PROJECT FINAL REPORT

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Final publishable Summary Report

1. Executive Summary

The EERQI project was motivated by the fact that the international notion of scientific quality as being the main determinant on which research is funded and supported may cause undesired side effects if the questions of *how quality is interpreted* and *how it is measured* are not adequately answered. Current instruments for 'measuring' quality via citation counting and similar methods *do cause* such side effects, as they are strongly biased and largely inadequate for research in the SSH disciplines.

The EERQI project developed an approach to detect the quality of research texts – with educational research serving as model case – by applying an intelligent combination of different approaches that complement each other. This is what we call the EERQI Prototype Framework. It consists of products and methods that can serve as alternatives in processes of assessment of quality in SSH research. The possibility of multilingual assistance of assessment processed by EERQI's multilingual search engine and automatic semantic analysis are tailor-made for strengthening the European research space. The EERQI products and methods consist of:

- **A content base** with educational research texts in the four European languages that were exemplary included in the EERQI project: English, German, French and Swedish.
- **A multilingual search engine** that includes query expansion: an effective tool dedicated to educational research in general, capable of finding educational research texts in the Web in the four EERQI languages.
- **An automatic semantic analysis for the detection of key sentences in a text**; the method is applicable to educational research publications (in at least) the four EERQI languages.
- **A combination of bibliometric/ webometric approaches for the detection of 'extrinsic' quality indicators** (tool aMeasure).
- **First tests of a citation analysis method** that has the potential to be further developed for the application to educational research (and other SSH) texts.
- **A set of text-immanent indicators** for the detection of quality in educational research publications that has been presented to the research community and was positively evaluated.
- **An accompanying peer review questionnaire** that was tested for reliability and practicality.

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- **A set of use-case scenarios** that give advice on how to use which resp. combination of the above-mentioned tools.
- First attempts to detect interrelations between 'extrinsic' and 'intrinsic' quality indicators.

The EERQI Prototype Framework accompanies the process of quality detection:

- The process begins with the detection of *potential* quality via *identification* of relevant texts from different sources. The EERQI content base (educational research texts provided by the EERQI publisher partners) and the multilingual search and query engine are the relevant tools for this step.
- The application of 'aMeasure' - a stack of tools and programs to measure extrinsic characteristics of research publications (such as citations and Web mentions) – allows for collecting information about *extrinsic indicators* of the quality of publications.
- The application of automated semantic analysis provides support for evaluating the internal quality of a text. The method developed in EERQI allows for the identification of key sentences that indicate parts of documents to which peer reviewers should pay particular attention.
- The application of a Peer Review Questionnaire that contains a tested operationalization of the *intrinsic indicators* of quality that were developed by the EERQI project supports the readers' final judgments on the quality of texts.

2. Summary description of project context and objectives

2.1. Context

All across the world, the structures and control mechanisms of publicly funded research projects have changed dramatically in the last decade. There are many widely discussed causes of these developments. The set of causes on which we concentrate here is based on the evocation of the 'ability to compete internationally' – a request that is expressed vis-à-vis national research landscapes in Europe as well as the European Research Area.

A metaphor that is either explicitly used or implicitly resonates in the existing discourses, in the decisions on new governance mechanisms, and in new modes of research funding is *quality.* The discovery, improvement and promotion of research quality are the driving motives for the tendency to re-evaluate and redevelop structures for the research area, for redesigning the funding of research institutions and projects, and for instituting control and legitimization systems that are (or intend or pretend to be) helpful for decision-makers.

In the framework of these developments, the questions of *how quality is interpreted* and *how it is measured* are of fundamental importance. Analyses dealing with this question supplied the starting point for the development of the research project 'European Educational Research Quality Indicators (EERQI)'.

The project was developed by a truly interdisciplinary European research consortium, a unique composition of experts from educational science, biblio- and webometrics, information and communication technologies, computational linguistics and publishing houses.

The focus of the analysis prior to the project was on special questions such as: What constitutes and marks the current quality control systems that are applied in contexts of governance and funding, irrespective of the genre and the type of research that is at stake? And what are possible effects of these systems on research that is conducted in the European research area, especially in the domains of the social sciences and the humanities?

According to our assumptions, educational research is particularly suitable for considerations and research on such questions, because it can be considered to be prototypical for vast areas of the whole field of the social sciences and humanities. This is justified by the following: educational science and research combine a wide spectrum of theoretical and methodological approaches – from primarily philosophical-historical methodologies as used in the humanities to psychologically or sociologically based empirical observations of individual development, education, training or *Bildung*; from hermeneutical interpretation, single case studies to the generation and statistical analysis of great amounts of survey data. This manifests relevant characteristics of knowledge production, which are also found in other disciplines in the social sciences and humanities.

Another reason why it is relevant to use educational research as a model is that the visibility of education and learning as a policy space and its emergence as a significant area of policy are not matched by useful analyses of its operation. Policy in education and educational research is no longer the sole domain of the nation-state, but has become a key feature of a 'Europeanizing' process. 'New Learning' through social innovation is central to the knowledge economy, allowing education to be compared, promoted, researched and improved in its European role as a key part of the knowledge economy and as a distinctive element in the particular mission of Europeanization within globalization. However, the contribution of European education research is hampered by the way it is organized in Europe. Distinctive and fruitful traditions of work are locked into national intellectual resources and it is a slow process of enabling them to move across borders. Thus, there is a need to intensify networks and agree on common standards paving the way to a virtual working space for European educational researchers. The EEQRI project aims to contribute to this development.

The EERQI review on the appropriateness of instruments and strategies for quality assessment that are actually applied to educational science resulted in a generic judgment that can briefly be articulated as follows: the existing instruments do not lead to valid results, because they do not measure what they claim to measure. An example to illustrate this statement is quality assessment based on citation indices and journal rankings. As yet, this has been the most common approach in vast areas of quality assessment.

The central quality criterion that is used in these instruments is 'international visibility' of research findings. This is expressed by the placement of the publication, namely in journals with a good reputation, and by the number of citations of a publication. This approach is characteristic of the Social Science Citation Index, a commercial instrument, owned by the US American publishing group Thomson Reuter. Its results often play an important role in reporting systems on research achievement. A closer look at the documentation of the journals represented by this index reveals (for 2009 and the field of educational science according to the "Journal Citation Report"[1]) the following:

In total, 201 educational research journals are incorporated in the rankings. Approximately 52% of these journals are published by US American publishers. An additional 24% derive from British publishing houses. The next "largest" nations in this ranking are the Netherlands (with 4% of cited journals) and Germany (with 3% of publications). Altogether, 15 nations across the world are represented in the ranking of the Journal Citation Report. A slightly different perspective reveals that 89% of the publications are in English. The next "largest"

[1] Journal Citation Reports® are a commercial product offered by the US-American publishers' group Thomson Reuters, see http://thomsonreuters.com/products_services/science/science_products/a-z/journal_citation_reports/ [May 2011]. The products can be linked with ISI Web of Knowledge and Web of Science.

languages with 2.5% and 2% respectively are German, Spanish and Turkish. In total, eleven languages are represented by the index. A language such as French is not included.

These findings illustrate that these kinds of approaches do not produce valid information in the sense that they pretend to, because the intended international relevancy of the included publications cannot be proven. The rankings are heavily biased: they essentially refer to US American or UK publications and publications written in English. International visibility as a quality criterion must be translated here to: visibility of products from a selection of national research spaces to the rest of the world. The provided information is perfectly suitable to substantiate the dominance of a 'minority' of regional and linguistic research areas.

This means in fact, that these methodologies do not reflect an adequate coverage of European scientific publications, in particular in the social sciences and humanities. Hence, if European science or institutions are exposed to these evaluation methods, not only are individual researchers and institutions, but also complete subject domains and language areas widely ignored.

2.2 Project Objectives

Thus, the motivation for the development of the EERQI-project was, in a nutshell, the observation that the strategies of assessment that were developed in 'hard science'-contexts are heavily criticized for their methodological weakness and lack of validity – not only from a social sciences and humanities point of view[2]. At the same time, there was a genuine desire to develop approaches that can serve better for the aim of detecting research quality. This desire unites the research community as well as relevant stakeholders from other spheres, such as publishing houses, research funding and political decision making.

Our general intention was to develop useful tools that support the *process* of quality detection. An intelligent combination of such tools – that was our assumption – would be able to assist the readers with the task of quality determination. The application of these tools should meet two aims:

    a) it should raise the transparency and quality of the process of quality detection itself;

    b) it should make the task better manageable and less time consuming.

In order to meet these aims it was not EERQI's objective to develop one single method, such as an index. The aim was the development and testing of a set of tools that could support and accompany the process of detecting research quality in texts - from the moment of identification of texts to the moment of the determination of quality.

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[2] Bridges, 2009; Mocikat, 2009; see also http://www.adawis.de/index.php?navigation=1 Accessed 22nd May 2011

The new tools to be developed were compiled in a broader prototype framework, each tool addressing a specific part of the assessment process:

Before being able to assess educational research documents for their quality they had to be identified and gathered. Therefore, when searching for a specific term it was the task to identify relevant educational research documents and make them available to the user with the help of a search engine. The stock that the search engine comprised of needed to contain a wide range of documents, those being freely available in the World Wide Web and those being in the possession of publishing houses or research institutions – normally not freely accessible. Since the relevance of the harvested documents plays a crucial role, it was the task to refine the search engine to gather only educational research documents relevant to the search term. Taking into consideration the European context in which educational research documents are published in different languages the search engine needed additional multilingual functions so that it was able to deliver results to the search term in several languages.

After retrieving the documents, their quality was assessed with different approaches. This involved the improvement of the "classic" indicators (e.g. amount of citations; classification of a journal), and the development of new scientific/ research quality assessment indicators and methodologies. For the EERQI-project, we decided that there are two different types of such indicators: one type that is external to the text, such as bibliometric and webometric features; another type that is internal in the text – namely the signals that are given within the words, graphs, metaphors of which the text is composed.

In order to assist the reader with the detection of quality, the external and internal indicators had to be applied to the text and tools had to be developed to assist with their easy detection. Measuring extrinsic characteristics of research publications involves the harvesting of those pieces of information from different search engines such as Google Scholar, Google Web Search etc.

The detection of the intrinsic indicators is a much more complex process requiring assistance, if large amounts of texts have to be assessed. This assistance can be provided by automatic semantic analysis, a tool developed by EERQI team members. Another relevant tool is the EERQI peer review questionnaire; this instrument comprises of the operationalized items that indicate internal features of the quality of a text. The reliability and acceptance of this questionnaire was tested with a positive result.

