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Research-in-progress

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Abstract

As citation-based metrics are increasingly used for measuring research performance, the formation of academics' research choices and conceptions of academic freedom are affected. Critically examining the behaviours of academics in today's competitive publishing landscape, we argue that creeping managerial practices are shaping research choices and perceived opportunities. In addition, observation indicates that the way in which academic freedom is conceptualised is changing as a result of considering academic performance through metrics. This raises questions of whether and to what extent professional and academic autonomy remains in the hands of authors or are instead being outsourced to metrics. Based on 21 semi-structured interviews with academics across the humanities and social sciences, we found metrics relating to assessment, rankings and funding all direct research choices. This research-in-progress paper identifies key issues and outlines future research to understand the wider influence of metrification.

Keywords research metrics, scholarly publishing, academic freedom, managerialism, critical perspective

"University management's enslavement to metrics as social practice [...] is a matter of urgent societal concern, since it has the potential to undermine the purpose and ethics of universities, distort the pursuit of knowledge, muzzle independent thought and critique, truncate interdisciplinary and multidisciplinary approaches to addressing critical questions and problems, and even has the potential to reduce universities to simply regressing to becoming lowest common denominator vocational trainers." (Carnegie and Parker 2020)

1   Introduction

Metrics and data analytics are becoming commonplace to manage people and make decisions in organisations (Newell and Marabelli 2015). One area where we can observe an increasing reliance on metrics and league tables is within universities (Burrows 2012). The use of metrics to measure research performance has been subject to scrutiny and debate over the past few decades (MacRoberts and MacRoberts 2018) and criticised for being a simplistic proxy for quality, failing to take into account other dimensions such as originality and societal value (Aksnes et al. 2019). We have used the phrase 'citation-based metrics' to refer to those that are based on citation counts, and 'metrics' to refer to performance metrics in general.

Metrification of academic research has led to increasing standardisation and predictability of academic knowledge production, where scoring 'points' has become the primary objective of publication (Johnston and Riemer 2014). Research assessment serves to regulate academic work, with significant influence over the publishing practices of academics (Rowlands and Wright 2019).

Australia's national research assessment exercise, Excellence in Research for Australia (ERA), is not tied to any distribution of performance-based funding but incentivises quality research through international benchmarking. Australian universities have been found to commonly replicate performance indicators from ERA internally, "legitimating the use of research performance indicators across and within the university" (Woelert and McKenzie 2018, p. 192). A proportion of government funding was previously allocated to universities based on the quantity of publications, which led to an unintended consequence of increased publishing with low-quality journals and publishers (Butler 2005). Currently government funding is not tied to publications, instead, universities are allocated block grants based on the amount of funding their academics received through competitive grant schemes.

To date, there is insufficient empirical evidence on how metrics influence the publishing practices of academic authors. Changes to today's scholarly publishing landscape have altered the ways in which research is evaluated and measured, though the impact this has on the choice of research topic and direction remains underexplored. Anecdotal observation suggests that academics face significant pressures to produce the types of outputs and outcomes that are rewarded by research assessment, potentially in place of more novel or socially relevant agendas. Metrification raises questions of whether the long-held principle of academic freedom remains in the hands of authors or is instead being outsourced to metrics. While this paper focuses on the use of metrics in academia, it serves as an exemplary case of the increasing datafication of employees.

This research-in-progress paper progresses understanding by focusing on the linkage between metrics and how academics conceptualise academic freedom. We propose two research questions:

- How do metrics affect academics' research choices?

- How have conceptions of academic freedom changed over time?

