



EUROPEAN EDUCATIONAL RESEARCH
Quality Indicators



This project is funded by the Socioeconomic Sciences and Humanities Section.

EERQI Workshop, March 17-18, 2009.
Berlin, Germany

Semantic Analysis with Automatic Tools Progress Report

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Proposed list of indicators

Main category	Type within category	Evidence of category	Existing quality or relevance evaluation approaches that use the category	Link from the evidence of category to its being indicator of research quality
Contextual information	Type of document	Book Book chapter Conference proceeding Report Journal article Research note	Bibliographical search (2)	Condition for quality assessment: if the document type is a research document type, it is relevant to assess its quality. The exact type of the document must be known that it is a scientific document type, has no relation to quality: a book may be of just as good (or bad) quality as a journal article or a report. But does this apply to conference proceedings at the same level of quality?
	Publication year	Publication status		
	Publisher	International		
	The graphic information	Authors	Bibliographical search	
		Institutional affiliation(s)	Bibliographical search Research Assessment Eurasian Indicators Social Network Analysis	quality is based on background knowledge: the 'quality' of the author's institution is probably in relationship with the quality of the research.
	Subject matter information	Discipline Educational research / Not related to Education	Bibliographical search Research Cluster analysis	Condition for quality assessment: if the genre of the document type is research document, and if it is in education, it is relevant to assess its quality.
		Presence of a summary or abstract? Yes / no	Bibliographical search	Not an indicator of quality, merely of the completeness of the document
		Presence of keywords? Yes / no	Bibliographical search Reference-based indexing	Condition for quality assessment: if the keywords are relevant to educational research, it is relevant to assess quality. The nature of the keywords might be indicative of quality. The presence of keywords is only an indicator of the nature of the content & discipline, not of quality.
		Abstract		Similar to citations: relationship with impact, which may be in a probabilistic relationship with research quality.
		Acknowledgements? Yes / no		
Review information	Reviewed	Yes / no	ISI	If double-blind and at least two reviewers, the selection is probably more objective and reliable, which is a guarantee of quality. By how many reviewers? Who were the reviewers? Was it a blind review?
	Review standardized	Dependent on journal Dependent on document		Against which criteria was the text reviewed? See below for content-based criteria.
	Review outcomes: If not included? Other?	To be specified (e.g. accept, minor revisions, major revisions & reject)		If documents cannot be rejected, then quality control is less optimal.
Content-based criteria (peer based)	Expert Originality Significance Insight Style Other?	Each to be rated on a scale from 1 to 5. This is what was proposed later on by David.	Journal/book editors Research Assessment Eurasian	If the research is rigorous, significant, etc. it is of high quality.
Content-based criteria (machine-based)	Semantic group Originality Significance Insight Style Other?	Evidence in text for the indicators: sentences, frequency lists of words		Providing textual evidence for content-based quality criteria
Citation information	Abstracts, year, title	Across Journals and years Same journal, last two years ISI?	ISI: statistical - - InCites - Journal Citation - Journal Identity - Journal Citation - Image (ISI) - Journal Diffusion Factor Publish or Perish	Relationship with impact, which may be in a probabilistic relationship with research quality. Frequency of being cited is a probabilistic sign of quality
	Author(s), year, book			
	Author(s), year, other			
	Citation groups at publication Self-citations Other?			
Use information	Hits, linked at Number of downloads Integration in groups Involved in queries Other?		COUNTER: - Journal usage Factor - Reading Factor - Web impact factor	The frequency of these concepts is a probabilistic sign of quality

Authors
Institutional
Affiliation(s)

→ Extraction of authors and institutions from the first pages of the articles

Language

→ Multi-lingual search

Content-based
criteria
(machine-based)

→ Extraction of key sentences, key concepts and argumentation to help peer review

Citation
information

→ Citation typing

Extraction of authors and institutions from the first pages of the articles

Journal of Technology Education

Vol. 10 No. 2, Spring 1999

Addressing Women's Ways of Knowing to Improve the Technology Education Environment for All Students

Karen F. Zuga

I often help my female friends to negotiate parts of the technical world. For one it may be going on a car buying expedition, for another it may be a computer installation, and for yet another it may be the replacement of rotten boards on a front porch. They know that I enjoy such expeditions and, I hope, that they actually believe that I can be helpful.