The EERQI results were presented at several occasions to the scientific community for verification and acceptance. These presentations addressed educational research societies, experts in the field, representatives of research funding agencies, and promotion and evaluation bodies at the national and European level. They took place at EERQI workshops,

expert consultations and international conferences. Since it was the aim to apply the new methods to other SSH disciplines, the indicators and prototype framework were tested for transferability to political sciences. A distinguished sustainability plan including scenarios for follow-up research was developed.

3. Description of the main S&T results/ foregrounds

The EERQI *foreground* consists of the EERQI Prototype Framework. This framework is composed of a set of tools that aim at assisting the reader in processes of quality detection, which are applied to educational research texts. These tools are, in detail:

- **A content base** with educational research texts in four European languages that were exemplarily included in the EERQI project: English, German, French and Swedish.
- **A multilingual search engine** that includes query expansion: an effective tool dedicated to educational research in general, capable of finding educational research texts in the web.
- **aMeasure** – a tool for the **detection of 'extrinsic' quality indicators,** consisting of a combination of bibliometric and webometric approaches
- **A set of text immanent (instrinsic) indicators** for the detection of quality in educational research publications. These indicators relate to features that are internal to the text itself. They have been presented to the research community and were positively evaluated.
- An accompanying **peer review questionnaire** containing the operationalization of the intrinsic EERQI-indicators. The questionnaire was tested for reliability, acceptance and practicality.
- **Automatic semantic analysis** for the detection of key sentences in a text in order to enhance and accelerate the time consuming process of peer reviewing. The method is applicable to educational research publications in the four EERQI languages.
- First attempts to detect **cor- and interrelations between the 'extrinsic' and the 'intrinsic' quality indicators.**

The development and final state of the products are explained below.

3.1. Aggregation of Content and Establishment of the EERQI Content Base

In order to make educational research documents available to the researcher, the first step was to acquire full texts and the respective metadata from various sources such as publishers, research institutions, open access and other Internet sources, and store them in the EERQI content base. To this aggregation of content, the EERQI partners either contributed their own resources or supported by identifying repositories and other sources of information. The publishing houses that were consortium partners made their texts available to the content base. In the course of the project, more publishers could be won as

cooperating partners. Moreover, the French Institut Nationale de Recherche Pédagogique (INRP)[3] applied for associated membership to the EERQI project. This was gladly accepted by the whole consortium as a means of broader dissemination of EERQI's aims in the French speaking educational research community. Moreover, INRP contributed by delivering French educational research texts from their own repositories and publications.

The aggregated content was continuously updated until March 2011. Being stored in the content base, the relevance of the data for educational research was evaluated with support of the educational research partners in the project consortium.

EERQI aimed at a content base with texts in four European languages, namely English, German, French and Swedish. The composition of the consortium as well as general publishing strategies made it easy to achieve a sufficient number of English texts in the content base.

German texts were available via the German publisher partner in the consortium (VS-Verlag) and the early entrance of two further cooperating partners, namely Waxmann and Barbara Budrich publishers. Moreover, consortium partner DIPF contributed to the EERQI content base with own resources from their database, the "German Education Index". DIPF provided metadata (15,000 records) and a list of 17,000 open source documents. UHambDE supported the aggregation of content from German research institutions, open access and other internet resources.

French texts were made available with the support of the consortium partners INRP and SSRE, as well as French publishing houses that acted as cooperating partners (e.g. Peter Lang). Moreover, INRP delivered data from their own publications and repositories.

For Swedish, the consortium was less successful. Despite all efforts made by the Swedish consortium partners a critical mass of Swedish texts could not be acquired by the project. This is due to the fact that the number of educational research texts published in Swedish has diminished radically in the last decade. The main language of educational research publications in Sweden is English today. Swedish texts, where they are produced, are mainly available in university repositories and other semi-public sources[4]. It is one of the results of the EERQI

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[3] In the meantime, the INRP was relocated and renamed. The successor organization is the Institut Français de l'Èducation (IFE), located at the École Normale Supérieure de Lyon. The new institute remained an associated partner to the EERQI project and expressed strong interest in participating in the planned follow up-project.

[4] see also Hansen, M. & Lindblad, S.: Forskningskommunikation och publiceringsmönster inom utbildningsvetenskap. En studie av svensk utbildningsvetenskaplig forskning vid tre lärosäten, Vetenskapsrådet, 2010

project that some (educational) research communities surrender to the overwhelming dominance of English as the language for research publications and the relentless demand of the respective governing bodies to publish in English *only*. By doing so, publications in the own national or regional languages are rigorously devalued. An estimation of the risk of this practice for the further general development of such languages – they will lack the necessary continuous updating of expressions in the domains of science and research – has not yet been made.

Due to the united effort of data aggregation, by March 2011 the EERQI content base consisted of a total of 41,240 documents: more than 12,000 from the EERQI publishers and nearly 30,000 from the World Wide Web. This stock is being continuously updated.

The texts represent the EERQI languages German, English, French and – to a small extent – Swedish. The largest number of contributions is in English, followed by German and French.

The EERQI content base is accompanied by a legal framework that supports a stable, sustainable content aggregation and processing environment. This included negotiations with copyright owners and data providers, as well as regulations in order to deal with various forms of licenses for access to full texts (both commercial and open access licenses) for investigatory and research purposes, for storage of the electronic texts in the project format, and for extracting the necessary metadata for the purposes delineated in the project. A publisher agreement concluded with the participating publishers in the project - consortium members as well as cooperating publishers – also addresses this issue. Authors and researchers are assured of their rights via the respective information channels of the participating educational research societies and, if necessary, through direct contact.

The Content Base itself is one of the basics for all research conducted by EERQI. It will be hosted, updated and maintained by HU-Berlin and will be accessible via the Berlin School of Library and Information Science http://www.ibi.hu-berlin.de/.

3.2. The EERQI Search and Query Engine

The EERQI Search and Query Engine is another basic element of the EERQI Prototype Framework. It is a tool that enables the determined finding and identification of educational research documents. The EERQI search and query engine allows for the dynamical identification of documents in the field of educational research via automatic methods (crawling and harvesting). It makes those documents available to the user for extended searching, text mining and analysis.

The EERQI search and query engine consists on the one hand of the content base with documents supplied by the EERQI publishers etc., as explained above. On the other hand, this content base is augmented by a crawler which traverses the Web, retrieving relevant documents. For the EERQI project, a focused crawler concentrating on educational research documents was developed. For this task, the open source crawler Nutch[5] was used and extended by plug-ins that were specifically developed by RRZN in order to optimize the focused crawling. Link analysis was used to calculate a fetch score based on the relevance of previously fetched educational research documents. Relevance is based on a decision of whether a document is identified as deriving from educational research or not.[6] This detection process has been enhanced in the course of the project by integrating refining features, such as keyword detection, language detection, length of a document and existence of a reference section. Additionally, a Classifier was developed by ISN. This tool is another EERQI product. It has been trained and tested for educational research documents in the four project languages English, French, German and Swedish. The Classifier detects the probability of new documents as belonging to educational research by extracting sets of n-word shingles and comparing these with the already available set of positively and negatively identified documents.

Another component of the EERQI search and query engine is the search *frontend* which provides a user interface that leads to the acquired information.

The search engine *backend* was extended in order to provide results for multilingual queries in the four EERQI languages. For this enhancement, the query terms are automatically translated into the languages selected by the user. Additionally, educational research thesauri and term networks (developed by the EERQI partners DIPF and IRDP) were integrated into the search engine in order to make additional search terms available to the user.

In order to enhance the relevance of ranking of the search engine, the method of automatic semantic analysis and key sentence extraction from the documents (see par. 6) that was developed by the EERQI-partner XEROX was integrated in the search engine.

The development and enhancement of the EERQI search and query engine is the result of a very successful cooperation of the main partners XEROX, RRZN, ISN, DIPF, IRDP and HU-Berlin. The EERQI educational research partners also supported this work.

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5 http://nutch.apache.org/

[6] This is no trivial decision in the case of educational research (as well as in other SSH fields), because a large bulk of publications uses identical terminologies and other features for identification, but stem from the political or practical sphere.

At a very early stage in the project a search engine prototype was launched and made available to the general public and research community for testing and feedback. Now, the EERQI search and query engine is available via a user interface on the EERQI project homepage[7] as well as via an OpenSearch/RSS[8] interface which was used as a feed for the MetaGer[9] search engine. These access possibilities hopefully lead to a broad public visibility of the product.

3.3. Development of new Indicators of Research Quality

Developing new indicators and methodologies to determine the research quality of scientific publications is an ambitious endeavour. The attempt to overcome the disadvantages and problems related to the use of traditional methods of quality detection in scientific publications is necessary, not least in order to reflect the European Research Area more adequately: the different historical and cultural traditions as well as the diversity of languages that are used in Europe for the creation and dissemination of new knowledge by research.

<u>Starting Point</u>
For the first EERQI Workshop in Leuven (2008), DIPF prepared a report entitled "Analysis and Evaluation of Existing Methods and Indicators for Scientific Quality Assessment"[10]. In order to facilitate a first approach to the discussion of developing new and innovative quality indicators, this was a state-of-the-art report about the existing methods of quality assessment that were (and still are) applied internationally and affect research in Europe. The report included an outline of widely-used methods for quality detection, such as citation analysis and peer review. It also included an overview of techniques that are still in the stage of development (like online usage metrics and new retrieval and clustering approaches). The report pointed to areas that were to be further explored by the EERQI project. The potential, role and function of automated semantic analysis in quality assessment was especially stressed, as this was regarded as a promising way to involve the treatment of full texts in the assessment process. The support of the reader/ peer in the assessment process was identified as one of the most challenging areas of development for EERQI. Respective

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[7] http://www.eerqi.eu/page/eerqi-searcher and http://makalu.xrce.xerox.com/eerqi/

[8] http://www.opensearch.org

[9] http://www.metager.de/

[10] http://www.eerqi.eu/sites/default/files/Analysis_and_evaluation_of_existing_methods_and_indicators.pdf

methodologies had been developed and tested before in areas of science, but never on texts that derive from educational research or other Social Sciences and Humanities (SSH)-fields.

The report presented a first approach to indicators to be explored within the EERQI project. Furthermore, a questionnaire on "The role scholarly publications play in national evaluation procedures" and a working paper "The role scholarly publications play in national evaluation procedures" were delivered by IRDP. Based on the results of a survey, the IRDP working paper gave an overview of evaluation practices in different European countries, with a special focus on evaluation procedures in the educational sciences.

