

Policy Analysis

The CHE University Ranking in Germany¹

Maarja Soo and David D. Dill

University of North Carolina
Department of Public Policy

Introduction

The idea of university rankings has gained a remarkable popularity in the last 20 years (van Dyke, 2005). The first academic rankings were created in the US in 1925 by Raymond Hughes a professor of chemistry and later a university president (Webster, 1992). Responding to a request from the North Central Accrediting Association for a study of graduate schools, Hughes conducted a reputational survey and produced the first published academic rankings, which in this case were rankings of the quality of graduate level degree programs in the primary academic disciplines in the United States. Hughes' rankings created an important precedent and similar reputational rankings of the quality of graduate degree programs were repeated in 1934 by Hughes himself, in 1959 by Hayward Kinston, and in 1966 by Alan Carrter. This tradition of multidisciplinary rankings of graduate degree programs based upon reputational surveys has been continued in the United States by the National Research Council (NRC), a private, nonprofit institution that provides science, technology and health policy advice to the federal government under a congressional charter. The inaugural *US News and World Report (USNWR)* rankings of 1983, usually cited as the first university rankings, therefore broke with this tradition, first by being produced by a commercial publisher rather than by members of the academy, and second by providing rankings of whole institutions focused on the supposed quality of undergraduate or first-level education. The *USNWR* rankings inspired a new international industry in university "league tables"² and now universities are regularly ranked in at least 20 countries (Merisotis 2006). The practice has been adopted in education systems as different as Germany, Canada, China, and Nigeria. Furthermore, university rankings have crossed national borders. As higher education has become more global and students more mobile, there is also a demand for cross-national and global rankings. The World University Rankings by *The Times HE Supplement (THESE)* and the *Shanghai Jiao Tong University (SJTU)* ranking compare universities internationally and are well known among students and university administrators around the globe.

¹ We would like to thank Gero Federkeil for providing us with valuable information on the CHE ranking system and for his helpful comments on an earlier draft of the paper.

² Outside the US university rankings are often described as "league tables," reflecting the published rankings or standings of international football (i.e., soccer) teams. In this paper, the term league tables will be used synonymously with university rankings.

As university rankings have gained legitimacy and visibility in the world, rankings themselves have become a subject for academic research and international partnership. Several international workshops and conferences have been dedicated to the topic, special issues of higher education journals have been published, and numerous academic articles discuss the strengths and weaknesses of various rankings.³ In 2002 UNESCO-CEPES started with regular meetings of higher education experts, researchers, and practitioners who are involved in various university rankings in the world. The initial purpose of the meetings was to compare experiences, discuss methodological problems, and improve rankings, but by now the steps have been taken towards some professional self-regulation in the area. This initiative established an International Ranking Expert Group (IREG) and designed a set of principles of quality and good practice in university rankings (IREG 2006).

The existing university rankings are far from homogenous. They differ in terms of their stated purpose, the criteria that are used for evaluation, the methodology, and the nature of the producer. Following in the footsteps of Raymond Hughes some rankings continue to be produced by academic researchers such as those at the University of Melbourne and the Shanghai Jiao Tong University, or by not-for-profit organizations such as the Centre for Higher Education Development (CHE) in Germany or the National Academy of Sciences in the US. But in the vast majority of cases league tables are produced by commercial publications. Most of the league tables suggest they are designed to inform student choice and as such provide rankings of entire universities, and/or rankings of academic degree programs, including first degree programs, professional programs such as MBAs and law degrees, and research doctoral programs. This function of university rankings relies upon economists' argument that the provision of appropriate information in a competitive market can serve as a means of assuring the efficient price and quality of goods and services. Research on organizational rankings similar to university league tables, for example, suggests they can be a useful instrument for public accountability, supplying information to consumers and policymakers on measurable differences in service quality, while also providing an incentive to organizations for quality improvement (Gormley and Weimer, 1999). However, if (university) rankings are to help assure (academic) quality, several linked behaviors need to occur (Gormley and Weimer, 1999). First, rankings and related consumer information on academic quality need to utilize measures that closely approximate or are clearly linked to valued societal outcomes. Second, league tables must inform and influence student choice of university or encourage universities to act in anticipation of the potential effects of published rankings. Third, universities must respond to student choices and/or to the potential effects of rankings by genuinely improving the educational benefits provided to students. In a separate analysis (Dill and Soo, 2005) we examined the leading university rankings in Australia, Canada, UK, and the US and concluded that most commercial university rankings failed to meet these conditions and therefore were unlikely to be useful instruments for assuring academic quality.⁴

However the ranking in Germany carried out by the CHE is explicit in its purpose, carefully designed, and is acknowledged by a number of researchers as minimizing the conceptual and technical problems that often make university rankings controversial (Dill and Soo, 2005; van Dyke, 2005; Usher and Savino, 2006). The CHE ranking is an independent, non-governmental initiative and its primary purpose is to provide university applicants with reliable data on various aspects of German universities. The CHE began ranking German universities and universities of applied science (*Fachhochschulen*) in 1998. By 2007 the exercise has gone through three cycles and is well established in the German higher education environment.

³ See e.g. the journal *Higher Education in Europe* 2002 vol27 no 4 and 2005 vol. 30 no 2; Dill and Soo (2005), and Usher and Savino (2006) for comparative analyses.

⁴ An important exception was the *Good University Guide* in Australia, which will be discussed below.

Background

As previously noted university rankings have had the longest tradition and highest visibility in the United States as well as in the United Kingdom. The rankings have been associated with specific characteristics of the related higher education systems: competition between universities for students, staff and resources; competition between students to be admitted to a specific university, and a clear prestige hierarchy among universities. These principles were alien to the traditional German higher education system.

