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Inciting the Metric Oriented Humanist: Teaching Bibliometrics in a Faculty of Humanities

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Abstract

In the past few decades the core of bibliometrics has predominantly been 'scientometric' in nature, due to the first commercial citation index having been created for scientific journals and articles. The production of citation indexes for books implies that proper education related to their use is now becoming critical. A new breed of humanistic bibliometrician can emerge successfully if well-trained lecturers are prepared to provide students with a foundation in mathematical indicator construction and a stimulating environment dedicated to problem-oriented learning. We examine some of the key principles and practices associated with teaching bibliometrics to humanists, with the aim of encouraging students to reflect upon new indicators relevant to scholarly research outputs across the humanities. Emphasis is placed on the "biblio" in bibliometrics (i.e., books), digital record-keeping across the humanities, the work of humanists who have sought to explain the development of new knowledge through objective pattern-seeking, and the complementary value of alternative versus traditional indicators of scholarly research performance.

Keywords: Pedagogical Philosophy; Humanistic Bibliometrics; Research Evaluation for the Humanities

1. Introduction

With the introduction of Thomson Reuter's Book Citation Index [1, 68] and the addition of thousands of books to Elsevier's Scopus [19], quantitative research assessments are now emerging for the humanities [11, 28, 44, 70]. New or expanded citation indexes; however, cannot be the only starting point for introducing humanists to bibliometrics. Humanities scholars themselves also need to understand the history of this practice and what it can mean for them. Consequently, *there has never been a more critical period for examining the pedagogical challenges associated with teaching bibliometrics to students and scholars involved in the production of humanistic research*.

The purpose of this paper is to propose a pedagogical approach that is both indicative and supportive of the humanist's best interests, particularly in a politically charged academic environment where evaluations are unavoidable. Bibliometricians associated with educational policy have been quick to

respond to the general 'evaluation' impetus, but gaps still exist between what humanities scholars value as professionals, where they want their research to have the most influence, and how we might educate them to initiate their own community of bibliometric experts.

We start with a general philosophy of how a suitable program might be developed. For instance, teaching could be modeled in part after the bibliometric workshops/courses that are already in place, but put more emphasis on books, monographs, and book chapters, and include a history of the humanities that are amenable to empirical research. In the second section, we distinguish between a humanistic approach to bibliometrics and another course of study known as digital humanities. The third section illustrates how to explain a mathematical indicator to humanists and suggests how to implement an open-ended teaching approach for problem-oriented learning. In the final section we note that alternative metrics are currently under development and discuss some of the challenges associated with teaching students how to use alternative tools when a humanistic approach to bibliometrics is still new and has been inadequately supported with accurate data in past years.

2. A humanistic approach to bibliometrics

2.1. A return to the 'biblio'

Few institutes or university departments have developed educational programs in bibliometrics, but the first textbook dedicated to this subject, *Citation Analysis in Research Evaluation* [49] was introduced at the Center for Science and Technology (CWTS), Leiden University as a study guide for their graduate course on "Measuring Science". In addition to the CWTS course, a European Summer School for Scientometrics, which started Berlin, Germany, has been held in circulation between the Universities of Berlin, Vienna (Austria) and Leuven (Belgium). Across North America, there has also been a tradition of teaching and conducting bibliometrics research in schools of Library and Information Science (LIS) [8, 79, 80]. As a subject, bibliometrics might best be described as a 'meta' discipline; it crosses many disciplines and academic boundaries. It can be taught to a greater or lesser extent within various university departments, because it is relevant to most scholars. Scientists do not necessarily always agree with or appreciate bibliometric approaches to evaluations [38, 42, 71, 77], but humanists are likely to be even more resistant [81]. Much of the scholarship that humanities scholars produce has not been included in commercial bibliometric data resources, and this makes the typical methods of evaluation that we use for scientists difficult to apply to the humanities [56].