On the basis of these reports and the outcomes of the First EERQI Workshop in Leuven, June 2008, a preliminary list of new quality indicators was established.[11]

3.3.1. Intrinsic and Extrinsic Indicators of Quality

The preliminary list of indicators that could help to detect the quality of a text was presented in various forms – oral and written consultations, presentations and group discussions – to expert audiences. In an iterative process, all relevant feedback was integrated in the further development of the initial prototype set of indicators. The expert feedback and first attempts of testing led to a very important strategic decision for the further development of the EERQI project. The decision was that the EERQI-Indicators had to be differentiated into two types:

- intrinsic evidence (indicators) of quality, i.e. indicators that *derive from* and can predominantly be *identified in* a text itself;
- extrinsic evidence (indicators) of quality, i.e. indicators that derive from *metadata* (= bibliometric or webometric information).

This decision was based on considerations about (a) the different nature of features of a text that might support the decision about its quality, and (b) the different methodological approaches that were necessary to test the respective features.

3.3.1.1. Detection of Extrinsic Indicators: Development and Application of "aMeasure"

To be able to automatically collect the so-called extrinsic indicators for measuring research quality a JAVA application was developed. This application is called aMeasure. After the

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[11] This was presented to the public in EERQI policy brief No. 2; see http://www.eerqi.eu/page/publications

project's end aMeasure will be available under the Apache 2.0 license for public use and refinement.

AMeasure is a stack of tools and programs to measure extrinsic characteristics of research publications using Google Scholar, Google Web Search, MetaGer, LibraryThing, Connotea, Mendeley, and citeulike. It consists of 4 parts:

1. a crawler to gather all information from Google Scholar (GS), Google Web Search and the Social Network Services,
2. a database to store the gathered information,
3. a client side application (JAVA-applet), and
4. a Web interface to present the results and the content of the database to end users.

The main component of aMeasure is the crawler. For optimal work the crawler needs to be provided with author names. It has turned out that the major challenge in measuring extrinsic characteristics of research publications is the reliable identification of author names in the Social Network Services, GS, Google Web Search, and MetaGer[12]. For aMeasure, a query syntax was established on the basis of recommendations by Rutha/ Zamal 2010, namely: "the first name of the author the initials of the middle names the last name of the author"[13].

In addition, Google Web Search, MetaGer and the Social Network Services are queried in order to get information about the impact of each author's papers. As it is impossible to get hold of each author's individual curriculum vitae, the search was limited to 60 years arguing that an author is unlikely to start publishing before his/her 20th birthday and after his/her 80th year of life.

The process of crawling is carried out from a central server located at HU-Berlin. All gathered data is stored in a central database located on the EERQI server at HU-Berlin. Google Scholar is used to retrieve information about authors and their papers as well as the citations of these papers. Due to the fact that Google does not provide an API, aMeasure uses a technology called Screen-Scraping. The same technology is used to query MetaGer and the Social Network Services.

As it turned out that all methods we used have their specific limitations with respect to author identification, it is an open task for further research and development to identify and define a valid method for this. Different attempts to achieve this aim have already been made by several research and development groups, to which the EERQI analyses contribute further

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12 http://www.metager.de/

13 http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0012133, retrieved: 2010.09.27

knowledge. Our attempts led to the preliminary conclusion that a more comfortable method should be tested. An example is the retrieving of results from Google Web Search and Mendeley as they provide APIs to their search engines. Another test of making the results more precise by matching author names and affiliations or places turned out negative. The problem of the standardization of e.g. institutions' names or the frequent change of places of scientists etc. is out of the scope of the EERQI project. The high mobility, especially of new researchers, leads to the loss of a large amount of publications. A positive outlook to the future is that the interdisciplinary network ORCID[14] comprising of publishers, research organizations, libraries and companies also addresses this issue through the development of a comprehensive "research identifier". This is to be publicized by the end of 2011.

<u>Using aMeasure, the following extrinsic characteristics can be retrieved and calculated</u>

    (i) from Google Scholar, Google Web Search and MetaGer:

-     number of papers per author,
-     number of citations per author,
-     first year of retrieved publication until last year of retrieved publication,
-     citations per year,
-     citations per paper,
-     the g-index (an improvement of the h-index),
-     hits matching author's name (Google Web Search and MetaGer).

    (ii) from Social Network Services
-     citulike hits matching the author's name and the article's title,
-     LibraryThing hits matching the author's name and the article's title,
-     Connotea hits matching the author's name and the article's title,
-     Mendeley hits matching the author's name and the article's title as well as readers of articles in Mendeley.

3.3.1.2. Development and Testing of Intrinsic Indicators of Quality

The consultation and evaluation process that was based on the first preliminary list of indicators led to the result that a comprehensive set of generic indicators is appropriate for the detection of quality in educational research texts. In an iterative process carried out in cooperation with the European Educational Research Association (EERA), National

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[14] www.orcid.com

Educational Research Associations such as the EERQI-Partners BERA and SSRE, the German Educational Research Association DGfE, the World Educational Research Association WERA and further relevant individual educational researchers such as the EERQI-partners UmU, UHambDE, IRDP, Radboud-NL and ESOE(TU/e), the preliminary list of intrinsic indicators was gradually structured, modified and condensed to five concepts that carry the relevant information about potential quality of an educational research text. These are the following:

- rigour,
- originality,
- significance (for other researchers, policy and practice),
- integrity (including considerations of authenticity, honesty and ethical requirements in the conduct of research) and
- style (including clarity, communicability, eloquence and elegance).

These concepts were positively evaluated by the consulted experts and considered as generally relevant for the assessment of educational research quality.

Operationalization of Intrinsic Indicators, Development and Testing of the 'EERQI Peer Review-Questionnaire'

In the further process these concepts were operationalized and transferred into items of the 'EERQI Peer Review-Questionnaire'. This instrument was tested and revised in three waves on the basis of texts from the EERQI content base (responsible: EERA and UHambDE with support of Radboud-NL).

The outcome of the first wave of exploring and testing was a reduction of the five generic indicators to three main indicators *rigour, originality and significance*. This was due to the empirically based insight that questions referring to 'integrity' and 'style' were lacking discriminatory power and thus impaired the criteria validity of the instrument. Items that are related to 'integrity' and 'style' were integrated in the scales for rigour and originality in the second version of the questionnaire. Moreover, the items' scaling was enlarged in order to receive a better variance of the ratings, and additional items on demographic data of the reviewers as well as open questions were included in order to receive more detailed information on the acceptance and practical use of the questionnaire.

Wave two aimed at testing the new operationalization of the indicators and the reliability of the instrument. It was carried out from June 2010 to September 2010. The second version of the questionnaire was revised again and tested from December 2010 to January 2011 in wave three. The third wave of testing was carried out on the basis of the received empirical results of wave two. The goal was a further refinement of the questionnaire in terms of its validity, practicality and acceptance by reviewers. The third wave also included the elicitation of qualitative feedback from members of the educational research community with respect to the general acceptance of the questionnaire. and the results of wave three led to the final version of the questionnaire.

The final version of the EERQI Peer Review Questionnaire includes three scales as operationalizations of the intrinsic indicators 'rigour', 'significance' and 'originality'. It comprises of 16 items:

RIGOUR

METHODS AND APPROACHES:

1.   The methods are intelligibly described.
2.   The method / approach is appropriate.
3.   The method / approach is accurate.

RESULTS

1.   The results are completely described.
2.   The results are correctly described

DISCUSSION

1.   The study's method is reflected in an appropriate way.
2.   The study's results are reflected in an appropriate way.
3.   The pattern of reasoning is consistent.
4.   The discussion shows a critical evaluation of the work.

ORIGINALITY

1.   The study shows new approaches in its methodological procedures.
2.   The study shows new approaches in the structure of its line of argumentation.
3.   The study contributes innovative ideas for the state-of-art in its research area.

SIGNIFICANCE

1.   The study contributes to the development of its research field.

2. The study makes a significant contribution to the latest discussions within the research field.

3. The study makes a significant contribution to the latest discussions within the educational policy field.

4. The study makes a significant contribution to the latest discussions within the educational practice field.

The evaluation of the questionnaire included closed and open questions regarding the reviewers' opinions on the relevance of the indicators and the practical use of the questionnaire. The analyses of the responses led to very positive results in general. The acceptance and indication of the usefulness of the questionnaire was especially high with reference to educational research texts that derive from empirical studies. Anyhow, the statistical results of the evaluation also show that the questionnaire can well be applied to other areas of educational research such as historical and philosophical research in education, international comparative or intercultural research.

All test and item characteristics showed good to very good values. The following table illustrates the values for the scales:

Table 1: Overview Final Scale Values[15]

Scale	Subscale	Number of items	Reliability	Mean value for item validity
Rigour		9	.92	.76
	Methods & Approaches	3	.83	.72
	Results	2	.94	.64
	Discussion	4	.90	.82
Originality		3	.91	.78
Significance		4	.91	.78

The additional analysis of qualitative responses substantiated the respondents' opinion that the questionnaire includes the most important indicators of quality assessment in educational research publications, at least in the three research areas that were taken into account.

Our conclusion is that EERQI's intrinsic indicators and their operationalization as shown in the questionnaire were successfully tested. The acceptance of the instrument in the

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[15] The reliability was measured by using Cronbachs Alpha. The item validity was measured by using a procedure presented and tested by Yousif, Koopmann & Amelang (Yousfi, S., Koopmann, B., & Amelang, M. (2005). Correlates of item validity. On the eminent importance of global self-ratings. Unpublished manuscript).

educational research community appears to be high according to our investigations. The implementation of this instrument will support the intention to facilitate and to raise the transparency of assessment processes. This again will enhance the quality of quality assessment procedures as such.

3.3.2. Cor-/ interrelations between extrinsic and intrinsic characteristics of quality

Three approaches were carried out in order to analyse the possible relations between the extrinsic and the intrinsic indicators.

In all three approaches, no significant correlations between the extrinsic and intrinsic indicators were identified. A test of modelling the correlation between the different indicators by using a non-parametric regression model was not successful (approach 1). The measurement model with three intrinsic and two extrinsic latent factors which was constructed by Radboud-NL, showed that significant correlations *do* exist among the intrinsic and among the extrinsic factors. However, no significant correlations were found between the intrinsic and the extrinsic factors that were selected for this test. In approach 2, rank correlations and conducting factor analysis calculations based on 179 articles were carried out. In approach 3, a test of modelling the correlation between the indicators by using different regression models (non- parametric) was not successful either.

The result of these testings was, in short:

- The directly summed up (linear) correlations between the extrinsic and intrinsic indicators that were developed in EERQI are low.
- The inter-correlations between the extrinsic respectively the intrinsic indicators are high. The results give evidence that the indicators are multi-collinear.

