

Project:
**The Landscape and Isobars of European Values in
Relation to Science and New Technology (Value
Isobars)**

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Work package 2

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1. Introduction and Overview

This work package aims at a) reviewing the data quality in value surveys, b) comparing methodological approaches and c) providing an improved survey scheme for value studies. In the first phase of the project, we made preliminary progress on the two first objectives. Specifically, we addressed the following questions:

1. What value concepts inform empirical studies in the science and technology domain? What are the strengths and weaknesses of the respective approaches?
2. What data are available for analyses of the relationship between values and public perceptions of science and technology?
3. What is being published on the relationship between values and public perceptions of science and technology?

The first two questions were addressed through a review of the literature on the conceptualisation and measurement of values in the context of science and technology and a preliminary assessment of the availability of relevant data. We suggested that there are many different understandings of the term value, and that the literature was fragmented. With regards to the availability of data on values in the context of science and technology, we found some data on values as well as on attitudes towards science and technology but not a lot of surveys that combine both topics. However, we suggested that more detailed work is needed in the analysis and combination of the available data in order to identify areas of agreement and disagreement for different technologies and look for patterns or an absence of them, when classifying cultures, groups and individuals. We will deal with these issues in the final phase of the project. Such comparisons would potentially increase our understanding of benefits and shortcomings of different measurement and analytical approaches. To further inquire how different lines of thoughts have influenced theoretical as well as empirical research on values in the context of science and technology, in this deliverable we focus on the exploration of publication activities since 1956 on the issue and look at the theoretical traditions these tend to follow.

We did this by exploring the breadth and nature of academic discussions that exist on values in relation to science and technology. We sought to discover what is being published on values and public perceptions of science and technology, hoping to also uncover what is missing. In the first report, we presented a preliminary analysis of this review. The first search resulted in a very low proportion of empirical papers (only 200 from the 2,267) and we wanted to ensure that all relevant papers have been included. This report presents a more extensive and improved exploration and analysis of the relevant literature, the themes that emerged, the theoretical frameworks that contoured it and the methodologies used to study biotechnology. We present the results in this order.

2. Literature Review

2.1 Method

We used the ISI Web of Science database to review the literature (empirical and non-empirical) on values and science and technology. For our search we included only the Social Sciences Citation Index (1956-present) and the Arts and Humanities Citation Index (1975-present), excluding the Sciences Citation Index (SCI) because we were mainly interested in empirical research on values and related concepts, and this is provided by the social scientific literature. However, we acknowledge that social scientists may also publish their work in science and technology-related journals. Yet it was not possible to include all databases in our search as it would make the present review an impossible endeavor, yielding a massive amount of data. We also excluded the Conference Proceedings Citation Index because we were interested in peer-reviewed publications that allow for an evaluation of the current academic debate in the sense that some degree of consensus is ensured. We are well aware that the coverage of the databases is not exactly the same for all times, places and all disciplines. This limitation should be kept in mind when interpreting our results. However, we consider it a useful tool for getting a systematic overview on trends and developments. We also decided to include English publications only. Knowing that this disadvantages some disciplines and all non-English languages, we voted for this procedure both because we are unable to read most of the non-English languages and also because non-English languages are not equally covered in the database. By concentrating on English contributions we deal with what might be called the international quintessence of the debate.

On the basis of the preceding theoretical discussion, we conducted our search using keywords that are normally connected to discussions around public perceptions of science and technology and value concepts. More specifically we searched for: value* or worldview* or ethic* or moral* or cultu* or relig* in the *title* AND scien* or technol* in the *topic*. A topic search looks for the keywords in the title, abstract and keywords as opposed to a title search, which only looks at the titles. We tested the validity of our search by looking for key authors and publications retrieved by a *titles* only search and we found that some of the key publications on the researched topic area did not mention all of our keywords in their titles and were consequently omitted by this type of search. A topics search for scien* or technol* hence results in a higher number of results, ensuring a more inclusive coverage. We included only articles excluding other document types such as reviews, letters, notes, discussion, conference proceedings, editorial material etc. The search derived 8,786 results. For comparison, we also ran a search including reviews, letters and other potentially useful document types but the search retrieved more than 15,000 results, which evidently is a difficult number to review and analyse and was abandoned for pragmatic reasons. Furthermore, the interest in this context is on empirical studies, which are unlikely to be published in such formats. As already mentioned, we included all years in our search but restricted it to English only publications, again for pragmatic reasons. Although, this choice would seem like a bias in our research, in fact in the database search the majority of publications were in English language followed by a very small volume of publications in other languages mostly in German, French and Spanish. This is not an observation only relevant to the specific topic. In fact, the English language is the dominant language for the dissemination of results in the social sciences in general, accounting for 94.45% of publications in the social sciences covered in SSCI (Gingras, 2010).

The results were exported to a library of the Endnote software, where they were further coded. This process aimed at cleaning the database from publications that did not take a social scientific angle in examining issues pertinent to values in the broadest sense and science and technology (for example,

the term 'value' also is frequent in methodological or statistics papers). Each record was checked for its relevance and was coded either as an empirical or a non-empirical paper. Empirical was defined in a broad sense, including different social research methods such as surveys, interviews, focus group studies, experiments and case studies. The final database consisted of 4,348 results, which were then exported to SPSS for further analyses.

2.2 Findings

The first question we want to address is the proportion of empirical and non-empirical publications within our data. Being concerned with the measurement of values, empirical papers are of special interest as they need to translate value concepts into measurement. The number of such empirical studies, however, is relatively low. Out of 4,348 publications from 1956 to 2010, 3,359 were non-empirical papers and 989 were empirical occupying 23% of the overall body of literature. This is a higher proportion of empirical publications compared to those derived from our first search, suggesting that with our new search strategy we were more successful to include all relevant publications.

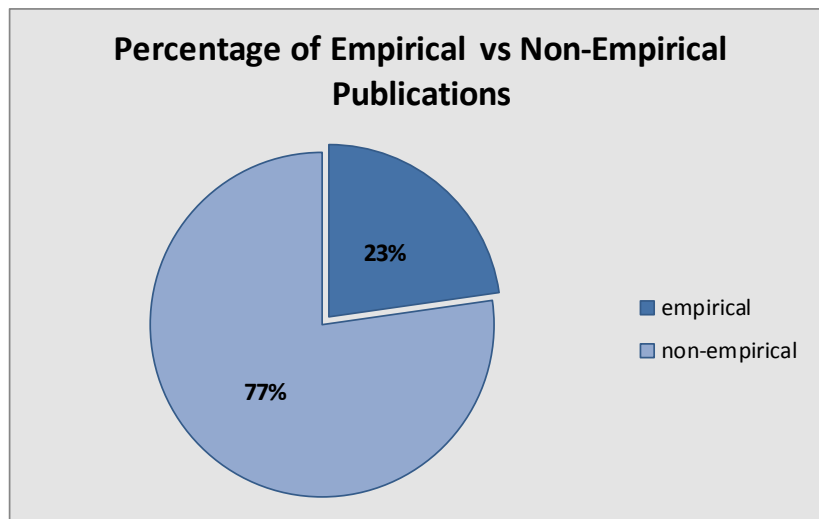


Figure 1: *Frequencies of empirical and non-empirical publications*

We then explored how the publications are distributed over time. Figure 2 presents the distribution for 10 year periods. We observe a linear increase of publications on values and science & technology. Please note that the period between 1956 and 1960 only includes 5 years. In addition, the data available for the period 1956 to 1970 represent publications only from the Social Sciences Citation Index.

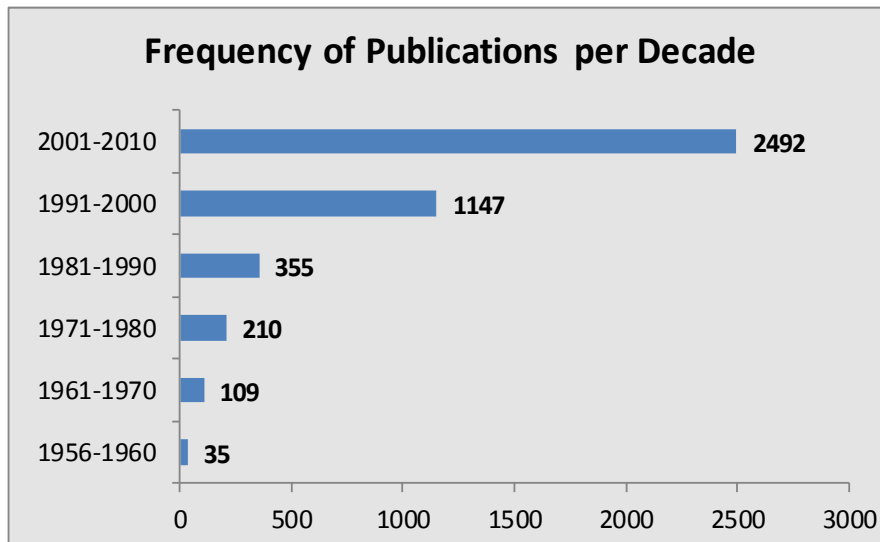


Figure 2: *Distribution of publications per decade*

Our next step in the analysis was to explore similarities and differences in the distribution of empirical and non-empirical publications over time. Figure 3 presents the results confirming a similar trend, thus showing a linear increase in the publication of empirical and non-empirical contributions. Although the number of empirical studies is chronically low in comparison to non-empirical papers, it is the last two decades that saw a number of empirical work to be published.

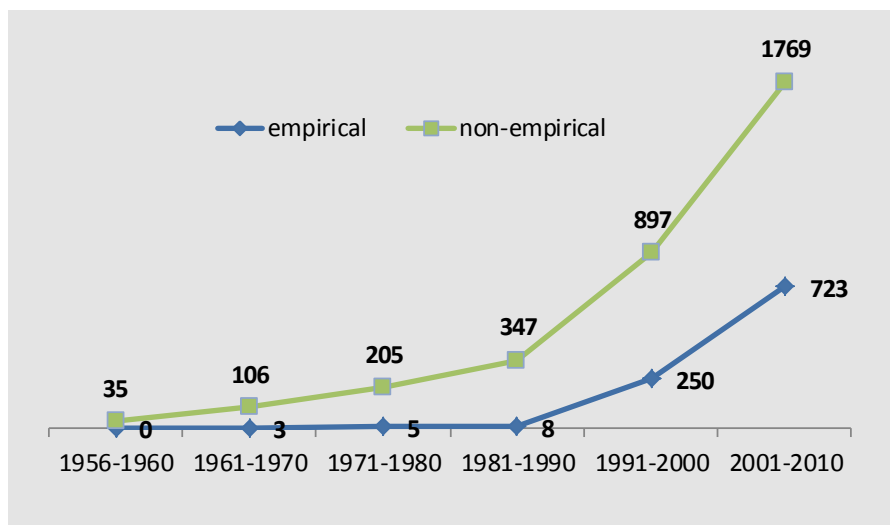


Figure 3: *Distribution of empirical and non-empirical publications per Decade.*

We were also interested in examining which are the key journals that publish on the topic of interest. Figure 4 presents the frequencies of publications by Journal. This graph presents only those that appear more than ten times. *Zygon* (158 times) is the most important journal in this area, followed by *Journal of Medical Ethics* (107), *Social Science & Medicine* (93), *Science and Engineering Ethics* (72). *Zygon* is an interdisciplinary journal existing since 1966, with contributions from the natural sciences and from the humanities, and it is dedicated to the areas of science, religion and morality. *Journal of Medical Ethics*, *Social Science & Medicine*, *Science and Engineering Ethics* are journals with a focus on ethical issues confronting scientists, engineers, medical doctors and professionals involved in health care. The journal of *Science, Technology and Human Values* (41), a key journal in the research topic area, ranked 6th on the list.

The remaining journals come from a mixture of disciplines, covering both the social and the natural sciences, and addressing four further issues: business ethics (*Journal of Business Ethics* -51-), science education (*International Journal of Science Education* -40-, *Journal of Research in Science Teaching* -40-), bioethics (*Bioethics* - 32-, *American Journal of Bioethics* -32-) and environmental ethics (*Agricultural & Environmental Ethics* - 29-).

