The authors identify problems with the NRC study's data quality and interpretation.
- Druzdzel, Marek J. and Clark Glymour. " What Do College Ranking Data Tell Us About Student Retention: Causal Discovery in Action". In *Proceedings of the Fourth International Workshop on Intelligent Information Systems (WIS-95)*, Augustow, Poland, June 5-9, 1995, p.138-147.** The above link will take you to an abstract of the paper and will allow you to download an Adobe PDF version of the work.
- Ehrenberg, Ronald G. "Reaching for the Brass Ring: The U.S. News and World Report Rankings and Report." *The Review of Higher Education*, 26 (2) (Winter 2003): p. 145-162.** The United States higher education system is known throughout the world for its competitiveness, and rankings add to this environment. Institutions competing for top rankings may forgo cooperation with other institutions, which

can be detrimental to both the student and the institution as well as higher education, in general. This article examines the role of the U.S. News and World Report rankings and its methodology in this competitive atmosphere and also what changes could be made to encourage cooperation.

Espeland, Wendy N. and Michael Sauder. "Rankings and Reactivity: How Public Measures Recreate Social Worlds". *American Journal of Sociology*, v113 n1 (July 2007): p. 1-40. This article uses the example of law school rankings to demonstrate how public measures such as rankings change expectations and permeate institutions, suggesting why it is important for scholars to investigate the impact of these measures more systematically.

Farrell, Elizabeth F. and Martin Van Der Werf. *Playing the Rankings Game. Chronicle of Higher Education*. v53 n38 (May 25, 2007). "Many college officials are asking hard questions about the methodology and effect of the 'U.S. News' rankings. One complaint: The survey overwhelmingly favors private institutions."

Gater, Denise S. *A Review of Measures Used in U.S. News & World Report's "America's Best Colleges."* Gainesville, FL: Lombardi Program on Measuring University Performance, University of Florida, 2002. This article critically examines the methodology of the U.S. News and World Report rankings. With special attention to the ranking's assessment of research universities, the report analyzes each of the sixteen measures of academic excellence used in the 2002 rankings and suggests alternative measures for improvement.

Goldstein H. and DJ Spiegelhalter. "League Tables and Their Limitations: Statistical Issues in Comparisons of Institutional Performance." *Journal of the Royal Statistical Society Series A: Statistics in Society*. 159(Part 3)(1996): p.385-409. For readers who understand and enjoy statistics, this article offers insight into the statistical principles involved in comparing institutions along various lines. While focusing mainly on medical institutions, the article does offer general observations on inter-institutional comparison and counsels caution in interpreting apparent differences.

Graham, Hugh Davis and Nancy Diamond. "Academic Departments and the Ratings Game." *The Chronicle of Higher Education*, 45 (41) (June 18, 1999): p.B6. This opinion piece by the authors of the book listed directly below offers interesting insights into the topic of reputational rankings. The authors conclude with the following paragraph. "There is something unseemly and petty in the spectacle of academics squabbling over whose department or program is higher in the pecking order. The purpose of the next N.R.C. study should not be to fuel yet another round of warfare over professorial status. Instead, it should be to provide useful information -- to political and business leaders, foundations and professional associations, scholars and administrators, and students -- about which programs are the most productive in creating new knowledge."

Graham, Hugh Davis and Nancy Diamond (eds.) *The Rise of American Research Universities*. Baltimore: John Hopkins University Press, 1997. This book explores the post-World War II rise to prominence of the American research university, presenting historical analysis, as well as providing comparisons and rankings of public and private universities. Indicators used as evaluation criteria are: "Federal R&D obligations, journal publications in all fields, journal publications in top-rated science and top-rated social science journals, and arts and humanities awards" (p. 236). The book contains tables illustrating rankings, extensive notes, and a bibliography.

Hattendorf, Lynn C. "College and University Rankings: An Annotated Bibliography of Analysis, Criticism, and Evaluation." *RQ*, volumes 25-29 (1986-1990): Parts 1-5. "...[I]dentified and evaluated rankings sources in the area of higher education." (Hattendorf, Lynn C. (1986) *Educational Rankings*).

Haworth, Jennifer Grant and Clifton F. Conrad. *Emblems of Quality in Higher Education: Developing and Sustaining High-Quality Programs*. Boston: Allyn and Bacon, 1997. This book is an excellent source for those interested in the topic of higher education quality. Of special note for individuals interested in rankings is Chapter One, "Perspectives on Academic Program Quality." Here the authors identify five areas of emphasis which are often used in evaluating program quality or ranking colleges and universities; faculty, resources, student quality and effort, curriculum requirements, and a multidimensional or multilevel view.