It has to be mentioned though that our first attempts to detect possible connections between extrinsic and intrinsic parameters were primarily based on the testing of uni-variate and linear correlations between the two sets of indicators. Correlations between the multivariate elements of each set are most probably non-linear and complex. We will continue with investigations on this assumption by testing non-linear correlations (multivariate analyses) (responsible: UHambDE and ISN). The results of this further testing will be published in the book publication in which all EERQI approaches and findings will be presented.[16]

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16 Gogolin et al. (2012): "Preliminary Title: European Educational Research Quality Indicators (EERQI) – Results of a European Research Project", VS-Verlag, Wiesbaden, 2012

Anyhow, the preliminary testing shows that both sets of parameters are complementary to each other, not contradictory. This can mean for example, that a paper which has been assessed as 'significant' may be well cited, even if it was not considered to be 'original'. Our key findings are in line with former research results and contributions to debates about assessment procedures and indicator systems. Extrinsic and intrinsic parameters obviously deliver evidence on different aspects of the potential quality of research texts. They can complement, but most possibly not replace each other – at least not in the given state.

Depending on the type of information that is expected as the outcome of an assessment process, either one of the approaches or a combination of both is recommendable for a valid result. The more the expected result is related to actual 'inner' characteristics of the text itself, the more weight has to be given to intrinsic indicators. The application of extrinsic indicators can fulfil filter functions in the process and provide information on the impact of a publication. However, the problem that such information is predominantly available for research publications in English, remains unsolved for the moment.

Our results support the assumption that the construction of a framework, consisting of different tools with complementary functions which can be applied in intelligent combinations in assessment processes, is a relevant contribution to the enhancement of the quality of evaluation procedures in educational research, but also in other fields of SSH. The approaches to include multilingual functionalities in assessment processes – tested with four European languages in the EERQI project – open up perspectives to strengthen the European Research Area, but need further development and evaluation.

3.4. Semantic Analysis in Research Quality Assessment

The task here was to work out the requirements for automatic semantic analysis as a method that can enhance and accelerate the time-consuming process of peer reviewing.

Having performed various tests we defined the role of semantic analysis in research quality assessment as follows:

Key sentence extraction for assisting peer-reviewers and enhancing the ranking algorithm of the search engine.

<u>Key Sentence extraction</u>

We have developed a tool that detects key sentences in educational research articles in English, French, German and Swedish, and we have tested its performance. The application of key sentence detection is twofold in EERQI:

1. highlighting for reading assistance for peer-reviewers,
2. improvement of the search engine by
   - using the key sentences as snippets in the search results and thus assisting the relevance evaluation by the user
   - integration into the mechanism that ranks the results of the search engine: if the query word(s) occur(s) in key sentences, the article gets ranked higher.

For the development of the tool for detecting key sentences, the following tests were performed.
- comparative study to test if highlighting helps peer-reviewers. The main results are the following:
  o Highlighting allows evaluation concerning significance, originality and style, but not according to integrity and rigour.

  o Results are different according to genre (see genre analysis below).

  o Highlighting makes it possible to rapidly filter out bad quality: processing the highlighted texts took 4 times shorter time.

- Peer review exercise: it was tested if the automatically highlighted key sentences correspond to summaries written by peer-reviewers (as part of the peer review exercise that was presented above). The human summary sentences were compared with the automatically detected sentences. The results show that the automatically detected sentences do cover a considerable proportion of human summary sentences, which suggests that automatic highlighting has indeed the potential of providing useful key sentences for peer-reviewers.

<u>Testing the role of key sentence in relevance ranking</u>

In the EERQI search and query engine, the basic ranking algorithm of the publicly available Lucene search engine was used. We compared the results of this relevance ranking with the list of documents in which the query word(s) occur(s) in key sentences. Lucene uses term frequencies and inverse document frequencies for ranking the retrieved documents. The

results show that the top ranked relevant articles returned by Lucene and those selected by our tool are disjoint, which indicates that the two approaches are complementary. Since our tool returns a considerable number of relevant articles that would appear late in Lucene's ranked list, we consider that our approach is promising and that the integration of the two tools is beneficial for the user.

To sum up, it can be said that all tests support the hypothesis of the usability of key sentence detection and the effectiveness of the XEROX Incremental Parser for carrying out the task. The method of automatic semantic analysis can enhance and accelerate the time consuming process of peer-reviewing.

Genre analysis

In the subsequent genre analysis it was tested how well the extraction of key sentences analysis works for different genres of educational research. The results are the following: In theoretical articles the proportion of research issue sentences detected is significantly higher than that of summary sentences. The best performance comes from educational research articles that are based in sociology of education.

3.5. Citation Analysis for rethinking the Method of using Citations as Quality Indicators

The method of citation counts that is used in most current approaches for quality assessment is highly criticized; manifold shortcomings have been uncovered in scientific analyses of the processes and outcomes of this method. A reanalysis of these research results was part of the proposal of the EERQI project, and the further development of such research – that confirms the reservations about this method – was continuously observed throughout the project. Anyhow, it was one of our approaches to find out whether an alternative use of citations could be a means to overcome the restrictions that are bound to citation counting. The approach we chose was directed towards the identification of the *motivation* of a citation. Especially for SSH research it is true that the mere fact of being cited is not meaningful. The citation can just as well be motivated because the author wishes to contradict the cited work and refute an argument or research result, as it can be motivated by approval and consent. Whereas the model of scholarly communication in natural science can be characterized as 'cumulative', the communication models in SSH research are manifold. This is illustrated in the following image:[17]

 Figure No. 6: Communication models in different research traditions

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[17] See also Aström, F.: „Models of Scholarly Communication and Citation Analysis", www.gbv.de/dms/tib-ub-hannover/60745721x.pdf

Cumulative

Diverging

Negotiating

Converging

Distinctive
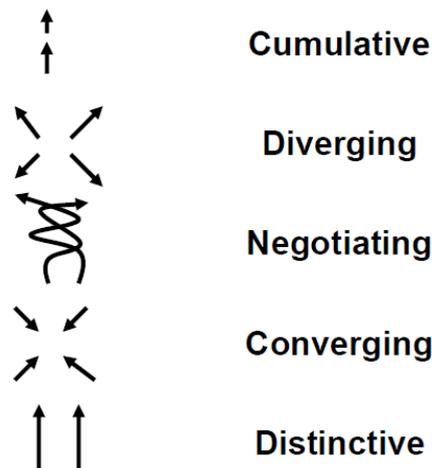
For this part of the EERQI project, the hypothesis was developed that automatically retrieved information on the *motivation* of a citation can be useful for the support of an assessment process.

In order to test this hypothesis, we have identified five types of motivation for citation and developed a grammar that labels these motivations in English. The types are the following:

- ARGUMENTATION: argumentation between the citing and the cited work.
- EVIDENCE: the cited work provides evidence for the cited work.
- IMPORTANCE: the author of the citing work finds the cited work important.
- QUALIFICATION: the cited work is qualified by the citing work.
- SURPRISE: the author of the citing work is surprised by the cited work.

The results of the testing are the following:

We have identified two problems with this approach to citation analysis:

- It cannot be applied in all of the tested articles because the forms of citations are different and not all of them are recognized by the analyser yet. However, in a test of 35 articles containing 9564 sentences the analyzer correctly identified 1494 citations. These numbers show that further development of the tool might be helpful, but needs further analysis and testing.
- The types of citations are as yet not straightforward to use.

The main result of the citation analysis is the empirically based conclusion that citations in educational science research articles have various functions indeed. These functions could be important factors to be taken into account for the further development of citation indexes.

In present methodologies for calculating citation indexes, one citation counts as one unit independently of its function; this is obviously an insufficient, if not a misleading information in assessment processes.

3.6. Transferability of the EERQI Indicators to another SSH field

The question of whether the EERQI indicators can be transferred to another SSH field is not only important for the evaluation of the developed Prototype Framework itself, but also in the context of sustainability issues. The EERQI methodology of quality assessment in itself is endowed with a high degree of flexibility. Thus it was our hypothesis that it can be adjusted to a variety of different use cases and is well-equipped to facilitate usage in a wider context than just educational science. The possibility of transferability to other disciplines and other usage scenarios seems especially viable when taking into consideration the characteristic features of a respective field.

The methodology developed for testing the transferability of the EERQI Prototype Framework includes various parts of the EERQI project activities which had to be transferred to the context of political science which was chosen as an exemplary discipline.

A first step was to set up a separate database to store political science documents. As a second step the crawler was adapted to political science by providing discipline-specific search terminology and URLs of appropriate documents and links as start URLs. To attain the extrinsic document characteristics the EERQI Classifier had to be trained for the identification of documents from political science and discerning them from documents that derive from other research fields. For this purpose a large number of relevant documents for political science as well as documents explicitly different from political science were collected and evaluated.

After this preparatory measure, the EERQI tool aMeasure could successfully be applied to calculate the extrinsic characteristics of 36 aleatorically selected documents from political science. In correspondence to the procedures for educational science numerous document characteristics were collected, among others Web mentions, usage statistics, alternative citation measures or data from online reference management systems.

For further empirical proof of the concept the calibration measures establishing a correlation between extrinsic and intrinsic indicators for the educational sciences have to be transferred to political science to test if they are applicable in this discipline as well or should be adapted.

This testing is still in progress; it will be based on the further tests of non-linear correlations (in multivariate analyses) that are mentioned above.

Not all parts of the design could be carried out, due to the fact that the final results of WP 6 were not achieved earlier than February 2011. The following parts, however, could be achieved:

The search engine was adjusted to political science. The Classifier was trained to discern political science documents from documents of other disciplines. The documents were collected from the web and other sources. The EERQI tool aMeasure was adapted to political science document assessment. The above-mentioned methodology for a final testing of transferability was designed and is available for follow up research.

With regard to the results of WP 6, two of three aims of WP 12 could be reached:

- The tool aMeasure could be transferred to be used in political science.

- The questionnaire for the measurement of intrinsic indicators (Peer Review Questionnaire) can also be used in the reviewing process of research articles in the field of political science.

The methodology of transferring the EERQI framework to another discipline exists and all preconditions for further testing of transferability have been established. Considering the data gathered and taking into account the very flexible framework of the EERQI quality assessment procedures, transferability seems highly probable.