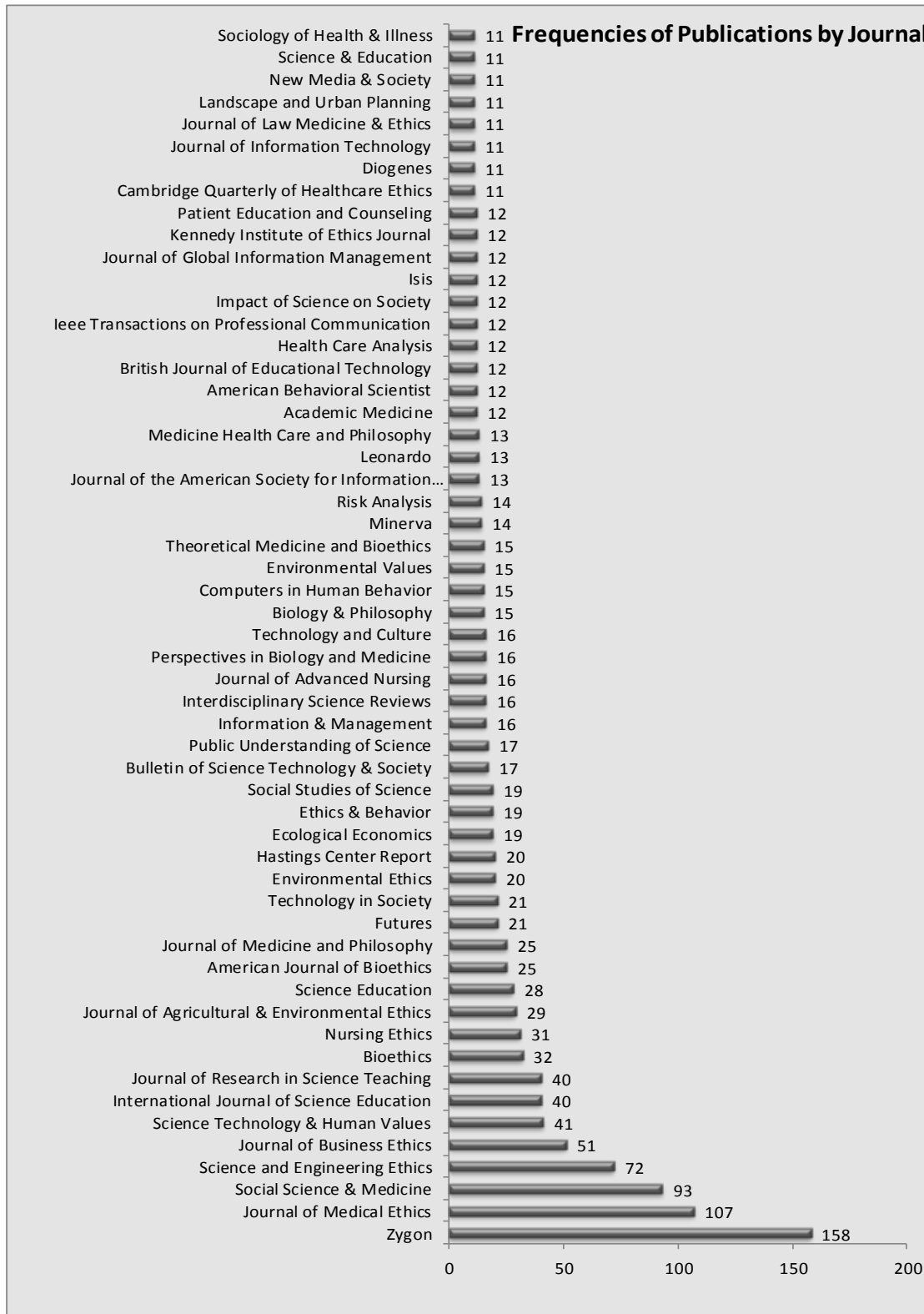


Figure 4: *Frequencies of Publications by Journal.*

When we examine which journals publish *empirical* papers on values, science and technology (figure 5), Zygon completely disappears from the list. When it comes to empirical studies, *Social Science & Medicine* (49), the *Journal of Research in Science Teaching* (32), the *International Journal of Science Education* (30) and *Journal of Business Ethics*(20) take the lead. The four journals are dedicated to medical ethics, science education and business ethics and so are some of the remaining journals. We can also see that *Public Understanding of Science* and *Information Technology* have a strong presence.

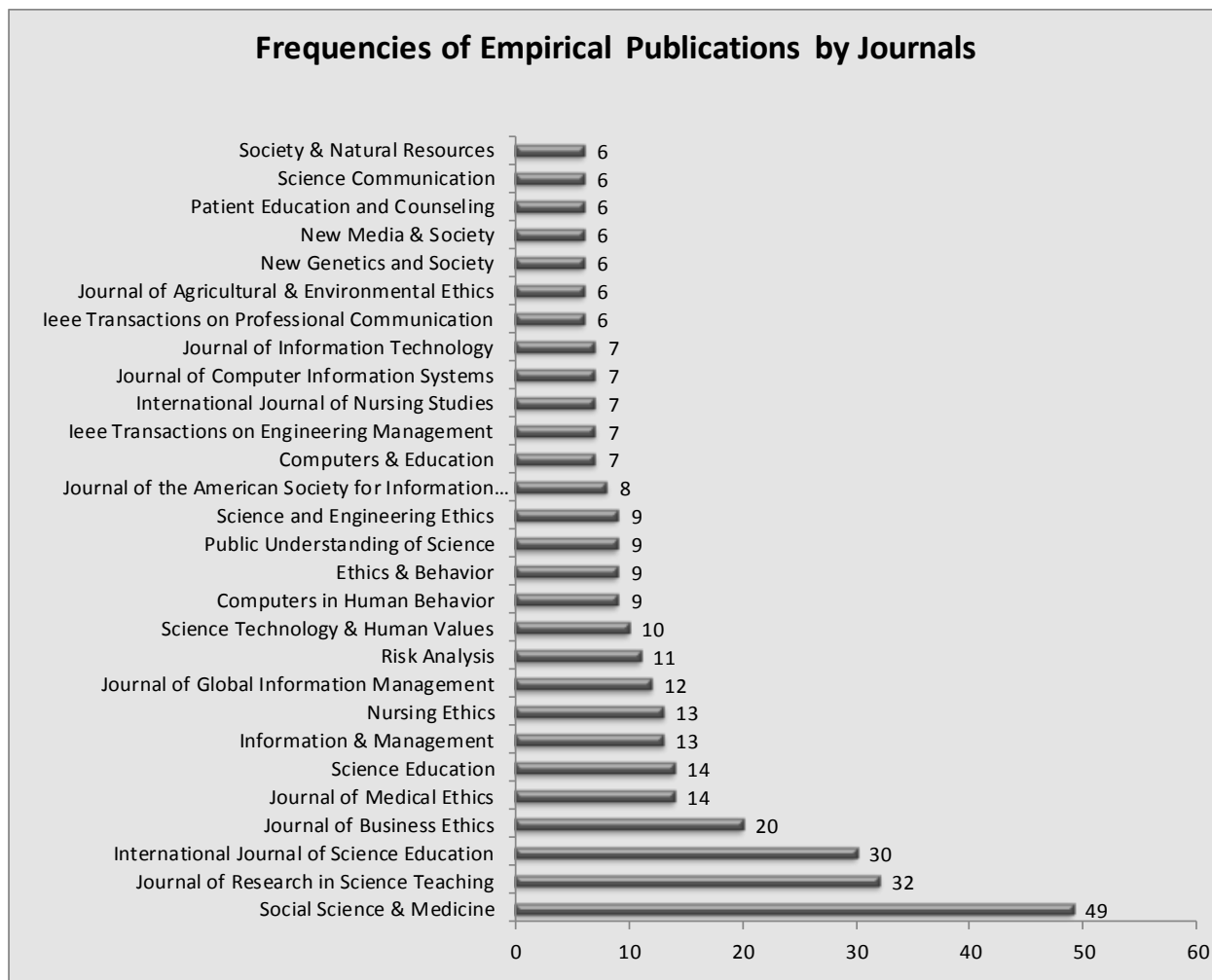


Figure 5: *Frequencies of Empirical Publications by Journal.*

2.3 Geographical Analysis

We were also interested in examining the types of relationships between the publications and the countries that produce them. Each of the references was coded based on the first author's affiliation using the 2010 World Bank's country classification (209 countries)¹. From the 4,348 publications, 490 are missing from this analysis because they either did not report the author's affiliation or did not provide any details about the author's country of origin. Figures 6 and 7 show the frequencies of

¹ Source: The World Bank
<http://econ.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20523404~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html>

publications by the country of the first author's affiliation first in the European Union – 23 countries out of 27 were found in our database - and then outside the EU. For the cross-cultural analysis, we note that that we do not report all of the countries retrieved in the present search but we restrict the analysis only to the countries that have produced up to 14 publications.

From figure 6, we can see that the UK with 478 articles dominates the science production on the issue of interest, followed by the Netherlands with 105 articles and Germany with 71 articles. Evidently, the focus on English language can explain this imbalance, which comes from the fact that the SSCI is biased towards English-language journals from the UK. In addition to this, most journals in the social sciences are edited in the UK, Germany and the Netherlands (Gingras, 2010).

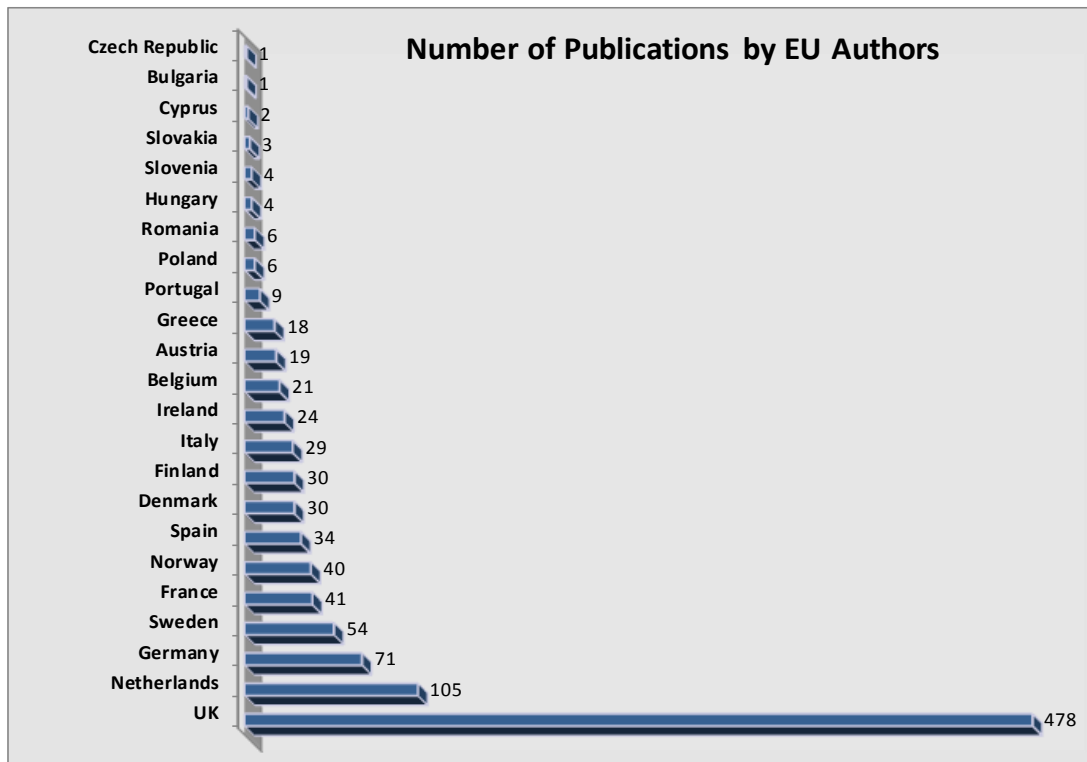


Figure 6: Number of Publications by EU Authors

When comparing the above EU countries with the rest of the world, we can note an obvious transatlantic difference. The Americans (n=1967) occupy the majority of the literature on values, science and technology, followed by the Europeans (n=1045). Canada (n=260), Australia (n=162), Israel (n=51) also seem to exhibit a vibrant academic activity in this field. However, we need again to examine these results in light of the general trends in the global production of social sciences. We thus find North America occupying a dominant position in the SSCI database as well as in the edition of social science journals (Gingras, 2010).

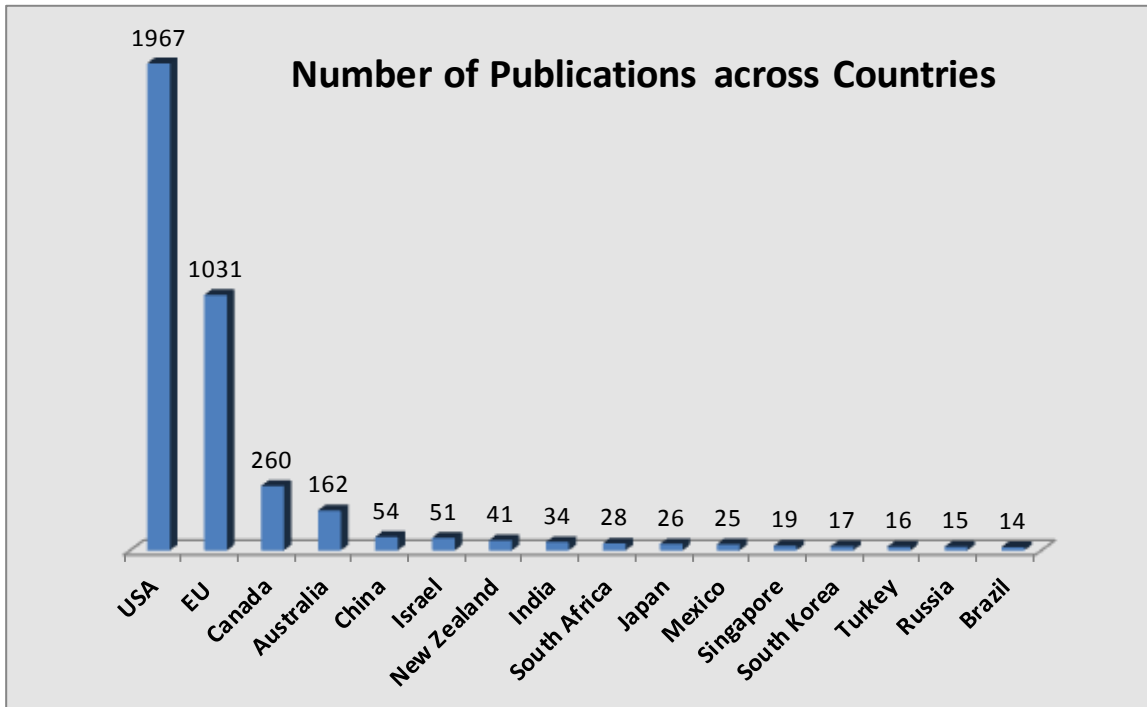


Figure 7: Number of publications across different countries

Interested in the types of journals scientists tend to publish in, especially those who come from countries with a strong publication, we cross-tabulated the six most popular journals (figure 4) with the six top countries (figures 6 & 7). Table 1 shows the results for the European publications. We can see that there is a preference for journals focusing on ethics and societal issues around medicine (i.e. Journal of Medical Ethics & Social Science and Medicine), as well as for journals that concentrate on ethics about science and technology in general (i.e. Science and Engineering Ethics). Apart from the UK, journals that examine business ethics as well as religion and science & technology do not seem to be very attractive for Europeans. *Science, Technology & Human Values*, a journal specifically aimed at research on the relationship between social values and science does not seem to attract a lot of European researchers.