In practice, the humanist may be defined as a scholar of philosophy, musicology, philology, theology, history, archaeology, media studies, and literature. Intellectually, he/she belongs to a unique 'tribe' of specialists dedicated to examining, critiquing, and highlighting patterns of relationship across products of the human mind [7]. The result is often a monograph, which "presents what the scholar concludes is the truth about some set of historical events, the characteristics of some work of art or literature, or the biography of a historical figure, an artist or writer" [12, ¶ 9]. Monographs are published, catalogued and held in libraries. Academics who author new monographs want to be affiliated with a prestigious press and widely read and cited [30], but the citation characteristics or impact of monographs as research outputs have not been systematically measured until fairly recently [e.g., 43, 69, 70, 78].

Scientists, on the other hand, study natural phenomenon, and the "natural sciences are set up institutionally to produce a field consensus quickly" [29, p. 32]. Scientific methods support the

production of journal articles; hence the scientific research community has grown accustomed to journal citation indexes (i.e., Thomson Reuter's Web of Science and Elsevier's Scopus). The statistical indicators developed from these commercial indexes have also become a logical part of them [24, 51]. When Eugene Garfield first created the Science Citation Index (now part of Thomson Reuter's Web of Science), his main motive was to demonstrate its quantitative value to the historian. In 1955 he introduced the journal impact factor as a measure for ranking scientific journals [22]. At about the same time, he acknowledged that a failure to include monographs as indexed sources presented a drawback to recognizing the impact of certain types of works. The creation of a "Book Citation Index", he said, would be "a major challenge for the future" [23].

The absence of citations from books in commercial citation indexes has been a strong reminder of how inconvenient the term *bibliometrics* has been in conjunction with the discipline of 'scientometrics'. Scientometrics has historically emphasized the application of mathematical and statistical measures to scientific journals [61], but the word bibliometrics is a consolidation of the words 'biblio' and 'metron', which means 'books' and 'measures'. A humanistic approach to bibliometrics can now return to the 'biblio' and focus on statistical evaluations and patterns related to books and monographs.

2.2. Eschewing false assessment ideals

When teaching humanists bibliometrics, it is useful to emphasize that the quantitative-qualitative divide in research assessment refers simply to methods of working with information/data, and is not a rationale for promoting one form of evaluation above another. There are in fact many valid ways to assess the influence, impact, quality, and timeliness of a piece of scholarly work or a collection of works [62]. The benefit of eschewing a false assessment ideal is that it will prevent humanists from thinking they lack capacities relevant to the practice of bibliometrics. Humanists can and do count, and they also understand both the drawbacks and benefits of peer review. Moreover, the door is kept open for problem-based teaching [10], which can focus on the relative strengths and weaknesses of metric indicators versus peer-based assessments.

Guillory [29] defines peer review as a form of "evaluative discourse" which "constitutes a mode of argument that differs from demonstration [and may be called] an account or description: it gives an enriched description of [the] work by answering to it and for it" (p. 29). With peer review there is always potential for bias and fallibility, but some members of the bibliometrics research community note that mathematical indicators are also not perfect and should be applied with caution [33]. An experienced evaluator knows that quantified measures "are likely to be just as fallible in the long run as any act of judgment in any area of enterprise" [29, p. 30]. For instance, datasets used for counting have to be filtered and standardized to ensure accuracy, and indicators have to be tested periodically for their stability. Some indicators have also been challenged, revised and re-revised to suit new field developments and to allow for more reliable comparisons between fields [e.g., 27, 50, 58, 72, 74, 75]. In cases where bibliometric approaches are not optimal or unclear, peer assessments can be a welcome alternative [57]. Moreover, peer review need not be recognized solely as a qualitative process. For instance, Zuccala et al., [82] obtained a sample of scholarly book reviews from the *American Historical Review* and linguistically coded positive and negative statements in these texts pertaining to scholarly credibility and writing style. In doing so, the authors show how to transform sentiments from reviews into a quantitative indicator for use in future book evaluations.