One recent Labor Day weekend I was engaged in helping a friend to replace the worn and damaged boards on her front porch. We worked the day away, pulling boards, removing rotten wood, and replacing it with solid wood. As we worked, I thought about how she probably had not been given much instruction in how to use tools and to construct with wood. Nonetheless, she was trying to do a simple household repair in order to save herself money. Her skills and tool selections were clear evidence of a lack of technical knowledge and her plans for the repair process, while adequate, needed some improvement. Probably, I thought, like my own school experiences, she did not have the opportunity to study "industrial arts" when she was going to school. Yet, I was concerned because young women today, given the opportunity to do so, are still not taking technology education courses in great numbers. Women and girls often perceive the subject of technology education as a male domain, especially after they have had a course in technology education (Hendley, Stables, Parkinson, & Tanner, 1996; Bame, Dugger, & deVries, 1993; Bame & Dugger, 1990).

Yet, women are technologists. Women are and have always been significant contributors to the making of the environment of which we are a part. Every woman has been a technological being, using and often inventing tools, materials, and processes in order to adapt and modify her world. Their contributions have been either focused on the traditional homemaking roles of females, or they have been diminished in the records of industrial and economic spheres (Wajcman, 1991). In addition to diminishing the role of women in technology and engineering, many technical occupations, including science, have a low representation of women. Are there differences between women and men which might influence their choice of study and which need to be addressed? Can technology educators begin to address the lack of participation

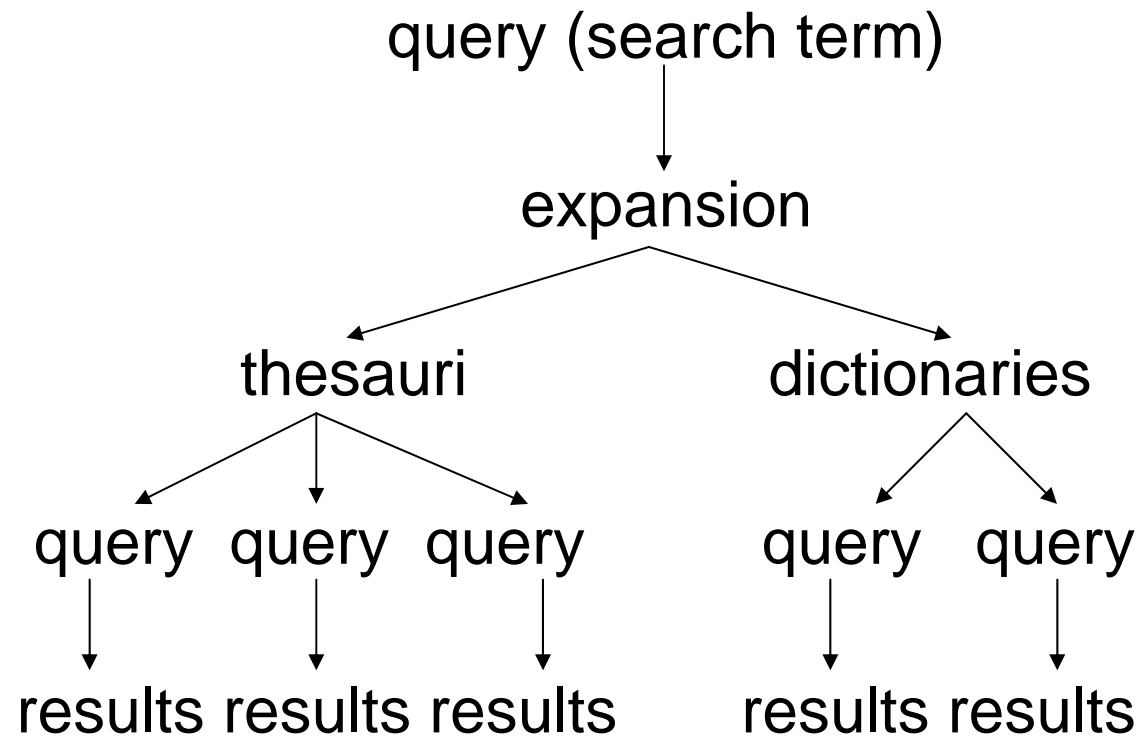
Karen F. Zuga (zuga.1@osu.edu) is an Associate Professor in Math, Science and Technology Education, School of Teaching & Learning, The Ohio State University, Columbus, OH.