	Journal of Business Ethics	Journal of Medical Ethics	Science Technology & Human Values	Science and Engineering Ethics	Social Science & Medicine	Zygon	Total
UK	10	5	7	18	7	25	72
Netherlands	1	3	4	7	0	4	19
Germany	0	5	0	2	2	3	12
Sweden	1	5	0	1	0	2	9
France	0	3	0	1	0	1	5
Norway	0	1	2	2	6	1	12
Total	12	22	13	31	13	36	128

Table 1: Distribution of the six most significant journals in the six most research active countries in the EU

When we look at the same journals in non-European countries (table 2), we see a strong preference for Zygon, especially by the USA. This finding is consonant with extant empirical research that shows a salience of religious values and religion in American society and in particular in relation to science and technology (Scheufele, Corley, Shih, Dalrymple, & Ho, 2009). *Social Science & Medicine* and

Science and Engineering Ethics are also popular journals. However, in contrast to Europeans, business ethics seems to be a more important thematic area for Americans and Canadians. It is also interesting to note that China apart from *the Journal of Business Ethics* does not seem to publish anything in any of the other journals.

	Journal of Business Ethics	Journal of Medical Ethics	Science Technology & Human Values	Science and Engineering Ethics	Social Science & Medicine	Zygon	Total
USA	33	18	24	38	27	124	264
Canada	4	1	0	1	6	3	15
Australia	0	8	1	1	7	1	18
China	1	0	0	0	0	0	1
Israel	0	2	0	0	4	0	6
New Zealand	0	4	1	1	2	0	8
Total	38	33	26	41	46	128	312

Table 2: *Distribution of the six most significant journals in the six most research active countries outside the EU*

When we look at the distribution of empirical publications across the same countries, we get a similar picture. The Anglo-Saxon cultures show higher publication rates than all other countries.

	Social Science & Medicine	Journal of Research in Science Teaching	International Journal of Science Education	Journal of Business Ethics	Journal of Medical Ethics	Science Education	Total
UK	21	2	5	2	27	4	61
Netherlands	0	0	1	1	3	0	5
Germany	2	0	0	0	5	0	7
Sweden	0	0	0	1	5	0	6
France	0	0	0	0	3	0	3
Norway	6	0	0	0	1	0	7
Total	29	2	6	4	44	4	89

Table 3: *Distribution of the six most significant empirical journals in the six most research active countries in the EU.*

	Social Science & Medicine	Journal of Research in Science Teaching	International Journal of Science Education	Journal of Business Ethics	Journal of Medical Ethics	Science Education	Total
USA	27	28	5	33	18	16	127
Canada	6	3	6	4	1	4	24
Australia	7	3	3	0	8	4	25
China	0	0	1	1	0	1	3
Israel	4	1	1	0	2	0	8
New Zealand	2	0	2	0	4	0	8
Total	46	35	19	38	33	25	196

Table 4: *Distribution of the six most significant empirical journals in the six most research active countries outside the EU.*

These figures aimed to provide a first picture of the cross-cultural distribution of publication. But given the differences in population sizes across countries, we performed an analysis of all publications by country calculating the rate per million population (figures 8 and 9). The ‘World Population Prospects: The 2008 Revision’ issued by the United Nations Secretariat² was used to retrieve information on the countries’ population rates. When controlling for population size, a different story emerges. In the EU (figure 8), Norway (n=8.2) and not the UK (n=7.7) now leads the publication production on values, science and technology. However, British scientists still are among the most productive in Europe. Finland (n=5.6), Ireland (=2.3), Cyprus (n=2.3) and Slovenia (n=2) significantly moved up to the top ten while Spain (n=0.8), France (n=0.7) and Italy (n=0.5) inversely dropped to the bottom ten.

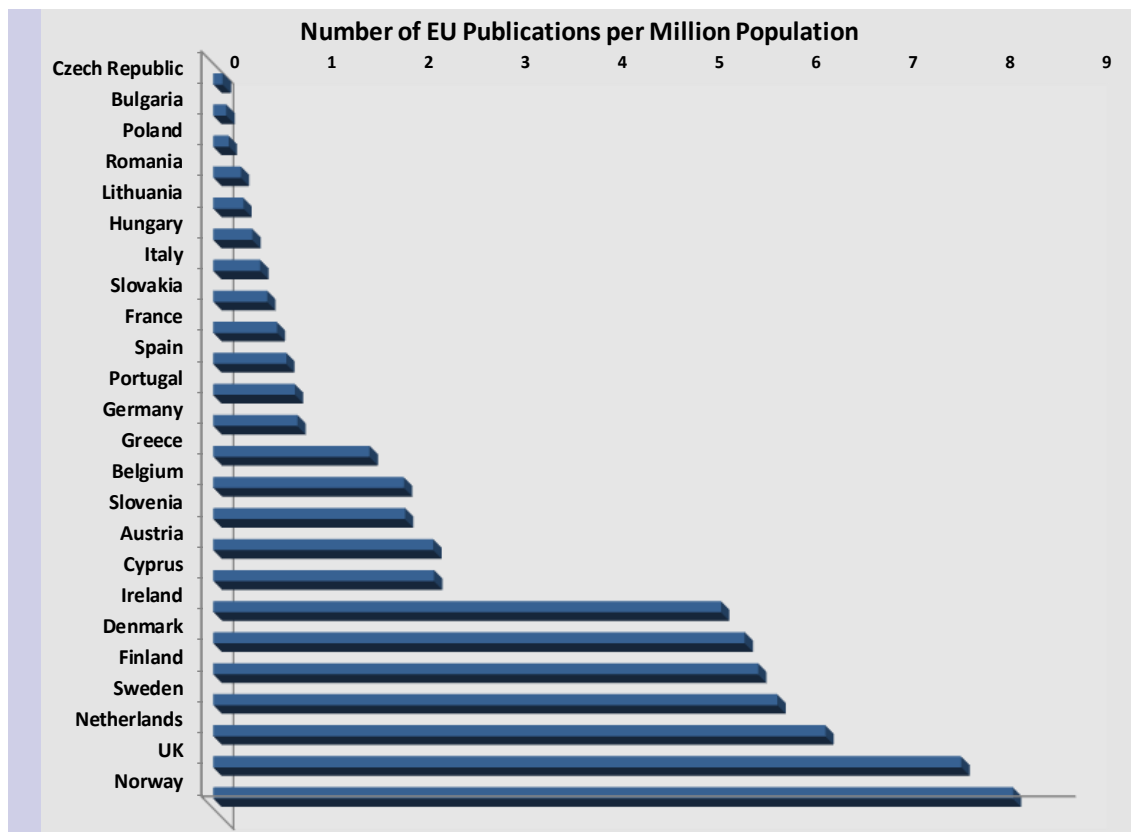


Figure 8: *Number of Articles per Million Population in the EU.*

²<http://esa.un.org/unpp/>

When comparing the EU with the rest of the world, likewise we can distinguish a different picture. The United States (n=6.2) drops to the fifth position and New Zealand (n=9.5) takes the lead in publications, followed by Canada (n=7.7). Australia (n=7.5), Israel (n=7) and Singapore (n= 3.9) also move up the ranking, demonstrating a strong academic presence in the field. The EU (n=2.1) loses its prevailing position when controlling for its population and scores 7th after Singapore.

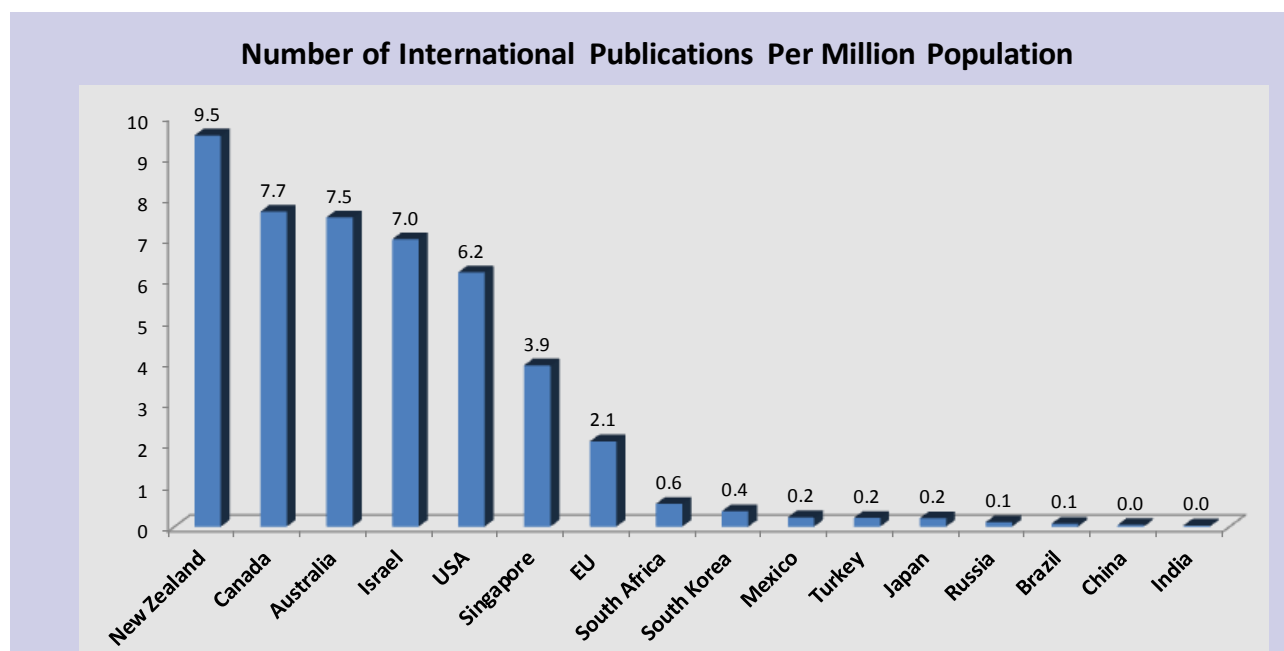


Figure 9: Number of International Publications per Million Population.

2.4 Themes Identified – ALCESTE Analysis

In our previous report, we performed a word count of the articles' keywords using Atlas.ti, in an attempt to identify the key themes the publications tend to focus on. In this report, we use the software ALCESTE, which is specifically designed for this purpose. ALCESTE, performing a correspondence analysis, classifies words used about a topic, thus identifying different ways of talking about that topic (Reinert, 1990; 1998). ALCESTE looks firstly for words that are frequently mentioned and secondly for words that co-occur. According to these criteria it distinguishes word classes that represent different forms of structures and discourse about the topic of interest (Kronberger & Wagner, 2000). Using the references' year, title, journal and abstract will thus allow us to explore the dominant themes and the key terms underpinning each theme.

The use of ALCESTE rests on two important preconditions. Firstly, the corpus must be homogenous in its conditions of production and in its themes. In our case, our corpus (i.e. abstracts) focuses on values, science and technology and clearly fulfills this precondition. Secondly, the corpus must be big enough (10,000+ words). Our corpus of 4,338 references contains 628,164 words, making the data corpus highly suitable for an ALCESTE analysis. ALCESTE is not suitable for hypothesis testing but rather for an exploratory analysis that can be followed by a more in-depth analysis.

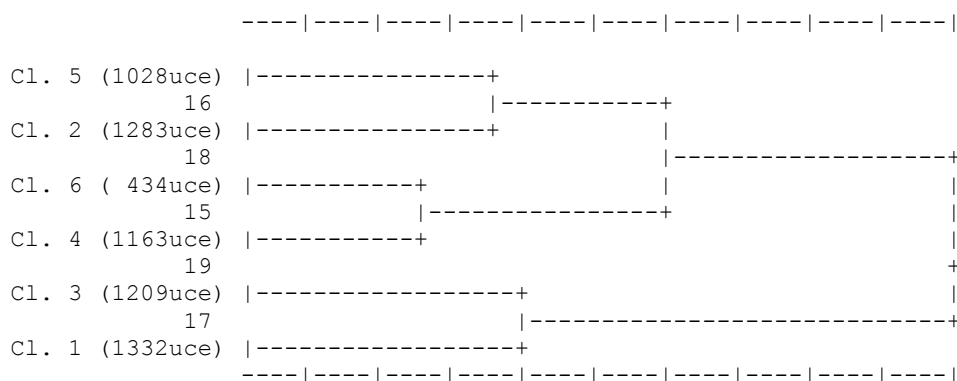
After formatting³ the text, we ran the analysis. Table 5 gives a summary of the Alceste analysis for our corpus. Alceste divides the corpus into ECUs (i.e. sentence-like units) based on the punctuation and the number of words contained. Thereby, two analyses based on ECUs of slightly differing length are being calculated and compared. The level of the strength of the analysis is provided by the percentage of the corpus that can be classified in a stable way (that is, in the same way in the two analyses). In this case it was about 77%, which indicates a relatively good analysis.

Number of words in corpus	628164
Number of different unique words identified	28781
Total number of words used in analysis	13491
Number of ICU's	1
Number of ECU's	8340
Average number of significant words per ECU	31.917990
Number of lexical classes	6
Volume of Text Analysed	77.32%

Table 5: Summary of Alceste Analysis

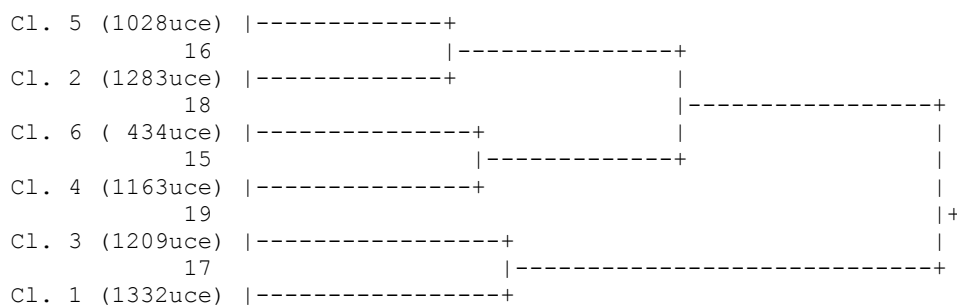
Our corpus was divided into six classes. The following dendograms show that the two separate analyses based on different lengths of units resulted in the same six-class solution. Consequently, we can confidently confirm the validity of the classification. The dendograms are also useful for examining the linkages between the different classes. This is done in the description of the classes. It shows, for example, that in comparison to the other classes, the vocabulary in classes 5 and 2 is relatively similar. The classes 3 and 1 seem to be more distinct from the remaining classes in terms of the vocabulary used.