While German universities differ in their mission and size they were traditionally seen as homogenous in terms of quality. Differences existed in the performance of individual academics, reflected for example in the resource allocations by the German Research Foundation, but these individual differences had not led to a formally stratified system of universities. Even though the equality in the system was regarded as more myth than reality (Müller-Böling and Federkeil, 2007) there was no publicly obvious hierarchy of universities. The idea of homogeneity is grounded also in the traditional power structure of the German university system. On the one hand, universities were heavily regulated by the federal and *Land* governments, on the other hand, individual professors in the university had a high degree of autonomy. The university as an entity had quite limited power to plan its future and develop a unique identity. This traditional structure of German higher education, however, has been rapidly changing in the last decade. Lump-sum payments by the government have replaced the traditional rigid line item budgets and more decision-making power is delegated to universities. Also the idea of homogeneity across universities is under a pressure as various evaluations demonstrate clear performance differences among universities (see for example, Kehm in this volume). Furthermore, the idea of equality has been explicitly altered by the current higher education policy. In 2004 the federal government proposed the idea that Germany needs a band of elite universities in order to promote top quality research and the international reputation of German universities (Kehm 2006). The first set of universities was selected for this special treatment in 2006.

The competition between students for access to certain universities is also alien to the German higher education system. Until recently universities had no role in student admission and universities' revenue is not significantly affected by student demand. The number of students admitted to each academic program is decided centrally in each *Land* and the decision is based primarily on the numerical teaching capacity. In most cases all applicants will be admitted. If the number of student places is insufficient (e.g. in medicine), a central authority *Zentralstelle für die Vergabe von Studienplätzen (ZVS)* distributes applicants between universities. The decision used to be based primarily on school grades and the applicant's place of residence. However, since 2005 universities can participate in the selection process and can freely choose their own selection criteria. The final decision is now dependent on three components: the average grade in high school, waiting time after finishing high school, and success as judged by the selection criteria of the university.

Tuition fees remain a heated political topic in Germany. As elsewhere in Europe, higher education has been free of charge, but the idea of tuition fees has gained much popularity in the recent decade. To protect free education in Germany, the federal parliament passed an amendment to the Higher Education Framework Law in 2002, which would guarantee free higher education to all students. Opponents argued that the law violated the constitutional autonomy of *Länder* in educational and cultural issues and appealed to the Constitutional Court. In 2005 the Constitutional Court ruled that *Länder* have a right to decide on tuition fees. The first *Länder* (Bavaria, Baden-Württemberg, North Rhine-Westphalia) introduced tuition fees in 2006/2007.

German students are also affected by the "Bologna process". In 1998 an amendment was added to the Higher Education Framework Law, which introduced Bachelor's and Master's degrees on a trial basis, and in 2002 these degrees were instituted as regular degree programs. Currently former *Diplom* and *Magister* degrees function in parallel to the new degrees.

The German higher education system is going through a significant transformation and the CHE university ranking is both an expression of the new thinking as well as a contributor to the changes.

Policy problem

The issues of competition, evaluation, and accountability in higher education were first raised in Germany in the 1980s. The German Science Council (*Wissenschaftsrat*), an advisory body on higher education, science, and research policy that is co-funded by the Federal Government and the governments of the 16 Länder, explored the possible advantages of introducing greater rivalry in German higher education and concluded that publicly available information on academic quality and performance was a necessary precondition for effective competition in the sector (Wissenschaftsrat 1985). The Council recommended that the German Rectors' Conference – an association of German universities – should collect and publish comparative information on all universities. The Rectors' Conference expressed little enthusiasm for the idea of university ranking, but did organize a symposium on performance assessment and cross-university comparisons and initiated publication of descriptive information on universities (Frackmann 1990). In 1988 the Science Council also started to publish comparative information on study duration, which was in these days a much discussed issue in Germany. The average duration of studies in German universities was seven years which was clearly above the international average and also above the length of study set out in university and examination regulations (Berchem 1991). It therefore became an important performance indicator in Germany. The publication by the Science Council explicitly intended to inform students about the comparative advantages of the different institutions and aimed to point at the institutional responsibility in this issue (Frackmann 1990).

As the public interest in the quality differences in German universities increased, several private actors began to publish university rankings. In 1989 the weekly news magazine *Der Spiegel* published a ranking of German universities. This ranking was based on a survey of students about their learning experience and satisfaction with the academic environment. Following this first initiative, several other university-level or subject specific rankings were constructed and published (Ott 1999).

In the beginning of the 1990s, the German Rector's Conference developed a partnership with the *Bertelsmann Foundation*. The Bertelsmann Foundation is a private foundation and it promotes the idea that competition and civic engagement are essential for social progress. The Foundation was seeking an agenda in higher education and discovered that its interests were aligned with those of the Rector's Conference. In 1994 the German Rectors' Conference and the Bertelsmann Foundation jointly founded the Center for Higher Education (CHE). Among the primary tasks of the Center was to design and implement a university ranking. In 1998, after a two year preparatory phase, the CHE started to rank German universities.

The nature of the ranking

Most well-known commercial university rankings have been subject to serious criticism in recent years because of their conceptual and methodological weaknesses (Bowden 2000; Dill and Soo 2005; Ehrenberg 2002; Usher and Savino, 2006; van Dyke 2005; Yorke 1997). One of the most fundamental weaknesses of rankings is the ambiguity of the purpose. When the purpose of the ranking is undefined, then the ranking also fails to specify what exactly is being ranked: is it university prestige, research quality, teaching quality, or something else? This ambiguity, however, leads to a fundamental problem. When the purpose of the ranking is undefined, the choice of indicators remains arbitrary. There is often also a problem of aggregation. Most commercial rankings incorporate several indicators and each indicator is weighted for the aggregate rank. The problem is not so much the methodology for determining appropriate weights for each indicator, but the idea that there is a unique set of weights which reflects users' preferences. It is unlikely that all users value different aspects of a university identically and an aggregate ranking therefore fails to reflect personal preferences (Ehrenberg 2002). University level rankings have an additional aggregation problem. While students have consistently demonstrated that the academic program is one of their major decision criteria (James et al 1999, Connor et al 1999), institutional level aggregation hides differences between programs in one university. Therefore a ranking of institutions does not show the best university for studying

a specific field or doing research in a specific field. In sum, rankings that aggregate indicators and/or subject fields assume that there is a unique hierarchy of universities that is accurate for all purposes, for all users, and for all subject fields. However, this assumption is not justifiable.

