Acknowledgment Research Genealogy for Today's Quantified Academia

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Abstract: Acknowledgments are recognized as relevant objects of study in the sociology of science; yet it is difficult to extract a clear understanding of their value and functions in the reward system of science. Our acknowledgment research genealogy suggests that a literature-based framework could guide further studies and research evaluation in academia.

1. Introduction

Acknowledgments are one of many conventions by which researchers bestow their gratitude upon the individuals, organizations, or funding agencies that played a role in the work that led to publication. Although they could be considered a simple "scholar's courtesy" (Cronin, 1995), acknowledgments have also been perceived as markers of symbolic capital (Bourdieu, 1975) and an intrinsic part of the "reward triangle" (Cronin and Weaver-Wozniak, 1993) in the sociology of science.

Acknowledgments in scholarly communication have been the subject of more than 100 scientific articles, editorial notes, book chapters, and theses since the 1970s; yet no clear consensus can be drawn from this literature as to their value and functions. Since 2008, we have witnessed a resurgence of interest in what can and has been called paratextual elements (Genette, 1997), namely because of the massive indexation of acknowledgements found in scientific articles in the Web of Science databases.

These "scholar's courtesies" (Cronin, 1995) can vary greatly in nature, format, style; their position in the paper (first footnote, end paragraph, body of the text), while often conventional, is also not standardized. This research will present the preliminary results of an ongoing content analysis of the literature on acknowledgments in scholarly communication. These results will convey how observed trends and emerging issues can guide us in understanding how this paratextual element might develop into an important

evaluative indicator in the current highly quantified context of academia, as scholars' output are increasingly monitored.

2. Methodology

The corpus for this research was collected in two phases. In the first phase, iterative searches in interdisciplinary bibliographic databases [1] and pearl-growing techniques allowed us to collect literature on acknowledgments in scholarly communication from multiple and varied fields of research. Excluding duplicates, 115 documents were initially retrieved with this combination of methods (this first phase was the subject of a book chapter; Desrochers, Paul-Hus, and Larivière, accepted for publication).

This initial overview led to the second and current phase, which began by specifying our object of query according to our research questions. This paper will focus on the following:

1. What does "acknowledgment research" look like?
   a. Throughout history? (1970-present)
   b. What were its founding concepts and considerations?
   c. How are acknowledgments perceived and positioned in the acknowledgments literature itself?
2. Who is concerned with acknowledgment research?
   a. Scientists from what fields conduct acknowledgment research?
3. What aspects of acknowledgments are studied in acknowledgment research?

We have established a protocol based on existing methodologies and recommendations (Rousseau et al., 2008; Dixon-Woods et al., 2005; Mays et al., 2005; Urquhart, 2010). We are currently refining our corpus by conducting an additional round of searches, looking at the conceptual frameworks used in the literature, and mining bibliographies in order to construct a coherent and systematic review of the relevant documents using the PRISMA model (Moher et al. 2009). At this point in the analysis, we have identified 80 documents relevant to our research questions. This paper presents preliminary findings from the initial, paper-level content analysis; these findings will be refined in the upcoming phases through qualitative and quantitative content analyses leading to a full meta-synthesis (Rousseau et al., 2008) of the literature.

3. Findings

3.1 Trends and prevalent considerations

We have already identified certain trends in acknowledgment research, which appear consistent throughout the past five decades. The acknowledgment research literature is composed of multiple and varied fields of study, ranging from Anthropology, Computer

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[1] Databases: Web of Science Citation Indexes (Science Citation Index Expanded, Social Sciences Citation Index, Arts & Humanities Citation Index, Conference Proceedings Citation Index- Science and Conference Proceedings Citation Index); Library and Information Sciences Abstracts (LISA); Library, Information Science & Technology Abstracts (LISTA); Library Literature & Information Science Index; Dissertation & Theses (ProQuest); FRANCIS: and Sociological Abstracts.

Science, Economics, and Linguistics, among others. However, the current corpus shows a clear preponderance of Library and Information Science (LIS) contributions – with more than half of the retrieved documents pertaining to LIS as classified by the Web of Science (2012) "Research Areas".

The first two decades of research on acknowledgments were almost exclusively situated within the sociology of science perspective. The first few and unconnected studies were written in the 1970s. Central to those pioneering pieces are the emerging notions of "sub-authorship" collaboration (Patel, 1973) and of "trusted assessors" (Mullins and Mullins, 1973), both supported by the underlying concept of the "invisible college" (Crane, 1972). Similarly, the 1980s yielded sporadic studies that also built on the same concepts.

