European Educational Research Quality Indicators (EERQI)

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Introduction

Metrics-based quality assessment of scientific publications have depended heavily on ranking methods involving citation frequencies, largely based on data from the ISI Thomson databases. Within the ISI databases, differences in terms of coverage between fields are well known, as is the dominance of publications in English, affecting e.g. the social sciences and the humanities. Issues concerning analyzing the social sciences and humanities have been approached by e.g. Butler and Visser (2006), analyzing non-source item citation; and by van Leeuwen (2006), analyzing publication and citation practices in the social sciences. However, both articles are based on ISI data; and since much of e.g. the European social sciences publish in non-journal media and in their respective domestic languages: we know little about how representative these analyses actually are. Furthermore, we still know relatively little about how varying citations practices affect the citation analyses, as well as of the nature of these citation practices in different fields.

Objectives

These issues are approached in the European Educational Research Quality Indicators (EERQI) project, whose broadly defined aim is to develop a prototype framework for relevance assessment of research publications in European educational research. Together with traditional indicators, new methods and indicators will also be tested, such as semantic-based full text analysis for tracking evidence of quality in text and references.

More specifically, the goals of the project are to:
- Develop new indicators and methodologies for quality assessment.
- Make this framework operational on a multilingual basis (starting with English, German, French and Swedish).
- Produce a search and query engine for resource harvesting and text analysis.

- Test transferability of the EERQI indicators into other fields in social sciences and the humanities.
- Develop a sustainability plan for quality assessment of European educational research publications.

Analyzing educational research as an example of academic activities in the social sciences and humanities is largely because of its nature as an interdisciplinary field of research, covering the whole range of methodologies and epistemological orientations found in social science and humanities research. Using European educational research as case for the analyses is motivated by there being a joint institutional research infrastructure as expressed in e.g. the European Educational Research Association and the European Association for Learning and Instruction, at the same time as much of the research is performed in the domestic languages of the member countries.

Tentative citation analysis

To get an overview of publication and citation patterns in the field, research articles proper from the 20 highest cited journals in the 'Education and Educational Research' JCR category was downloaded from the Web of Science (omitting specialized journals and journals with a domestic focus). Out of 4,386 research articles citing a total of 179,240 references, 30% of the references were to other journal articles. 48% of the author addresses were from the U.S and 18% from the U.K (46% of the European total). The most cited authors are dominated by citation classics in the field, such as Vygotsky and Piaget; and general theorists such as Foucault and Bourdieu. Furthermore, when applying a citation among documents analysis (Persson, 2001), only 2% of the total amount of citations goes back to source item articles; and the majority of these are limited to one research specialization within the larger field. Thus, we have a large dominance of Anglo-American articles; and also, an indication that 'citation traffic' to active

peers within the field is relatively slow. The question whether this information is representative to the field as a whole remains, but having access to data from European research publications in different languages and in different media of publication, we have the opportunity to test this.

Content base and prototype search engine

The content base is built by gathering research documents including books and book chapters, as well as journal articles, supplied by the academic publishers being part of the project. The data comes in form of pdf-files with xml-files containing document metadata. In addition to building the local document corpus, a search and query engine is being developed for resource harvesting and data analysis; as well as for finding new educational research documents publicly available at the World Wide Web. To deal with the documents, two indices have been created: a content index and a metadata index building on *Lucene*, an open-source Java library, whereas the the WWW index builds on *Nutch* for crawling and indexing URLs.

Quality indicators

One basic idea in the EERQI project is to combine different indicators for document quality assessment. One type of metrics is different usage indicators, e.g. download frequencies and citation analysis. Another type of metrics to investigate is analyses of other forms of metadata, e.g. information on authors and institutions, as well as keywords and their relation to concepts of relevance. In addition to these kinds of quantitative analyses, semantic processing tools are used to identify evidence of quality by combining quality indicators identified by e.g. peer reviewers with semantic analyses of research documents.

Results

Semantic analyses

A main theme in the EERQI project is to utilize automated semantic analyses of documents and references to identify evidence of quality by using the natural language processing tool Xerox Incremental Parser (XIP) (Aït et.al., 2001; 2002), e.g. for identifying different kinds of citations. In relation to this, tentative analyses on citation practices in e.g. education research has been done to see to what extent research texts follow the normative idea of research being cumulative, one of the main assumptions for using citations as an indicator of quality. Based on science studies theories and the result of co-citation based research maps, together with semantic analyses, Åström and Sándor (2009) found evidence of research organized and communicated in a negotiating and distinctive way, in addition to being cumulative. Further more, the semantic analyses are also used to

identify evidence of quality in the documents per se. Based on a set of quality criteria and how peer reviewers applies these, the XIP is 'trained' to identify conceptual, factual and referential expressions in the text reflecting aspects of research quality. In addition to this, the semantic analyses can also be used for extracting metadata out of the documents, which might not necessarily be reflecting research quality per se, but that can be of great interest for conceptual mapping of the research field, as well as for developing relevance criteria for ranking search results in the EERQI prototype search engine.

Classification of indicators

In addition to this, there is also important conceptual work going on, identifying and categorizing quality indicators. There are the indicators themselves: e.g. rigour and significance, as well as usage indicators; but also the distinction between intrinsic indicators, being directly related to the text itself, and extrinsic indicators, not inherently constituting quality with a probabilistic relation to quality.

Acknowledgments

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