Hodges, Shannon. "Authentic Values and Ersatz Standards: Making Sense of College Rankings." *Academe*, v88 n6 (November-December 2002): p. 33-35. This article examines college rankings in the light of social

responsibility. It looks at the divide between public universities and community colleges and the "glamour schools", elite, wealthy institutions, such as those in the Ivy League. The author questions the role of rankings in maintaining the divide and in the corporatization of higher education.

Hoover, Eric. Liberal-Arts College Group Plans to Help Develop Alternative to Commercial Rankings.

Chronicle of Higher Education. (June 20, 2007). This article discusses the reasons behind 80 liberal arts colleges electing no longer to take part in commercial rankings such as the U.S. News & World Report's rankings.

Institute for Higher Education Policy. "College and University Ranking Systems: Global Perspectives and American Challenges" April 2007. "While college and university rankings are growing in their frequency and popularity, greater understanding about how these ranking systems function is needed to ensure accountability and greater transparency." (from abstract)

Institute for Higher Education Policy. "Impact of College Rankings on Institutional Decision Making: Four Country Case Studies" May 2009. "This issue brief seeks to understand the role that rankings play in institutional decision making and how institutions in various countries use rankings in ways that might benefit higher education in the United States." (from executive summary)

Ioannidis, John P.A., Nikolaos A. Patsopoulos, Fotini K. Kavvoura, Athina Tatsioni, Evangelos Evangelou, Ioanna Kouri, Despina G. Contopoulos-Ioannidis, and George Liberopoulos. "International Ranking Systems for Universities and Institutions: a Critical Appraisal." *BMC Medicine* 2007, v. 5 article 30. This article is a review of the two most publicly visible international ranking systems, the Shanghai Jiao Tong University 'Academic Ranking of World Universities' and the Times Higher Education Supplement 'World University Rankings'.

Jacobs, David. "Ascription or Productivity? The Determinants of Departmental Success in the NRC Quality Ratings." *Social Science Research*. v28n2 (June 1999): p.228-239. This article examines the effect of ascribed factors on the ranking of sociology departments in the National Research Council's ranking of research doctorate programs. The author concludes that factors which should be irrelevant such as whether a school has the word "State" in its name do have an effect when sociologists assess departments' reputations.

Jaschik, Scott. "Should U.S. News Make Presidents Rich?" *Inside Higher Ed*. March 19, 2007. This article discusses the controversy of Arizona State University instituting an incentive bonus (equaling \$60,000) for the university's president if their university improves in the *U.S. News & World Report* rankings.

Jennings, Matthew V. "A Thin Line Between Love and Hate." *Currents*, v30 n9 (October 2004): 22-27. While many university administrators and faculty members have serious problems with *U.S. News*-type lists, it is clear that rankings are here to stay. Jennings provides a concise summary of the controversies surrounding rankings, and then examines strategies institutions have used to deal with them. He discusses the challenges faced by university and college communicators over whether to publicize their rankings status or not, and those faced by administrators over whether to make decisions with the specific goal of improving their rankings. Both of these dilemmas reflect the tension between resisting and acknowledging the very real influence of rankings.

The Learning Alliance for Higher Education. "Best in Show: Rethinking the Rankings Game." *Change*. v35 n5 (September/October 2003): p. 55-58. Through a somewhat complicated statistical analysis comparing *U.S. News and World Report's* rankings to a formula developed by University of Pennsylvania researchers to measure a college or university's position in the higher education market, this article argues that the *U.S. News* rankings capture market forces (demand, financial resources, price, etc.) more so than the overall "quality" of an institution. A key additional finding is that, in place of the complicated *U.S. News* formula, just two factors can be used to create a close approximation of the rankings: six-year graduation rate and peer review score.

Mallette, Bruce I. "Money Magazine, U.S. News and World Report, and Steve Martin: What Do They Have in Common?" *New Directions for Institutional Research*. n88 (Winter 1995): p.31-44. "An examination of one of the most popular publications that rate and rank collegiate undergraduate education reveals several methodological concerns. The challenge for consumers and researchers include understanding what shortcomings exist in these rankings, what impact these shortcomings have on the rankings, and what

methodological changes might improve the evaluations" (from *New Directions for Institutional Research*)