3.7. Integration of the EERQI Products and Methodologies into one Prototype Framework assisting the User in the whole Process of Quality Detection

The EERQI Prototype Framework is a set of indicators and tools which can be used in the *process* of quality detection. The elements of the framework accompany the usual steps of the process. After detecting and identifying relevant texts (part 1) the EERQI indicators of quality can be applied (part 2, 3, 4). The EERQI project identified two different types of indicators: one type that is external to the text, such as bibliometric and webometric features; and another type that is internal in the text – namely the signals that are given within the words, graphs, metaphors of which the text is composed. The EERQI products of quality detection are composed as elements of the prototype framework as follows:

- Part 1 is the detection of potential quality via identification of relevant educational research texts in different sources: the EERQI content base (educational research texts provided by the EERQI publisher partners) and the multilingual search and query engine.
- Part 2 is the application of aMeasure (developed by EERQI partner HU-Berlin). AMeasure' is a stack of tools and programs to measure extrinsic characteristics of research publications. In the context of the EERQI project, aMeasure was used to collect information about extrinsic features of the quality of educational research publications.
- Part 3 is the application of automated semantic analysis, a linguistic technology in order to provide support for evaluating the quality of a text. The method developed in EERQI (by EERQI partner XEROX) allows for the automatic identification of key sentences to indicate parts of documents to which peer reviewers should pay particular attention .
- Part 4 is the application of a questionnaire (Peer Review Questionnaire) that contains a tested version of items that contain the operationalization of the intrinsic indicators that were developed by the EERQI project (main responsibility: EERA, UHambDE).

The elements of the EERQI prototype framework can either be applied as single methods for specific parts of an assessment process; or they can be applied consecutively, leading to a final judgment on the basis of intense reading of selected texts. In the latter case, the parts of the framework take over filter (or selection) functions in the assessment process. Part 1 is the identification of a text (or a number of texts) according to the relevance in principle for the given task; the search and query engine supports this part. Part 2 is the identification of a possible impact of the text(s) via the application of extrinsic indicators. Part 3 is the assistance of a reader by highlighting salient sentences that provide textual evidence for peer reviewers in their evaluation. Part 4 (supported by the EERQI Peer Review Questionnaire) leads to a final judgment based on reading selected texts and applying the intrinsic indicators that were developed and tested by EERQI with respect to their validity and acceptance by the educational research community. The EERQI Protoype Framework is illustrated in the following figure:

Figure 1: The EERQI Prototype Framework

The EERQI Prototype Framework
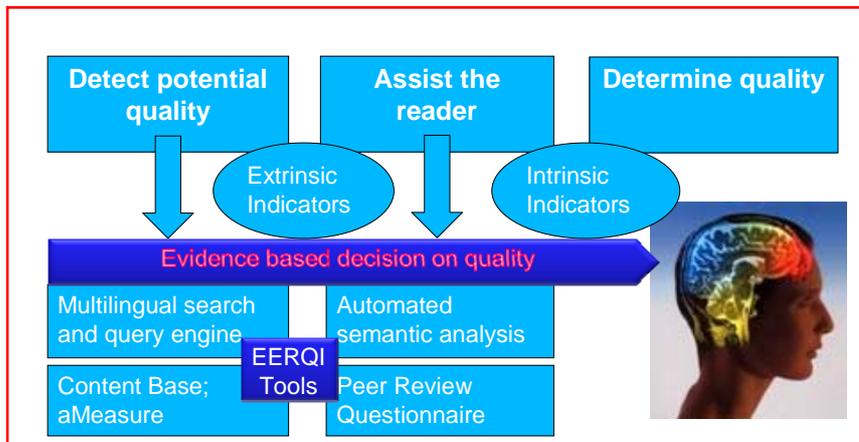
© Ingrid Gogolin, EERQI Project 2011

All parts of the EERQI Prototype Framework are available to the public in non-partisan environments that are provided by the EERQI partners.

4. The potential impact (including the socio-economic impact and the wider societal implications of the project so far) and the main dissemination activities and exploitation of results

4.1. Impact of the project

The mission of the EERQI project was to develop new approaches for the quality evaluation of educational research publications. Traditional methods of assessing the quality of scientific publications are highly depended on ranking methods according to citation frequency and journal impact factors. Both are based on methodologies that do not reflect adequate coverage of European scientific publications, namely in the social sciences and humanities (SSH). Hence, if European science or institutions are exposed to these evaluation methods, not only are individual researchers and institutions, but also complete subject domains and language areas widely ignored. The initiators of the EERQI project as well as numerous researchers and evaluation bodies within the European Union recognized the need to remedy the inadequacies of this situation.

The EERQI project concentrated on educational research. This domain can serve as a model case for research in the social sciences and humanities. The results of the project are:

- a set of tools and methodologies that can be applied to the process of quality assessment, based on educational research publications, and a Prototype Framework that allows the intelligent combination of these approaches,
- provisions which make this framework operational on a multilingual basis (with English, German, French and Swedish as the EERQI project languages),
- a test of transferability of the EERQI framework to political science, another field of social sciences and humanities.

The project research and the results will have an impact on research policy issues relating to the use of quantitative methods for analyzing the productivity and impact of research endeavours, especially in SSH research. Traditional assessment methods do not sufficiently take into consideration the publication culture in these research areas. They are focussed on citation counts and mainly based on journal articles written in English. The development of new indicators is a desideratum, not least because research evaluation constantly gains more importance for the researchers' communities themselves and for the governance of their institutions. Several initiatives strive to develop new indicators of quality, such as the "York University Research Indicators Initiative".[18] The EERQI project complements these

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[18] http://www.yorku.ca/univsec/senate/committees/APPC/Research_Indicators_Initiative.htm

endeavours, concentrating on one exemplary research domain from the SSH field and trying to overcome the general criticism that all existing methodologies are based on parameters that do not reflect the range and nature of work in the social sciences and humanities. Especially approaches relying only on bibliometric methods – even if these are optimized – are likely to have positive, but also negative effects: "positive in terms of sharpening up performance management and negative in terms of the potential impact on publications behaviour."[19]

EERQI presented a unique approach to solve these problems as the project strived for intelligent combinations of both, quantitative and qualitative approaches, supported by automated semantic analysis. The tools developed in the project are (for the moment) applicable to four European languages (English, French, German and Swedish). Prerequisites for a transfer to more European languages were made. Several of the different approaches that were provided by other relevant research and development groups were taken up in constant processes of exchange and adapted for the purposes of the EERQI framework. The final products of the EERQI project strongly rely on the fruitful cooperation in a truly transnational and interdisciplinary European research team that allowed intertwining the theoretical, methodical and technical requirements.

The results of the EERQI project will contribute to an increasing awareness of problems existing in publication evaluation primarily in non-English speaking European countries. The outcomes of the project go beyond results of comparable European projects (such as: Scoping; ERIH). Other than those projects, EERQI can present applicable products, not merely journal lists (of contested quality as in ERIH) or recommendations (as in Scoping). The EERQI project put forth a number of tools that can be either taken up and further developed by other research teams or applied to assessment processes in the given state. The EERQI Prototype Framework is not only a tangible outcome of a research project. It is also a promising contribution to attempts of achieving better global visibility of European (educational) research and to the appreciation of Europe's multicultural and multilingual heritage.

For the EERQI team it is not possible to deliver grounded data on the possible socio-economic impact of our results, particularly because the project aims do not include the

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[19] Technopolis: Identification and dissemination of lessons learned by institutions participating in the Research Excellence Framework (REF) bibliometrics pilot. Results of the Round Two Consultation – report to HEFCE, September 2009, p. 35. http://www.hefce.ac.uk/pubs/rdreports/2009/rd18_09/

See also Science Metrics Final Report (2004): The Use of Bibliometrics in the Social Sciences and Humanities. http://www.science-metrix.com/pdf/Science-Metrix_Use_Bibliometrics_SSH.pdf.

economic utilization of the EERQI products. Our aim is to share the project's results with researchers as well as other interested publics, and to provide what we achieved in non-partisan environments. We wish to contribute to further joint efforts to (a) enhance the global visibility and esteem of European research, and (b) improve the transparency and quality of research assessment processes.

Due to the international consortium and widespread dissemination activities of the partners, the EERQI project became known in educational research communities in different European countries and in other international contexts. Moreover, the project was presented to different relevant forums such as publisher associations, university executives' associations (e.g. the Coimbra Group, an association of long-established European multidisciplinary universities of high international standard), to European and national funding agencies, to representatives of other SSH disciplines and to relevant representatives of EU research (e.g. the NET4SOCIETY, a transnational network of National Contact Points for Socio-Economic Sciences and the Humanities). The impact of the project is likely to rise in the future, as a number of publications as well as presentations at European and international conferences are in preparation.

4.2. Exploitation of results

The overall aim of the EERQI sustainability plan is the establishment of a virtual research environment which comprises of the products developed in EERQI. This endeavour will be realized by further proposals to national and European funding agencies that allow for the advancement of the given EERQI products. We plan to establish a European Research Network as an umbrella organisation for the elaboration of respective proposals. As long as this endeavour is not realized, the EERQI products are nevertheless available to the scientific, general and political public. The EERQI partners developed a model of shared responsibility for this purpose.

(a) Sustainability of EERQI products and the Prototype Framework, in detail:

- The **EERQI website** www.eerqi.eu will be sustained and maintained for at least three more years (responsible: ISN, UHambDE).

- The **EERQI content base** will be hosted and maintained by HU-Berlin; it will be accessible via the Berlin School of Library and Information Science http://www.ibi.hu-berlin.de/.

The publisher partners agreed to deliver more contents if necessary for further research.

- The tool **aMeasure** will also be available under the Apache 2.0 license for public use and refinement after the project's end.

  AMeasure will continue to gather extrinsic information on scientific publications. It will be maintained by resources of the Berlin School for Library and Information Science at HU-Berlin. The tool will operate on a server located at this university. For the further development of the tool and the exploration of transfer to another research area, HU-Berlin initiated negotiations with the publishing house Emerald to obtain publications and peer-review data in the field of Library and Information Science. The results will be at the disposal of interested researchers for further research in the field of extrinsic quality assessment. This is another example of transferring EERQI results to other research fields.

- The **Classifier** algorithms and the API used plus the Cloud-based back-office provide a high potential for dissemination. In mid-May 2011, ISN commenced a project with the German Institute for Research Information and Quality Assurance (IFQ) with the aim to develop and test the Classifier for other fields of SSH research and for research in other disciplines.[20]

- **The EERQI search and query engine** will be maintained and further developed at least until 2012 by RRZN, an institute of the University of Hannover. There are good prospects that this tool becomes an important source of search for educational scientists and neighbouring disciplines. Current academic search engines have relatively low coverage of educational science and general search engines return a high number of irrelevant results. EERQI is the first publicly available multilingual search engine dedicated to educational research. – Unfortunately though, the University of Hannover recently decided to close down the laboratory for search engine development, most likely in 2012. The development of an alternative institution that could continue with this important work (e.g. as a non-profit SME) is still ongoing. In the meantime, the search and query engine will be accessible via the EERQI website[21] and an OpenSearch/RSS[22] interface which was used as a feed for the MetaGer[23] search engine.

