CRITERIA IDENTIFICATION FOR STUDY PROGRAM QUALITY ASSESSMENT AND RANKING

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Abstract: *The authors present different approaches for higher education institution (HEI) or HEI's study course quality evaluation as well as introduce a new solution for assessing and ranking study programs based on identification and evaluation of quality criteria.*
The aim of this research is to define the set of criteria that can be used for study program quality evaluation and ranking. Later on these quality criteria are to be analysed by the group of experts. In the first section the authors review world's experience in creating rankings and also identify it strengths and weaknesses. In the second section the authors examine Latvian experience in creating rankings and quality evaluation activities using accreditation. In the third section the authors compare concepts of ranking and quality. In the final section the authors include criteria for ICT study program quality assessment that are presented to experts for detailed analysis as well as describe a method that can be used to identify quality extent of different ICT study program.

Discussion questions
Is there a need to compare quality of study programs?
What constitutes quality of a study program?
How it can be assessed?

Introduction

During the last years several rankings of world's HEI were developed. Rankings are different, but the aim is one – to create the list of best HEI on the base of fixed criteria. The purpose of rankings is to focus students and employers on top HEI.
Analogical rankings of Latvia's higher education institutions were created in last two years. Two of these rankings were not popular, however one - published in one of the biggest newspapers in Latvia gave cause for wide discussions about the aim of rankings and selected criteria.

When inspecting rankings two questions arise:

- Do rankings help students in choosing the most appropriate and best higher education institution or even study programs?
- Do rankings indicate the quality of study program realisation?

The authors assume that most experts would answer 'No'. However European Union and the government of Latvia call for quality evaluation and improvement of higher

education institutions as well as improvement of HEI's study program content and realisation.
Griffith provides the following definition of quality that clearly states the necessity of certain standards in quality assessment -
"Quality of education may be defined as the extent to which the delivery of the school curriculum is realising the learning outcomes established in the educational standards" [15]. This definition also shows the necessity of criteria identification that needs to be considered in study program realization as well as quality evaluation.

One of existing approaches for study program quality evaluation in European higher education area (EHEA) is accreditation. Although main purpose of accreditation is assessment of study program's compliance with government regulations, accreditation also involves study program's evaluation against established criteria. However, usually accreditation means just passing/failing certain thresholds of a set of parameters thus giving little data for comparing and ranking.
The aim of this research is to define the set of criteria that can be used for study program quality evaluation and ranking. During future research these quality criteria would be analysed by the group of experts. In the first section the authors review world's experience in creating rankings and also identify it strengths and weaknesses. In the second section the authors examine Latvian experience in creating rankings and quality evaluation activities using accreditation. In the third section the authors compare concepts of ranking and quality. In the final section the authors include criteria for ICT[1] study program quality assessment that are presented to experts for detailed analysis as well as describe a method that can be used to identify quality extent of different ICT study programs.

1. University ranking – world experience

1.1. Worlds best university ranking by 'The Times'

One of the world's most recognized university rankings is created by 'The Times'. There are different ranking modifications available based on the collected data: worlds best 100 universities, worlds top 400 universities, Europe's top 150, UK top and USA top.
The methodology of the ranking is based on the following criteria: [12]:

- Research Quality
- Graduate Employability
- International Outlook
- Teaching Quality

These four criteria are divided into eight indicators. During data processing each indicator was weighted as shown in the Table 1.

Table 1 Ranking Criteria and Weights [12]

Criteria	Indicator	Brief description	Weight
Research Quality	Peer review	Composite score drawn from peer review (which is divided into five subject areas)	40%

[1] Information and Communications Technology

	Citations per Faculty	Score based on research performance factored against the size of the research body	20%
Graduate Employability	Recruiter Review	Score based on responses to recruiter survey	10%
International Outlook	International Faculty	Score based on proportion of international faculty	5%
	International Students	Score based on proportion of international students	5%
Teaching Quality	Student Faculty	Score based on student/faculty ratio	20%

For the highest evaluation of each indicator the scoring of 100% was given whereas the rest of scorings were calculated as a percentage of the highest scoring.

The ranking created by 'The Times' is based on world's best researcher and employer references. During the process of this ranking more than 5000 active academics from all continents and various academic lines were questioned [1][2]. In the last stage scientific activity is evaluated using Scopus, which ensures more precise information search specifically for universities (in the beginnings of the ranking ESI was used, however after emerge of Scopus it became non-competitive [2]).
Despite comments about being more favourable to well known universities and inconveniencing the emerge of new university names, ranking by 'The Times' represents all continents, 101 countries and all the main scientific directions [1][2].
However, the authors believe that this ranking provides more information about the prestige of universities rather than quality of the study process. Moreover the results show only the position of the university in the given list but it doesn't allow to analyse how qualitative is the university according to the ideas of rank creators.