Classification DescendanteHiérarchique...
 Dendrogramme des classes stables (à partir de B3_rcdh1) :



³ For an ALCESTE analysis, the text needs to be prepared beforehand. For a full exposition of the details and logic behind the text preparation see Reinert (1998).

Classification DescendanteHiérarchique...
 Dendrogramme des classes stables (à partir de B3_rcdh2) :



Let us now turn to the question, what contents are being dealt with in the articles we found in our SSCI search. Table 6 shows the most important words of each lexical class. Each list is ordered from the most central to the least central, based on a chi2 value, which indicates the relationship of the word to the class. The higher on top a word appears, the more important it was for the construction of the class. We report the top forty words. Please refer to the appendix for the full list.

Based on this data and more details from the ALCESTE analysis (not all presented here) we can describe the contents of the six classes as follows:

Class 1, 'Science Education', refers to knowledge and learning about science in schools, colleges and universities. This class was the largest of all, showing that science education is a highly important context for publications on values and science and technology. The idea of empirical research also seems to be prevalent in this class. This is reflected through the frequent use of specific words like *attitudes, study, questionnaire, survey, rating, measures, interview, qualitative, correlation, and measurement*. Science education thus seems like a thematic area that attracts extensive empirical research, which seems to be taken on by both qualitative and quantitative approaches.

Class 2, 'Socio-economic Development and Sustainability', relates to the discourse of technological development and its implications on the trajectory of global social, political cultural and economic order. It is anchored in publications about mass *media* development, *sustainability, the environment and ecology, industrialisation and urbanisation, globalisation and localism, history and modernity*.

Class 3, 'Technological Diffusion and Markets' focuses on technological applications and in particular on technological acceptance in the context of business growth. Looking at the specific words (eg. *computer, software, web, mobile*) information technology seems to be the key technology that researchers look at, when studying organisational development and business innovation. Similar to Class 1, Class 3 also seems to be associated with empirical research (e.g. *empirical, study, findings*). That is perhaps the main reason why we find these two classes linking to each other based on the dendrogram.

Class 4, 'Medical Ethics', looks at ethical dimensions of medical and clinical work as well as health care. It consists of words like *ethics, clinical, medical, patient, healthcare, trial, consent, legal, guidelines* alluding to the role of ethics and regulations in biomedical research and healthcare provision and professionals' responsibilities in relation to patients' rights and their exposure to risks.

CLASS 1	CLASS 2	CLASS 3	CLASS 4	CLASS 5	CLASS 6
20.65 % of ECUs	19.89 % of ECUs	18.75 % of ECUs	18.03 % of ECUs	15.94 % of ECUs	6.73 % of ECUs
SCIENCE EDUCATION	SOCIO-ECONOMIC DEVELOPMENT AND SUSTAINABILITY	TECHNOLOGICAL DIFFUSION IN THE MARKETS	MEDICAL ETHICS	RELIGION AND SCIENCE	BIOETHICS AND LAW
student+ were teacher+ school+ questionnaire+ teach. interview+ study+ educat_+ sample+ ethnic+ curriculum+ score+ particip+ female+ was data survey+ item+ group+ attitude+ gender+ course+ male+ differ+ facult+ classroom+ minor+ report+ learn. had instruct+ family+ rate+ university+ respondent+ children+ train+ result+ educat+ their correlat+ overall college+ high+ qualitat+ random+ rating+ measure+ using	politic+ cultur_ media+ change+ ecolog+ century+ sustain+ econom+ society+ new+ modern+ global+ transform+ histor+ discourse+ environment+ contemporar+ industrial+ local+ material+ conservat+ creat+ water+ govern+ social+ article+ televis+ form+ island+ construct+ capital+ space+ artist+ embrace+ technolog+ chang+ aesthetic+ nineteenth product+ produce+ landscape+ image+ france+ urban+ climate+ symbol+ institut+ land+ past become.	firm+ management+ value+ system+ organisational user+ business+ model+ innov+ adopt+ market+ custom+ commerce+ manager+ inform+ study+ industr+ service+ result+ invest+ effect+ e web influence+ mobile+ technolog+ consumer+ trust+ company+ diffus+ impact+ employee+ perform+ software+ distance+ factor+ findings+ chain+ cost. internet+ communic+ empirical+ shar+ design+ is computer+ resource+ network+ efficienc+ b_v_	ethical+ patient+ care+ medical+ clinical+ health+ treat+ ethic+ medicine+ principle+ psychiatr+ trial+ consent+ issue+ decision+ prevent+ professional+ guideline+ dilemma+ disease+ autonomy+ right+ justice harm+ illness+ moral+ responsibilities disorder+ physic+ respons+ forensic+ legal+ families+ healthcare ill neuroimag+ consider+ subject+ benefic+ advance+ risk+ biomedical+ death+ placebo+ mental+ review+ standard+ brain+ make. person+	religi_ philosoph+ zygon+ theolog+ science+ his god+ l secular+ evolution+ darwin+ think. christian+ tradition+ real+ he natural+ worldview+ theor+ claim+ biolog+ religion+ essay+ metaphys+ mind+ rational+ nature+ truth+ scientific+ histor+ human+ modern+ religious faith+ critique+ argue+ scholar+ read. ideal+ idea+ is moral+ not being+ its interpret+ origin+ epistemolog+ root+ biological+	cell+ embryo_+ stem+ genetic+ tissue+ cloning+ reproduct+ regul+ patent+ commission+ legal+ bioethic+ human+ federal+ ethical+ abortion+ biotechnolog+ debate+ raise+ council+ advisor+ sex gene+ policy bank+ law+ therapeutic+ therap+ issue+ dna legislat+ public+ commercial+ right+ transplant+ regulatory animal+ welfare argument+ fund+ status fetal committee+ research+ controvers+ moral+ protect+ advice+ 9 should applic+

Table 6: Most important words in each class based on their chi2 values.

Class 5, 'Religion and Science', examines the relationship between religious and scientific worldviews. Some characteristic words contained in this class are *religion, science, zygon, philosophy, theology, secular, god, Christian, biology, evolution, Darwin, morality*. It is not surprising to find the Journal Zygon in this class, as it deals precisely with these issues. Hence, this type of literature seems to deal with the epistemological, metaphysical and philosophical issues on human nature, the existence of God and the origin of human species. The role of Christian faith and values in these debates seems to be also quite important. This class is closely associated with class 2. This may be because debates about scientific progress and human nature are likely to extend to discussions about the wider implications of science on human societies and their development. In a way, we can say that these two classes represent discourses about the concept of good life in the context of science and technology.

Class 6, 'Bioethics and Law' is the smallest of all classes and seems to be linked to debates on regulatory frameworks about biotechnology. Some of the key words included in this class are *cell, embryo, cloning, therapeutic, reproductive, transplant, public, debate, commercial, law, legislation, animal*. This literature deals with moral debates on the regulatory aspects biotechnology pertinent to issues of basic research, research procedures, data storage and applications (from embryonic stem cell research, stem cell banks, animal welfare, cloning to transplantations, IVF and gene therapy). It is thus not surprising to find this class closely related to class 4, which also emphasises the ethical issues underpinning biomedical research and healthcare.

In a next step, we analysed how the publications relate to the theoretical value concepts we described in our first deliverable. More specifically, we explored how the different theoretical frameworks discussed in the previous report influence both empirical studies and theoretical work published. For this purpose, the most important authors in the area of for each approach are listed in the table below. We analysed how often these authors were cited (a) in the non-empirical and (b) in the empirical publications.

A look at the table shows the 'usual suspects' from the literature on values as leading the literature on values in the context of science & technology. In empirical publications, we can see the prevalence of the traditional psychometric approach, as represented by Schwartz, Slovic, Rokeach, Hofstede, Inglehart and Triandis. In non-empirical publications, we find again Hofstede dominating the field but the anthropological paradigm -with Mary Douglas at the forefront- seems to have an equally strong presence.

Approach to conceptualising and measuring values	Author name	Frequency: Author cited in non-empirical publications	Frequency: Author cited in empirical publications
1. ideals/goals	Schwartz S.	12	44
	Allport G.	21	7
2. dangers	Slovic P.	39	50
3. value conflict	Kahneman D.	20	18
	Baron J.	10	7
	Fiske A.	4	2
4. values in practice	Rokeach M.	14	23
	Morris C.	9	2
	Rayner S.	12	3
5. cross-cultural comparison	Hofstede G.	85	234
	Inglehart R.	11	30
	Triandis H.	17	59
6. cultural variability	Douglas M.	68	22
	Wildavsky A.	7	5
	Dake K.	3	8
7. human problems	Kluckhohn C./F.	14	10

Table 7: *The influence of theoretical approaches to conceptualising and measuring values on empirical studies (N = 4.348 publications). Note that a publication can cite more than one of the listed authors.*

What can be learned from this analysis is that there is not one single conceptualisation of values that dominates the field. Both in empirical and theoretical work, a number of value conceptualisations play an important role. In the following we take a closer look at our main area of interest, namely the empirical studies on values and related concepts.

2.5 Empirical studies on values, science and technology

For a more detailed analysis of the empirical studies on values, science and technology, we coded the 989 empirical publications with the help of the ATLAS.ti software, which facilitates qualitative coding. We included the titles and abstracts of the publications and conducted automated search for key words, including value concepts, contexts and methodologies.

Our search in the SSCI data base consisted of a search for the key words *value, worldview, ethics, moral, culture or religion* and all their grammatical variations (see section 2.1). The following table shows that more than half of the empirical papers dealt with questions on culture. More than a third of the papers referred to the concept of value while slightly more than a quarter of the papers employed the concept of ethics. Moral and religious aspects both were addressed in about 9% of the empirical papers. The worldview concept clearly is the least often used concept for guiding empirical analyses.

Topics	Percentage of empirical articles
Cultur*	52%
Value*	37%
Ethic*	28%
Moral*	9%
Religion	9%
Worldview*	1%

Table 8: Percentages of key topics in empirical research. Note that more than one concept can be used in a publication; the percentages hence do not sum up to 100%.

In a next step, we analysed the methods used for addressing values and related concepts in empirical ways. As the following table shows, the survey is the most frequent used method, followed by interviews and focus groups. Other social research methods are present as well, although with much lower frequency.

Methods	Percentage of empirical articles
Survey	29%
Interview or Focus Group	23%
Media Analysis	11%
Case Study	7%
Experiment	5%
Observation	4%
Ethnography	3%
Action Research	1%
Repertory Grid	0%

Table 9: Percentages of methods used in empirical research. Note that more than one method can be used in a publication; furthermore, not all publications indicated in their title or abstract the methodology used. The percentages hence do not sum up to 100%.

Of particular interest to the Value Isobars project is the question, which contexts are likely to elicit empirical value studies. As the following table shows, research questions on values and related concepts have been most likely to arise in medical contexts; one third of the empirical papers deals with questions related to medicine and its practices. Science education is another important context that also elicits empirical value-related studies. About a quarter of the published empirical studies relates to questions in the domain of information technology. Economic issues are also raised in a relevant number of published articles. Values in the context of environmental issues or biotechnology are addressed in about 10% of the published papers. Issues like agriculture, food, climate change and sustainability, or nuclear energy and nanotechnology represent the least frequent contexts eliciting value studies

Context	Percentage of empirical articles
Medical context	33%
Science education	29%
Information technology	25%
Economic context	18%
Environmental issues	11%
Biotechnology	9%
Agriculture	5%
Food	4%
Climate change & sustainability	2%
Legal context	2%
Nuclear energy	1%
Nanotechnology	1%

Table 10. Percentages of contexts researched in empirical value studies. Note that more than one concept can be used; the percentages hence do not sum up to 100%.

Comparing these analyses to the ALCESTE analysis, which was based on both empirical and theoretical publications, we see that most issues resulting from the more general analysis also are being addressed in empirical work. Religious and legal issues seem to be more likely to be addressed in non-empirical than in empirical publications.

Since the Value Isobars project has chosen two applications – biometrics and dual use – we also checked whether and how often these issues come up in empirical value research. We did not find a single publication dealing with these issues. However, since these two applications often become relevant in the wider context of biologically sensitive issues, we picked out empirical research on biotechnology and analyse what questions are being addressed in this content domain. Out of all empirical publications, nine per cent deal with biotechnology. Nearly all of these employ surveys and interviews or focus groups as research method to address values in relation to biotechnology (including issues such as cloning, stem cell research, xenotransplantation, genetic testing, genetic engineering, etc.). Although values, morality, ethics, were found to be used interchangeably, ethics seemed to be used the most. This means that there is no conceptual clarity that guides empirical research, while also ‘ethics’ seems to be used as a meta-term that encompasses everything.

As the Value Isobars project is primarily interested in values as held by the general public, it seems worthwhile to consider who is included in the sample of this research. The following table shows that the general public indeed is addressed in a number of empirical studies (there are nineteen empirical studies available⁴). However, there are more studies that address special groups, such as scientists, students, staff and employees working in biotechnology-related fields, patients or other stakeholders. Taking the perspective of policy-makers in the field of biotechnology who want to take empirical evidence of views held by the public into account, it can be concluded that there are not too many studies published in high quality journals that address the overlapping issues of general public concerns, values and biotechnology.

⁴ The number might be slightly higher as not all articles indicate in their title or abstract what research method was used. However, the numbers are not likely to change dramatically.

Biotechnology			
	Survey	Interview or focus groups	Both survey and interviews or focus groups
general public (representative samples or selected groups)	11	6	2
scientists/ researchers	7	5	0
students	4	3	1
biotech staff/ employees	1	2	2
patients (including participants in genetic research)	0	4	1
stakeholders	1	1	2

Table 11. Overview of the samples used in empirical research

3. Summary

What is being published on the relationship between values and public perceptions of science and technology, was the main question that this report addressed.

Our new search in the ISI Web of Science data bases revealed that the highest volume of publications was theoretical with one fifth to be empirical work. A linguistic bias in our search has partially accounted for the increased numbers in publications by the UK and other Anglo-Saxon cultures. Although, as we reported, only a small proportion of papers was published in other languages.