2.3. Empiricism in the humanities

Another constructive pedagogical approach is to incorporate a history of the humanities with an empirical outlook. Scientific research is often differentiated from humanistic reflection, but Bod [7] questions the extent to which this distinction is essential. He even suggests that the differences are somewhat artificial. Some scholars are convinced that the humanities focus primarily on 'understanding', while the sciences are dedicated to 'explaining' [18]. Bod [7] prefers to look at things differently:

> Indeed products of the humanities have been created by people, but when products manifest themselves in the form of (collections of) manuscripts, pieces of music, literary works, sculptures, grammar books, plays, poems and paintings, they are obviously just as open as other objects to empirical research and the development of hypotheses. [S]ince Antiquity humanistic material has indeed been exposed to hypotheses and evaluation relating to assumed patterns and interpretations (p. 7).

In Bod's [7] *New History of the Humanities*, a section is devoted to the field of historiography, and the sub-specialty of economic historiography known as 'cliometrics' (note: the term that comes from Clio, the muse of history in Greek mythology [3].) A reference is made to Fogel and Engerman [20], who employed mathematical-economic models of historical data to demonstrate that nineteenth-century slavery in the United States was profitable. In their book, *Time on the cross: The economics of American negro slavery*" computer-calculated data were used to show that "the South was 35% more efficient in agricultural production than the North" and "that the economic benefits of the large-scale plantation were so great that blacks actually received more income as slaves than they would have as free farmers" [33, pp. 41-42]. Soon after the book appeared, Gutman [31] published a methodological objection, yet Fogel and Engerman [20] stood relatively unchallenged for years until newer cliometricians came along [7]. In the *New York Times*, reviewer Peter Passell [59] lauded these cliometricians for their ability to "turn around a whole field of interpretation" by "exposing the frailty of history done without science" (p.4). Thomas L. Haskell [33] presented a more balanced perspective: "I do not deny the validity or usefulness of the [economic] index itself, I challenge only the careless use to which Fogel and Engerman put it" (p. 34).

The value of teaching from Bod's [7] *New History* is that it indicates the presence of empirical pattern-seeking in humanities research for quite some time. This is the perspective we need for ushering in a new era of humanistic bibliometrics. Similar to cliometrics, the discipline of bibliometrics has potential to bring its own unique form of objectivity to humanistic scholarship, but it is not a neutral approach. It will demand as much responsibility in use as any type of explanatory scheme. *All* metric-oriented evaluators need to be responsible for developing "awareness and understanding of the kinds of practices generally considered by their peers to be justifiable by ethical principles" [21, p. 91].

3. Digital humanities versus humanistic bibliometrics

The field of digital humanities relates to humanistic bibliometrics because both disciplines tend to have a similar root problem: they can be difficult to define due to a perceived lack of theory [47]. Sometimes the digital humanities are referred to as the eHumanities or as humanities computing, or even humanist informatics [66]; thus adding the humanistic bibliometrician to this roster could make things more confusing. To be clear, the common factor between these labels is that when researchers

are engaged in pattern seeking across the humanities "nothing is more important than the capacity to organize and search large bodies of information" [40, p. 108]. Hence, a digital humanist primarily investigates phenomena in the humanities using computation—for instance, "parsing techniques in computational linguistics, the calculus for expressive timing in music, or data mining in history" (17, p. 4, 66]. In contrast, the humanistic bibliometrician computes statistical indicators to evaluate both patterns of and the influence of humanities scholarship in both academe and society.

While the discipline of digital humanities has its own associations, journals, bibliographic compendiums, and educational syllabi [66], few of these resources can adequately support the needs of the humanistic bibliometrician. By comparison, the digital humanities community seems to have been much more effective at generating new datasets to support new research. Warwick et al., [76] note that "in the UK alone, over 250 digital humanities projects have been funded by the Arts and Humanities Research Council (AHRC) since 1998" (p. 10). Bibliographic datasets for evaluating humanities outputs have, on the other hand, been much slower to develop—a topic that has been under scrutiny and discussion by scholars worldwide [2, 36, 53, 64, 65].