1.2. CHE University Ranking

This ranking is created in Germany and provides information about universities and universities of applied sciences in Germany. Unlike 'The Times' this ranking gives possibility to evaluate according to provided study directions as well as university location. Furthermore, besides various criteria which are used for the ranking it is also possible to receive sufficiently detailed information about study programs [10] Research for this ranking is provided by student questionnairs, professor opinions and statistical data. There are several ways how the data of this rating can be reviewed.
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„Ranking overview" provides the possibility to view universities according to the following criteria:

- Overall study situation
- Counselling
- IT infrastructure
- Third party funds
- Research reputation

For calculating these values each criteria is evaluated to value from 1 to 6. In reviewing the values of ranking exact values are almost never used. Instead each evaluation is placed in one of the following groups: top, top (improved), medium, medium (improved), medium (declined), final or final (declined). The authors believe such evaluation is better to interpret for the users of the ranking.

„University comparison" allows users to chose up to three universities and view all criteria results of each university in a comparing table.

„My Ranking" allows reader to sort and place universities according to his/her own chosen five main criteria. There is also possibility to set the lowest border of each evaluation. Such choice can be maid from more than 20 criteria.

Table 2 List of criteria in CHE University Ranking [11]

Group	**Criteria**
Academic studies and teaching	- Contact between students - Contact students-teachers - Counselling - Courses offered - E-Learning - Study organization - Teaching evaluation
Equipment	- IT-infrastructure - Library - Library – computer workstations - Media equipment - Rooms - Workstations
Job market and career-orientation	- Employment market oriented programmes - Practice support
Overall opinions	- Overall study situation - Reputation for academic studies and teaching - Research reputation
Research	- Doctorates per professor - Third part funding
Study location and higher education institution	- Higher education sport - Lots of higher education sport - Low rent - Small university location

The list of „Ups and Downs" allows to review universities which comparing to the previous period have improved either worsened their results in any of previously mentioned five groups.

The authors believe that information provided by this ranking as well as possibilities of the web page provide users with qualitative comparative information about universities. However, limitation is predominance of criteria where results are obtained using student questionnairs.

2. Activities of quality measurement in Latvia

2.1. Accreditation

One of the ways in which university and study program adequacy is evaluated is accreditation. In Latvia it is stated that each higher education institution as well as each study program has to obtain accreditation. During the accreditation process it is stated if university/study program obtains accreditation for two or six years. Accreditation is based on the institution's self-analysis document, which evaluates study utilities, resources used in the study programs, analysis of academic staff as well as student, graduate and employer questionnairs. Self-analysis document is supplemented by the visit of experts and their conclusion. According to all these data commission takes decision about the accreditation of institution/study program. Higher Education Quality Evaluation Centre - HEQEC, organizes accreditation activities. [5][6]

Although during the accreditation process experts evaluate study program according to precise criteria and record the results into form created by HEQEC it is hard to tell that results can be equipollently interpreted.
The first reason is the value scale in the questionnaire. Experts are asked to respond to each question with values 4 (excellent), 3 (highly satisfactory), 2 (satisfactory) and 1 (unsatisfactory) [7]. At the same time there are no criteria in which cases corresponding values can be given. As a matter of fact such evaluation scale is sufficient to evaluate study program correspondence to requirements, however obtained results are too general. The second reason is the diversity of study programs. For different study programs there should be additional criteria, which have to be evaluated. In the case of one general-purpose questionnaire it is not possible. The questionnaires prove that experts often give additional evaluation in a free manner comments. [13]
There is a belief that accreditation doesn't reach its aim as there is a very low number of higher education institutions which doesn't receive accreditation. This process needs certain improvements.

2.2. Higher education institutions ranking in Latvia

This year the first publication about higher education ranking in Latvia emerged [1]. The author – master student at the University of Latvia – researched the data from the Ministry of Education and Science 2007 annual report and university web pages creating ranking with nine indicators:

- Number of students versus each academic staff member
- Graduate density
- Density of Academic staff members with Doctors degree
- Density of Academic staff members
- Academic staff age structure
- Density of students from abroad
- Density of scientific staff members
- Number of publications for each academic staff member

This ranking was created similar to the World University Ranking [2] published by the best-known appendix of The Times - Higher Education. Contrarily to the World University Rankings, slightly different criteria were chosen.
Ranking was published in on of the biggest newspapers in Latvia – „Latvijas Avīze". After the publication of this research members of higher education institutions undertook active argumentation pointing out the following weaknesses: lack of independent approach [3][8], lack of substantiation for chosen criteria [3], comparison of different profile higher education institutions by the similar criteria [3][8][9].