The CHE ranking is different from most commercial rankings because these conceptual problems are carefully considered. Most importantly, the ranking defines clearly its purpose and this definition serves as a strong foundation for selecting indicators and developing methodology. The CHE ranking is designed for students. Consistent with the research on effective organizational report cards (Gormley and Weimer, 1995), the ranking is expected to inform the decisions of new students and of students who are planning to change their study programs. The format of the ranking and the selection of indicators therefore reflect the aspects that students consider in choosing a university.

The CHE ranking is built on four *core principles* that represent the conceptual foundation of the ranking.⁵ These principles distinguish the ranking from most other commercial rankings in the world and address the major conceptual problems of university rankings.

The CHE ranking is a *subject-level* assessment, not a university-level assessment. The quality, performance, and expectations may vary significantly across fields of study in one university and an average university-level evaluation does not provide helpful information for students who come to study a specific field. The ranking currently includes 35 subject fields (see Appendix 1 for the list of subjects), which covers about 80% of all new students.

The CHE ranking is *multi-dimensional*. Unlike many other popular rankings, the CHE ranking does not attempt to construct a unique hierarchy of universities in each field. It is recognized that different aspects cannot be effectively combined into one aggregate measure – e.g. research measures or teaching measures can reveal very different hierarchies. It is also recognized that students have different priorities and they should have an opportunity to rank universities based on their own criteria. A universal ranking that would satisfy the needs for all students is therefore an impossible task.

The CHE ranking combines *different perspectives* on performance. The ranking presents objective facts on program characteristics, but it also presents the opinion of students and professors about their satisfaction of the program and on the performance in general.

Instead of a linear ranking of universities, the CHE distributes universities into three *groups* – top group, middle group, and bottom group – with respect to each indicator. As a general rule, 25% of universities are included in the top group, 50% in the middle group, and 25% in the bottom group. Within each group universities are listed alphabetically. Such an approach is more accurate than ranking all universities sequentially, as do most university league tables. It has been demonstrated that differences between universities are often marginal and assigning ranks based on statistically insignificant differences is therefore unwarranted (e.g. Clarke 2002).

All subjects are re-evaluated every three years. By now most of the subjects have gone through three evaluation rounds: 1998-2001, 2001-2003, and 2004-2006. One evaluation cycle takes three years. About one third of subjects are evaluated in one year and when the cycle is completed the next cycle starts again. This means that each year approximately one third of results are updated in the ranking.

Indicators

When CHE started to design a framework for the ranking, the first step was to identify the criteria that students consider when they choose a university. The CHE engaged evaluation experts, members of professional and university associations, students and school leavers in this preparatory process. From these discussions emerged a “decision model” – a list of indicators that students consider in their choice. The indicators are not all relative performance measures. The database includes also descriptive information on

⁵ The CHE website www.che.de and the document CHE (2006) are used as primary source for the description below.

study programs, on the university in general, and on the location of the university. Comparable indicators have been discovered to be influential on student choice in other industrial countries (Dill and Soo 2005). The indicators are also constantly revised and new indicators have been added if found helpful.

The decision model consists of nine components. The components are very different in their nature. Some of the components are more descriptive than evaluative – e.g. description of the location and general university characteristics. Other components are more evaluative – e.g. research output or overall assessment of students. Each of the components contains several specific indicators, some of them based on factual data, some on subjective assessment by students and professors. Individual indicators may vary somewhat between study fields depending on the specifics of the field. The list of components and individual indicators is presented in Box 1.

Since all subjects have gone through several rounds of evaluation, it is now possible to compare the performance with the previous years. The recent ranking identifies also universities where performance has significantly improved or worsened, considering both relative and absolute change in performance.

Data collection

The CHE ranking presents both objective factual data on study programs and universities as well as subjective assessment by students and professors. Most of the information is obtained from surveys. Four sets of questionnaires are sent out for each subject evaluation:

- a) survey of the subject area in each university,
- b) survey of universities,
- c) survey of students in the subject area,
- d) survey of professors in the subject area.

In the summer before the results are to be published, CHE sends out a questionnaire to relevant faculties and/or departments. Questions concern general information about students and graduates, exam results (if applicable), financial and human resources, and research outcomes. The results are first reviewed and checked by the CHE and then returned to the units for final verification. At the same time another questionnaire is sent to the central administration of the university. The questionnaire asks about tuition fees, library hours, division of students across disciplines, etc. Since 2006 the questionnaire includes also questions about sports in the university – the number and nature of sports programs and courses. The response rate to the questionnaires is near 100% both at the faculty level and at the university level (CHE 2006).

To get information on students' satisfaction with their studies the CHE conducts a student survey in the subject area. Questions concern the organization of studies, the relevance of their studies, learning environment, student support and counseling, facilities and their overall satisfaction with the program. Students are asked also about their living conditions (e.g. rent, mode of transportation). The survey is conducted online and the list of students and their email addresses is obtained from the student office of each university. As a general rule, the questionnaire is sent out to all students in their 5th - 12th (10th in *Fachhochschulen*) semesters in *Diplom* programs, and in 2nd - 7th semester in Bachelor's programs. When a program enrolls less than 500 students in this specified window (e.g. 5th-12th semester) then the questionnaire is sent to *all* students enrolled in the program regardless of their year of studies. Survey results are published only if at least 15 students in a program responded. In the last evaluation round the average response rate was around 20%, but the rate varied significantly across disciplines. For example, 35% of students in biochemistry programs returned the questionnaire while only 9.5% of history students returned the questionnaire (CHE 2006, see Appendix 2).

Box 1. The list of components and main indicators.

Component 1. Student body

Total number of students, proportion of female students, number of first year students, trend in student numbers over last years

Component 2. Student outcomes

Average grade in final exams (if applicable), study duration, graduation rate, expected graduation time, the proportion of students who graduate in the expected time frame, documentation at the end of studies (transcript, diploma supplement etc.)