Pedagogical programs within humanities faculties can remedy the bibliographic resource problem, if we remind humanists that record keeping is critical to their 'memory' function. According to Bod [7], the humanities are similar to the sciences, in that they too possess a memory function, an educational function, and a critical evaluation function. Throughout all historical periods, humanists have been keeping records of the past, educating new researchers on the importance and meaning of these records, and critically assessing their influence on society. These functions endure today; thus, in some countries across Europe (i.e., Spain, Denmark, Belgium, Finland, Norway, Poland) nationwide information systems have been implemented to maintain digital records of new scholarly books and book-type publications [25]. In Norway and Denmark, for instance, record keeping is used to generate performance 'points' linked to level 1 (prestigious) and level 2 (normal) lists of publication channels, either for a publisher or for a series, including journals, book series, and conference series. The authority lists for Denmark are published by the Ministry of Science, Innovation and Higher Education, and performance points are later used to financially reward a university department for its academic productivity [60, 63]. A study pertaining to the Danish Bibliometric Research Indicator (i.e., known as the BFI model) has shown that there have been changes in some scientific fields related to the increased production of articles in journals [39]. New research has yet to determine how book-oriented information systems are affecting humanities scholars and their research activities. One might surmise that the more humanists are required to support this system of record-keeping, the more they will want to contribute to the development of new performance/impact indicators. To do so they will need to understand and reflect on how mathematical indicators work.

4. Explaining mathematical indicators

The discipline of bibliometrics has traditionally aligned itself with the sciences and has chosen an identity that is "based on the reassuring mantel of mathematics" [15, p. 29]. Humanists may be wary of mathematical indicators, particularly if they engage in a field of study devoted to the written text and analytic discourse. This does not mean that all humanities scholars are uninterested in mathematics (e.g., some philosophers are well-versed in mathematical logic), but it is fair to say that there are general differences in orientation between the scientist and the humanist. For instance, when scientists disagree with metric approaches to evaluation, they are still more likely than a humanist to suggest new mathematical indicators [37] or participate in their improvements [4]. When introducing indicators to

students of the humanities, it is therefore important to do so in a language that they can understand. In the following paragraphs, we outline a basic lecture concerning a set of citation measures for journal articles, which have implications for the development and use of similar measures for books, book chapters and monographs. Here it is of primary interest to teach students about the concept of normalization. The term "normalization" relates to the fact that fields within different areas of research do not produce and receive citations at the same rate or order of magnitude; hence mathematical formulae can be constructed in a way that will account for these differences.

4.1 The basic lecture: field-normalized indicators for articles in journals

In this basic lecture we show how mathematical formulae can be made more accessible to some students by focusing on the construction of and debate surrounding the Center for Science and Technology Studies (CWTS) 'Crown Indicator'. De Bruin et al. [16] are the first to have introduced this indicator; however, it has been developed further and used regularly in research evaluation reports produced at the Center for Science and Technology Studies, Leiden [52]. The function of the 'Crown Indicator' was to facilitate comparisons of citation rates in different fields, due to the fact that research departments at a particular university are often comprised of scientists who contribute to more than one field of research. Although the indicator was accepted and used for some time, bibliometricians began to test and question its effectiveness; hence a debate grew concerning two possible methods of normalization: the use of *a ratio of averages* versus an *average of ratios* [48, 58, 72; 74, 75].

The 'Crown Indicator' corrects specifically for the field and year in which a (journal) publication was published by calculating *a ratio of averages*. Waltman et al., [75] present the following mathematical definition (**CPP**= Citations Per paper; **FCSm**= Mean Field Citation Score; ***c*** = actual citation rates given to ***n*** papers published in a particular year; **e** = expected citation rates for ***n*** papers in that particular field for a particular year; **∑** = summation operator for ***n*** where ***i*** is the index of summation at the lower limit of 1):

$$\mathrm{CPP/FCSm} = \frac{\sum_{i=1}^{n} c_i/n}{\sum_{i=1}^{n} e_i/n} = \frac{\sum_{i=1}^{n} c_i}{\sum_{i=1}^{n} e_i}.$$

Given the debate about choosing an alternative normalization method, the authors then define a new indicator, the Mean Normalized Citation Score (MNCS), which normalizes journal publications by calculating an *average of ratios*:

$$\mathrm{MNCS} = \frac{1}{n}\sum_{i=1}^{n}\frac{c_i}{e_i}.$$

Individuals who do not have training in mathematics might struggle to comprehend the above notations, yet they are difficult to avoid when explaining critical aspects of bibliometrics. Again, the aim is to explain to humanities scholars how certain indicators are constructed mathematically, without advising them to memorize formulae (and thus perhaps alienate them), but rather motivate them to observe specific principals (e.g., normalization) so that they can more easily reflect upon how statistical measures might be relevant to their own research outputs (i.e., books; book chapters).