2   Literature review

Metrics are symptomatic of a wider phenomenon of using data analytics for organisational decision-making (Mittelstadt et al. 2016). Data analytics are intended to remove bias and subjectivity from managerial decision-making, leading to better decision-making. However, the use of quantitative measures as the predominant source of knowledge raises itself ethical issues of bias, simplification and discrimination. Quantitative measurement is not neutral, but "value-laden... [their] parameters are specified by developers and configured by users with desired outcomes in mind that privilege some values and interests over others" (Mittelstadt et al. 2016, p. 1). While decision-making is traditionally understood as a human-centred, knowledge-based activity, data analytics outsources those determinations. Algorithms are shown to inadvertently discriminate against marginalised populations

(Barocas and Selbst 2016), reflecting biases that exist in broader society. While humans define what is measured, algorithms represent a 'black-box' where the cause and consequences of behaviours might not be clear (Newell and Marabelli 2015). These issues mean that the use of metrics for evaluation, and consequences of their use, warrants further empirical investigation.

2.1 Increasing use of metrics in academia

Academia offers a useful case for examining the use of metrics to measure performance, as the development and use of measures, as well as the datasets, are readily observable and subject to scrutiny and lively debate. Underlying a metrics-driven approach is the assumption that quantitative data provides an objective measure of research quality. Burrows (2012) identifies six key domains of increasing 'quantified control' in universities: citations, workload models, transparent costing data, research assessments, teaching quality assessments, and university league tables. Accelerating metrification reflects a growing 'audit culture' in universities (Shore 2008; Welch 2016).

Within this audit culture, citations function as the building blocks of research performance. Citation databases such as Scopus or Web of Science are used by academics and their universities for citation analysis (e.g. citation counts, h-index), journal rankings (e.g. impact factor), and institutional rankings. Despite their widespread use, the limitations of citation-based metrics are well-established (MacRoberts and MacRoberts 2018). Garfield, who notably first developed the Science Citation Index (SCI), warned of "the possible promiscuous and careless use of quantitative citation data for sociological evaluations" (1963, p. 290). Suffice it to say, this warning was not heeded.

Arguments against the use of citation analysis for evaluative purposes include the practices of self-citing, coercive citing, referencing bias (confirmatory bias), and field-related biased citing (MacRoberts and MacRoberts 2018). Researchers have many motives behind their citing behaviours, and "many may be characterized as personal, self-serving or even political rather than professional or scholarship-serving" (Lindgren 2011, p. 8). The use of citation-based metrics may imply less attention to other dimensions of research quality, such as solidity/plausibility, originality, and societal value (Aksnes et al. 2019). The coverage of books, conferences and grey literature in citation databases is also poor and unreliable for the purpose of evaluation.

In response to some of these limitations, research evaluation has expanded in recent years to include impact on society, the economy, and policy development (Ravenscroft et al. 2017). Measuring research impact in this broader sense necessitates moving beyond the use of citations. Social media and alternate metrics ('altmetrics') provide an entirely new suite of tools and indicators to measure research impact, though these are highly heterogeneous and, in some cases, more easily gamed than traditional metrics (Sugimoto et al. 2017). These developments represent the ongoing metrification of academic work, and while research evaluation has become more nuanced over time, citation-based metrics continue to be the dominant method for measuring research performance.

2.2 The consequences of measurement

Some authors have argued that the requirement to measure, monitor and report academic performance within institutions is fundamentally reshaping what it means to conduct research (Rowlands and Gale 2019). Metrics have been criticised for increasing the commodification of research, minimising the knowledge value of research in favour of a product value. Measuring research in this way has led to increasing standardisation and predictability, where scoring 'points' has become the primary objective of publication at the expense of the knowledge value of the academic enterprise (Johnston and Riemer 2014). A longitudinal study on the impact of the United Kingdom's research evaluation system found that in the field of educational studies, evaluation has led to increasing quantitative and applied research, a trend towards journal articles, and a concentration of external funding (Marques et al. 2017). Alvesson and Sandberg (2014) discuss the various pressures upon researchers to situate their work within specialised sub-disciplines and "unreflectively reproduce the overall research agenda" (p. 971), reducing opportunities for self-reflection and disincentivising ambitious, paradigm-shifting scholarship. They advocate for a redefinition of what constitutes 'good' research, and greater rewards for publishing 'box-breaking research'. In a study of two departments at a Danish university, PhD students and early career researchers were found to be heavily influenced by research assessment. This meant that they reported "strategically 'hunting for points' through their research choices" (Rowlands and Wright 2019, p. 2) as a compliance practice to build intellectual capital. It appears that producing research that is favoured by research evaluation has overtaken the pursuit of generating new knowledge. Biagolioli and Lippman (2020) argue that today's landscape has redefined scholarly publishing through "the switch from qualitative human judgment to quantitative calculated indexes; and the merging of publication and evaluation" (p. 5). At least at the institutional level, research evaluation has almost