Component 3. International orientation

Double degree option, participation in European Credit Transfer System, field specific foreign language courses, course programs in foreign languages, courses in foreign languages, mandatory experience abroad (study abroad semester or internship), international students, international visiting professors, primary foreign countries with whom the program has connections

Component 4. Teaching and learning

Student-staff ratio, opportunity for a joint degree, the structure of the program; availability of professors (office hours and informal counseling), E-learning (internet-based learning opportunities and virtual interaction environment), breadth of the program, transparency, interdisciplinarity, interaction with professors and other students

Component 5. Infrastructure

Library resources, IT infrastructure, laboratories and other field specific facilities

Component 6. Research

Research funding per academic staff, patents, publications, citations, Ph.D.s supervised, research reputation as assessed by professors

Component 7. Labor market

Internship requirements and opportunities, student assessment of career preparation

Component 8. Study location and university

Location: population, proportion of students, primary mode of transportation, living conditions, rent. Universities: the number of students, primary study fields, student counseling, library hours, university sports, the year of foundation

Component 9. Overall assessment by students and professors

Students' overall satisfaction with the program, professors' identification of five universities that they would recommend for undergraduate studies in their field and five leading research universities in their field

The faculty survey includes all permanent academic staff in the subject field. The academic staff survey includes questions about working conditions: facilities, infrastructure, human resources, and support from the central administration. The survey also asks two questions on the quality and reputation of other universities. The first question asks: Which 5 universities in Germany, Austria and Switzerland would you recommend for an undergraduate programme, considering only the quality of the program? The second question asks: In your opinion, which 5 universities in Germany, Austria and Switzerland are considered as leading universities in research in your field? In the last evaluation round ca 31,000 questionnaires were distributed and about half of the academic staff responded. The response rate was the lowest in medicine (26%) and in mass communication (31%) and the highest in Pharmacy (66%) and Biochemistry (65%) (see Appendix 3).

Research productivity is evaluated not only based on the faculty survey, but also with objective, quantifiable data. The bibliometric analysis includes the number of publications and the number of citations. As a general rule, the count includes all publications in internationally recognized academic journals in the three-year period. This information is extracted from discipline specific databases: e.g. Science Citation Index (SCI) Expanded in sciences; MathSciNet in mathematics; SOLIS, HWWA, ECONIS, BLISS in economics and social sciences. Publishing behavior varies across disciplines and bibliometric measures are altered accordingly. In the field of sociology, for example, publications in what is considered as the top journals in the field were double counted. Publications in the field of economics, social sciences and American studies were weighed based on their length and the number of authors. In mathematics, for example, only the number of publications, not citations, is presented because on average the number of citations is low and varies greatly between areas in the discipline. Scientific databases cannot be equally trusted in all fields. Because of methodological limitations bibliometric analysis has not been utilized for a number of fields: computer science, German studies, geography and geology, architecture, political science, industrial engineering and a few others. In engineering and some natural sciences, research output includes also the number of patents and this data was obtained from the German Patent office (PATDPA).

Where students have to pass a nationally recognized exam, the ranking collects information also on the exam results. Students of Medicine, for example, must pass a qualification exam and the office in charge of the exam in each *Land* provides data on the number of exams taken, success rate, and grades.

The accuracy of data is essential for trustworthiness of a ranking. Data mistakes can have a fatal effect on the rank of the university as well as undermine the legitimacy of the entire ranking process. There is evidence of serious mistakes in rankings due to erroneous data; e.g. a leading business school in the US was entirely dropped from a ranking because it was mistakenly associated with another school with a similar name (Economist 2007). The CHE has developed sound quality assurance procedures in order to ensure reliability of the data. Statistical tools are used for detecting outliers and inconsistencies in the data. As a preliminary assurance, all collected data will be sent back to universities for proofreading before indicators will be computed. As an additional assurance, each subject field that is being evaluated has its advisory board. The board advises about the choice of indicators and methodology, but it also analyses the plausibility of results.

Dysfunctional effects of university rankings on universities' behavior are one of the biggest concerns of the rankings. In order to improve their position in the ranking, universities are likely to manipulate their performance data or even change their procedures without actually improving learning in the institution. Evidence from US universities suggests that dysfunctional effects are not rare. Some universities, for example, made standardized test scores (SAT) an optional application requirement in order to demonstrate a higher average SAT score for ranking purposes (Ehrensberg 2002). Other universities have excluded the scores of international students from the average SAT statistics in order to better position their institution in the ranking. Rankings that rely on self-reported data are particularly vulnerable to this kind of data manipulation. The CHE consciously avoids indicators that stimulate such a dysfunctional response from universities. While the CHE ranking is heavily based on self-reported data, the problem of data manipulation is somewhat alleviated by the nature of the ranking. Since the ranking refers only to single disciplines, not the entire

institution, the academic community has a better overview of the situation in other universities and thereby functions as a social control mechanism. The CHE has encountered a few instances where departments tried to manipulate the student survey by telling their students that it is in their interest to graduate from a university that is ranked high. The CHE has a strict policy for occasions like this. In case there is any reason to suspect that a university has tried to manipulate the results, the universities are excluded from the ranking altogether and their scores are not published.

Publication

While the CHE alone is responsible for data, methodology, and design of the ranking, the publication, marketing, and distribution of the results takes place in cooperation with a major national publisher. From 1999-2004 the results were published by the weekly news magazine *Der Stern* and since 2005 the publishing partner is the weekly newspaper *Die Zeit*. *Die Zeit* is responsible for distribution and marketing.

The results are published in three formats: a summary in the regular issue of *Die Zeit*, a book, and an interactive website. The online version offers the most detailed information, the book provides program level data on a few indicators, and *Die Zeit* summarizes the results from a more generic perspective.

The book “*ZEIT-Studienführer*” is published annually. For each subject field universities are listed alphabetically and the score of four or five most important indicators is presented. The selection of published indicators varies from subject to subject, but in most cases information includes reputation as perceived by professors, research output, students’ opinion of the learning environment, student support, and resources (e.g. libraries in the humanities and social sciences, laboratories in the natural sciences). The book also provides information on universities and general information on study fields.