→ **ORGANISATION(Journal of Technology Education)**

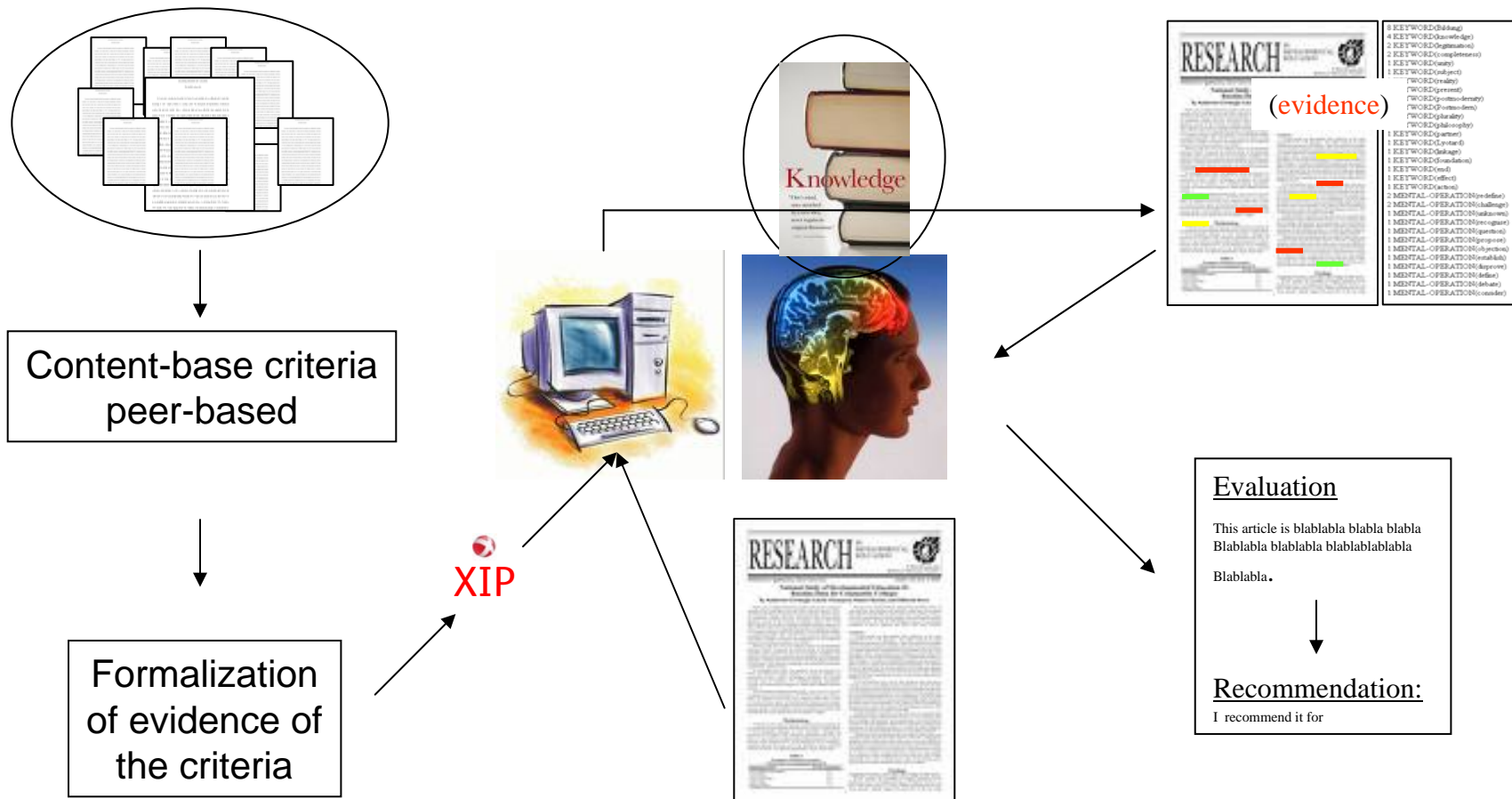
→ **PERSON(Karen F. Zuga)**

→ **ORGANISATION(School of Teaching)**
ORGANISATION(Ohio State University)