ceased to require human agency, and the reliance on institutional metrics for evaluation not only enables, but incentivises, manipulation.

As universities expand into a globalised marketplace and compete to attract students and research funding, ranking and accreditation practices have increased. Consequently, assessment mechanisms have grown in size and complexity, and "the academic profession is increasingly assessed and controlled not on what its members publish but, rather, where they publish" (Huzzard et al. 2017, p. 2). The growing metrification of academic labour can be seen as a symptom of a growing managerialism in universities, with incentive schemes and performance management regimes tied to the production, teaching and dissemination of knowledge (Huzzard et al. 2017).

3   Research Approach

This study adopts a critical perspective to systematically question and critique 'management', where the purpose is "not to question the usefulness of management practices per se, but rather to scrutinise the social costs of these practises" (Huzzard et al. 2017, p. 3). By critiquing the perceived objectivity of metrics, this research can provide a way forward for empowering and emancipating the academic community by revealing the influence of metrics on academic freedom. An aim of critical research in information systems (IS) is to challenge "established social conditions and institutions and oppressive forms of control, often enabled and supported by IS, which prevent the realization of humane, just and free organizations and society" (Cecez-Kecmanovic 2011, p. 442).

Metrics are understood as a managerial force that influences the research choices and opportunities of academic authors. By revealing the broader structures of power and control, moving beyond the immediate narratives of the participants, this work endeavours to expose the oppressive forces of managerialism on academics' research choices and conceptions of academic freedom.

Data collection and analysis are ongoing and have so far involved semi-structured interviews with 21 academics between July 2019 and June 2020. Participants were drawn from a variety of disciplines in the humanities and social sciences working at different universities in Australia. Participants were primarily recruited through a previous study (Mrva-Montoya et al. 2019), with additional participants identified through purposive sampling to capture a variety of disciplines, career stages and universities. We invited our participants to share their publishing experiences across a broad range of topics, from publishing motivation, prestige in publishing, and the impact of institutional pressures and funding bodies. A grounded theory approach (Strauss and Corbin 1990) was used to code the data and identify key themes.

4   Preliminary findings

Our interviews revealed that participants face heightened institutional pressures on their publishing practices, manifesting in pressure to publish with quality outlets and pursue research funding. The quality of journal articles is determined through citation-based metrics, and the prestige and brand name of publishers are important for book publishing. Metrics were often spoken about in the context of institutional performance requirements, as well as a way of making publishing decisions. Table 1 summarises themes which emerged from the interviews.

Theme	Interview data
Publishing pressures have changed over time	• "You can't go back to the old system, when I was an early academic, where it was much more free for you to just make your own decisions, about where you thought it was appropriate to publish" (participant 8) • "There's now more of a focus on quality over quantity. So, you know, 10 years ago or thereabouts, the push was really quantity. So, journal articles, and you could sort of scattergun approach it." (participant 15)
Influence of citation-based metrics on the humanities	• "My university [...], it's driven by a STEM mentality. [...] in this system, there's no [sic] detraction or loss of standing for co-authorship. And there's no greater weight given to books. So, if I published an 8,000- word or 6,000-word journal article or a 60,000-word book, even if the book's sole-authored, and the journal article has 10 co-authors, it will appear the same." (participant 12) • "It's a very science-based message to be giving staff... I'm hoping that, with mentoring, staff will realise there's still value in producing those books, because