In light of this debate concerning normalization and in contrast to the 'Crown Indicator' (CPP/FCSm) bibliometricians from the CWTS later adopted a different field normalization method; termed the Mean Normalized Citation Score (MNCS). Waltman et al. [75] explain that the new Mean Normalized Citation Score (MNCS) is actually related to the 'Crown Indicator' because this latter formula is a weighted version of the first. In other words, "it turns out that the CPP/FCSm indicator is a kind of weighted version of the MNCS indicator" if it is re-written as follows [75, p. 470]:

$$\text{CPP/FCSm} = \frac{1}{n}\sum_{i=1}^{n} w_i \frac{c_i}{e_i}$$

where w_i is weighted by

$$w_i = \frac{e_i}{\sum_{j=1}^{n} e_j \Big/ n}.$$

The remaining difference now between the newly written 'Crown Indicator (CPP/FCSm) and the Mean Normalized Citation Score (MNCS), is that the 'Crown Indicator' (CPP/FCS) "gives more weight to ratios corresponding with publications that have a higher expected number of citations" [75, p. 470].

Now, consider the challenge of taking the original 'Crown Indicator' (CPP/FCSm) and the new Mean Normalized Citation Score (MNCS) and giving students from the humanities an opportunity to reflect further on how the two are operationalized. Table 1, below, illustrates one approach:

Table 1. Operationalizing the 'Crown Indicator' (CPP/FCSm) versus the Mean Normalized Citation Score (MNCS).

p = publication list	*f = field of publication*	*ci = number of citations received*	*eci = expected number of citations for that particular field of publication*		
1	A	12	10	Ratio=	1.2
2	A	10	10	Ratio=	1
3	A	15	10	Ratio=	1.5
4	B	6	4	Ratio=	1.5
5	B	4	4	Ratio=	1
6	B	3	4	Ratio=	0.75
		ci AVERAGE = 8.33	*eci* AVERAGE = 7		SUM = 6.95 → AVERAGE of RATIOS = 6.95 / 6 = 1.16

Mean Normalized Citation Score MNCS

Crown Indicator CPP/FCSm → RATIO of AVERAGES: 8.33 / 7 = 1.19

In Table 1 we see the publication list of a research group (***p*** = 1, 2, 3, 4 and 5 articles). The group has been contributing articles to journals that have been classified in two different fields (***f*** = A, A, A, B, B, B). Here, the lecturer can show how 'normalization' is operationalized with sample numbers. The number of citations each article has received versus what it is expected to receive will vary from field to field (i.e., the ***ci*** versus ***eci*** for ***field A*** and the ***ci*** versus ***eci*** for ***field B***). We calculate this expected value by

taking the mean average rate of citations to journal articles in the specified field, across a specified period. For instance, in the field of physics the expected citation rate to published articles is normally higher than it is for the field of mathematics.

A *ratio of averages* approach calculates an overall mean average for the list of actual citations (***ci***) and also for the list of expected citations (***eci***), then divides the ***ci*** average with the ***eci*** average to create the "crown indicator" (CPP/FCSm). The alternative Mean Normalized Citation Score (MNCS) first takes individual ratios of the actual citations (***ci***) and expected citations (***eci***) then sums these ratios, before taking an overall mean.

Note from Table 1 that the two different calculations yield slightly different results. The value for the CPP/FCSm (n = 1.19) is slightly higher than the value for the MNCS (n = 1.16), although both are above 1, which makes them similarly gratifying. A value below 1 would be considered disappointing. According to Waltman et al. [38] we can see a slight difference in values because the CPP/FCSm gives more weight to publications in fields that have a higher *expected* number of citations (i.e., ***field A***); whereas the MNCS weighs the publications equally from both fields (i.e., ***fields A*** and ***B***). In a real evaluation situation where a research group's journal articles are assessed, the benefit of choosing the MNCS is that it would ensure that all fields in which the group has published are treated equally without any weighted bias.