Although part of the criteria used in Latvian higher education institution ranking is statistical several of the same data are used also in evaluation of study programs, such as evaluation of academic staff and its age structure. In the evaluation process of scientific actions it is important to take into consideration that research is carried out by academic staff relevant to the study program. In addition only educational institutions which work in research should evaluate scientific actions. The authors believe that the main lack of Latvian higher educational institution ranking is the generality of the results as it is difficult to identify the difference between 1st (100%) or 15th (30,7%) place in the ranking.

3. University ranking and quality

The authors propose hypothesis stating that ranking doesn't show quality. The authors of the previously mentioned ranking created by 'The Times' point out that this rating is the comparison of educational institutions according to certain criteria but it never mentions quality. Also Academic Ranking of World Universities (ARWU) that has been published by the Institute of Higher Education, Shanghai Jiao Tong University does not mention quality but analyses university academic or research performance based on internationally comparable third-party data.
It should be similar also in Latvian ranking. The authors believe that this ranking shouldn't talk about quality, as research method used in creating this ranking is quantitative rather than focusing on identifying quality. Following the definition of quality university work is a process (how the knowledge is obtained) as well as a product (the content of study programs, graduates with certain level of knowledge and skills). Some of Garvin's Five Quality Definitions [4] are the following.

- Quality is related to a comparison of features and characteristics of products.
- Quality is a precise and measurable variable.
- Quality is conformance to specifications.
- Quality is meeting or exceeding customer expectations.

These quality definitions clearly demonstrate terms that have to be followed when evaluating target, in this case - quality of a study program.

4. Solutions for study program quality evaluation

Based on previously reviewed information the authors conclude that accreditation is more or less appropriate for evaluating study quality, however, it is necessary to take into consideration existing weaknesses and to supplement the set of accreditation

questions corresponding to each evaluated study program. Also it is necessary to define precise and unambiguous evaluation criteria.
The authors have developed questionnaire for evaluating ICT study programs [14], which is based on the study program accreditation form [7] and have supplemented these questions with criteria specific to evaluating ICT program (criteria obtained from expert focus groups) [13]. Also the authors have included demands described in Standards and Guidelines for Quality Assurance in the European Higher Education Area. Questionnaire includes 49 quality criteria separated into 10 groups.

Table 3 List of criteria for study program quality evaluation

Group	**Criteria**
Aims and objectives	- The objectives are clearly stated - Aims are real and measurable
Study program content (study courses)	- Study program is mutually integrated - Different study courses doesn't have ungrounded repetition of the same study material - Study courses have succession -Changes in study courses are managed in order not to decrease mutual integration - Consistency of the study programme and its parts with the demands to create the common European education space, including the comparison with at least two study programmes from EU countries - Length and selection of the courses is relevant to study program aims and objectives - Learning outcomes for practical study courses are defined clearly and they are practically organized - Complying with the professional and education standards, legislation of the Republic of Latvia and with the requirements and standards of the European Union - Study programs carry out well-grounded demands of industry towards the content of the study programs
Regular activities for quality assurance	- Institution has regular activities for the assurance of the quality - Quality assurance activities includes feedback from students - Annual self-assessment of the study programme, evaluation of the strengths and weaknesses, changes, plans and possibilities for the development, continuously action of the system of self-evaluation and quality improvement - Institution publishes all information and results about study program quality assurance
Competency of academic staff	- Academic staff is qualified and professional - Academic staff has consistent academic degree - Academic staff is involved in the research activities, up to date character and connection with the content of the study programme - The faculty is concerned on development of staff's competence. Individual competence development plans are elaborated - The faculty employ own lecturers with sufficient competence instead of visiting lecturers - Academic staff publishes study courses information on WEB - Modern methods of teaching are used - Average age of professors is low and with the time it's being lower - Load of academic staff is well balanced
Resources	- The faculty have all needed resources for study program realization - The faculty have adequate rooms and technical equipment for students count - The library is enriched with English text-books in topic areas relevant to the study program - The library contains literature for all study courses - The lectures really uses library in study process

