

U-Map and U-Multirank: some first results and reflections on two new profiling and ranking tools for higher education institutions

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Introduction

This paper will show some first results from the U-Map and U-Multirank projects (CHEPS, 2008; Van Vught, et al. 2009; 2010). U-Map was developed in a series of (EU-subsidised) projects to lay the ground work for building a classification of European higher education institutions (HEIs). U-Map aims to map higher education institutional diversity in the large and highly diverse European higher education landscape. It does not rank the institutions league-table-style, but describes institutions on a number of dimensions, each representing an aspect of the activities of higher education institutions (www.u-map.eu). The mapping focuses on the profiles shown through *activities* of the institutions. At the same time, U-Map can also act as a tool for universities, colleges, polytechnics, and other types of HEIs to present what they do and how that compares to activities of other HEIs. This may inform the HEIs' strategy building, their positioning in the field and may assist them in benchmarking exercises or in developing inter-institutional co-operation. In short, U-Map can also serve as a profiling tool for HEIs.

U-Multirank (CHERPA Consortium, 2009, 2010, 2011) is a project commissioned by the European Commission and aims at designing a multidimensional ranking tool that is more comprehensive and rigorous than existing rankings. U-Multirank is inextricably connected to U-Map: U-Multirank adds the *performance* aspect to the mapping: how well are higher education institutions *performing in the context of their institutional profile*? In U-Multirank the emphasis is on indicators of performance. Therefore, the first requirement for the indicators used in U-Multirank is to reflect as closely as possible the institution's or unit's performance. However, the complexity of higher education and the paucity of (internationally comparable) data often necessitates aiming for proxy indicators. Unfortunately, this blurs the distinction between U-Map's focus on enablers (input and activity) and U-Multirank's focus on output and performance to some extent. Such overlap cannot be avoided at all times, but should become smaller with the maturing of U-Multirank over the years.

Dimensions of institutional activity and institutional performance

The U-Map classification consists of six dimensions and a set of indicators per dimension. A dimension reflects a characteristic of HEIs upon which differences and similarities can be mapped. The perspectives of the different groups of users were taken into account in the selection of dimensions and indicators. The relevance of dimensions and indicators in their eyes was one of the leading principles in the design of U-Map.

The multidimensional set up of U-Map implies that institutions can be described, grouped and compared in a variety of ways. Quantitative information – expressed through indicators – is used to describe the position of a HEI on each of the dimensions. The indicators allow users to differentiate between institutions and to construct different classes per dimension. The dimensions and the indicators per dimension are listed in the table below.

Table 1: U-Map: Dimensions and indicators

Teaching and learning profile	Student profile	Research involvement
Degree level focus	Mature students	Peer reviewed academic publications
Range of subjects	Part time students	Professional publications
Orientation of degrees	Distance learning students	Other research output
Expenditure on teaching	Size of student body	
Involvement in knowledge exchange	International orientation	Regional engagement
Start-up firms	Foreign degree seeking students	Graduates working in the region
Patent applications filed	Incoming students in exchange programmes	New entrants from the region
Cultural activities organised	Students sent out in exchange programmes	Importance of local/regional income sources
Income from knowledge exchange activities	International academic staff	
	Importance of international income sources	

U-Map’s activity profiles are based on data submitted by the institutions themselves. The main data-gathering instrument is the on-line U-Map questionnaire.

U-Multirank adds the *performance* aspect to the mapping of HEIs: how well are higher education institutions *performing in the context of their institutional profile*? U-Multirank as a project is a *feasibility study* that will include both focused institutional rankings and field-based rankings. A focused institutional ranking relates to a particular dimension of the classification and allows comparisons of entire institutions along a single aspect of institutional activity such as education, research, internationalization, or knowledge transfer. According to the multidimensional approach a focused ranking does *not* collapse all dimensions into *one* rank, but will instead provide a fair picture of institutions (‘zooming in’) within the multi-dimensional context provided by the full set of dimensions. The comparative analysis of a set of institutions on one singular dimension is a focused ranking of these institutions on that dimension.

A field-based ranking is a multi-dimensional ranking of a set of study programmes in a specific field or discipline of higher education. Rankings of study programmes can only be meaningfully interpreted within the wider context provided by the multi-dimensional classification of entire institutions. U-Multirank has chosen to focus on business studies and engineering as the two fields for which a multidimensional field-based ranking will be investigated. In the remainder of this paper we will however discuss the focused institutional ranking only.