Multi-lingual search



Extraction of key sentences, key concepts and argumentation





Big question

- Key concepts ~ keywords; key sentences ~ title, abstract
- Hypothesis:
 - keywords, title, abstract: relevant semantic indicators for information retrieval
 - relevance necessary but not sufficient condition for quality
 - similar semantic indicators might be provided automatically
- Is this really help for evaluators?
 - Empirical question: it should be tested



Examples of quality criteria formulated by EERQI working groups

- "A clear statement of the problem, the hypothesis and/or the research question"
- "An argument – consecutively and consistently developed"
- "Clear explanation of central concepts – and consistency in their use"
- "Are the claims the author makes in any conclusion for the significance of the study convincing? "

Structure helps to elucidate the criteria in biomedical abstracts:

OBJECTIVE:: Body checking may be an important behavioral consequence of body image disturbance. Despite the importance of body checking, few measurements of this construct exist, particularly for males. This study describes the development and validation of the Male Body Checking Questionnaire (MBCQ).

METHOD:: Convergent and divergent validity, factor structure, and reliability were tested in three separate samples of men and women.

RESULTS:: Factor analyses suggested a reliable four-factor structure with evidence of a higher order global checking factor for men, but not women. The MBCQ demonstrated good concurrent and divergent validity. Short-term test-retest reliability was good with high internal consistency across time.

DISCUSSION:: Interpretation of psychometrics and recommendations for subsequent research are discussed. The MBCQ is likely to be an appropriate tool for investigating body image-based pathology in males. (c) 2009 by Wiley Periodicals, Inc. Int J Eat Disord 2009.



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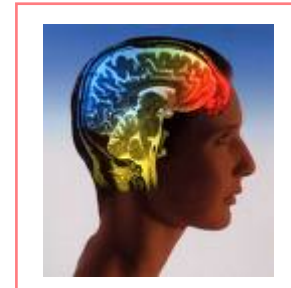
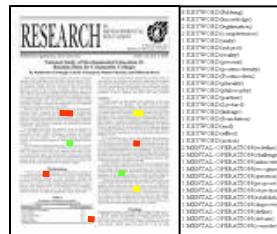
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"An argument – consecutively and consistently developed"

"Clear explanation of central concepts – and consistency in their use"

"Are the claims the author makes in any conclusion for the significance of the study convincing?"

XIP



Sentences that convey a problem or a research question: method for the extraction

XIP



Keyword: Cultural Diversity - A Guide Through the Debate

- The term of diversity is still used rather ambiguously in debates on multiculturalism, identity politics, anti-discrimination policies and educational contexts (BREWSTER et al. 2002; VERTOVEC/WESSENDORF 2004).
- The recognition of diversity in this sphere challenges conventional notions of citizenship, as new forms of political participation by these emerging actors will end up establishing different types of belonging allowed in the public sphere (SICAKKAN 2005, p. 7).
- Cultural diversity emerges as a concept and an issue in a particular phase of the multiculturalism debates and specifically as an anti-essentialist claim against all too reified notions of culture and ethnicity.
- The necessity of identifying yourself along a set of officially recognized diversity categories has indirectly, but often intentionally promoted an essentialist identity discourse, which homogenizes group members and thus contradicts the very basic assumptions of diversity.

Sentences that convey a problem or a research question: method for the extraction

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Keyword: Cultural Diversity - A Guide Through the Debate



RESEARCH

QUESTION/PROBLEM

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QUESTION/PROBLEM



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RESEARCH

approach
category
debate

...
term
use

+

QUESTION/
PROBLEM

against
ambiguously
contradict
debate
rather
overlook

+

OBJECT(term,used)
MANNER(used,unambiguously)
MODIFIER(unambiguously,rather)
MODIFIER(used,debates)



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Sentences that convey a problem or a research question

XIP



Keyword: Cultural Diversity - A Guide Through the Debate

No abstract

24 pages

16 sentences extracted for the description of a research problem

3 sentences extracted for the description of the author's contribution

Sentences that convey a problem or a research question

XIP



Keyword: Cultural Diversity - A Guide Through the Debate

Keywords:

anti-discrimination policy;
cultural diversity;
diversity management policy;
ethnicity;
multiculturalism

Key sentences:

The term of diversity is still **used rather ambiguously in debates on multiculturalism**, identity politics, **anti-discrimination policies** and educational contexts (Brewster et al. 2002; Verto-vec/Wes-sendorf 2004).