Teaching	- Modern methodology of teaching, a clear statement of results to be expected - Use of computers, internet, audiovisual and multi media equipment - Study courses that are based on SW products deals with newest versions of SW products - Methods to assess the knowledge, skills and attitudes are used to improve the studies - Counselling and guidance for students, academic supervision and consultations of the teaching staff - Students are motivated to study - Single marking system, the average value is integrated within different courses of one study program
Graduates	- Successful work of graduates according to their qualification - High Graduate Employability - Employers satisfaction with the knowledge and attitude of the graduates
Technical environment	- Implemented e-learning system - Information about all relevant objects, plans, events, teaching material for all courses, and individual study results in the faculty is electronically available to all students - Academic staff is consulting students also electronically
Student assessment	- Quality control using feedback from students is carried out systematically for all courses - Feedbacks from students are collected and further actions on these feedbacks are provided
Cooperation	- The faculty has strong relations with IT companies for students employment, for closer touch to graduates, for better understandings of IT companies practical needs - The faculty stimulates students studies in foreign universities - Opportunities to continue studies and financial guarantees in the case of closure of the programme, its re-organisation and other changes - Co-operation with other higher education institutions, research institutions, international organisations - International outlook. Are international students

For identifying and validating the study quality criteria the authors have chosen the method of focus group. Group of experts was created including ICT study program directors, ICT study program evaluating experts as well as members of HEQEC.

Identification and validation of study program quality criteria as well as development of general study program quality evaluation method takes place in three stages.
During the first stage focus group experts evaluate quality criteria proposed by the authors. It is expected that besides these criteria experts provide more criteria for evaluating study programs moreover some of the criteria could be removed.
During the second stage expert answers are reviewed and criteria approved. This stage also includes the next focus group considering evaluation of each criterion.
During the third stage experts evaluate the quality of a study program based on the evaluation of each criterion.

The following method for study program quality evaluation will be used.

Table 4 Activities for study program quality evaluation

Activities	**Example**
Experts identify set of quality criteria QC, that is composed of quality criteria $\{qc_1, qc_2, ... qc_n\}$. Study program quality will be evaluated by these quality criteria.	As an example following quality criteria can be used: qc_1 – Graduate employability qc_2 – Library completeness
For each quality criteria qc_i set of potentional values U_i is fixed. This set includes all the possible values of criteria qc_i.	The definitive set of values U_1 for the criteria qc_1 would be created by all the possible values from 0% to 100% The infinite set of values U_2 for the criteria qc_2 would be creted by all the possible values from 0 līdz ∞. This would characterize number of cases when literature given in the description of a study program wouldn't be stated in the library.

Experts clasify the set of potentional values U_i of each quality criteria qc_i into one or more clases $\{u_{i1}, u_{i2}, ... u_{ij}\}$.	As an example the following clases could be created from the potentional values of quality criteria: u_{11} = [100% - 90%) u_{12} = [90% - 80%) u_{13} = [80% - 70%) u_{14} = [60% - 50%) u_{15} = [50% - 0%] u_{21} = [0] u_{22} = [1 - 4] u_{23} = [5 - ∞)
For study program quality assesment experts establish sudy program quality grades {1.grade, 2.grade, ... , n.grade} and for each grade adjust appropriate quality criteria qc_i value clases.	For example, all value clases can be divide into the following grades: 1.grade = (u_{11},u_{21}) 2.grade = (u_{11},u_{12},u_{13},u_{21},u_{22}) 3.grade = (u_{11},u_{12},u_{13},u_{14},u_{15},u_{21},u_{22},u_{23})
To calculate study programm quality, each quality criterion qc_i is assessed and the value from the set of potentional values U_i is selected. According to the acqired value the conformity to quality criteria class u_{ij} is estimated for each quality criterion qc_i. Whole study program quality – conformity to one of the grades defined by experts can be evaluated according to the grade definition created by experts.	When evaluating study program X, for example it is stated, that graduate employability is 92% (value class u_{11}). However by the evaluation of library completeness three weekneses were found (value class u_{22}) it . As a result it can be assessed, that study programm conforms to 2. grade.

5. Conclusion

The aim of this research was to identify criteria for ICT study program quality evaluation. Criteria published in this article are sent to experts for detailed analysis and approval.

The authors of this article consider criteria for ICT study program, but these criteria also can be used for quality assessment of different study programs. Resulting from this example general and similarly interpretable study program evaluation can be created.

During the future research activities the authors plan to develop supporting tool for study program quality evaluation and collected data storage. This tool would provide not only support for the accreditation once in two or six years, but also for annual quality assessment activities. This tool is planned to be offered to Higher Education Quality Evaluation Centre, so experts involved into accreditation can store evaluated data that after approval could be accessible to everyone. Data stored for a long period of time would help to analyse and compare quality of different study programs and also would assist quality improvement.

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