Both U-Map and U-Multirank depart from the same conceptual model, incorporating the dimensions Research, Teaching & Learning, Knowledge Exchange,

Internationalisation, and Regional Engagement. This allows for U-Map to prepare the ground for U-Multirank in ranking only those HEIs that are comparable in the eye of the user. This is important, because rankings should be made of HEIs that are comparable. A pre-selection - or filtering - is required to group HEIs with *homogeneous* features. This filtering takes place through U-Map.

In U-Multirank the emphasis is on indicators of the institution's (or a unit's – as in the case of programme/field-based rankings) performance. Unfortunately, the complexity of higher education and the paucity of (internationally comparable) data often necessitates the use of input or process indicators and other proxies. To some extent this may blur the distinction between U-Map's focus on enablers (input and activity) and U-Multirank's focus on output and performance. Such overlap cannot be avoided at all times, but should become smaller with the maturing of U-Multirank over the years.

Different users engage with HEIs for various reasons and are therefore interested in different dimensions and indicators of the performance of HEIs and the programmes they offer. The U-Multirank ranking therefore adheres to the principle that it should include information that is relevant to the different users/stakeholders and their motives for using the ranking. For different dimensions (research, teaching & learning, knowledge exchange, regional engagement) and different stakeholders/users the relevance of information about different aspects of performance may differ.

Table 2: U-Multirank: Dimensions and indicators

Teaching and learning	Research	
expenditure on teaching	% expenditure on research	
time to degree bachelor	research publication output (self reported)	
time to degree master	research income from competitive sources	
time to degree bachelor	Web of Science publications	
time to degree master	post doc positions	
relative rate of graduate unemployment	share of within-country joint research publications	
Interdisciplinarity	field-normalized citation rate	
	highly cited research publications	
	number of art related outputs	
Knowledge exchange	International orientation	Regional engagement
spin-off companies created	students in joint degree programs	graduates working in the region
university-industry joint publications	international doctorate graduation rate	regional joint research publications
number of CPD courses offered	international joint research publications	number of research contracts with regional partners
incentives for knowledge exchange	international academic staff	income from regional sources
third party funding		student internships in local enterprises
number of patents awarded		
size (staff volume) of technology transfer office		

The dimensions and indicators for the focused institutional ranking are shown in Table 2. For reasons of space we will not present the dimensions and indicators for the focused field-based rankings.

Visualising the results

The diversity of each institution's activity is pictured in its 'sunburst' chart (see below), with six colours representing the six dimensions of U-Map. Each 'ray' represents an indicator – its length indicating the relative position of an institution against a user-defined set of comparator institutions. It is good to stress that the emergent classification does not imply a rank order. There is no hierarchy between dimensions, nor between the categories within a dimension. The idea is to offer a description of the actual profile of an institution on the dimensions and indicators judged to be relevant by stakeholders. The institutional profile shows ('maps') the activities of an individual HEI against the background of the information on other HEIs.