Sentences that convey a problem or a research question

XIP



Keyword: Cultural Diversity - A Guide Through the Debate

Keywords:

anti-discrimination policy;
cultural diversity;
diversity management policy;
ethnicity;
multiculturalism

Key sentences:

Cultural diversity emerges as a concept and an issue in a particular phase of the multiculturalism debates and specifically as an anti-essentialist claim against all too reified notions of culture and ethnicity.

Sentences that convey a problem or a research question

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Keyword: Cultural Diversity - A Guide Through the Debate

Keywords:

anti-discrimination policy;
cultural diversity;
diversity management policy;
ethnicity;
multiculturalism

Key sentences:

This term is not used in any sentence. It is a section title.



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Key concepts

XIP



Keyword: Cultural Diversity - A Guide Through the Debate

Keywords:

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ethnicity;
multiculturalism

Key concepts:

-

Key concepts

XIP



Keywords:

anti-discrimination policy;
cultural diversity;
diversity management policy;
ethnicity;
multiculturalism

Keyword: Cultural Diversity - A Guide Through the Debate

Key concepts:

CONCEPTUAL(standardized and reified notion,of cultural diversity management)
CONCEPTUAL(the multicultural creed,of diversity recognition)
EDUCATION(cultural diversity,as a Resource)
EDUCATION(cultural diversity,as a right)
EDUCATION(cultural diversity,at School)
EDUCATION_CONCEPTUAL(contribution,of cultural diversity)
EDUCATION_CONCEPTUAL(the notion,of cultural diversity)
EDUCATION(cultural diversity,as a right)
EDUCATION(cultural diversity,in the classroom,with school problem)
EDUCATION_PROBLEM(the debate,on cultural diversity)
EDUCATION(re-conceptualize and re direct educational task,in_terms_of cultural diversity)
EDUCATION(the classic colonial perception,of cultural diversity)
EDUCATION(the existence,of cultural diversity,in the classroom)
EDUCATION(the intrinsic value,of cultural diversity,in education)
EDUCATION(the Visibilization,of cultural diversity)



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Key concepts

XIP



Keyword: Cultural Diversity - A Guide Through the Debate

Keywords:

anti-discrimination policy;
cultural diversity;
diversity management policy;
ethnicity;
multiculturalism

Key concepts:

CONCEPTUAL (approach, with regard to diversity management)
CONCEPTUAL (standardized and reified notion, of cultural diversity management)
EDUCATION (long tradition, of diversity management)
EDUCATION (the multicultural program, through concrete measure, of diversity management)

Key concepts

XIP



Keyword: Cultural Diversity - A Guide Through the Debate

Keywords:

anti-discrimination policy;
cultural diversity;
diversity management policy;
ethnicity;
multiculturalism

Key concepts:

CONCEPTUAL(an issue,in a particular phase,of the multiculturalism debate)
EDUCATION_CONCEPTUAL(the institutional and legal recognition,of multiculturalism)
EDUCATION_CONCEPTUAL(the paradigm,of multiculturalism)
EDUCATION_PROBLEM(debate,on multiculturalism)
EDUCATION(social movement,in multiculturalism)
EDUCATION(the discussion,about multiculturalism)
EDUCATION(the often ambiguous slogan,of multiculturalism)
EDUCATION(the rapid academic integration,of multiculturalism)
EDUCATION(the relative success,of multiculturalism,in different Anglo-Saxon country)



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Testing

- 3 tests designed
- Sample testing carried out
- Need for several independent evaluators



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Test 1: the quality of the automatic evaluation

Evaluate if the key sentences extracted are in fact key sentences in the article

Evaluation by Peter Meyer:

- Automatic extraction: 16 sentences
- Agreement: 12 sentences
- To be cancelled: 4 sentences
- To be added: 7 sentences

Test 2: Expert evaluation

- 1st proposition: evaluate if reading the key sentences extracted does in fact give an indication to the evaluator concerning the quality of the paper – this test seems to be inadequate:
- Problem: key sentences are taken out of context – can they be understood?
- Simplified proposition for testing:
 - provide the evaluators with some unknown papers where the key sentences are highlighted and a list of key concepts is added
 - the evaluators to skim through the papers first with special attention to the data automatically provided, formulate their first quality impressions according to the 5 criteria formulated by the semantic working group
 - the evaluators read the papers thoroughly and compare their impressions with the one that they formulated before
 - the evaluators formulate the results of the test