From the journal analysis, we found that topics like science education and business ethics seem to attract the most empirical interest, with the USA devoting the most research attention in these areas. In Europe, in tandem with these two fields, a good proportion of research also focuses on the societal and ethical dimensions of medicine and related fields, with the UK leading the publication records. This difference between the US and the EU may have to do with the organisation of health care. The health system in the EU is mainly publicly funded thus making an important part of the public sphere, open to public scrutiny and debates in contrast to the American system, which is mostly privately funded and thus perhaps less exposed to these types of discussions.

In terms of the themes identified, most articles concentrated on science education. This may partly relate to the fact that the vast proportion of publications is produced by the USA. However, can we tentatively say that values are entering the realm of science and society following a knowledge and education based model? Insofar as scientific developments are increasingly recognised to be dealing with value laden issues, are questions about educating the public(s) and future generations on values and ethics becoming priorities? This viewpoint touches on the concept of a right and obligation to information on the ethical and value related dimensions of science and technology, which yet remains to be further investigated.

Other research touched on the intersection between technological development and the concept of progress, bearing a close relevance to research on the relationship between religion and science. These two thematic areas in combination seem to reflect discussions about the role of values in socio-economic development and beliefs about the sanctity of life. The issue of technological diffusion and acceptance especially by markets and businesses was another popular research area. Finally, we identified ethical dilemmas as posed by the life sciences and the health system, especially in terms of the structure and delivery of health services, the regulation of research and their applications, as important objects of research efforts.

Turning to empirical studies on values and science and technology, we found that similar issues to those just mentioned are taken up for empirical investigation. There is a wide range of issues being addressed. This means that decision-makers interested in empirical research on values held by the general public for a specific context will not find too many publications. In addition, there was no unique conceptualisation of values that guided research in a specific context. This highlights that there still is a lacuna that should be addressed by further research.

In the next phase of the project, we will answer some of the questions that arose from both this report and our first deliverable. Furthermore, we will also review the data quality of the surveys in more detail and consider challenges of measuring values. In combination, we will provide a more detailed and integrated report on value concepts and measurement in empirical research. This critique will lead to the formulation of suggestions for future research that addresses values in the context of science and technology.

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Appendix

Alceste Output – List of words with chi2 square values composing each lexical class

Classe n° 5 => "Religion and Science"

 Nombre d'u.c.e. : 1028. soit : 15.94 %
 Nombre de "uns" (a+r) : 46765. soit : 15.71 %
 Nombre de mots analysés par uce : 25.13

num	effectifs	pourc.	chi2	identification	
27	32.	79.	40.51	36.02	V go.
44	32.	57.	56.14	69.36	V read.
48	51.	174.	29.31	23.86	V see.
55	105.	224.	46.88	165.73	V think.
56	142.	633.	22.43	22.08	V understand.
68	59.	217.	27.19	21.20	account+
118	19.	34.	55.88	40.70	ancient
122	38.	111.	34.23	28.21	anthropolog+
126	18.	37.	48.65	29.71	appeal+
131	17.	33.	51.52	31.33	appreci+
138	132.	437.	30.21	71.19	argue+
139	50.	160.	31.25	28.70	argument+
150	20.	38.	52.63	38.40	assert+
156	44.	111.	39.64	47.34	assumption+
157	55.	173.	31.79	33.34	attempt+
187	25.	43.	58.14	57.53	being+
189	75.	293.	25.60	21.36	believ+
199	52.	138.	37.68	49.74	biological+
200	64.	125.	51.20	118.27	biolog+
207	16.	34.	47.06	24.70	book+
234	18.	29.	62.07	46.26	catholic+
256	54.	80.	67.50	160.71	christian+
260	74.	149.	49.66	129.46	claim+
274	40.	117.	34.19	29.61	cognit+
305	104.	415.	25.06	27.53	concept+
316	17.	38.	44.74	23.66	consciousness+
325	23.	60.	38.33	22.66	constitute+
372	28.	67.	41.79	33.76	critic+
373	36.	67.	53.73	72.16	critique+
378	17.	35.	48.57	27.96	cultur__+
383	44.	52.	84.62	184.51	darwin+
393	34.	87.	39.08	35.24	deep+
422	32.	83.	38.55	32.09	dialogue+
437	24.	54.	44.44	33.02	discover+
509	15.	32.	46.88	22.97	epistemic
510	33.	69.	47.83	52.92	epistemolog+
515	60.	118.	50.85	109.30	essay+
528	103.	205.	50.24	185.94	evolution+
545	32.	73.	43.84	42.88	explanation+
564	37.	66.	56.06	80.10	faith+
633	67.	89.	75.28	237.16	god+
656	142.	445.	31.91	90.97	histor+
664	228.	840.	27.14	90.45	human+
667	30.	52.	57.69	68.20	ideal+
668	64.	164.	39.02	66.92	idea+
686	20.	46.	43.48	26.22	implicit+
714	24.	54.	44.44	33.02	inherent+
743	64.	176.	36.36	56.32	interpret+
746	16.	35.	45.71	23.28	intrinsic
759	21.	39.	53.85	42.07	john+
821	23.	55.	41.82	27.72	man+
846	21.	48.	43.75	27.91	metaphor+
847	24.	27.	88.89	107.68	metaphys+
852	44.	74.	59.46	105.81	mind+
859	92.	250.	36.80	84.46	modern+
864	184.	703.	26.17	61.66	moral+
875	15.	30.	50.00	26.09	myth+

882	110.	258.	42.64	142.93	natural+
883	128.	367.	34.88	104.15	nature+
933	33.	68.	48.53	54.47	origin+
948	97.	404.	24.01	20.94	particular+
972	191.	364.	52.47	384.23	philosoph+
989	34.	105.	32.38	21.53	popular+
1003	25.	58.	43.10	32.23	pragmat+
1066	30.	90.	33.33	20.61	quarter+
1079	58.	114.	50.88	105.71	rational+
1083	98.	214.	45.79	147.23	real+
1084	78.	253.	30.83	43.57	reason+
1093	26.	59.	44.07	35.16	reduction+
1095	23.	63.	36.51	20.09	reference+
1104	23.	53.	43.40	30.06	reject+
1110	52.	91.	57.14	116.94	religion+
1111	33.	54.	61.11	82.92	religious
1112	411.	757.	54.29	941.52	religi_
1142	29.	57.	50.88	52.39	root+
1153	45.	96.	46.88	69.60	scholar+
1156	249.	930.	26.77	95.19	scientific+
1157	85.	344.	24.71	20.85	scientist+
1165	48.	57.	84.21	200.03	secular+
1170	31.	93.	33.33	21.30	sense+
1223	23.	50.	46.00	33.98	spiritual+
1224	35.	86.	40.70	39.87	spirit+
1280	21.	54.	38.89	21.40	text+
1282	86.	104.	82.69	351.51	theolog+
1284	145.	402.	36.07	129.64	theor+
1288	15.	31.	48.39	24.47	thesis
1289	20.	49.	40.82	22.80	thing+
1302	70.	123.	56.91	157.08	tradition+
1316	39.	62.	62.90	103.04	truth+
1356	106.	407.	26.04	33.10	view+
1358	20.	45.	44.44	27.48	virtue+
1367	123.	493.	24.95	32.33	way+
1372	62.	191.	32.46	40.09	western+
1373	23.	55.	41.82	27.72	west+
1384	57.	95.	60.00	139.69	worldview+
1385	115.	412.	27.91	47.08	world+
1386	19.	33.	57.58	42.91	writing+
1393	105.	138.	76.09	380.72	zygon+
1394 *	726.4263.		17.03	11.15 *	a
1404 *	543.2018.		26.91	263.65 *	science+
1406 *	340.1814.		18.74	14.80 *	0 an
1407 *	47. 164.		28.66	20.31 *	0 any
1408 *	462.2411.		19.16	29.83 *	0 as
1410 *	55. 264.		20.83	4.92 *	0 do
1411 *	58. 307.		18.89	2.10 *	0 first
1414 *	55. 87.		63.22	147.11 *	0 he
1417 *	1012.6281.		16.11	5.30 *	0 of
1418 *	56. 211.		26.54	18.29 *	0 so
1419 *	620.3347.		18.52	34.66 *	0 that
1424 *	103. 385.		26.75	35.73 *	0 what
1425 *	225.1158.		19.43	12.83 *	0 which
1427 *	147. 746.		19.71	8.92 *	1 can
1428 *	27. 86.		31.40	15.54 *	1 cannot
1429 *	33. 154.		21.43	3.55 *	1 could
1434 *	45. 232.		19.40	2.15 *	2 no
1435 *	243.1011.		24.04	58.64 *	2 not
1439 *	27. 111.		24.32	5.92 *	3 beyond
1440 *	18. 61.		29.51	8.46 *	3 far
1442 *	23. 109.		21.10	2.20 *	3 here
1445 *	86. 469.		18.34	2.17 *	3 there
1446 *	34. 165.		20.61	2.75 *	3 where
1450 *	9. 35.		25.71	2.51 *	4 already
1455 *	9. 34.		26.47	2.83 *	4 later
1457 *	52. 247.		21.05	5.01 *	4 often
1458 *	28. 128.		21.88	3.43 *	4 since
1461 *	23. 108.		21.30	2.35 *	4 yet
1463 *	9. 36.		25.00	2.22 *	5 every
1470 *	37. 141.		26.24	11.41 *	5 much
1471 *	30. 118.		25.42	8.07 *	5 without

1472	*	151.	833.	18.13	3.41	*	6	about
1473	*	17.	75.	22.67	2.56	*	6	according
1474	*	38.	136.	27.94	14.93	*	6	against
1475	*	123.	657.	18.72	4.22	*	6	also
1479	*	60.	216.	27.78	23.37	*	6	because
1480	*	210.	1042.	20.15	16.46	*	6	between
1481	*	164.	726.	22.59	26.99	*	6	but
1485	*	17.	76.	22.37	2.37	*	6	either
1486	*	44.	166.	26.51	14.19	*	6	even
1487	*	263.	1507.	17.45	3.35	*	6	from
1489	*	54.	231.	23.38	9.89	*	6	if
1490	*	16.	64.	25.00	3.96	*	6	just
1491	*	26.	85.	30.59	13.79	*	6	like
1492	*	13.	42.	30.95	7.11	*	6	nevertheless
1493	*	14.	37.	37.84	13.32	*	6	nor
1494	*	195.	1009.	19.33	10.23	*	6	or
1496	*	44.	182.	24.18	9.48	*	6	rather
1497	*	20.	81.	24.69	4.69	*	6	still
1500	*	16.	59.	27.12	5.55	*	6	though
1503	*	36.	144.	25.00	9.02	*	6	thus
1504	*	11.	39.	28.21	4.40	*	6	too
1507	*	27.	103.	26.21	8.24	*	6	why
1509	*	106.	184.	57.61	245.42	*	7	his
1510	*	36.	100.	36.00	30.50	*	7	itself
1511	*	19.	46.	41.30	22.24	*	7	my
1512	*	103.	422.	24.41	24.16	*	7	our
1514	*	51.	244.	20.90	4.66	*	7	them
1516	*	124.	656.	18.90	4.78	*	7	they
1517	*	42.	128.	32.81	27.74	*	7	us
1518	*	84.	440.	19.09	3.50	*	8	all
1519	*	22.	81.	27.16	7.71	*	8	another
1520	*	293.	1446.	20.26	25.99	*	8	it
1521	*	163.	614.	26.55	56.98	*	8	its
1523	*	65.	327.	19.88	3.99	*	8	only
1525	*	111.	545.	20.37	8.71	*	8	some
1528	*	50.	179.	27.93	19.76	*	8	then
1533	*	20.	61.	32.79	13.04	*	8	whose
1535	*	284.	1556.	18.25	8.18	*	9	be
1536	*	109.	572.	19.06	4.55	*	9	been
1539	*	44.	150.	29.33	20.56	*	9	does
1540	*	12.	44.	27.27	4.25	*	9	doing
1543	*	182.	968.	18.80	6.96	*	9	has
1544	*	191.	1056.	18.09	4.34	*	9	have
1546	*	583.	2932.	19.88	62.40	*	9	is
1547	*	31.	115.	26.96	10.60	*	9	might
1551	*	35.	155.	22.58	5.23	*	9	own
1555	*	41.	186.	22.04	5.32	*	9	would
1557	*	113.	594.	19.02	4.64	*	J	both
1560	*	118.	516.	22.87	20.09	*	J	one
1564	*	102.	539.	18.92	3.91	*	J	two
1567	*	60.	314.	19.11	2.47	*	M	B_
1580	*	164.	372.	44.09	233.39	*	M	I_
1603	*	52.	251.	20.72	4.45	*	M	W_
1606	*	10.	37.	27.03	3.41	*	M	_

Nombre de mots sélectionnés : 183

Classe n° 3 => "Medical Ethics"

Nombre d'u.c.e. : 1209. soit : 18.75 %
 Nombre de "uns" (a+r) : 56381. soit : 18.94 %
 Nombre de mots analysés par uce : 28.02

num	effectifs	pourc.	chi2	identification	
19	69.	144.	47.92	82.27	V cost.
22	35.	89.	39.33	25.09	V drive.
34	102.	321.	31.78	37.64	V learn.
49	82.	244.	33.61	36.76	V set.
50	117.	430.	27.21	21.66	V show.
81	40.	71.	56.34	66.60	add+