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20 http://www.research-information.de/Institut/institut_zie.html; see also
http://www.forschungsinfo.de/Projekte/Internationalisierung-Feldabgrenzung/projekte_Internationalisierung-Feldabgrenzung.asp

21 http://www.eerqi.eu/page/eerqi-searcher

- The **multilingual functionality** of the search and query engine is continuously supported by XEROX and also accessible via the EERQI website (or via http://makalu.xrce.xerox.com/eerqi/). This increases the visibility of non-English documents, thus supporting European cultural and linguistic diversity as it is present in educational research.

- The **EERQI research and testing data** will be available for follow-up research. The EERQI publisher partners agreed to further usage and exploration of their data for research purposes. Researchers wishing to carry out additional analysis with the existing data will have to submit a proposal (via the EERQI website) to the Scientific Coordinator and Technical Coordinator. The project proposal must include the theoretical and methodological interest of the research, as well as an indication of the objectives of the study. Furthermore, confidentiality of data, data protection and property rights provisions have to be safeguarded and guaranteed. Each proposal will be examined by relevant members of the EERQI team in order to make sure that all formal and scientific requirements have been met. Furthermore, it will be taken into account if the envisaged research question can be answered in a meaningful way with the requested data and by the methods that shall be applied. If necessary, independent reviewers will be consulted in the approval procedure. A contract will clarify in every case respectively how the data can be accessed, how confidentiality and property rights will be safeguarded and how results will be fed back to the EERQI consortium or any follow-up organisation.

- The **EERQI Peer Review Questionnaire** will be made available on the EERQI website for further usage and development. The possibility of transferring the instrument into a training instrument for reviewers will be explored with the EERQI publisher partners and interested editors.

- **Semantic analysis** through the highlighting of key sentences has been proven to be an effective support for peers in assessment processes. Moreover, the multilingual functionalities allow researchers to get access to research publications and results, even if they themselves have no command of a respective language. This opens up the prospect to a future of truly multilingual collaboration in transnational research

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[22] http://www.opensearch.org

[23] http://www.metager.de/

teams and the possibility to overcome the restrictions that are caused by being limited to a single working language, namely English.

Also through this method a further development of the search and query engine in a follow-up project may provide improved search effectiveness for educational scientists. It has furthermore the potential of being integrated into the peer review procedures of publishing companies.

- A detailed **description of the EERQI Prototype Framework** will be accessible on the EERQI website, illustrated by exemplary use case scenarios that show how the single tools and approaches can be intelligently combined.

(b) Follow-up Project of EERQI: EuRES

The envisaged aim of a follow-up project is the development of a "Virtual Research Environment": a collaborative workspace for trans-national groups of educational and other SSH-scientists hosting the EERQI Prototype Framework as well as the single EERQI products. The research environment will be non-partisan and non-profit in nature.

Furthermore, the virtual environment shall be a space that allows for developing, submitting, assessing, carrying out and publishing transnational collaborative research. A team of excellent junior researchers (post grad, post doc) and experienced senior researchers will build an "academy" that is active in the "virtual research environment".

The realization of this virtual environment is a joint endeavor of European partners. A possibility of financing and conceptualizing it could be the call "INFRA-2012-3.3: Coordination actions, conferences and studies supporting policy development, including international cooperation, for e-Infrastructures" published in the Work Program of the FP7 specific program Capacities.

The virtual workspace will comprise of the EERQI products to facilitate research and quality assessment. The multilingual search engine collecting relevant educational research (and further SSH) literature in at least three languages (English, German, French)[24] from the Web can be established immediately. The EERQI publisher partners agreed to the further use and development of the EERQI content base. The texts can be presented with extrinsic features

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[24] As we reported in our second project periodic report, we were not able to acquire a sufficient number of Swedish educational research texts for our development and testing purposes. The number of educational research texts published in Swedish diminished radically in the last decade. Today, the main language of educational research publications in Sweden is English. If Swedish texts are produced, they are available in University repositories and other semi-public sources. See also Hansen, M. & Lindblad, S.: Forskningskommunikation och publiceringsmönster inom utbildningsvetenskap. En studie av svensk utbildningsvetenskaplig forskning vid tre lärosäten, Vetenskapsrådet, 2010

provided by aMeasure and with the key sentences highlighted by applying automatic semantic analysis. The relevant texts can be downloaded into a space of the virtual research environment that is accessible by network members only.

The workspace will enable the following activities with reference to texts that are used for collaborative work on the basis of the EERQI results:

- collection of educational research texts (printed and others) and texts of other SSH areas,
- tagging / annotation of texts,
- establishment of various kinds of links,
- synthesizing the results of collaborative contributions,
- assessing the results of collaborative contributions,
- ongoing 'virtual' communication and exchange.

The gradual improvement of a knowledge base in the field of educational science will be one of the results. The envisaged framework will "provide core services (such as authentication and rights management; repositories; project planning, collaboration and communication tools) and allow the development or easy integration of modules for specific uses"[25].

The endeavour to set up a virtual research environment in the scientific discipline of education in highly relevant and innovative:

From a historical perspective, considerable parts of educational science were conceptualized as national, or even regional or local in scope. This was not least due to the fact that the national education systems were the major fields of reference for educational theory formation and knowledge building. Comparative education has developed as a sub-discipline that complements the national scope of educational science. At present, however, it is obvious that neither the theoretical and practical problems which are addressed by educational science and research in general, nor the methodological or practical or policy approaches that are applied for solving such problems are related to national boundaries. Eminent parts of theory formation as well as the empirical observation of educational reality and the development of evidence informed practical solutions – even if they address regional or local phenomena – gain relevance, depth and validity by applying a transnational perspective, and often also: interdisciplinary strategies.

Consequentially, international projects are emerging, not only in the field of large scale

empirical projects (such as the PISA- or PIRLS-studies). A considerable growth of transnational and interdisciplinary exchange and collaboration is indicated, for example, by cooperative projects deriving from networks in learned societies such as the European Educational Research Association. This opens up the challenge not only to design and shape, but also to carry out educational research to a growing extent in an effective and transparent, but also affordable way of interdisciplinary and transnational European collaboration.

New information technologies offer a considerable potential in this respect, and national as well as European research policies encourage the development of technologies that effectively support respective research processes. The available solutions, however, are not convincing. According to expert judgment, they do not meet the aims of transparency and a sound relation of costs and benefits for the researchers.

The EERQI results and products offer a unique starting point for the further development of a collaborative workspace, namely a prototype "virtual research environment", for groups of educational scientists (and other SSH researchers from an interdisciplinary perspective) in Europe. The envisaged consortium unites educational researchers and the respective experts from information technologies (in a broad sense). In a recent review of evaluations, Rittberger, Botte et al.[26] stress the fact that effectiveness, functionality and acceptance of virtual research environments are strongly dependent on the participation of both, 'technical' partners and 'users' (here researchers), from the *beginning* of the development process. This was exactly the case in EERQI. Thus, the cooperation experience we gained is a substantial capital for the planned follow-up project.

4.3. Dissemination activities

The EERQI website provides all information about the project, its results and the partners as well as all publications relating to it freely accessible. Currently, it also serves as means of making the EERQI products accessible to the public. It is available in English, French and German.

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[26] Botte, A., Rittberger, M. & Schindler, C. (2011). Virtuelle Forschungsumgebungen: Wissenschaftspolitische Erwartungen, informationswissenschaftliche Forschungsfelder und Herausforderungen. In J. Griesbaum, T. Mandl & C. Womser-Hacker (Hrsg.), Information und Wissen: global, sozial und frei? (Schriften zur Informationswissenschaft, 58, S. 422-433). Boizenburg: Verlag Werner Hülsbusch.

The EERQI website is linked to a number of other relevant websites (e.g.: www.eera.eu). Brief presentations of EERQI were provided for other websites, such as the site of the World Educational Research Association (WERA).

Furthermore, reports on the project and its results were and will be delivered to European Educational Research Associations and their members. Not only the Associations being EERQI members contribute to this way of information circulation, but also others such as the German, the French, the Polish and Turkish associations. Moreover, other international research associations expressed their interest in the EERQI results, such as the Australian, Canadian, Mexican and several Asian Educational Research Associations.

The EERQI products and the Prototype Framework were and are being presented in a large number of relevant international conferences addressing international and interdisciplinary scientific as well as political and public audiences. During the project contributions were made several National, European and International Conferences from various fields. For a detailed list please refer to the list of dissemination activities.

This strategy will continue. Contributions are already accepted for national and international educational research conferences (e.g. ECER 2011, Sept. 2011 in Berlin; Taiwan International Conference of Educational Research TICE, December 2011 in Taiwan; American Educational Research Conference AERA, April 2012 in Vancouver).

A moderate number of publications and written reports were provided to the different publics that represent the interdisciplinary composition of the EERQI research team. Only a few of these appeared in so-called international highly recommended journals. This is due to a number of facts, most importantly: (a) there is hardly any such journal that covers the interdisciplinarity representing the aims and scope of the EERQI project. (b) The most relevant EERQI results were achieved in the final phase of the project. These are now transferred to publications, especially in journals in the fields of educational research and of biblio-/ webometrics. The publication in such journals, however, has to anticipate a period of roughly one year between submission and appearance of articles. Thus we planned for more EERQI articles to be published after the submission of this report.

We will also publish an edited book in which all project results will be presented (together with the EERQI publisher partner VS-Verlag).

An international conference on the further development of approaches to determine (educational) research quality is scheduled to take place at the University of Hamburg in

December 2012. It will be organized by the EERQI scientific coordinator in cooperation with the President of the University of Hamburg, the 'Zeitschrift für Erziehungswissenschaft (ZfE)' and other EERQI partners.