Test 3: Comparison with peer reviews

Evaluate if the reference to the content of the articles in peer reviews coincides with the contents extracted

Experiment with an article of mine: 3 peer reviews

Questions:

1. Is this paper relevant to the SIGIR ELECTRA Workshop?
2. Briefly SUMMARIZE the paper, including which TYPE of paper it is.
3. Describe the IMPORTANCE OF THE PROBLEM, addressing the following concerns: Is it new and significant? Is it a useful and relevant problem? Do the authors sufficiently motivate the problem? Did you learn anything? Does the issue apply to Information Retrieval? Computational Linguistics?
4. Describe the QUALITY OF THE ARGUMENTS AND RESULTS
5. How novel is the research presented in the paper?
6. Describe the QUALITY OF THE PRESENTATION, addressing the following: Do the authors clearly describe what was done and/or how it was studied? Is the writing clear and concise? Do they provide the right level of detail? Do they use too much jargon? Do the figures support the text?
7. Does the paper STIMULATE DISCUSSION?



Test 3: Comparison with peer reviews

Results:

- All the sentences in 2 peer-reviews can be assigned to one of the sentences in the paper (abstract+body)

Peer review	XIP
The paper describes an approach to automatically detecting and extracting text segments that contain three types of information (or contextual concepts as called in the paper): background knowledge, potential danger posed by a device and innovative products.	In this article we propose a general framework for extracting three contextual concepts :
The approach presented aims to go beyond the standard information extraction task of extracting facts or concrete entities and relationships among them.	Although information extraction systems often focus on assertions about concrete entities and relationships among them , there is growing interest in tools for identifying the contexts in which these assertions are made .

- 1 peer-review summarizes the paper in 1 sentence, which is not correct



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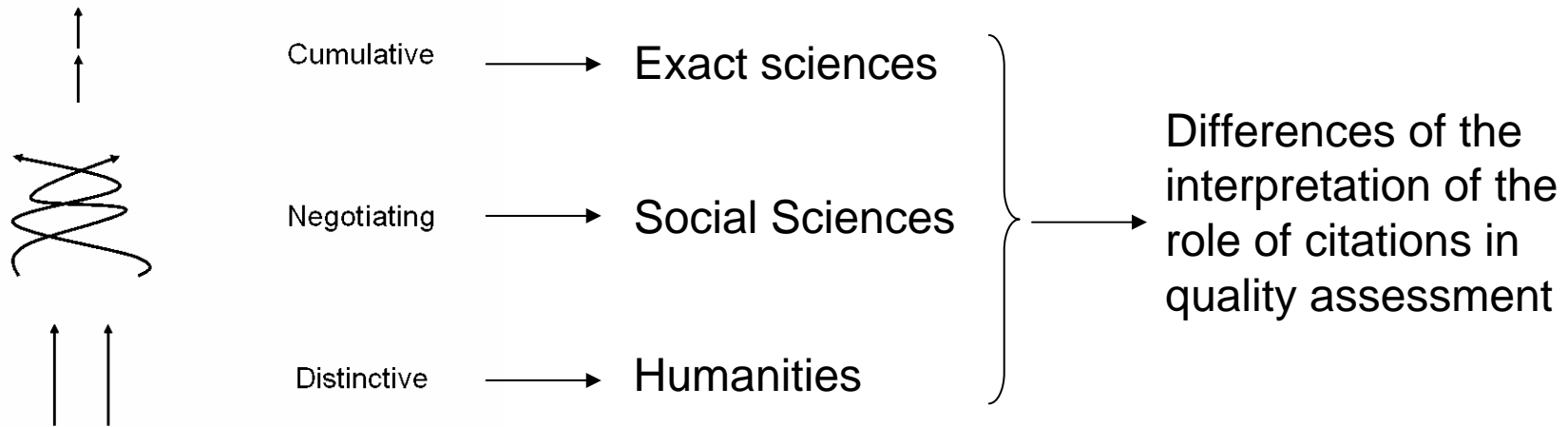