More detailed information on individual subjects can be accessed in the online version. The website www.das-ranking.de is free of charge and requires only registration for some inquiries. As a first step the user has to choose a subject of interest. Then the site provides several options on how to approach data.

- *Concise Ranking* (Ranking Kompakt) presents an alphabetical listing of universities and gives scores (green, yellow, and red) for five main indicators. These five indicators are the same as in the book.

- *My Ranking* allows the user to identify important criteria based on personal priorities and then constructs an individualized ranking. The user can specify up to 5 indicators and must rank the indicators for the sorting sequence. The user can also specify whether he or she wants to consider only the top group, the top and middle groups, or all universities.

- *Comparing universities*. After specifying the subject, the user can also select up to three universities of interest and compare them by an extensive list of indicators.

In addition to the subject-specific performance information the website provides also a general description of each subject field and provides descriptive information on individual universities and their location.

DAAD (German Academic Exchange Service) has made the ranking available also in English and Spanish for international students.

Implementation

The ranking exercise started with the creation of the *Center for Higher Education* by the Rector’s Conference and Bertelsmann Foundation. The founders believed that the ranking exercise should be conducted by an independent, non-political, not-for-profit organization. While the university ranking became the core task of the new center, the CHE’s mission and contribution has expanded over the years. The CHE has become a respected party in public discussions on higher education issues and it has developed expertise also in the areas of research policy, science policy and internationalization of higher education. Today the

CHE has a staff of 15 people. Its activities are guided and supervised by an advisory board which includes representations of the two founding organizations and other higher education and management experts.

The first round of ranking exercises started in 1998. The first ranking exercise was done in cooperation with a national foundation for testing goods and services *Stiftung Warentest*, which provided both methodological and technical assistance in conducting surveys.

As most data is collected by organizational and individual surveys, the cooperation by universities and individual students and professors is crucial for success. The idea of evaluating universities and constructing a relative hierarchy of universities was not necessarily a popular idea among university leaders and professors. While the current rankings system is independent of the government, as noted earlier it likely would not have been implemented without the pressure for comparative data on universities provided by the German Science Council (*Wissenschaftsrat*), an advisory body for political decision-makers and an instrument of cooperative federalism designed to promote scientific work in Germany, which is co-funded by the Federal Government and the governments of the 16 *Länder*. Within this supportive environment the CHE was able to develop the trust that has made the ranking effective. First, the ranking exercise gained the moral support and ownership of the Rector's Conference, which ensured the general compliance of university leaders. Second, the new head of the CHE was a former Rector of a German university and his academic background and managerial experience increased the trust for the CHE as a qualified partner for universities. Third, as other rankings were being published in Germany by private, for-profit actors, universities were open for a more systematic exercise even if not enthusiastic about the idea of ranking per se.

Participation in the ranking exercise is voluntary for universities and almost all universities choose to participate. The ranking results are not a part of the formal evaluation of universities. However, some *Länder* use the ranking results as a starting point for contracts between the *Land* and the university that outline needed areas of improvement.

Costs

The CHE annual budget is about € 3.2 million. A significant part of the budget is covered with an institutional grant by the *Bertelsmann Stiftung*. The rest of the funding is obtained on the project basis from various partners. The university ranking exercise takes circa € 0.8 million per year. These funds pay for the data collection and project coordination in the CHE. The ranking is put together by a core group of 5 people and with help of a few student assistants. The data entry is contracted out to an outside partner.

Costs of marketing and publication of the ranking results is the responsibility of the newspaper *Die Zeit*. The paper copy of the student guide can be ordered online for € 6. The online version is provided free of charge and the costs are covered with funds from advertisement and corporate sponsorship.

Impact

The primary purpose of the CHE ranking is to guide students in their decision as to which university to choose for their further studies. One success criteria is therefore the extent to which students indeed use the ranking in their decision making. Evidence collected by the CHE indicates that approximately one third of all entering students consult the rankings for general orientation among universities (Federkeil 2002). The number varies by study fields – e.g. 50% of engineering students consults the ranking while only 19% of literature students use the ranking. The study also demonstrated that achievement oriented students in particular use the ranking in their decision. The reported proportion and types of students who use ranking information for university choice making in Germany therefore corresponds with research on the use of rankings in the US and the UK (Dill and Soo, 2005).

A survey of the first year university students in 2005, ordered by the Federal Ministry of Education and Research, confirms the relevance of the university ranking among applicants. The survey shows that two thirds of entering students consulted university rankings, and the use of rankings has increased 6 percentage points in the last two years (Heine et al 2007). On the other hand, only 13% of students recommend the rankings as the best information source for future students. The importance of ranking varies between fields: for Law students the fame of the university and ranking results are most important decision criteria while for Arts' students ranking results have only a marginal relevance. The report (Heine et al 2007) also points out that the number of students that consider several alternative universities has increased, and the authors associate this trend with the availability of comparative information in the form of rankings.

A survey of high school students confirms the evidence of the relative importance of rankings in choosing a university (Heine and Willich 2006). Male students and students from more highly educated homes were more likely to use rankings. As noted, the fact that students from more highly educated homes are more likely to use the rankings seems to be universal (e.g. McDonough et al 1998 in the US.)

There is also some evidence that the ranking results affect student demand. In the field of psychology the number of applications at the recommended universities increased significantly. The number of applications rose on average 19% in universities that were recommended as excellent in research and the number of applications increased 15% in universities that were recommended as efficient and supportive in teaching (Federkeil 2002).

University rankings can potentially be not only an information source for students, but also a quality assessment instrument. Federkeil (2003) argues that the quality assurance mechanisms are relatively weakly developed in Germany and since higher education is managed by individual states there is no nation-wide government Quality Assurance instrument. The rankings compiled by private institutions are the only nation-wide initiatives in quality. Since 1998 Germany has been implementing a comprehensive assessment of teaching and learning in the format of program accreditation (see the chapter by Kehm in this volume). However, the accreditation information suffers from the fragmentation of the accrediting process and consequently its results are not easily comparable across the entire higher education system. Moreover, the accreditation procedure is relatively expensive for universities. In contrast, ranking, if rigorously designed, can serve as a tool for quality assessment.