The 1990s mark a significant surge in acknowledgments research, due to the work of Blaise Cronin, who published his first major contributions on the topic at the time. Through the years, Cronin authored or co-authored more than one quarter of our corpus of acknowledgments-related literature (n=20). Cronin and Weaver-Wozniak (1993) introduced the concept of a "reward triangle" (authorship, citations, acknowledgments) that shaped further acknowledgment research. Moving from the "invisible college" framework, the 1990s acknowledgments studies are clearly situated in a Mertonian (1973) perspective of the scientific community, sometimes with the addition of the Bourdieusian (1975) "social capital" concept.

Since the late 1990s, acknowledgments research has built upon another theoretical concept, the paratext (Genette, 1987; 1997), which addresses the location of acknowledgments as a textual element situated outside but accompanying the body of a text. Interestingly, this concept can be alluded to with or without actually citing Genette, a trend seen in other areas of scholarly communication (Åström, 2014). This influences the perception of what acknowledgments "are" in terms of scientific output: part of the research article or not? A necessary or optional component (Kassirer and Angell, 1991)? This ambiguity is further ratified by editorial guidelines, which either do not address parameters for acknowledgments inclusion or dictate them in a very strict fashion (e.g. PLOS ONE, 2015). On the whole, the form these acknowledgments should take is still debated in the community (Liesegang and Bartley, 2014).

In the 2000s, acknowledgments research became more diversified in terms of fields of study and approaches, namely because more contributions came from or were concerned with the field of Linguistics (Bing and Ruhl, 2008; Gesuato, 2004; Giannoni, 2002). Finally, the 2000s and 2010s studies continue to build upon the "reward triangle" concept (Costas and van Leeuwen, 2012; Cronin 2012; Cronin, Shaw and Labarre, 2004; Giannoni, 2002; Roa-Atkinson and Velho, 2005).

3.2 Differences characterizing the literature and the nature of its limitations
The varied and multidisciplinary nature of acknowledgment research contributes to both its richness and its complexity; however, it cannot create a coherent corpus suitable for meta-analysis. Furthermore, some pieces do not present empirical data but rather make theoretical and critical contributions. Setting the disciplinary and geographical boundaries of the studies, defining the sample studied, identifying the research questions or methods used was not as straightforward as could be hoped, sometimes due to the reporting style inherent to the various disciplines.

For instance, samples studied could be based on publications from one or a set of journals or scholars (e.g. Cronin and Shaw, 2007; Rattan, 2013; Sugimoto and Cronin, 2012; Tiew, 1998a; 1998b); on the content of theses or dissertations affiliated to one or more department or faculty (e.g. Al-Ali, 2010; Cheng, 2012; Lasaky 2011; Scrivener, 2009); or multidisciplinary samples retrieved through Web of Science (e.g. Costas and van Leewen, 2012; Días-Faes and Bordons, 2014). The languages studied in each sample could not always be defined unequivocally (Coates, 1999; Cronin and Weaver-Wozniak, 1992; Heffner, 1981; Koley and Sen, 2013) and identifying geographical boundaries was at times just as much an intricate task. For example, geographical affiliations might be defined through the national identity of scholars (Días-Faes and Bordons, 2014; Roa-Atkinson and Velho, 2005), institutions of production (Al-Ali, 2010; Bashtomi, 2008; Gesuato, 2004), national boundaries of production (Salager-Meyer et al., 2006; 2010a; 2010b) or journals (Cronin, Shaw and La Barre, 2003; 2004).

4. Discussion and conclusion

The literature is consistent on what aspects of acknowledgments need to be analyzed (who, why, where to acknowledge) and how (content and form). So while there is no potential for meta-analysis, a meta-synthesis of this growing corpus will certainly yield a framework for further studies, as well as editorial and funding guidelines.

We now have more powerful tools, namely the Web of Science data – totalling more than 3.5 million acknowledgments for the 2008-2012 period – which will allow us to conduct quantitative analyses in the later stages of our study. Yet, contrary to what its name suggests, the "Funding Text" field of Web of Science does not solely include information pertaining to funding, but indexes the whole of the acknowledgments. Qualitative work will thus accompany the quantitative analyses.

With much emphasis being placed on metrics and the quantification of scholarly production, there is reason to think that acknowledgments might become relevant evaluative indicators (both for the people thanked and for the people doing the thanking). Once the value and functions of acknowledgments is better understood, a proposition for standardization can be envisioned. This perspective notwithstanding, flexibility, as well as disciplinary traditions (extremely present in the literature), will need to be an intrinsic consideration in any standardization of guidelines. The results of our analyses could provide insight for the development of scientific policies and have concrete implications for the evaluation of research by suggesting nuanced and contextualized approaches to the measurement of impact and influence through acknowledgments as part of the "reward triangle".

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