85	129.	241.	53.53	198.81	adopt+
88	36.	61.	59.02	65.56	advantage+
93	66.	192.	34.38	31.73	affect+
113	16.	27.	59.26	29.21	amount+
128	72.	241.	29.88	20.35	applic+
182	222.	780.	28.46	54.97	bas+
184	74.	231.	32.03	27.77	behavior+
191	73.	245.	29.80	20.41	benefit+
220	123.	208.	59.13	230.16	business+
225	28.	52.	53.85	42.40	capabilit+
243	27.	34.	79.41	82.58	chain+
271	17.	33.	51.52	23.38	cluster+
280	27.	66.	40.91	21.50	combine+
282	45.	51.	88.24	162.95	commerce+
288	138.	383.	36.03	79.86	communic+
290	58.	103.	56.31	96.96	company+
295	27.	49.	55.10	42.84	competit+
302	104.	269.	38.66	73.08	computer+
331	74.	140.	52.86	109.31	consumer+
361	64.	199.	32.16	24.25	countries+
362	34.	82.	41.46	28.14	country+
367	38.	106.	35.85	20.69	creation+
374	77.	236.	32.63	30.98	cross+
381	61.	83.	73.49	165.44	custom+
384	128.	441.	29.02	32.83	data
407	16.	32.	50.00	20.62	deploy+
413	142.	407.	34.89	74.31	design+
424	122.	456.	26.75	20.65	different+
425	119.	426.	27.93	25.27	differ+
427	32.	41.	78.05	95.26	diffus+
430	60.	178.	33.71	26.90	dimension+
446	42.	68.	61.76	83.49	distance+
472	36.	81.	44.44	35.56	effectiveness
473	179.	470.	38.09	124.46	effect+
475	27.	37.	72.97	71.84	efficienc+
477	47.	102.	46.08	50.82	electronic+
490	88.	212.	41.51	74.56	empirical+
491	33.	45.	73.33	88.64	employee+
493	37.	83.	44.58	36.83	enable+
505	29.	56.	51.79	40.48	enterprise+
518	17.	31.	54.84	26.64	estimate+
531	153.	538.	28.44	36.19	examine+
536	23.	48.	47.92	27.01	exhibit+
548	18.	36.	50.00	23.21	exploratory
558	37.	100.	37.00	22.22	facilit+
559	127.	338.	37.57	83.00	factor+
580	122.	320.	38.13	83.00	findings+
581	104.	129.	80.62	330.82	firm+
585	23.	37.	62.16	46.05	flex+
655	118.	399.	29.57	32.73	high+
665	19.	38.	50.00	24.51	hypotheses
682	132.	341.	38.71	94.19	impact+
684	74.	204.	36.27	42.49	implement+
685	125.	407.	30.71	40.83	implicat+
688	57.	177.	32.20	21.63	improve+
690	21.	43.	48.84	25.73	inc
696	78.	232.	33.62	34.95	increase+
702	97.	250.	38.80	68.66	indic+
704	16.	27.	59.26	29.21	indirect+
707	92.	170.	54.12	143.40	industr+
711	164.	430.	38.14	113.74	influence+
712	303.	896.	33.82	155.14	inform+
713	21.	46.	45.65	22.02	infrastructure+
717	116.	202.	57.43	204.81	innov+
727	75.	214.	35.05	38.61	integrat+
732	30.	58.	51.72	41.78	intention+
734	98.	266.	36.84	59.64	interact+
738	18.	33.	54.55	27.91	interface+
741	78.	172.	45.35	82.09	internet+
750	50.	70.	71.43	128.94	invest+
760	18.	27.	66.67	40.87	joint+
770	17.	28.	60.71	32.52	korean

787	107.	329.	32.52	43.19	level+
813	23.	53.	43.40	21.32	maker+
815	207.	388.	53.35	324.52	management+
816	75.	118.	63.56	158.46	manager+
826	109.	188.	57.98	195.66	market+
834	75.	218.	34.40	36.31	measure+
839	17.	32.	53.13	24.95	medium+
840	40.	88.	45.45	41.78	medi+
855	40.	53.	75.47	112.88	mobile+
857	199.	436.	45.64	222.06	model+
858	18.	33.	54.55	27.91	moderate+
872	20.	39.	51.28	27.27	multi+
880	109.	306.	35.62	60.05	national+
889	64.	137.	46.72	71.88	network+
919	55.	114.	48.25	66.29	online+
921	38.	70.	54.29	58.68	operat+
928	116.	178.	65.17	258.96	organisational
930	115.	326.	35.28	61.58	organ+
931	53.	158.	33.54	23.28	orient+
932	26.	55.	47.27	29.63	original+
935	49.	144.	34.03	22.58	outcome+
939	17.	33.	51.52	23.38	owner+
941	234.	857.	27.30	47.51	paper+
959	74.	182.	40.66	59.03	perceive+
961	77.	221.	34.84	38.92	percept+
962	94.	220.	42.73	85.99	perform+
973	13.	23.	56.52	21.62	phone+
978	51.	114.	44.74	51.46	plann+
999	58.	181.	32.04	21.62	power+
1007	47.	117.	40.17	35.91	prefer+
1032	116.	380.	30.53	36.78	process+
1035	107.	314.	34.08	50.92	product+
1049	76.	214.	35.51	40.85	propose+
1064	68.	185.	36.76	40.56	qualit+
1100	33.	88.	37.50	20.60	region_+
1106	128.	425.	30.12	38.62	relation+
1124	109.	287.	37.98	72.93	resource+
1132	248.	710.	34.93	137.16	result+
1150	21.	38.	55.26	33.46	satisfaction+
1164	30.	70.	42.86	27.01	sector+
1177	126.	274.	45.99	139.38	service+
1186	36.	57.	63.16	74.46	shar+
1197	48.	124.	38.71	33.08	site+
1200	19.	34.	55.88	30.94	size+
1209	38.	58.	65.52	84.05	software+
1217	19.	41.	46.34	20.63	spatial+
1238	105.	289.	36.33	61.42	strateg+
1246	352.	1115.	31.57	145.51	study+
1251	73.	172.	42.44	65.13	success+
1257	23.	46.	50.00	29.71	suppl+
1258	139.	427.	32.55	57.22	support+
1261	96.	294.	32.65	39.11	survey+
1267	249.	551.	45.19	276.57	system+
1270	33.	81.	40.74	26.05	task+
1272	37.	70.	52.86	54.05	team+
1283	55.	165.	33.33	23.65	theoretical+
1304	28.	45.	62.22	56.23	transact+
1305	29.	70.	41.43	23.90	transfer+
1315	59.	102.	57.84	104.00	trust+
1319	64.	166.	38.55	43.88	type+
1322	40.	89.	44.94	40.66	uncertain+
1333	28.	42.	66.67	63.73	usage
1335	104.	160.	65.00	230.43	user+
1336	280.	1148.	24.39	29.20	use+
1337	141.	462.	30.52	45.28	using
1345	465.	1322.	35.17	294.58	value+
1349	53.	163.	32.52	20.81	various+
1357	33.	78.	42.31	28.77	virtual+
1368	62.	103.	60.19	118.04	web
1396	* 37.	101.	36.63	21.55	*
1397	* 532.	2240.	23.75	56.39	*
1398	* 111.	244.	45.49	119.08	*
					c
					cultur_
					e

1401	*	23.	89.	25.84	2.98	*	i
1405	*	477.	1760.	27.10	110.93	*	technolog+
1412	*	599.	3056.	19.60	2.78	*	0 for
1423	*	215.	928.	23.17	13.91	*	0 we
1427	*	156.	746.	20.91	2.59	*	1 can
1430	*	111.	510.	21.76	3.31	*	1 may.
1437	*	55.	167.	32.93	22.65	*	3 across
1441	*	52.	187.	27.81	10.38	*	3 further
1444	*	545.	2479.	21.98	27.71	*	3 on
1465	*	147.	705.	20.85	2.30	*	5 how
1477	*	102.	382.	26.70	16.87	*	6 among
1478	*	1185.	6257.	18.94	5.07	*	6 and
1495	*	13.	43.	30.23	3.75	*	6 per
1505	*	16.	52.	30.77	4.97	*	6 whereas
1529	*	250.	1199.	20.85	4.28	*	8 these
1534	*	437.	2113.	20.68	7.72	*	9 are
1553	*	166.	805.	20.62	2.12	*	9 was
1557	*	126.	594.	21.21	2.61	*	J both
1564	*	114.	539.	21.15	2.23	*	J two
1565	*	184.	742.	24.80	20.15	*	M A
1568	*	39.	67.	58.21	69.21	*	M B_V_
1569	*	105.	368.	28.53	24.53	*	M C
1572	*	11.	27.	40.74	8.61	*	M E
1575	*	46.	188.	24.47	4.16	*	M F_
1576	*	13.	15.	86.67	45.53	*	M GSS
1581	*	19.	35.	54.29	29.18	*	M ICT
1582	*	29.	41.	70.73	73.20	*	M IS
1585	*	159.	719.	22.11	6.02	*	M J_
1586	*	73.	311.	23.47	4.79	*	M K_
1593	*	12.	23.	52.17	16.93	*	M R&D
1598	*	21.	68.	30.88	6.64	*	M US
1599	*	16.	53.	30.19	4.59	*	M USA
1601	*	24.	55.	43.64	22.56	*	M U_S_
1604	*	29.	89.	32.58	11.34	*	M Y_

Nombre de mots sélectionnés : 184

Classe n° 6 => "Bioethics and Law"

Nombre d'u.c.e. : 434. soit : 6.73 %
 Nombre de "uns" (a+r) : 20227. soit : 6.79 %
 Nombre de mots analysés par uce : 27.41

num	effectifs	pourc.	chi2	identification	
61	20.	38.	52.63	128.31	abortion+
89	9.	21.	42.86	43.81	advice+
90	15.	27.	55.56	102.98	advisor+
119	26.	97.	26.80	63.23	animal+
128	40.	241.	16.60	38.84	applic+
139	35.	160.	21.88	59.96	argument+
178	16.	35.	45.71	85.21	bank+
198	48.	157.	30.57	145.75	bioethic+
201	19.	101.	18.81	23.86	biomedical+
202	29.	73.	39.73	128.07	biotechnolog+
203	9.	33.	27.27	22.30	birth+
237	108.	136.	79.41	1169.25	cell+
269	26.	34.	76.47	264.86	cloning+
283	21.	65.	32.31	68.44	commercial+
284	20.	30.	66.67	172.50	commission+
285	26.	109.	23.85	51.79	committee+
306	59.	504.	11.71	21.57	concern+
348	24.	102.	23.53	46.60	controvers+
359	16.	29.	55.17	108.91	council+
389	63.	265.	23.77	127.90	debate+
392	10.	32.	31.25	30.80	declar+
441	28.	175.	16.00	24.63	disease+
453	13.	26.	50.00	77.87	dna
482	89.	107.	83.18	1013.07	embryo_+
519	134.	1263.	10.61	37.67	ethic+
522	29.	182.	15.93	25.28	europe+

571	24.	49.	48.98	140.42	federal+
575	10.	22.	45.45	52.74	fetal
590	19.	95.	20.00	27.05	food+
614	24.	90.	26.67	57.80	fund+
625	91.	266.	34.21	333.81	genetic+
626	24.	65.	36.92	95.37	gene+
627	13.	50.	26.00	29.81	genome+
644	13.	53.	24.53	26.97	guid+
664	138.	840.	16.43	144.74	human+
722	13.	57.	22.81	23.68	institute+
753	10.	36.	27.78	25.55	islam+
755	125.	928.	13.47	78.45	issue+
780	39.	160.	24.38	81.39	law+
783	54.	180.	30.00	159.75	legal+
784	15.	34.	44.12	76.12	legislat+
837	78.	615.	12.68	38.39	medical+
864	90.	703.	12.80	46.35	moral+
923	18.	98.	18.37	21.47	opinion+
929	11.	40.	27.50	27.66	organis+
939	9.	33.	27.27	22.30	owner+
951	26.	46.	56.52	183.00	patent+
985	66.	350.	18.86	86.72	policy
1026	12.	48.	25.00	25.72	private+
1047	18.	86.	20.93	28.00	proper+
1051	17.	85.	20.00	24.17	protection+
1052	22.	91.	24.18	44.76	protect+
1060	88.	587.	14.99	70.22	public+
1068	54.	457.	11.82	20.27	question+
1072	46.	172.	26.74	112.78	raise+
1101	16.	43.	37.21	64.07	regulatory
1102	45.	120.	37.50	184.44	regul+
1119	53.	127.	41.73	252.87	reproduct+
1138	43.	208.	20.67	66.57	right+
1168	28.	173.	16.18	25.32	select+
1181	20.	47.	42.55	96.80	sex
1233	29.	126.	23.02	54.30	status
1234	77.	99.	77.78	808.57	stem+
1259	16.	80.	20.00	22.73	surround+
1285	22.	63.	34.92	80.55	therapeutic+
1286	28.	95.	29.47	79.46	therap+
1294	32.	47.	68.09	283.95	tissue+
1310	15.	38.	39.47	65.29	transplant+
1370	19.	59.	32.20	61.56	welfare
1399	* 196.	1463.	13.40	134.02	* ethical+
1403	* 171.	1620.	10.56	50.45	* research+
1412	* 227.	3056.	7.43	4.51	* 0 for
1422	* 13.	123.	10.57	2.94	* 0 very
1432	* 46.	418.	11.00	13.01	* 1 will.
1435	* 80.	1011.	7.91	2.67	* 2 not
1440	* 9.	61.	14.75	6.32	* 3 far
1456	* 10.	97.	10.31	2.01	* 4 now
1458	* 16.	128.	12.50	6.93	* 4 since
1467	* 34.	372.	9.14	3.65	* 5 many
1470	* 15.	141.	10.64	3.51	* 5 much
1472	* 69.	833.	8.28	3.68	* 6 about
1474	* 23.	136.	16.91	22.95	* 6 against
1485	* 10.	76.	13.16	5.06	* 6 either
1498	* 61.	730.	8.36	3.47	* 6 such
1506	* 19.	202.	9.41	2.38	* 6 whether
1507	* 12.	103.	11.65	4.04	* 6 why
1525	* 47.	545.	8.62	3.40	* 8 some
1527	* 430.	6311.	6.81	3.30	* 8 the
1535	* 129.	1556.	8.29	7.96	* 9 be
1544	* 85.	1056.	8.05	3.50	* 9 have
1547	* 14.	115.	12.17	5.53	* 9 might
1552	* 60.	423.	14.18	40.08	* 9 should
1567	* 29.	314.	9.24	3.30	* M B_
1583	* 8.	22.	36.36	30.88	* M IVF
1588	* 57.	685.	8.32	3.09	* M M_
1593	* 5.	23.	21.74	8.28	* M R&D
1597	* 8.	60.	13.33	4.21	* M UK