Current and further work on key sentences

- Tests on real data from the content base provided by RRZN: pdf transformed to xml
- Further development of the modelization of the underlying linguistic structure: intern
- Common research between DIPF and Xerox - common article at the ACL conference:
 - on the possibilities of integrating automatically detected semantic meta-data (like key sentences) into documentation
 - linking sentences in the abstract to the body of the paper

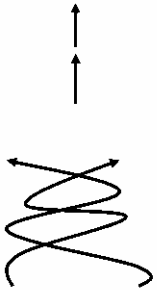
Citation analysis

- In collaboration with Fredrik Åström from Lund University
- Article accepted for ISSI conference: Models of Scholarly Communication and Citation Analysis





Citation types



Cumulative

EVIDENCE: the cited work provides evidence for the cited work

Negotiating

ARGUMENTATION: argumentation between the citing and 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



Citation types

ARGUMENTATION:

The term of diversity is still used rather ambiguously in debates on multiculturalism, identity politics , anti - discrimination policies and educational contexts (BREWSTER et al. 2002 ; VERTOVEC/WESSENDORF 2004).

HUNTINGTON's polemic theory about the inevitable clash of civilizations (1996) between the Western-Christian block and above all Islam deepens and takes advantage of the stereotypical vision of the Orient as an otherness that is incommensurable with the West (HUNTER 1998).

Accordingly , diversity **must not be conceived as** a mechanical summing up of differences, but as a multi-dimensional and multi-perspectivist approach to the study of lines of differences (KRÜGER-POTRATZ 2005), i.e. of identities, identity markers and discriminatory practices.



Citation types

EVIDENCE:

As WOOD's (2003) critical assessment of the U.S. diversity debate proves, since 1978, different levels of court rulings establishing affirmative action and equal employment opportunity schemes in public institutions, organizations and businesses have forced both public and private actors to introduce diversity mechanisms into their particular organizational contexts.

Also, in order to underscore the viability and synergy of all seven strands operating successfully within a single institution, I include examples from the pioneering work of Alex Bloom between 1945 and 1955 at St. George-in-the-East Secondary School in Stepney, London (see Fielding, 2005), ...

Far from being a platitudinous or tokenistic occasion, according to the account offered by E. R. Braithwaite in Chapter 17 of his autobiographical To Sir With Love (Braithwaite, 1969) ...



Citation types

IMPORTANCE:

Tenenbaum and colleagues (2001) recently empirically defined and examined **key features** of constructivist learning environments and their incorporation into two different learning environments (on-campus and distance learning).

In spite of the many variations of PBL that have evolved, **Barrows (1996)** **describes a core model** of PBL in which six fundamental characteristics can be distinguished.

Later **the influential journal The Use of English and David Holbrook's English for the Rejected (1965)**, based on his work in a Cambridgeshire village, **were important** in fostering self-expression in English teaching.



Citation types

QUALIFICATION:

There is, as one would expect, **much to applaud in Pring's approach** - eclectic yet robustly coherent, circumspect yet insistently principled.

Starting from a redefinition and broadening of the notion of cultural heritage, which now also includes non-material, intangible goods and elements, especially the **UNESCO's essentialist, static and elitist definition of culture** has evolved to a more inclusive one, which redefines cultural heritage in terms of changes, mixtures and diversity of cultures and people (**UNESCO 2003**).

From the initial expression multiethnic education, used above all in the United States during the first phase, when the **traditional assimilationist approaches** turned problematical (**BANKS 1981**), the majority of Anglo-Saxon countries have switched over to the term multicultural education, connoting a close link to the original objectives of the multiculturalist movements (**KINCHELOE/STEINBERG 1997**)



Citation types

SURPRISE:

The second set of concerns, the silences and absences that merit more substantial attention, cluster round the **surprisingly uneven presence of democratic theory** within the intellectual narrative of **the paper**.

Interestingly, one of the best known engagements with radical education in modern philosophy of education (**Barrow, 1978**) sees no need to go beyond the minimalist characterisation of a radical as someone 'who wants change that involves going to the root of the matter, as opposed to one who wants no change at all or one who wants superficial change' (p.1).

I include examples from the pioneering work of Alex Bloom between 1945 and 1955 at St. George - in - the East Secondary School in Stepney , London (see **Fielding , 2005**) ,arguably **the most compelling example** of prefigurative democratic practice within the secondary sector in England since the watershed of the 1944 Education Act .3 A. An Intended and Proclaimed Democratic Coherence.