Use and Dissemination of Foreground
Section A (public)

Template A1: List of all scientific (peer reviewed) Publications relating to the Foreground of the Project

	TEMPLATE A1: LIST OF SCIENTIFIC (PEER REVIEWED) PUBLICATIONS, STARTING WITH THE MOST IMPORTANT ONES									
NO	**Title**	**Main author**	**Title of the periodical or the series**	**Number, date or frequency**	**Publisher**	**Place of publication**	**Year of publication**	**Relevant pages**	**Permanent identifiers (if available)**	**Is/Will open access provided to this publication?**
1	Preliminary Title: European Educational Research Quality Indicators (EERQI) – Results of the Research Project	Ingrid Gogolin et al.	Book		VS-Verlag	Wiesbaden	2012	Ca. 200 pages		Yes
2	Research quality assessment in education: impossible science, possible art?	David Bridges	British Educational Research Journal	Volume 35, Issue 4, 2009	Taylor & Francis		2009	497-517	http://www.tandfonline.com/doi/abs/10.1080/01411920903111565	No
3	Research Quality Assessment: intended and unintended consequences	David Bridges	Power and Education, Special Issue: The Power of Journal Rankings	Volume 3, Number 1, 2011	SYMPOSIUM JOURNALS		2011	31-38	http://www.wwwords.co.uk/power/content/pdfs/3/issue3_1.asp	Yes
4	Scientometric Approaches to Better Visibility of European Educational Research Publications: a state-of-the-art-report	Alexander Botte	European Educational Research Journal	Volume 6, Number 3, 2007	SYMPOSIUM JOURNALS		2007	303-311	http://dx.doi.org/10.2304/eerj.2007.6.3.303	Yes

#	Title	Author	Source		Publisher/Institution	City	Year	Pages	URL	Peer reviewed
5	EERQI – Ergebnisse, Paradoxien und Perspektiven.	Stefan Gradmann	Marianne Krüger-Potratz, Ursula Neumann, Hans H. Reich (Hgg.): Bei Vielfalt Chancengleichheit			Münster	2010	177-184		No
6	A New Approach towards Vertical Search Engines - Intelligent Focused Crawling and Multilingual Semantic Techniques	Sybille Peters, Claus-Peter Rückemann, Wolfgang Sander-Beuermann	Proceedings of the 6th International Conference on Web Information Systems, WEBIST 2010				2010			Yes
7	An exploratory system for automatic assistance in peer reviewing research articles in educational sciences.	Ágnes Sandor, Angela Vorndran	NLPIR4DL '09 Proceedings of the 2009 Workshop on Text and Citation Analysis for Scholarly Digital Libraries		Association for Computational Linguistics	Singapore	2009	36-44	aye.comp.nus.edu.sg/nlpir4dl/presentations/Sandor-Vorndran.pdf	Yes
8	Detecting salient messages from social science research papers and its application in document search	Ágnes Sandor, Angela Vorndran	Subj. procesos cogn., vol.14, n.2		Universidad de Ciencias Empresariales y Sociales	Buenos Aires	2010	260-274	http://74.125.155.132/scholar?q=cache:yMQPygQA238J:scholar.google.com/+Sandor+Vorndran+Buenos+Aires&hl=fr&as_sdt=0,5	Yes
9	Models of Scholarly Communication and Citation Analysis	Frederik Åström	ISSI 2009: The 12th International Conference of the International Society for Scientometrics and Informetrics		BIREME/PAHO/WHO & Federal University of Rio de Janeiro	Rio de Janeiro	2009	10-21	www.gbv.de/dms/tib-ub-hannover/60745721x.pdf	Yes
10	European Educational Research Quality Indicators (EERQI)	Ingrid Gogolin	ISSI 2009: The 12th International Conference of the International Society for Scientometrics and Informetrics		BIREME/PAHO/WHO & Federal University of Rio de Janeiro	Rio de Janeiro	2009	934-935	http://www.lu.se/o.o.i.s?id=12588&postid=1459013	Yes

1 1	Le projet européen EERQI : la qualité des recherches européennes en sciences de l'éducation en question	Eva Roos; Valérie Sauter	Bulletin de l'ASSH	N° 4.·2008	SAGW / ASSH	Berne, Switzerland	2008	54-55	http://www.sag w.ch/en/sagw/ oeffentlichkeits arbeit/bulletin/b ulletin-2006-2008.html	Yes

Template A2: List of all Dissemination Activities

				TEMPLATE A2: LIST OF DISSEMINATION ACTIVITIES					
NO.	Beneficiary	Type of activities[27]	Main leader	Title	Date	Place	Type of audience[28]	Size of audience	Countries addressed
1	UHambDE	Conference	Ingrid Gogolin, Diann Pelz-Rusch	21st Conference of the German Educational Research Association	19th March, 2008	Dresden, Germany	Scientific Community	120	European
2	UHambDE	Conference	Stefan Gradmann	Fourth International Conference on Webometrics, Infometrics and Scientometrics	29th July, 2008	Berlin, Germany	Scientific Community	300	International
3	UHambDE, EERA	Conference	Fredrik Aström, Ingrid Gogolin, Stefan Gradmann, Agnes Sandor, Wim Jochens	European Conference on Educational Research (ECER)	11th September, 2008	Gothenburg, Sweden	Scientific Community	200	International
4	UHambDE, EERA	Conference	Fredrik Aström, Ingrid Gogolin, Stefan Gradmann, Agnes Sandor, Wim Jochens	European Conference on Educational Research (ECER)	September 2009	Wien	Scientific Community	200	International
	UHambDE,	Conference	Fredrik	European Conference on	August,	Helsinki	Scientific	200	International

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[27] Dissemination activities are: publications, conferences, workshops, web, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, exhibitions, thesis, interviews, films, TV clips, posters, Other.
[28] Type of public: Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias ('multiple choices' is possible.

	EERA		Aström, Ingrid Gogolin, Stefan Gradmann, Agnes Sandor, Lejf Moos, Wim Jochens	Educational Research (ECER)	2010		Community		
5	UHambDE	Conference	Ingrid Gogolin	Educating Europe – Educational Sciences go FP 7 and beyond	30th June - 1st July, 2009	Brussels	Scientific Community	80	European
6	UHambDE	Conference	Ingrid Gogolin	First International Congress of Educational Research	1st -3rd May, 2009	Canakkale Onsekiz Mart University, Canakkale	Scientific Community	250	European
7	UHambDE	Conference	Ingrid Gogolin	Teacher Education Policy in Europe Conference	18th – 20th June, 2009	University of Umeå, Sweden	Scientific Community	100	European
8	UHambDE	Conference	Ingrid Gogolin	EPROS-meeting	4th June, 2008	Luxemburg	Scientific Community	80	European
9	UHambDE	Conference	Ingrid Gogolin	Fourth International Meeting of Education Research Associations	24th–25th November, 2008	Singapore	Scientific Community	500	International
10	UHambDE	Conference	Ingrid Gogolin	Quality Assessment in Open Access Publications	17th February, 2009	German Research Foundation, Berlin	Scientific Community, Policy Makers	150	International
11	UHambDE	Workshop	Ingrid Gogolin	IuK-Initiative Wissenschaft: Annual Meeting	25th September, 2008	Berlin, Germany	Scientific Community	100	International
12	UHambDE	Workshop	Ingrid Gogolin	Seminar at the University of Turin	4th – 6th June, 2009	Turin, Italy			
	UHambDE	Workshop	Ágnes Sándor, David Bridges, Ingrid Gogolin, Stefan Gradmann	INRP Seminar	9th - 10th July 2009	Lyon, France	Scientific Community	50	European
13	UHambDE	Workshop	Ingrid Gogolin	Workshop on Quality	18th - 20th	Trinity	Scientific	50	European

					September, 2008	College	Community		
14	UHambDE	Workshop	Ingrid Gogolin	Workshop on Quality Assessment	18th - 20th September, 2008	Trinity College	Scientific Community	50	European
15	UHambDE	Publication	Ingrid Gogolin	European Educational Research Quality Indicators (EERQI). Ein Forschungsprojekt im 7. Rahmenprogramm der Europäischen Union[29]	2008		Scientific Community		Germany
16	UHambDE	Publication	Ingrid Gogolin	European Eductional Research QUality Indicators (EERQI). Published in the Bulletin of the Swiss Academy of Humanities and Social Sciences 2/2011	2011	Schwitzerland	Educational Researchers		Switzerland, Germany, Austria
17	UHambDE	Policy Briefing	Ingrid Gogolin	Policy Brief No. 1	September, 2008		Policy Makers		
18	UHambDE	Policy Briefing	Ingrid Gogolin	Policy Brief No. 2	April, 2009		Policy Makers		
19	UHambDE	Policy Briefing	Ingrid Gogolin	Policy Brief No. 4	April, 2010		Policy Makers		
20	UHambDE	Policy Briefing	Ingrid Gogolin	Policy Brief No. 3	October, 2010		Policy Makers		
21	UHambDE	Policy Briefing	Ingrid Gogolin	Policy Brief No. 5	October, 2010		Policy Makers		
22	UHambDE	Policy Briefing	Ingrid Gogolin	Policy Brief No. 6	April, 2011		Policy Makers		
23	HU-Berlin	Workshop	Stefan Gradmann	International Repositories Workshop	16th March, 2009	Amsterdam	Scientific Community	50	International
24	BERA	Publication	David Bridges	The EERQI Project: Bibliometrics as a basis for	2008		Scientific Community		International

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[29] http://www.pedocs.de/frontdoor.php?source_opus=2486&la=de

			research quality assessment[30]					
25	BERA	Publication for conference	David Bridges	"Assessing the quality of educational research in higher education in the UK"[31]	2008		Scientific Community		European
26	ISN	Workshop	Thomas Severiens	Meeting of Europeana WG2 about ORE	19th September, 2008	Århus	Scientific Community	50	European
27	XEROX, LUB-LU	Conference	Fredrik Åström, Ágnes Sandor	ISSI 2009: The 12th International Conference of the International Society for Scientometrics	2009	Rio de Janeiro	Scientific Community	50	International
28	XEROX, DIPF	Conference	Ágnes Sandor, Angela Vorndran	NLPIR4DL '09 Workshop on Text and Citation Analysis for Scholarly Digital Libraries	2009	Singapour	Scientific Community	30 persons	International
29	XEROX, DIPF	Conference	Ágnes Sandor, Angela Vorndran	Workshop on Natural Language Processing Tools Applied to Discourse Analysis in Psychology	2010	Buenos Aires	Scientific Community	30 persons	International
30	XEROX	Seminar	Ágnes Sandor	Seminar of the Humanities Deans of the Coimbra Group	April 2011	Monpellier	Scientific Community, Policy Makers	50 persons	International
31	RRZN	Conference	Sybille Peters	6th International Conference on Web Information Systems, WEBIST 2010	2010	Valencia	Scientific Community	200	International
32	DIPF	Conference	Alexander Botte	European Conference on Educational Research	25th – 27th August, 2010	Helsinki, Finland	Scientific Community	20 persons	Europe
33	DIPF	Publication	Angela Vorndran,	"An Analysis and evaluation of existing methods and	2008				International

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[30] http://www.eerqi.eu/page/publications