Classe n° 4 => "Medical Ethics"

Nombre d'u.c.e. : 1163. soit : 18.03 %
 Nombre de "uns" (a+r) : 54729. soit : 18.38 %
 Nombre de mots analysés par uce : 27.51

num	effectifs	pourc.	chi2	identification
11	43. 117.	36.75	28.25	V arise.
38	212. 773.	27.43	52.41	V make.
40	36. 101.	35.64	21.53	V meet.
84	16. 28.	57.14	29.10	adolescent+
87	99. 274.	36.13	63.41	advance+
107	20. 45.	44.44	21.38	allocat+
151	69. 215.	32.09	29.74	assessment+
170	59. 106.	55.66	103.22	autonomy+
190	31. 50.	62.00	65.90	benefic+
191	82. 245.	33.47	41.05	benefit+
192	39. 101.	38.61	29.40	best+
198	55. 157.	35.03	31.45	bioethic+
201	48. 101.	47.52	60.37	biomedical+
210	44. 94.	46.81	53.43	brain+
219	14. 23.	60.87	28.65	burden+
224	19. 43.	44.19	20.03	cancer+
228	18. 37.	48.65	23.60	careful+
229	271. 558.	48.57	385.25	care+
244	101. 316.	31.96	43.61	challenge+
252	38. 83.	45.78	43.80	child+
266	189. 356.	53.09	313.27	clinical+
267	24. 42.	57.14	43.74	clinician+
268	20. 42.	47.62	25.03	clinic+
285	46. 109.	42.20	43.81	committee+
306	140. 504.	27.78	35.12	concern+
312	24. 45.	53.33	38.20	confidentiality
313	72. 207.	34.78	40.59	conflict+
318	71. 120.	59.17	139.96	consent+
322	188. 625.	30.08	67.94	consider+
346	26. 56.	46.43	30.81	controll+
379	86. 310.	27.74	20.76	current+
388	38. 73.	52.05	57.81	death+
391	182. 501.	36.33	122.98	decision+
421	34. 84.	40.48	29.00	diagnos_
426	58. 178.	32.58	26.22	difficult+
429	71. 137.	51.82	108.13	dilemma+
441	83. 175.	47.43	105.15	disease+
442	35. 51.	68.63	89.02	disorder+
454	29. 52.	55.77	50.50	doctor+
458	32. 65.	49.23	43.23	drug+
460	14. 24.	58.33	26.47	duty
461	17. 28.	60.71	34.66	dying
519	418.1263.	33.10	241.05	ethic+
526	83. 260.	31.92	35.36	evidence+
565	43. 78.	55.13	73.50	families+
592	30. 42.	71.43	81.54	forensic+
642	72. 138.	52.17	111.19	guideline+
647	43. 69.	62.32	92.54	harm+
649	43. 79.	54.43	71.68	healthcare
650	329. 838.	39.26	293.58	health+
661	38. 79.	48.10	48.92	hospital+
677	25. 34.	73.53	71.21	ill
678	46. 77.	59.74	91.70	illness+
683	21. 42.	50.00	29.22	imperative+
731	25. 52.	48.08	32.01	intensive+
737	93. 293.	31.74	39.01	interest+
755	295. 928.	31.79	138.75	issue+
763	52. 92.	56.52	93.53	justice
764	20. 36.	55.56	34.48	justification+
766	19. 35.	54.29	31.29	justify+
783	78. 180.	43.33	80.18	legal+

790	112.	405.	27.65	27.06	life+
817	21.	47.	44.68	22.74	manage+
837	282.	615.	45.85	355.95	medical+
838	184.	416.	44.23	206.46	medicine+
843	59.	140.	42.14	56.27	mental+
864	218.	703.	31.01	89.88	moral+
890	20.	24.	83.33	69.49	neuroimag+
892	19.	43.	44.19	20.03	neuroscience+
906	44.	125.	35.20	25.41	nurse+
907	74.	199.	37.19	50.95	nursing+
910	39.	81.	48.15	50.33	obligation+
912	15.	24.	62.50	32.22	obstetric+
940	19.	40.	47.50	23.64	pain+
953	268.	442.	60.63	582.57	patient+
966	52.	121.	42.98	51.90	person+
975	88.	205.	42.93	88.76	physic+
976	20.	27.	74.07	57.61	placebo+
997	95.	332.	28.61	26.51	potential+
1001	208.	767.	27.12	48.61	practice+
1016	69.	124.	55.65	121.00	prevent+
1022	116.	236.	49.15	160.48	principle+
1029	35.	77.	45.45	39.64	procedure+
1036	153.	405.	37.78	113.96	professional+
1037	31.	84.	36.90	20.50	profess+
1052	38.	91.	41.76	35.15	protect+
1053	31.	57.	54.39	51.41	protocol+
1058	98.	187.	52.41	153.93	psychiatr+
1089	38.	102.	37.25	25.90	recommend+
1120	80.	285.	28.07	20.32	require+
1123	19.	40.	47.50	23.64	resolve+
1125	67.	190.	35.26	39.31	respect+
1129	32.	44.	72.73	89.66	responsibilities
1130	83.	194.	42.78	82.89	respons+
1135	132.	420.	31.43	54.53	review+
1138	91.	208.	43.75	96.16	right+
1139	113.	330.	34.24	61.82	risk+
1145	34.	72.	47.22	41.97	rule+
1147	38.	96.	39.58	30.62	safe+
1156	223.	930.	23.98	25.98	scientific+
1160	21.	48.	43.75	21.64	screen+
1229	66.	166.	39.76	54.41	standard+
1248	101.	277.	36.46	66.50	subject+
1252	21.	47.	44.68	22.74	suffer+
1260	15.	22.	68.18	37.56	surveillance
1265	12.	19.	63.16	26.25	symptom+
1277	31.	78.	39.74	25.17	tension+
1285	27.	63.	42.86	26.52	therapeutic+
1286	41.	95.	43.16	41.17	therap+
1311	148.	272.	54.41	254.24	treat+
1313	87.	157.	55.41	152.11	trial+
1342	15.	25.	60.00	29.90	vaccine+
1363	17.	29.	58.62	32.46	vulnerable
1399	* 587.1463.		40.12	624.63 *	ethical+
1403	* 380.1620.		23.46	43.04 *	research+
1407	* 41. 164.		25.00	5.52 *	0 any
1412	* 632.3056.		20.68	27.53 *	0 for
1413	* 43. 119.		36.13	26.87 *	0 good
1418	* 50. 211.		23.70	4.73 *	0 so
1428	* 29. 86.		33.72	14.51 *	1 cannot
1430	* 118. 510.		23.14	9.76 *	1 may.
1431	* 38. 169.		22.49	2.33 *	1 need.
1432	* 109. 418.		26.08	19.56 *	1 will.
1434	* 59. 232.		25.43	8.91 *	2 no
1435	* 205.1011.		20.28	4.08 *	2 not
1451	* 17. 59.		28.81	4.68 *	4 always
1452	* 19. 73.		26.03	3.19 *	4 before
1456	* 25. 97.		25.77	3.99 *	4 now
1460	* 91. 359.		25.35	13.76 *	4 when
1463	* 14. 36.		38.89	10.65 *	5 every
1467	* 91. 372.		24.46	11.04 *	5 many
1471	* 29. 118.		24.58	3.48 *	5 without
1472	* 166. 833.		19.93	2.32 *	6 about

1473	*	20.	75.	26.67	3.83	*	6	according
1474	*	36.	136.	26.47	6.69	*	6	against
1479	*	48.	216.	22.22	2.65	*	6	because
1483	*	22.	92.	23.91	2.18	*	6	despite
1486	*	41.	166.	24.70	5.12	*	6	even
1488	*	90.	401.	22.44	5.63	*	6	however
1489	*	58.	231.	25.11	8.11	*	6	if
1490	*	16.	64.	25.00	2.12	*	6	just
1494	*	217.	1009.	21.51	9.76	*	6	or
1498	*	154.	730.	21.10	5.22	*	6	such
1502	*	14.	48.	29.17	4.05	*	6	throughout
1515	*	29.	108.	26.85	5.78	*	7	themselves
1525	*	112.	545.	20.55	2.55	*	8	some
1526	*	14.	35.	40.00	11.49	*	8	sometimes
1529	*	245.	1199.	20.43	5.74	*	8	these
1531	*	71.	330.	21.52	2.85	*	8	those
1532	*	91.	332.	27.41	20.82	*	8	who
1533	*	16.	61.	26.23	2.80	*	8	whose
1534	*	445.	2113.	21.06	19.47	*	9	are
1535	*	342.	1556.	21.98	21.60	*	9	be
1536	*	120.	572.	20.98	3.68	*	9	been
1537	*	68.	287.	23.69	6.51	*	9	being
1540	*	13.	44.	29.55	3.97	*	9	doing
1541	*	12.	35.	34.29	6.29	*	9	done
1543	*	198.	968.	20.45	4.52	*	9	has
1544	*	240.	1056.	22.73	18.82	*	9	have
1546	*	589.	2932.	20.09	15.36	*	9	is
1548	*	64.	203.	31.53	25.82	*	9	must
1549	*	80.	303.	26.40	15.06	*	9	need
1551	*	37.	155.	23.87	3.66	*	9	own
1552	*	123.	423.	29.08	37.36	*	9	should
1556	*	974.	5208.	18.70	8.17	*	H	to
1566	*	130.	579.	22.45	8.40	*	M	A_
1573	*	13.	19.	68.42	32.73	*	M	EBM
1574	*	83.	342.	24.27	9.50	*	M	E_
1577	*	64.	289.	22.15	3.46	*	M	G_
1578	*	7.	15.	46.67	8.34	*	M	HTA
1583	*	8.	22.	36.36	5.02	*	M	IVF
1586	*	72.	311.	23.15	5.79	*	M	K_
1587	*	86.	415.	20.72	2.17	*	M	L_
1588	*	142.	685.	20.73	3.77	*	M	M_
1594	*	106.	521.	20.35	2.05	*	M	R_
1595	*	109.	515.	21.17	3.71	*	M	S_
1603	*	54.	251.	21.51	2.14	*	M	W_

Nombre de mots sélectionnés : 177

Classe n° 2 => "Socio-economic development and Sustainability"

Nombre d'u.c.e. : 1283. soit : 19.89 %
 Nombre de "uns" (a+r) : 58609. soit : 19.68 %
 Nombre de mots analysés par uce : 26.64

num	effectifs	pourc.	chi2	identification	
2	157.	529.	29.68	34.62	H into
6	42.	93.	45.16	37.80	H past
13	95.	278.	34.17	37.16	V become.
16	52.	142.	36.62	25.49	V build.
18	49.	123.	39.84	31.29	V come.
45	35.	77.	45.45	31.95	V rise.
92	22.	33.	66.67	45.53	aesthetic+
99	26.	53.	49.06	28.52	agenda+
141	206.	679.	30.34	51.94	article+
145	20.	28.	71.43	46.86	artist+
146	42.	99.	42.42	32.02	art+
165	25.	56.	44.64	21.71	australia
196	18.	32.	56.25	26.67	biodiversity
214	19.	31.	61.29	33.49	britain+
227	36.	68.	52.94	47.09	capital+

241	98.	175.	56.00	147.14	century+
246	197.	457.	43.11	166.30	change+
247	49.	107.	45.79	45.80	chang+
258	26.	57.	45.61	23.87	citizen+
259	25.	52.	48.08	26.13	city+
265	38.	78.	48.72	41.16	climate+
278	16.	25.	64.00	30.63	colon+
321	41.	73.	56.16	60.95	conservat+
329	87.	231.	37.66	47.46	construct+
332	21.	45.	46.67	20.38	consumpt+
334	82.	185.	44.32	71.33	contemporar+
336	20.	33.	60.61	34.50	contest+
368	85.	209.	40.67	58.50	creat+
390	33.	83.	39.76	20.82	decade+
428	41.	92.	44.57	35.64	digital+
436	85.	186.	45.70	80.02	discourse+
464	66.	178.	37.08	33.92	earl+
465	21.	44.	47.73	21.53	earth+
467	92.	158.	58.23	149.34	ecolog+
468	163.	394.	41.37	121.45	econom+
469	26.	48.	54.17	35.64	ecosystem+
479	29.	70.	41.43	20.59	embedd+
481	20.	28.	71.43	46.86	embrace+
485	62.	168.	36.90	31.32	emerg+
506	35.	88.	39.77	22.12	environmental+
507	172.	485.	35.46	79.77	environment+
521	26.	58.	44.83	22.83	ethnograph+
522	60.	182.	32.97	20.08	europe+
524	36.	93.	38.71	20.96	event+
582	17.	29.	58.62	27.41	fisher+
587	31.	73.	42.47	23.60	focuses
591	40.	96.	41.67	28.99	force+
593	24.	52.	46.15	22.68	forest+
597	109.	307.	35.50	49.29	form+
604	23.	37.	62.16	41.72	france+
628	35.	90.	38.89	20.66	geograph+
631	119.	287.	41.46	87.68	global+
635	77.	184.	41.85	57.28	govern+
653	27.	54.	50.00	30.97	heritage+
656	162.	445.	36.40	81.75	histor+
673	19.	33.	57.58	29.55	identities
680	34.	66.	51.52	41.84	image+
681	19.	32.	59.38	31.45	imagin+
706	54.	102.	52.94	71.02	industrial+
724	59.	146.	40.41	39.46	institut+
754	21.	30.	70.00	47.48	island+
773	38.	77.	49.35	42.43	landscape+
774	27.	49.	55.10	38.40	land+
795	46.	127.	36.22	21.67	link+
801	82.	188.	43.62	68.38	local+
829	77.	177.	43.50	63.65	material+
833	25.	47.	53.19	32.94	mean+
836	105.	180.	58.33	171.68	media+
859	110.	250.	44.00	94.83	modern+
868	27.	56.	48.21	28.43	movement+
873	22.	38.	57.89	34.64	music
882	81.	258.	31.40	22.31	natural+
883	118.	367.	32.15	36.69	nature+
888	22.	48.	45.83	20.42	negotiat+
894	272.	832.	32.69	98.17	new+
895	23.	36.	63.89	43.97	nineteenth
901	47.	117.	40.17	30.74	notion+
914	20.	42.	47.62	20.39	occurr+
952	17.	30.	56.67	25.57	path+
977	78.	222.	35.14	33.51	place+
986	164.	336.	48.81	185.96	politic+
989	41.	105.	39.05	24.57	popular+
1013	19.	34.	55.88	27.78	preservation+
1034	49.	110.	44.55	42.67	produce+
1035	108.	314.	34.39	43.55	product+
1043	80.	256.	31.25	21.57	project+
1122	24.	54.	44.44	20.59	resist+