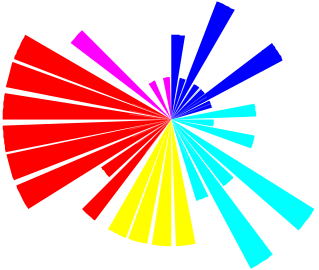

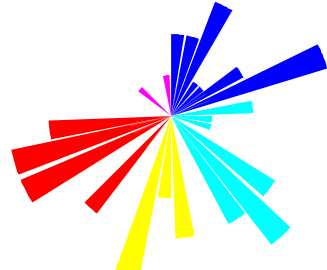

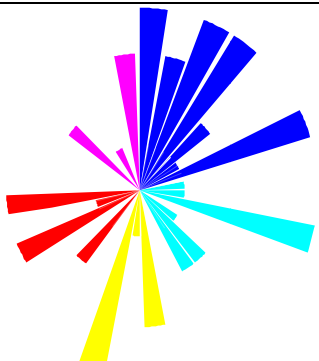

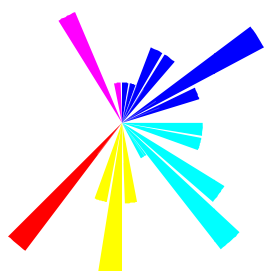
In the U-Map project the results are communicated through two web-based tools, known as the *Finder* and the *Viewer*. These tools allow the user to select ('find') and then compare ('view') institutions. Through the Finder, the user selects HEIs on the basis of particular characteristics, arriving at a subset of institutions that meet particular criteria. In the next step, the Viewer provides a picture of the institutional profile along the six dimensions covered in U-Map. The U-Map Viewer tool shows for each dimension the institution's value for an indicator by assigning the institution to one of four intervals (or classes). The indicator scores are grouped into four intervals, using quartile scores as criteria. The intervals are determined by *cut-off points* that depend on the distribution of the indicator scores across the sample. So, if the sample changes, the cut-off points may change. For the time being, the cut-off points are distribution-based and determined by the quartiles in the sample. Alternative ways of arriving at cut-off points may be investigated.


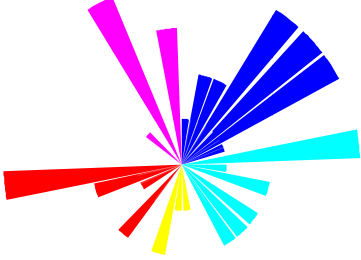

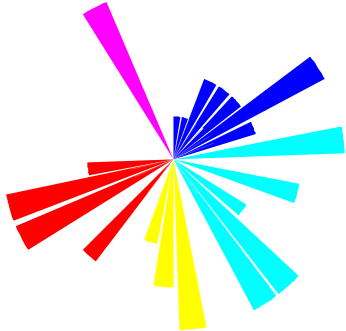



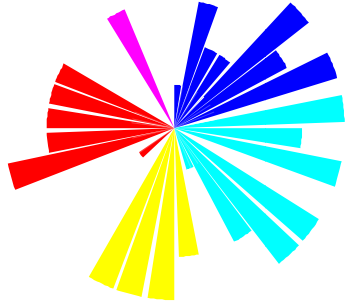
In Table 3 below we are showing some preliminary results from the U-Multirank project. For some institutions, the activity profile and the performance profile are presented. Because at the time of writing we are still in the data verification phase, the profiles are provisional and some of the profiles are still incomplete due to errors and missing data. The colour codes for the dimensions are consistent between U-Map and U-Multirank profiles. The indicators represented by the individual 'rays' are obviously not the same.


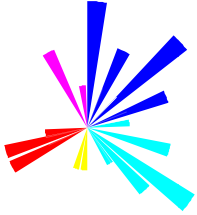

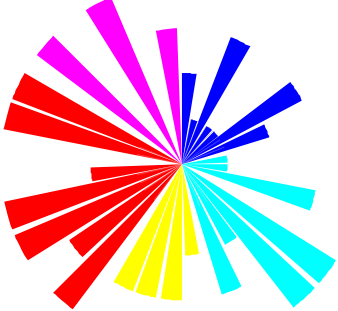
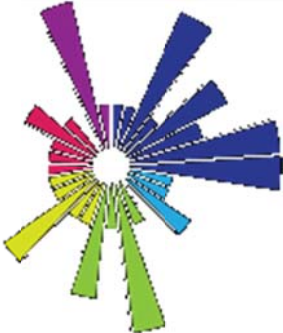
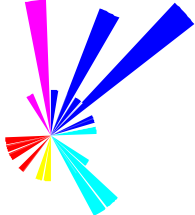

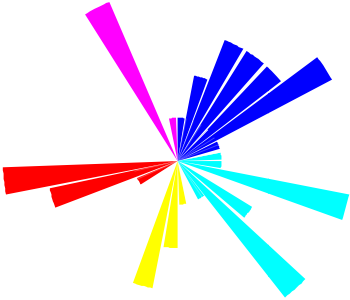
Since its launch, U-Map has been applied in four national higher education systems (the Netherlands, Estonia, Flanders and Portugal) as well as by a number of individual HEIs. This has provided a wealth of information on technical, methodological, and political issues regarding the implementation of U-Map. U-Multirank so far managed to collect information on about 100 HEIs from over 40 countries in Europe and elsewhere. The U-Multirank institutions were also asked to provide their data for the U-Map classification, allowing them to be mapped first before the ranking exercise.

In the final paper we will show more results and present some conclusions on the feasibility of the classification and ranking tools, their use and their potential for increasing transparency in higher education.