- Manion, Andrew P. Fixing a Fatal Flaw in 'U.S. News' Rankings. *Chronicle of Higher Education*. v53 n38 (May 25, 2007).** The author highlights a *U.S. News and World Report* Rankings flaw where institutions ranked as "top tier" close shortly after the rankings are published.
- Martens, Jack. "For the Ease of Masters." *Barron's*. v82 n34 (Aug 26, 2002): p. 31.** Many undergraduates take standardized tests like the GRE (Graduate Record Exam) or the LSAT (Law School Admissions Test) to advance to the next stage of their educational careers. Martens argues that scores from such tests provide a direct, empirical measure of undergraduate learning, and should therefore be accounted for in college rankings. However, due to what Martens calls a "culture of secrecy," undergraduate institutions have historically been very resistant to releasing student test data. Martens argues that colleges are avoiding accountability and urges "full disclosure" of student test performance data so that colleges can be evaluated more accurately.
- McDonough, Patricia M., Anthony Lising Antonio, MaryBeth Walpole, and Leonor Xochitl Perez. "College Rankings: Democratized College Knowledge for Whom?" *Research in Higher Education*. v39, n5 (October, 1998): p.513-537.** "This paper is a study of who uses the contentious and seemingly influential newsmagazine rankings of U.S. colleges and universities, and an analysis of what types of freshmen find these rankings useful in making their choice of college." (from *Research in Higher Education*)
- McGuire, Michael D. "Validity Issues for Reputational Studies." *New Directions for Institutional Research*. n88 (Winter 1995): p.45-60.** "Validity criteria can and should be applied to reputational study models, and research that tests their validity and reliability should be conducted. Such concerns, while weighing heavily on the minds of institutional researchers and others on campus, have typically not been raised by consumers and publishers. Two studies of *U.S. News and World Report's* "America's Best Colleges" suggest that this guide's validity may be suspect, and that systematic research and development are long overdue." (from *New Directions for Institutional Research*)
- McNeal, Cornelia H. "Who Says They Matter?" *Currents*, v30 n9 (October 2004): 28-30.** This article presents a guidance counselor's insights into "what parents and students really think about rankings." McNeal points out that rankings, while imperfect, do help parents and students narrow down the overwhelming choices they face in selecting a college or university. Although some inflate the importance of rankings and let them dominate the decision-making process, she observes that "the majority of parents I've met and counseled is too savvy to let rankings lists rule the college application process." The key piece of advice she offers parents is to scrutinize aspects of student and academic life that rankings cannot adequately capture to gain a more accurate picture of schools under consideration.
- Meho, Lokman I., & Kristina M. Spurgin. "Ranking the Research Productivity of LIS Faculty and Schools: An Evaluation of Data Sources and Research Methods." *Journal of the American Society for Information Science and Technology* 56, no. 12 (October 2005): 1314-1331.** "This study evaluates the data sources and research methods used in earlier studies to rank the research productivity of Library and Information Science (LIS) faculty and schools" (taken from article).
- Meredith, Marc. "Why Do Universities Compete in the Ratings Game? An Empirical Analysis of the Effects of the U.S. News and World Report College Rankings" *Research in Higher Education*, v45 n5 (August 2004): 443-461.** Examines the impact of the *U.S. News* rankings on a variety of variables. "The results show that many schools' admission outcomes are responsive to movements in the rankings; however changes in rank are more significant at certain locations in the rankings and affect public and private schools differently. The results also show that the socioeconomic and racial demographics of highly ranked universities may also be affected by changes in rank" (from article abstract).
- Monks, James and Ronald G. Ehrenberg. *The Impact of U.S. News and World Report College Rankings on Admission Outcomes and Pricing Decisions at Selective Private Institutions. NBER Working Paper No. W7227, July 1999.*** The above link will take you to an abstract of the paper and will allow you to view an Adobe PDF version of the work.
- Monks, James and Ronald G. Ehrenberg. "U.S. News & World Report's College Rankings: Why They Do Matter." *Change*. v31, n6 (Nov-Dec 1999): p.42-51.** "Although the yearly rankings are greeted with disdain on many campuses, they have a measurable impact on admissions outcomes and pricing policies at

highly ranked national universities and liberal arts colleges."

Morse, Robert. Morse Code: Inside the College Rankings. This is a blog maintained by Robert Morse, director of data research for *U.S. News & World Report* where he develops the methodologies and surveys for the *America's Best Colleges* and *America's Best Graduate Schools* annual rankings. This blog discusses *U.S. News & World Report* as well as other rankings' methodologies.

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Provan, David and Karen Abercromby. University League Tables and Rankings: A Critical Analysis *CHEMS Paper* no. 30, December 2000. (Commonwealth Higher Education Management Service) This paper provides an overview and analysis of five major university league tables including U.S. News and World Report, the Times Higher Education Supplement, Asiaweek, the Australian Good University Guide, and Maclean's. Focusing on the methodology of the different rankings, the study spans the globe in its coverage. It also discusses the usefulness, criticisms, and statistical validity of rankings and their impact on students' choices

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