4.2 Problem-based learning: normalized indicators for books

Bibliometric indicators for books are not yet fully developed; hence we can use the pedagogical example of the 'Crown Indicator' to stimulate problem-oriented learning in a new direction. With this approach students can be grouped together in small teams and given a set of authentic problems to discuss. The objective is to encourage them to focus on open-ended scenarios, which have more than one approach or answer [10]. There are at least five fundamental stages associated with problem-based learning. Stage 1 is the formulation and analysis of the problem by students in a small group setting. Stage 2 requires students to discuss potential solutions in a self-directed manner. Prior knowledge is helpful, because it can help students identify gaps in their own proposed solutions, before testing them (stage 3) and relating them to other known cases (stage 4). At the end of the group discussion (stage 5), time is left for critical reflection so that students can recognize where learning has taken place and where there are possibilities for improvement [41].

With the same five-stage framework, students in the humanities can discuss the problem of normalization as it relates to the book or monograph. In section 4.1 we presented a real case for normalization related to journal articles, but the new case is different. The 'scaffold' for implementing a learning opportunity might look like this:

Stage 1: What is the problem? What do we already know about this? (*How can we develop a normalized indicator of monograph impacts, and what factors will be of interest in developing one that is both relevant and effective?)*

- *Similar to journal articles, scholarly monographs are classified according to subject, but they are classified prior to publication and not after. There are also many different subject classification systems for books, including the Dewey Decimal System, The Library of Congress Classification, etc.*

- *Many scholarly monographs are written in different languages, because they appeal primarily to local or national interests. Sometimes these original-language monographs are translated into English, but not always.*
- *Various editions of the same monograph will have different ISBN numbers. This is different from a journal and a journal article, which will always have an ISSN and a DOI respectively.*
- *Digital journals are more prevalent than digital books.*
- *Research indicates that in addition to known commercial indices (Book Citation Index; Scopus) there are different types of databases/datasets that we can use to evaluate the impact of books (e.g., Kousha & Thelwall; 2009; Torres-Salinas & Moed, 2006; Torres-Salinas et al., 2014; White et al., 2006)*

Stage 2: What do we need to find out?

- *How are books classified according to subject in the Book Citation Index?*
- *Is the meta-data for books in the Book Citation Index comparable to what we find on Google Scholar, or Google Books?*
- *Is there a record-keeping system in place for allotting "bibliometric points" to published scholarly monographs in my country? Does the system distinguish between different levels of publisher quality?*
- *What is the expected number of citations that a monograph might receive in a particular field over a given time period? What is an appropriate "citation window" for counting these citations?*

Stage 3: Apply the new (previously taught) information or knowledge to the problem.

- *Can we apply the knowledge that we have about the new Mean Normalized Citation Score (MNCS) to scholarly monographs?*

Stage 4: Evaluate: Is the problem resolved?

- *Give students a sample dataset that can be used for experimentation. Allow them to apply what they know about field normalization to the new dataset.*

Stage 5: Reflection.

- *Are there factors that contribute to additional problems that we did not expect?*

Note that this 'scaffold' is not designed to lead students towards a final solution to the new indicator problem. Instead, it illustrates how shared knowledge (from section 4.1) can lead to a specific type of learning outcome (section 4.2). According to Brodie [10], planning for an exercise in problem solving "needs to be ill-structured" otherwise it will not "prompt student discussion and questioning" (p. 149). The role of the lecturer is to provide "relevant material" as students need it, such as directing them to "specific material or internet sites or stimulus material" or providing guides to useful datasets and software programs (p. 150).