Table 3: Provisional institutional profiles

Institution	U-Map	U-Multirank
4		
152		
148		
96		

Institution	U-Map	U-Multirank
203	 <p>A circular sunburst chart with a central white circle. The chart is divided into approximately 20 segments of varying lengths and colors, including purple, blue, red, yellow, green, and cyan. The segments are arranged in a roughly circular pattern around the center.</p>	 <p>A sunburst chart with a central white circle. The segments are arranged in a fan shape, primarily pointing towards the right. The colors include magenta, blue, red, yellow, and cyan. The segments vary in length and are clustered together.</p>
10	 <p>A circular sunburst chart with a central white circle. The segments are arranged in a roughly circular pattern, similar to the 203 institution. Colors include purple, blue, red, yellow, green, and cyan.</p>	 <p>A sunburst chart with a central white circle. The segments are arranged in a fan shape, primarily pointing towards the right. Colors include magenta, blue, red, yellow, and cyan.</p>
292	 <p>A circular sunburst chart with a central white circle. The segments are arranged in a roughly circular pattern, similar to the 203 institution. Colors include purple, blue, red, yellow, green, and cyan.</p>	 <p>A sunburst chart with a central white circle. The segments are arranged in a fan shape, primarily pointing towards the right. Colors include magenta, blue, red, yellow, and cyan.</p>
304	 <p>A circular sunburst chart with a central white circle. The segments are arranged in a roughly circular pattern, similar to the 203 institution. Colors include purple, blue, red, yellow, green, and cyan.</p>	 <p>A sunburst chart with a central white circle. The segments are arranged in a fan shape, primarily pointing towards the right. Colors include magenta, blue, red, yellow, and cyan.</p>

Institution	U-Map	U-Multirank
297	 <p>A circular U-Map visualization for institution 297. It features a central white circle with numerous colored segments radiating outwards. The segments are arranged in a roughly circular pattern, with colors including purple, blue, red, yellow, green, and cyan. The segments are of varying lengths and are separated by thin white gaps.</p>	 <p>A U-Multirank visualization for institution 297. It shows a central white circle with a few colored segments radiating outwards. The segments are primarily blue and cyan, with a few red and yellow segments. The overall shape is more compact and less circular than the U-Map.</p>
115	 <p>A circular U-Map visualization for institution 115. It features a central white circle with many colored segments radiating outwards. The segments are arranged in a roughly circular pattern, with colors including purple, blue, red, yellow, green, and cyan. The segments are of varying lengths and are separated by thin white gaps.</p>	 <p>A U-Multirank visualization for institution 115. It shows a central white circle with many colored segments radiating outwards. The segments are arranged in a roughly circular pattern, with colors including purple, blue, red, yellow, green, and cyan. The segments are of varying lengths and are separated by thin white gaps.</p>
298	 <p>A circular U-Map visualization for institution 298. It features a central white circle with numerous colored segments radiating outwards. The segments are arranged in a roughly circular pattern, with colors including purple, blue, red, yellow, green, and cyan. The segments are of varying lengths and are separated by thin white gaps.</p>	 <p>A U-Multirank visualization for institution 298. It shows a central white circle with a few colored segments radiating outwards. The segments are primarily blue and cyan, with a few red and yellow segments. The overall shape is more compact and less circular than the U-Map.</p>
98	 <p>A circular U-Map visualization for institution 98. It features a central white circle with many colored segments radiating outwards. The segments are arranged in a roughly circular pattern, with colors including purple, blue, red, yellow, green, and cyan. The segments are of varying lengths and are separated by thin white gaps.</p>	 <p>A U-Multirank visualization for institution 98. It shows a central white circle with many colored segments radiating outwards. The segments are arranged in a roughly circular pattern, with colors including purple, blue, red, yellow, green, and cyan. The segments are of varying lengths and are separated by thin white gaps.</p>

Discussion

U-Multirank has received wide support as an attempt to design a tool that is more comprehensive and rigorous than existing rankings. At the same time, stakeholders have articulated various concerns and issues. Actually, criticism is exactly what both projects were always open to. And after all, U-Multirank is a feasibility study.

The criticism ventilated concerns specific indicators that have been proposed as well as more general conceptual issues. We now will list a few general concerns, along with some replies. It should be mentioned that it is difficult to point out any shared criticism since different organizations and experts have expressed different issues.