[31] http://www.earli.org/resources/Assessing_the_quality_of_educational_research_in_higher_education_in_the_UK.pdf

			Alexander Botte	indicators for quality assessment of scientific publications[32]"					
34	DIPF	Workshop	Angela Vorndran	FIS-Bildung Fachtagung	3rd May 2010	Frankfurt/M., Germany	Scientific Community	25 persons	Germany
35	IRDP/SSRE	Other: Presenting the EERQI project during numerous informal contacts with Swiss University Professors or members of Swiss Academies.	Matthis Behrens, Eva Roos, Valérie Sauter, Caroline Sperisen	Presentation of the EERQI project.	2008 - 2011	Switzerland	Scientific Community	1 to 10 persons	Switzerland
36	IRDP	Other: Working Paper	Eva Roos & Valérie Sauter	The role scholarly publications play in national evaluation procedures, An overview of the evaluation practices in different European countries	2008	Neuchâtel, Switzerland	Scientific Community	30 persons	European
37	HU-Berlin	Conference	Stefan Gradmann	COLLNET Meeting	2008	Berlin	Scientific Community	250 persons	International
38	HU-Berlin	Conference	Stefan Gradmann	The Fifth International Conference "Academic Publishing in Europe"	2010	Berlin	Scientific Community	300 persons	International
39	HU-Berlin	Publication	Jenny Sieber, Stefan Gradmann	The use of Web 2.0 services in the EERQI context[33]	2010		Scientific Community		International
40	HU-Berlin	Publication	Jenny Sieber, Stoye, D.	Description aMeasure[34]	2010		Scientific Community		International

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[32] http://www.eerqi.eu/page/publications

[33] http://edoc.hu-berlin.de/

[34] http://edoc.hu-berlin.de/

41	HU-Berlin	Publication	Jenny Sieber, Stefan Gradmann	How to best assess the impact of monographs using established library infrastructure and Web 2.0 tools[35]	2010		Scientific Community		International
42	HU-Berlin	Workshop		URFIST- Séance de l'atelier bibliométrie du 15 décembre 2010	2010	Paris	Scientific Community	50 persons	International
43	HU-Berlin	Workshop	Stefan Gradmann	International Repositories Workshop	16th March, 2009	Amsterdam	Scientific Community	50	International
44	External	Publication	Oliver Rey	Quality Indicators and Educational Research publications: which publications count?[36]	July, 2009		Policy Makers		International
45	External	Pulication about EERQI	Bernt Armbruster	Qualitätssicherung: Nicht allein die Zitate zählen, sondern auch die Argumente zählen. Published in duz 03/2011	March, 2011	Germany	Scientific Community		Germany

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[35] http://edoc.hu-berlin.de/

[36] http://www.inrp.fr/vst/LettreVST/english/46-june-2009_en.php

Section B (Confidential or public: confidential information to be marked clearly)

Template B2: List of exploitable Foreground

No.	Type of Exploitable Foreground [37]	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application [38]	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
1	Exploitation of R&D results of public and scientific community	Search engine without multilingual enhancements	No	none	Focused crawler Search engine back end Search engine user interface	M72			RRZN
2	Exploitation of R&D results of public and scientific community	Search engine with multilingual enhancements	No	none	Focused crawler Search engine back end Search engine user interface	M72			RRZN, XEROX, DIPF, IRDP
3	General advancement of knowledge	Guidelines can be used to support application of the EERQI framework in different context so that a wider distribution of the project results is facilitated	No	none	Guidelines for the transfer of EERQI-methodologies to other SSH-fields	M72.2			DIPF
4	General advancement	Generic intrinsic indicators of quality for assessment in educational	No	none	Description of Quality	M72.2, J58			BERA, EERA,

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[37] A drop down list allows choosing the type of foreground: General advancement of knowledge, Commercial exploitation of R&D results, Exploitation of R&D results via standards, exploitation of results through EU policies, exploitation of results through (social) innovation.

[38] A drop down list allows choosing the type sector (NACE nomenclature) : http://ec.europa.eu/competition/mergers/cases/index/nace_all.html

No.	Type of Exploitable Foreground[37]	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application[38]	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
	of knowledge	research			Indicators and their operationalization				ITS SSRE, TU/e, UmU
5	General advancement of knowledge	Peer Review Questionnaire: Tested and approved instrument with operationalization of EERQI's set of intrinsic indicators	No	none	electronic version of questionnaire	M72.2, J58			UHambDE, EERA
6	General advancement of knowledge	Data set from evaluation of Peer Review Questionnaire	Yes	none	Statistical Data	M72.2			UHambDE, EERA
7	General advancement of knowledge	EERQI prototype framework for quality detection. It includes a mixed methodology of approaching the detection of quality in educational research publications. The key issue is the intelligent combination of quantitative and computer assisted qualitative methodologies for determining quality.	No	none	Description of prototype framework, including use case scenarios for the intelligent combination of the different approaches	M72.2, J58			UHambDE
8	Commercial exploitation of R&D results	Classifier: algorithms that support automatic decision if a crawled site is of relevance	No		Classifier, Adapting and operating classifier	M72	Starting begin of 2011		ISN
9	General advancement of knowledge	Expertise of designing, adapting, supporting of scientific web-servers (acquired on the external and internal EERQI server)	No		Development and support	M72, J63.1			ISN
10	Potential for	Software implementing document	No[39]	N/A[39]	Software	J58.1.4 M72.2.0	Undetermin	Potential for	XEROX

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[39] The fact that the software exists can be publicly disclosed; the source code is proprietary and there are no plans to disclose it.

No.	Type of Exploitable Foreground [37]	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application [38]	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
	commercial exploitation	processing service, including lemmatization and key sentence extraction				J62.0.9 J58.2.9	ed	third party technology licensing	
11	Potential for commercial exploitation	Software implementing search interface, including query translation and term suggestion.	No[39]	N/A[39]	Software	J58.1.4 M72.2.0 J62.0.9 J58.2.9	Undetermined	Potential for third party technology licensing	XEROX
12	General advancement of knowledge	Analyses investigating semantic structures in educational research, evaluating applicability of semantic analyses to identify quality indicators	No	-	-	M72.2	-	-	LUB-LU, XEROX, XRCE
13	General advancement of knowledge	Analyses investigating citation patterns in educational research, evaluating applicability of citation analyses to identify quality indicators	No	-	New information on citation patterns in educational research that can be further investigated on larger data sets	M72.2	-	-	LUB-LU
14	General advancement of knowledge	Modelling different modes of scholarly communication, with consequences for the applicability of citation analyses for research evaluation purposes	No	none	The model can be further elaborated both from the theoretical perspective as well as empirically tested	M72	-	Published article	LUB-LU, XEROX, XRCE
15	General advancement of knowledge	Methodology describing indicators and data resources, their operationalization and the way of	no		Corresponding methodology for analyzing	M72.2			HU-Berlin

No.	Type of Exploitable Foreground [37]	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application[38]	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
		how they could interrelate with each other. Methodology allows for further statistical analysis of relations of extrinsic and intrinsic indicators of quality of SSH research publications			new indicators				
16	1. General advancement of knowledge, 2. Commercial exploitation of R&D results	Java application to automatically gather information about authors and articles from Google Scholar, commercial search engines, and Social Network Services			aMeasure	J63, M72	Continued Maintaining of server and data gathering via aMeasure. Data at researcher's disposal on request.		HU-Berlin
17	General advancement of knowledge	Sustainability Plan, consisting of: Instruments for further use and updating of EERQI-products; data sets for further use; and design of follow-up research projects.	no	none	EERQI homepage EERQI content base Data sets Research design	M72.2			UHambDE, HU Berlin, ISN

In addition to the table, please provide a text to explain the exploitable foreground, in particular:

- Its purpose
- How the foreground might be exploited, when and by whom
- IPR exploitable measures taken or intended
- Further research necessary, if any

- Potential/expected impact (quantify where possible)

No. 10:
Document processing service
- Its purpose: performs linguistic analysis of a document. In the EERQI search engine, its role is to prepare documents to be indexed, allowing more effective search, better result ranking, and more useful excerpts. It could also be used to highlight key sentences in documents as a reading aid.
- How the foreground might be exploited, when and by whom
    1. Publishers may provide peer-reviewers with highlighted articles to assist the peer-review process
    2. Search engines might use lemmatization to improve document retrieval
    3. Search engines might integrate key sentence extraction for relevance ranking and providing snippets
    4. Search engines might return highlighted articles
- IPR (intellectual property rights) exploitable measures taken or intended
- Further research necessary, if any
    1. Improvement of the results of key-sentence extraction
    2. Extending the scope of the concept of key sentences
    3. Implementing highlighting into the PDF file containing the articles
- Potential/expected impact (quantify where possible)

More effective peer-reviewing process and improvement of search. Cannot quantify.

No.11:
Search interface
- Its purpose: allows end users to search a document collection with automatic query translation and term suggestion
- How the foreground might be exploited, when and by whom: content providers or aggregators could use the interface to provide access to their collections.
- IPR (intellectual property rights) exploitable measures taken or intended
- Further research necessary, if any
    1. Add "advanced search" functionality (Boolean search, field constraints)
- Potential/expected impact (quantify where possible): increase use of research literature across linguistic boundaries.

No. 12:
- The purpose of the analyses is to investigate underlying structures in semantic and citation patterns in educational research, to explain the results – or lack thereof – of analyses aiming at identifying and utilizing quality indicators based on statistical or automated methods for text analysis.

No. 13:
- Especially the citation analyses are performed on relatively small data sets and needs to be expanded. This does, however, require reliable techniques for extracting and standardizing citation data on an automated basis; and this is both in terms of citations to and from EERQI content base documents.
  The model for different modes of scholarly communication can also be elaborated, both in terms of theoretical discussions and empirical testing.
- The results are primarily related to the applicability of statistical and automated analyses of semantic and citation structures of educational research for research evaluation purposes, but are also of high interest for investigating the organization of educational research as a field of research from a science studies perspective. From a wider point of view, the results here as well as further investigation, are important from a research policy perspective in relation to the social sciences and the humanities.

No. 14:
- The model for different modes of scholarly communication is published – and thus protected by copyright – in a conference proceeding (ISSI 2009, the 12th International Conference on Scientometrics and Informetrics, July 14-17, 2009, Rio de Janeiro. Rio de Janeiro: BIREME/PAHO/WHO: Federal University of Rio de Janeiro).
  The analyses of semantic structures will be presented in a paper to be submitted to the European Educational Research Journal.
  The citation analyses will be presented in papers to be submitted to research journals. Further research necessary, if any