5. Introducing 'Alternative' Metrics

Earlier we explain that a humanistic approach to bibliometrics supports a 'return to the biblio', but currently there are traditional and alternative ways of formulating the 'metron'. A traditional measure is one that focuses on productivity or impact directly within the scholarly communication system –i.e., publication counts and received citations. An alternative measure can expand upon this system to include complementary academic research tools [9, 35, 45, 55, 73], or it can focus exclusively on social media [13, 14, 34, 67]. For the humanities, exploratory analyses have recently been carried out using Twitter, Mendeley, Cite U Like, blogs, Facebook, and Goodreads [32, 83]. Some scholars have also suggested measuring the 'impact' of a scholarly book, not just by publication counts or citation counts, but by using complementary catalog holding counts [46, 69] or 'libcitations', where the libcitation may be defined as a measure of perceived cultural benefit [78].

The disadvantage of introducing alternative tools and measures to humanists is that the humanities community still does not have normalized indicators for monographs, national journals, book publishers, books in translation, book chapters and other scholarly material that has been absent from commercial citation indices. In other words, valid, reliable, transparent *biblio*-metric indicators have not yet been sufficiently developed for this field. At present, the core task of the humanistic bibliometrician is not simply to expand his/her metric toolkit, but to first examine the term 'indicator' and reflect on the exact concept that it shall measure [26]. A new mathematical indicator serves as a proxy of a concept, and must be closely aligned with the concept or object that it is designed to measure. It can be challenging to develop because "the reality behind the concept [might] change over time and/or place" [26, p. 113].

With this in mind, students can be encouraged to reflect on the following questions: What is the clearest concept of a scholarly "book", and what are the key properties in the production of a new book? Have these properties remained stable, or have they changed now in comparison to twenty, fifty, or one hundred years ago? Does the definition of a "book" include the production of digital books published in short-form, or as separate chapters appearing in digital format over an extended period? Who can call themselves scholarly book publishers in an age when most information can be found online? What is the standard for peer-review related to the book? Humanities scholars often refer to their scholarly products as being of higher or lower quality, but the term 'quality' is difficult to conceptualize. If quality implies a certain degree of sentiment from the reviewer, how is it possible then to conceptualize, construct and agree upon an independent measure of quality? Could one set aside the notion of quality and utilize another concept, for example, 'visability'? Immediate answers are not required. The pedagogical principal here is to stimulate the metric-oriented humanist, so that she/he knows how to select the most relevant problems, formulate problems into clear concepts, and think about how to develop normalized indicators for various humanistic fields, with as much transparency as possible.

6. Conclusion

It may seem inappropriate to recommend a new type of training program in bibliometrics when much has been written about declining enrollments in humanities faculties and financial cutbacks [29]; however, there is a logical reason for this proposal. In *The Humanities, Higher Education, and Academic Freedom: Three Necessary Arguments* Berebe and Ruth [6] present a timely lesson in metric indicators when they explain why university administrators should not be looking at the share of humanists

graduating as a percentage of all degrees granted *within* a university system, but at the share of *population-normalized* humanities degrees granted as a percentage of the college-age population. If statistics in higher education are properly normalized, administrators can see (at least in America) that:

> despite skyrocketing tuition rates and the rise of the predatory student-loan industry; despite all the ritual handwringing by disgruntled professors and the occasional op-ed hit man; despite decades worth of rhetoric about how either a) fields like art history and literature are elite niche-market affairs that will render students unemployable, or b) students are abandoning the humanities because they are callow market-driven careerists; despite *all of that*, undergraduate enrollments in the humanities have held relatively steady since 1980 (in relation to all degree holders, and in relation to the larger age cohort) and undergraduate enrollments in the arts and humanities combined are almost precisely where they were in 1970 [6, p. 8].

Essentially the 'crisis' in the humanities is not what we think it is; rather it is related to graduate education and professional (under)employment. Berebe and Ruth [6] argue that Ph.D. graduates should be offered more teaching-intensive tenure-track opportunities in universities and not be replaced by contingent (non-PhD) faculty in the fulfillment of undergraduate teaching, with tenure reserved only for graduate education.

What does this mean for the discipline of bibliometrics? According to Bérubé [5] humanities scholars first need to possess professional security and academic freedom within their institutions: this is "absolutely necessary" for increasing their participation in "shared academic governance". The complementary value of training a new breed of humanistic bibliometrician is that it will give humanists a greater feeling of control over their research potential and impact, thus contribute more to education as a whole and the grander scheme of scholarly communication.

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