The concerns refer to the following issues.

- ‘The indicators in the U-Multirank project are imprecise proxies and do not describe accurately the quality in the specified dimensions. For example the indicators proposed under teaching are not a proxy for quality of teaching but rather the quality of process’. We acknowledge that the indicators are proxies, which is the case with most quantitative indicators that aim to capture complex processes and phenomena. In the absence of indicators on learning outcomes we focus on indicators that describe the processes and the impact of learning outcomes (e.g., in terms of graduates’ success on the labour market or drop-out rate). Excellence is a relative concept: whether an institution is excellent depends on the performance of other institutions. From that perspective, indicators may describe excellence if they discriminate between institutions. Another element of excellence is whether a good score on the indicator is relevant or important in the eye of the beholder. Only indicators that are relevant should contribute to the assessment of excellence. An assessment of the relevance is an integral part of the analyses in this stage of the project.
- ‘Statistics from country to country will not be comparable’. Comparability issues are most certainly a major point of concern in this feasibility study. For a number of indicators, such issues can be solved by using clear definitions, and if needed country specific guidance by providing examples in U-Multirank’s Glossary, in the additional information screens in the on-line questionnaire, and answers to frequently asked questions (FAQ) posted on the website of U-Multirank. For some indicators which are outside the ‘standard’ set of indicators, our definitions are more open to discussion. Moreover, characteristics of national systems may have an impact on the exact data provided. In those cases contextualisation is required. The pilot study has to sensitise the U-Multirank team for contextual influences that need to be taken into account when interpreting the data. In our view, finding out whether internationally comparable data can be produced or not needs to be tested empirically and this is one of the major tasks of the feasibility project. Earlier, a pre-test has revealed several occasions where more clarification or specification was requested by respondents for ensuring the comparability of data. Whether this will be sufficient or important biases will remain is a question that can be answered only in the final analysis of the project.
- ‘A lack of fundamental a-priory reflection on what each of the dimensions is supposed to capture’. The dimensions have been chosen after a thorough process of stakeholder consultation regarding what characteristics of higher education are

important in characterising it. During that process various expert and advisory groups have commented on the choice of dimensions, resulting in the five dimensions chosen (see also Interim progress report). In the choice of indicators within these dimensions we try to capture all relevant aspects of the dimension. Whether we have succeeded in that – the issue of validity – is addressed throughout this report.

- ‘It is difficult to draw a line between different dimensions. There is a continuum from applied research to knowledge transfer. Similarly CPD courses are serving not only the “third mission” but are part of the teaching function.’ This is correct, but we also think that the intertwinement of dimensions reflects the intertwinement of the functions of higher education institutions. Various activities can be distinguished but they cannot (always) be separated.
- ‘The U-Multirank indicators shy away from new, relevant indicators and favour indicators that are already in use’. The list of indicators proposed in U-Multirank covers a large number of indicators that refer to issues that are not addressed elsewhere. Issues like regional engagement and knowledge transfer are considered to be very relevant in the U-Multirank project. The number of new indicators is relatively large.
- ‘The list of indicators still does not reflect the diversity of missions and profiles of universities. The indicators have a bias towards a traditional research university’. This comment is a variation on the theme described in the previous comment. ‘Non’-research universities have emerged in more recent times. This implies that indicators for their ‘new’ activities are not yet very well developed. New indicators are incorporated but feasibility issues are more prominent there than with indicators for traditional research university activities.

Where possible we have incorporated all the criticism and adjusted our indicator set and we have tried to communicate more clearly our conceptual and practical foundations. In some occasions we have no other choice than to recognise that the U-Multirank cannot produce a perfect ranking at the first attempt.

The intense communication with participating institutions and other stakeholders has raised important questions about data provision procedures and revealed new vistas on the potential impact of U-Map and U-Multirank at the national and institutional level. In the long run, both instruments can possibly enrich comparative quantitative higher education research, as the availability of data and bases increases at the institutional and programme level.

In the final paper, the U-Map and U-Multirank instruments and their implementation process are described more thoroughly. A more deep reflection on the technical issues (e.g. the interactive visualisation tools), some methodological issues (such as the choice of cut-off points for the four indicator categories), as well as on the use of the resulting activity and performance profiles in higher education policy debates and legitimacy issues will be presented.

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