The ranking can develop into the role of an assessment instrument in two ways – either through the market mechanism or central regulation. If performance as demonstrated in rankings proves to be an important influence on student demand and the attraction of other essential resources for universities, then the ranking will possibly encourage quality improvement in the system. Alternatively, ranking results may be monitored and utilized by government as a reliable means of performance assessment and improvement.

A university ranking has a larger impact on the performance of the higher education system only if universities consider their position in the ranking and are motivated to improve their performance. There is some indirect evidence in Germany that the universities use the rankings information to analyze their strengths and weaknesses. The CHE will provide a more detailed summary of student survey results to interested participating departments and universities increasingly use this opportunity. In 2007 the CHE created a for-profit agency *CHE Consult* that provides assistance to individual universities on means of improving their academic performance, the design of university marketing strategies, and optimizing internal governance. As a fundamental principle, the university ranking and consulting activities within CHE are kept strictly separate and distinct.

The Future and Other Similar Initiatives

In the context of common European higher education area and student mobility there is a greater need for internationally comparable data on European universities. The CHE ranking has been examined as a potential foundation for such international endeavor. In the recent years the CHE ranking has been extended to other German speaking countries. Since 2005 Austrian and Swiss universities are fully integrated to the

general ranking procedure. In these countries the ranking is done in cooperation with local partners – the quality control agency in Austria *Qualitätssicherungsagentur (AQA)* and a private foundation *swissUp* in Switzerland. In 2006 the European Commission funded a pilot project to explore whether the CHE ranking could be extended also to the Netherlands and Flanders. In late 2007 all partners will decide if universities in the Netherlands and Flanders will be included in the CHE ranking system on a regular basis.

The CHE ranking is gaining international reputation and was an important influence on the development of a new university ranking system implemented in Canada.⁶ As noted earlier, however, the CHE approach is not the dominant model of university rankings in the world. For example the Shanghai Jiao Tong University and *The Times HE Supplement* league tables both rank universities, not subjects, and provide an ordinal ranking of all universities. Both of these rankings are also heavily biased towards research reputation. The highest weight is assigned to the quality of staff, publication citations, and university resources. The available research evidence however suggests that research quality and university inputs do not significantly affect the quality of teaching in first-level degree programs (e.g. Terenzini and Pascarella 1994).

National rankings share the emphasis on research and reputation. From the measures utilized in university league tables we would infer that prominent research institutions give the best education, although it is more accurate to conclude that the listed performance indicators do a much better job in assessing the research quality of a university than its teaching quality (Yorke, 1998). The league table rankings are heavily biased toward measures known to be associated with research performance including financial resources, numbers of faculty and research grants, as well as university reputation. Even the average faculty salary, which according to *USNWR* measures a school's commitment to instruction, more likely reflects faculty orientation to research and has been found to be negatively correlated with student learning in research studies in the US (Astin, 1996). An analysis of five rankings in Australia, Canada, the UK, and US demonstrated that the rankings are also heavily biased towards input measures – staff quality and student selectivity (Dill and Soo 2005). The importance of teaching output measures was significantly lower. The most commonly used output measures are student-staff ratio, graduation and retention rate, and some employability measure. However, unless output measures are controlled for the quality of the incoming students – which is rarely the case -- even these limited teaching outcome measures will fail to capture the quality of the education process.

Furthermore, reputation biases university league tables not only via an emphasis on indicators of research, but also directly through reputation surveys. Many rankings include survey results about universities' reputation that have been collected from faculty members, administrators, or employers whose knowledge of the actual academic quality of a university is obviously limited.⁷ Therefore their opinions are likely to be influenced more by the existing reputation of the university (i.e., the "halo effect") than by actual knowledge of program quality (Clarke, 2002). While the CHE ranking includes several reputational indicators among its components (see Box 1), unlike university league tables these indicators are presented separately and are not amalgamated into a weighted overall score or used to provide ordinal rankings of institutions or programs. Recent research (Berghoff and Federkeil 2006) on the reputational indicators used in the CHE ranking underscores the cited weaknesses of reputational measures in university league tables. Reputation was revealed to be a social judgment by particular groups or stakeholders, which was highly stable over time. Reputational judgments of the same universities or programs varied significantly among professors, students, and employers indicating that their judgments were based upon different perceptions and interests. Professors' reputational judgments, predictably, were correlated with research performance, but even among professors' reputational scores for different academic programs varied significantly within a single university, thereby confirming the meaninglessness of reputational scores for whole universities. Finally, the reputations of universities were found to vary systematically among survey respondents from Austria, Germany, and Switzerland indicating that the regional distribution of a survey sample influences institutional reputation scores, a bias that will likely affect global rankings of universities as well.

⁶ See: <http://www.universitynavigator.com/>

⁷ For example, reputational surveys provide 16% of the total score in the *Macleans* ranking, 25% in the *USNWR* ranking, and 50% in the *THE S* World ranking (Berghoff and Federkeil 2006).

More seriously, reputation-based rankings not only fail to indicate the quality of education in the university, but also encourage a socially costly “academic arms race” (Brewer et al., 2002). Research in the UK and US (Brewer et al., 2002; Rolfe, 2003) suggests that to be competitive universities are increasingly investing more financial resources and time in factors associated with reputation such as research doctoral programs, research facilities, and “star” researchers and investing less resources in activities known to be associated with improving student learning. Furthermore, because university ranking is a zero-sum game, investing in reputation is an endless process. Consequently the dysfunctional effects of poorly designed university rankings are becoming a serious problem for society.

The CHE ranking has thus many advantages over most national and international commercial rankings. It has a well-developed conceptual foundation, it follows a rigorous methodology, and it provides rich data. Because of its design it also seems to avoid some of the potentially dysfunctional effects of rankings. There are other examples of rankings that aim to provide reliable data, rather than a simplified reputational hierarchy.