1141	134.	482.	27.80	20.43	role+
1144	13.	20.	65.00	25.61	royal+
1197	48.	124.	38.71	28.08	site+
1198	18.	31.	58.06	28.48	situate+
1204	307.	1105.	27.78	52.07	social+
1205	214.	572.	37.41	120.87	society+
1206	42.	100.	42.00	31.15	socio
1216	44.	91.	48.35	46.90	space+
1217	20.	41.	48.78	21.60	spatial+
1262	89.	152.	58.55	145.98	sustain+
1264	29.	53.	54.72	40.66	symbol+
1275	21.	29.	72.41	50.42	televis+
1297	56.	161.	34.78	22.97	tool+
1306	65.	124.	52.42	83.92	transform+
1317	39.	93.	41.94	28.76	turn+
1318	20.	36.	55.56	28.89	twentieth
1332	36.	72.	50.00	41.41	urban+
1359	26.	49.	53.06	34.08	vision+
1360	26.	52.	50.00	29.81	visual+
1365	30.	69.	43.48	24.34	war+
1366	31.	49.	63.27	58.28	water+
1376	21.	44.	47.73	21.53	wider
1385	122.	412.	29.61	26.08	world+
1394	* 891.	4263.	20.90	7.99 *	a
1397	* 650.	2240.	29.02	179.25 *	cultur_
1405	* 447.	1760.	25.40	46.00 *	technolog+
1406	* 389.	1814.	21.44	3.80 *	0 an
1408	* 568.	2411.	23.56	32.44 *	0 as
1409	* 167.	760.	21.97	2.34 *	0 at
1411	* 76.	307.	24.76	4.78 *	0 first
1413	* 31.	119.	26.05	2.88 *	0 good
1415	*1131.	5471.	20.67	13.70 *	0 in
1417	*1259.	6281.	20.04	3.41 *	0 of
1420	* 61.	240.	25.42	4.77 *	0 time
1425	* 281.	1158.	24.27	16.92 *	0 which
1427	* 163.	746.	21.85	2.02 *	1 can
1439	* 28.	111.	25.23	2.01 *	3 beyond
1442	* 29.	109.	26.61	3.13 *	3 here
1448	* 94.	415.	22.65	2.11 *	3 within
1453	* 46.	182.	25.27	3.40 *	4 during
1454	* 27.	55.	49.09	29.67 *	4 late
1456	* 36.	97.	37.11	18.32 *	4 now
1465	* 183.	705.	25.96	18.26 *	5 how
1478	*1258.	6257.	20.11	5.87 *	6 and
1481	* 162.	726.	22.31	3.01 *	6 but
1482	* 408.	1852.	22.03	7.44 *	6 by
1496	* 47.	182.	25.82	4.13 *	6 rather
1501	* 132.	456.	28.95	25.23 *	6 through
1503	* 39.	144.	27.08	4.78 *	6 thus
1510	* 27.	100.	27.00	3.22 *	7 itself
1514	* 60.	244.	24.59	3.51 *	7 them
1520	* 346.	1446.	23.93	19.03 *	8 it
1521	* 164.	614.	26.71	19.78 *	8 its
1527	*1266.	6311.	20.06	5.08 *	8 the
1530	* 608.	2807.	21.66	9.72 *	8 this
1536	* 128.	572.	22.38	2.43 *	9 been
1543	* 232.	968.	23.97	11.85 *	9 has
1546	* 611.	2932.	20.84	3.01 *	9 is
1563	* 11.	36.	30.56	2.58 *	J twenty
1580	* 99.	372.	26.61	11.18 *	M I

Nombre de mots sélectionnés : 147

Classe n° 1 => "Science Education"

Nombre d'u.c.e. : 1332. soit : 20.65 %
 Nombre de "uns" (a+r) : 61026. soit : 20.50 %
 Nombre de mots analysés par uce : 27.47

num effectifs pourc. chi2 identification

25	110.	343.	32.07	28.81	V find.
34	138.	321.	42.99	102.84	V learn.
54	169.	282.	59.93	277.56	V teach.
58	39.	97.	40.21	22.97	V write.
69	56.	152.	36.84	24.89	achieve+
86	31.	56.	55.36	41.51	adult+
101	82.	182.	45.05	68.04	age+
114	59.	161.	36.65	25.77	analyse+
152	55.	155.	35.48	21.31	assess+
158	23.	40.	57.50	33.34	attend+
160	143.	297.	48.15	143.60	attitude+
163	24.	39.	61.54	40.02	attribut+
172	23.	33.	69.70	48.68	average+
189	111.	293.	37.88	55.60	believ+
222	23.	37.	62.16	39.12	canada
251	88.	185.	47.57	84.18	children+
261	55.	83.	66.27	106.73	classroom+
276	70.	173.	40.46	42.56	collect+
277	38.	56.	67.86	76.80	college+
292	49.	99.	49.49	51.03	comparison+
298	37.	81.	45.68	31.35	complete+
302	91.	269.	33.83	29.73	computer+
310	116.	298.	38.93	63.65	conduct+
324	21.	43.	48.84	20.98	consist+
335	54.	152.	35.53	21.01	content+
357	39.	57.	68.42	80.07	correlat+
361	69.	199.	34.67	24.62	countries+
364	89.	152.	58.55	136.43	course+
374	95.	236.	40.25	57.42	cross+
380	88.	121.	72.73	204.03	curriculum+
384	197.	441.	44.67	166.61	data
397	42.	92.	45.65	35.59	degree+
402	25.	50.	50.00	26.48	demograph+
413	128.	407.	31.45	30.89	design+
417	38.	85.	44.71	30.40	determine+
425	175.	426.	41.08	116.12	differ+
450	52.	120.	43.33	38.38	diverse
463	84.	213.	39.44	47.42	each
470	110.	255.	43.14	81.89	educat+
471	235.	508.	46.26	220.61	educat_+
500	33.	58.	56.90	46.91	engl+
503	22.	32.	68.75	45.39	enroll+
520	76.	93.	81.72	214.71	ethnic+
540	142.	407.	34.89	53.71	experience+
559	115.	338.	34.02	38.90	factor+
561	52.	75.	69.33	109.72	facult+
566	73.	134.	54.48	95.53	family+
572	60.	70.	85.71	182.78	female+
580	122.	320.	38.13	62.71	findings+
608	22.	32.	68.75	45.39	frequenc+
621	94.	163.	57.67	139.80	gender+
630	20.	23.	86.96	61.92	girls+
636	26.	33.	78.79	68.40	graduate+
640	198.	464.	42.67	147.90	group+
655	151.	399.	37.84	76.69	high+
657	31.	69.	44.93	25.07	hiv
659	33.	79.	41.77	21.76	home+
670	56.	146.	38.36	28.56	identifi+
691	99.	278.	35.61	39.66	include+
702	93.	250.	37.20	43.45	indic+
709	17.	29.	58.62	25.62	infect+
725	50.	76.	65.79	95.60	instruct+
744	63.	161.	39.13	34.39	intervention+
745	130.	199.	65.33	250.04	interview+
756	54.	64.	84.38	160.15	item+
775	66.	161.	40.99	41.68	language+
782	16.	25.	64.00	28.77	learners+
787	120.	329.	36.47	52.94	level+
791	53.	130.	40.77	32.76	like+
805	37.	81.	45.68	31.35	low
806	22.	39.	56.41	30.61	lower
809	20.	39.	51.28	22.46	mail+

812	82.	237.	34.60	29.19	major+
814	48.	62.	77.42	123.09	male+
830	28.	42.	66.67	54.61	mathematic+
834	96.	218.	44.04	75.27	measure+
842	29.	47.	61.70	48.68	men
849	130.	341.	38.12	67.04	method+
853	37.	45.	82.22	104.82	minor+
863	26.	32.	81.25	72.05	month+
906	51.	125.	40.80	31.57	nurse+
913	33.	79.	41.77	21.76	obtain+
937	51.	86.	59.30	79.44	overall
944	35.	69.	50.72	38.48	parent+
947	191.	405.	47.16	185.26	particip+
955	29.	61.	47.54	27.16	pedagog+
957	26.	46.	56.52	36.37	peer+
959	69.	182.	37.91	34.04	perceive+
960	19.	28.	67.86	38.23	percent+
961	89.	221.	40.27	53.74	percept+
965	84.	254.	33.07	24.87	personal+
990	80.	215.	37.21	37.19	population+
1004	35.	64.	54.69	45.69	pre
1005	19.	31.	61.29	31.39	predictor+
1010	21.	41.	51.22	23.52	prepar+
1041	79.	178.	44.38	62.89	program+
1063	65.	125.	52.00	76.42	qualitat+
1067	99.	116.	85.34	301.64	questionnaire+
1070	18.	28.	64.29	32.67	racial+
1073	37.	54.	68.52	76.13	random+
1077	59.	98.	60.20	94.98	rate+
1078	30.	39.	76.92	75.81	rating+
1091	22.	42.	52.38	25.97	recruit+
1117	125.	279.	44.80	103.77	report+
1121	30.	60.	50.00	31.82	resident+
1126	53.	87.	60.92	87.25	respondent+
1128	78.	214.	36.45	33.69	response+
1132	239.	710.	33.66	82.37	result+
1134	70.	190.	36.84	31.30	reveal+
1146	31.	72.	43.06	22.30	rural
1149	97.	136.	71.32	217.64	sample+
1151	45.	103.	43.69	33.89	scale+
1154	184.	257.	71.60	423.83	school+
1159	60.	66.	90.91	200.83	score+
1169	78.	231.	33.77	25.13	self+
1179	32.	46.	69.57	67.63	seven
1190	146.	396.	36.87	67.68	signific+
1192	43.	111.	38.74	22.54	similar+
1201	50.	100.	50.00	53.38	skill+
1244	331.	461.	71.80	792.50	student+
1246	423.	1115.	37.94	245.70	study+
1261	147.	294.	50.00	161.87	survey+
1263	21.	31.	67.74	42.14	swed+
1271	161.	202.	79.70	443.67	teacher+
1279	91.	269.	33.83	29.73	test+
1298	40.	96.	41.67	26.25	topic+
1299	37.	65.	56.92	52.70	total+
1303	75.	148.	50.68	83.30	train+
1323	24.	32.	75.00	57.96	undergraduate+
1330	18.	33.	54.55	23.25	universities+
1331	68.	125.	54.40	88.57	university+
1336	303.	1148.	26.39	28.07	use+
1337	168.	462.	36.36	74.94	using
1350	96.	222.	43.24	71.58	vari+
1379	79.	169.	46.75	72.09	women+
1382	16.	27.	59.26	24.66	workshop+
1388	106.	258.	41.09	68.45	year+
1390	32.	73.	43.84	24.21	young+
1395 *	23.	52.	44.23	17.78 *	b
1396 *	29.	101.	28.71	4.07 *	c
1400 *	21.	66.	31.82	5.07 *	g
1402 *	15.	22.	68.18	30.43 *	n
1403 *	369.	1620.	22.78	5.95 *	research+
1404 *	452.	2018.	22.40	5.45 *	science+

1409	*	187.	760.	24.61	8.21	*	0	at
1416	*	21.	74.	28.38	2.73	*	0	least
1426	*	520.	2181.	23.84	20.44	*	0	with
1437	*	59.	167.	35.33	22.53	*	3	across
1449	*	40.	152.	26.32	3.04	*	4	after
1453	*	65.	182.	35.71	25.92	*	4	during
1466	*	45.	155.	29.03	6.80	*	5	less
1468	*	187.	776.	24.10	6.38	*	5	more
1469	*	88.	355.	24.79	3.92	*	5	most
1472	*	210.	833.	25.21	12.11	*	6	about
1477	*	132.	382.	34.55	47.88	*	6	among
1485	*	21.	76.	27.63	2.28	*	6	either
1487	*	354.	1507.	23.49	9.65	*	6	from
1494	*	226.	1009.	22.40	2.22	*	6	or
1495	*	17.	43.	39.53	9.42	*	6	per
1499	*	145.	487.	29.77	26.73	*	6	than
1506	*	52.	202.	25.74	3.29	*	6	whether
1513	*	369.	1230.	30.00	81.00	*	7	their
1516	*	172.	656.	26.22	13.80	*	7	they
1518	*	108.	440.	24.55	4.36	*	8	all
1532	*	105.	332.	31.63	25.71	*	8	who
1538	*	44.	96.	45.83	37.70	*	9	did
1542	*	98.	202.	48.51	98.77	*	9	had
1553	*	307.	805.	38.14	171.54	*	9	was
1554	*	420.	799.	52.57	566.69	*	9	were
1558	*	36.	98.	36.73	15.70	*	J	five
1559	*	71.	178.	39.89	41.32	*	J	four
1561	*	34.	69.	49.28	34.86	*	J	six
1562	*	114.	336.	33.93	38.11	*	J	three
1563	*	14.	36.	38.89	7.34	*	J	twenty
1564	*	144.	539.	26.72	13.19	*	J	two
1565	*	207.	742.	27.90	26.84	*	M	A
1569	*	87.	368.	23.64	2.12	*	M	C
1591	*	14.	17.	82.35	39.59	*	M	P
1600	*	10.	32.	31.25	2.20	*	M	U_

Nombre de mots sélectionnés : 179

Nombre de mots marqués : 1604 sur 1607 soit 99.81%