The Australian *Good University Guide* (GUG) (Dill and Soo 2005) has a number of similarities to the CHE ranking. The GUG focuses on subjects and academic programs, not whole institutions. The GUG also emphasizes indicators relevant to the preferences expressed by student consumers and offers a website in which prospective students can craft rankings individualized to meet their particular needs. Also similar to the CHE ranking, the GUG ranks academic programs in divisions or bands according to a variety of criteria, with no overall ranking for all institutions. The GUG measures reputation objectively using three indicators. While the GUG is a commercial publication, the source of almost all its data is government records, including the well regarded and government mandated Graduate Destination Survey and Course Experience Questionnaire, which yield generally reliable and educationally insightful information unavailable from commercial league tables in other countries (see Harris and James in this volume).

The new University Report Card Navigator developed by the Canadian Educational Policy Institute was explicitly modeled on the CHE ranking.⁸ Similar to the CHE ranking, the Navigator was designed and is maintained by a not-for-profit research institute, but is made available by a commercial publisher, *The Globe and Mail* newspapers. Like the CHE ranking the Navigator’s focus is on student choice and provides multiple indicators of interest to students including relevant information on the student experience and measures of student engagement in higher education. The Navigator does not weight nor aggregate its indicators, but permits each student to choose the indicators and ranking appropriate to her or him. In the presentation of information ordinal rankings of universities are similarly avoided and the Navigator relies primarily on non-university sources of data to circumvent the potential for institutional manipulation of ranking data.

The most comparable rankings in the US to those of the CHE are those conducted by the National Research Council (NRC), which has continued the practice of ranking research doctoral programs first initiated by Raymond Hughes (Dill 2006). While the NRC rankings are subsidized by US federal agencies including the National Institutes of Health and the National Science Foundation, similar to the CHE, the NRC is a private, nonprofit institution that also provides science, technology and health policy advice to the federal government under a congressional charter. Because of its national stature, the NRC rankings are designed and carried out by some of the leading social scientists in the US. The NRC rankings include objective data on measures that research has indicated are important determinants of academic quality in research-doctoral programs. These include inputs, such as the number of faculty members and doctoral students in each program, and crucial process measures, such as student time to degree. The measures also include objective output measures such as the number of doctoral graduates each year and the number of faculty publications, as well as significant outcomes, such as the number of times faculty publications were cited and the number of distinguished awards received by the faculty.

⁸ See: <http://www.educationalpolicy.org/universitynavigator103106.html>

The form of the NRC's rankings also has a number of similarities to the CHE rankings. Institutional ratings data are provided in the form of ranges rather than rankings to diminish the incentive for institutions to take actions designed purely to "move up in the rankings." Future NRC rankings will include student assessments of their educational experience, their personal research productivity, and their institutional and program environment in order to encourage a greater focus by programs on education in addition to research. Finally, the NRC ranking, similar to the CHE ranking, presents all its data in an unweighted form. Thus users of the assessment can apply their own preferences to the data and make their own comparative judgments, which is impossible with weighted measures.

The NRC rankings have also traditionally included reputational peer judgments of research doctoral programs. Following its last ranking exercise, however, the NRC commissioned a study by leading social scientists of the methodology used in that assessment (Ostriker and Kuh, 2003). The NRC reputational measure had included two questions, one on the scholarly quality of the program faculty and a second on the effectiveness of the doctoral program in training scholars. While the reputational survey had been limited to members of the discipline being rated, nonetheless, the committee concluded – consistent with the research reported above -- that the strong correlation between the two reputational measures in past NRC assessments "suggests that raters have little knowledge of educational programs independent from faculty lists" (Ostriker and Kuh, 2003, p. 36). Therefore while the reputational measure will be continued, it will be limited to scholarly reputation of the program faculty alone. Furthermore the NRC committee determined that because more highly ranked programs were most visible some measure of the rater's familiarity with the program should also be included.

Conclusion

Organizational rankings have been used in many other sectors in order to promote accountability (Gormley and Weimer, 1999). Rankings have the potential to be a valuable instrument for academic quality assurance, because they can provide useful information to consumers and policy makers about quality differences in academic programs and can also provide an incentive for universities to improve their academic standards. This however requires that rankings are compiled rigorously, carefully, and published in an appropriate and useful form. The Berlin Principles on Ranking is one attempt by an international expert group to outline the criteria for a good quality university ranking (IREG 2006). These principles specify the criteria for defining the purpose, selecting indicators, managing data collection, and presenting results.

After criticizing the legitimacy of the reputation rankings it should be noted that the intention of all rankings is not necessarily information for consumers. Rankings clearly have also an "infotainment value." That is they provide some information but are also a source of entertainment for those within and outside of higher education (Bowden 2000). Because of the entertainment value, rankings are a commercially valuable product. Overly simplified, institutional-level rankings, as opposed to more sophisticated evaluations of different aspects of universities, have a higher "infotainment value" and therefore greater popularity and visibility in society. For this reason there is little likelihood that commercial publishers will invest the time and/or the money necessary to create valid, reliable, and academically useful university league tables. If university rankings are to help assure rather than distort academic quality they will need to be guided by appropriate public policies. While the CHE rankings are published commercially, their validity and reliability is supported by the non-profit status of the organization, the private source of its funding, as well as by the indirect support of the German Federal and Länder governments exercised through the oversight of the German Science Council. The NRC in the US is also a highly respected, non-profit scientific organization, whose university rankings are subsidized by the federal government. The well designed *GUG* in Australia is highly dependent upon relevant data designed and subsidized by the national government as well as by the government's encouragement of university engagement in the process. In each of these cases, the positive contribution of the university rankings to academic quality assurance is influenced by government policy.

There is certainly a market for different kinds of university rankings. However, a ranking that has the ambition to be "the third leg of the quality-assurance stool, along with accreditation and government regulation and licensing" (Bollag 2006), must fulfill the criteria of conceptual and statistical rigor. The CHE ranking is in this respect a valuable model for policymakers.

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Resources for policy-makers

The CHE ranking <http://www.das-ranking>

The CHE ranking in English (DAAD)
<http://www.daad.de/deutschland/hochschulen/hochschulranking/06543.en.html>

Technical and methodological documents

Survey questionnaires

Study field (administration)

http://www.che.de/downloads/Fachbereichs-Fragebogen_06.pdf

Survey of professors

http://www.che.de/downloads/Fragebogen_Universitaeten_06.pdf

Survey of students

http://www.che.de/downloads/Studierenden-Fragebogen_06.pdf

Questionnaire to the university administration

http://www.che.de/downloads/Hochschulverwaltungs-Fragebogen_06.pdf

Background paper on the ranking methodology

CHE HochschulRanking 2006: Vorgehensweise und Indikatoren (in German).

http://www.che.de/downloads/Methoden_2006.pdf

Organizations

CHE www.che.de

German Rectors' conference www.hrk.de

Bertelsmann Foundation www.bertelsmann-stiftung.de

Appendices

Appendix 1: List of Subject Fields in Universities and Universities of Applied Sciences (Fachhochschulen) Ranked by CHE

Appendix 2: The response rate to student survey by disciplines

Appendix 3: The response rate to professors survey by disciplines

APPENDIX 1 List of Subject Fields in Universities and Universities of Applied Sciences (Fachhochschulen)
Ranked by CHE

Natural sciences, Mathematics, Computer Science

Biochemistry
Biology
Business Computing
Chemistry
Computer Science
Dentistry
Food Chemistry
Geography
Geoscience
Human Medicine
Mathematics
Pharmacy
Physics
Technical Computer Science

Legal, Economic and Social Sciences

Business Administration
Commercial/Business Law
Economics
Law
Nursing
Political Science
Social Policy and Social Work
Sociology/Social Science

Linguistics and Civilization Studies, Psychology

Education Science
English/North American Studies
German Language and Literature
History
Media- and Communicational Science, Journalism
Psychology
Romance Studies

Engineering Sciences

Architecture
Civil Engineering
Electrical and Information Engineering
Industrial Engineering
Mechanical Engineering
Process- and Chemical Engineering

APPENDIX 2. The response rate to student survey by disciplines.

	Universities			Universities of Applied Sciences		
	Sample	Responses	Response rate (%)	Sample	Responses	Response rate (%)
Mathematics, computer science, sciences, medicine, geography and geology						
Biochemistry	2 180	763	35.0	-	-	-
Biology	21 100	5 038	23.8			
Chemistry	10 900	3 008	27.6			
Geography	14 300	3 206	22.4			
Geology	2 900	751	25.9			
Medicine	17 950	4 370	24.2			
Computer science	27 700	4 860	17.5	14 500	3 425	23.6
Food chemistry	1 000	290	29.0			
Mathematics	16 700	4 594	27.5			
Pharmacy	6 380	1 705	26.7			
Physics	11 900	4 179	35.1			
Operations	5 600	1 531	27.3	9 100	1 930	21.2
Dentistry	3 080	853	27.7			
Law, Economics and Social Sciences						
Business Administration	22 600	6 060	26.8	40 200	9 140	22.7
Law	11 400	3 320	29.1	2 600	950	36.5
Nursing				1 960	556	28.4
Political science	10 100	2 900	28.7			
Social work				13 800	4 700	34.1
Sociology	10 900	2 400	22.0			
Economics	8 900	1 760	19.8			
Industrial engineering	4 200	1 600	38.1	9 800	3 000	30.6
Linguistics and Culture						
English/American studies	24 674	2 358	9.6			
Education	14 961	3 459	23.1			
German	29 889	3 022	10.1			
History	20 952	1 989	9.5			
Media and Communication, Journalism	7 500	2 600	34.7	2 300	650	28.3
Psychology	10 867	3805	35.0			
Engineering						
Architecture	4 355	1 029	23.6	6 679	2 176	32.6
Civil engineering	4 085	1 203	29.4	8 349	2 108	25.2

Electrical and computer engineering	6 266	1 703	27.2	12 765	3 344	26,2
Mechanical engineering	9 842	2 429	24.7	15 582	4 178	26,8
<i>Verfahrenstechnik</i>				4 474	988	22.1
Physicalische Technik				1 488	384	25.8
Technische Informatik				3 080	550	17.8
Vermessungswesen				1 048	331	31.6
TOTAL	201 491	41 637	20.7	124 125	33 055	26.6

Source. Tabelle 4 in CHE 2006

APPENDIX 3. The response rate to professors' survey by disciplines.

	Universities			Universities of Applied Sciences		
	Sample	Responses	Response rate (%)	Sample	Responses	Response rate (%)
Mathematics, computer science, sciences, medicine, geography and geology						
Biochemistry	97	63	64.9			
Biology	937	326	34.8			
Chemistry	811	356	43.9			
Geography	271	144	53.1			
Geology	383	137	35.8			
Medicine	3 006	799	26.6			
Computer science	784	436	55.6	1 120	501	44.7
Food chemistry	35	16				
Mathematics	1 115	435	39.0			
Pharmacy	162	107	66.0			
Physics	165	515	44.2			
Operations				183	128	69.9
Dentistry	182	90	49.5			
Law, Economics and Social Sciences						
Economics	1 427	731	52.2	2 662	1 301	48.9
Law	814	479	58.8	133	119	89.5
Nursing				258	147	57.0
Political science	273	146	53.5			
Social work				1 152	581	50.4
Sociology	365	147	40.3			
Industrial engineering	462	180	39.0	929	434	46.7
Linguistics and Culture						
English/American studies	355	195	58.2			

Education	637	247	38.8			
German	619	246	39.7			
History	556	251	45.1			
Media and Communication, Journalism	260	80	30.8	143	81	86.6
Psychology	443	246	55.5			
Engineering						
Architecture	377	143	37.9	686	321	46.8
Civil engineering	400	233	58.3	819	457	58.0
Electrical and computer engineering	540	297	55	1 919	894	46.6
Mechanical engineering and <i>Verfahrenstechnik</i>	1008	494	49	3 108	1 033	33.2
<i>Physicalische Technik</i>				328	116	35.4
<i>Technische Informatik</i>				160	105	65.6
<i>Vermessungswesen</i>				160	105	65.6
TOTAL	17 464	6 910	41.7	13 600	6 218	44.7

Source. Tabelle 3 in CHE 2006