	it's not just about your measurement here […] It's about getting grants, all the other ways that you get assessed, and people within that discipline who are assessing you." (participant 8)
Influence of funding on research priorities	• "I put my name on the grant. I didn't have any background in China, but I was working as part of a team. […] That refocused my work for a good two years, plus. And I wouldn't necessarily have chosen to if it wasn't for the grant." (participant 3)
Pressure to publish with specific outlets and publishers	• "If I did three journal articles with A* journals, they'd be happy. If I did a book with Cambridge [University Press], they'd be happy. Theoretically, I should be able to do a book with Cambridge every few years. But that said, if I'm not publishing journal articles in between, I'll probably be punished." (participant 7) • "Top 25% of Scopus is in the guidelines. Although, I really aim for the top 10% of Scopus if I'm publishing." (participant 14)
Pressure to meet institutional performance measures	• We already have these ways of measuring, there's review processes to get published […] I guess it's just a distrust with what we're doing. You know, the idea that the university would need to monitor what we're doing, after we've already been through so much to get a position." (participant 9)
Academic autonomy	• "I've never had any pressure on me to publish in any kind of particular way." (participant 21) • "I don't feel any pressure about what to write about […] I've never felt any pressure that I need to direct my research in any particular way. It's up to me, which is very important to me, that I have that autonomy." (participant 15)

Table 1: Summary of key themes emerging from interview data

Many participants, especially more senior researchers, describe how *publishing pressures have changed over time*. As noted by participant 15 in Table 1, there was previously a greater emphasis on quantity of publications whereas now there is a focus on quality. This shift is consistent with changes to the way ERA is conducted, and funding allocated. Academics face greater scrutiny about where they publish, and described how recruitment, tenure and promotion processes all require them to be more strategic in their publishing decisions. Those who reach full professor are able to have great flexibility in their publishing strategy, which includes being able to publish textbooks, support new and emerging journals, and publish in open access journals. Junior academics are well aware of the institutional pressures on their publishing and see these as key drivers to inform their strategy.

Our participants report an *increasing influence of metrics measurement and funding requirements* driving their publishing practices. Several describe a "STEM-mentality" at their universities (Table 1), where the use of citation-based metrics encourages publishing practices from STEM. For example, journal articles are preferred over books; multiple authorship is encouraged; and textbooks, edited books and books for a general audience are disincentivised. Participant 15 described that their university offers a $10,000 research award for publishing in *Nature* or *Science*; the same incentives do not exist for journals in the humanities. Academics face pressure to bring in research funding, as universities are allocated funds through research block grants based on the amount of competitive funding awarded to their academics. However, the need to appeal to funding bodies may result in changes to an academic's own research focus, as participant 3's story illustrates in Table 1. Funding bodies are interested in research projects that are topical and promise measurable societal and economic benefits. Participant 16 deliberately chose not to apply for funding with the Australian Research Council, as they felt this would have influenced the direction of their research.

Academics face *pressure to publish in particular places and meet performance expectations*. For many, the message is simple: publish with international journals and publishers, especially those based in the United States and United Kingdom. Most of our participants' universities have implemented some form of journal ranking list to identify recommended outlets. Participant 9 described this as "a very fraught exercise", and several felt that their specific subject area was not well-represented. Some discussed lobbying to have certain journals added to the lists or spoke about the politics of decision-making around what journals were included. Participant 12 explained needing to justify their choice of publication outlet, "it goes to my key audience, which is how I would defend it if I was taken to task by my institution". Publishing strategy, therefore, represent a tension between the author's disciplinary

practices, personal research interests, and institutional pressures. A number of participants felt that their institution's performance measures are too severe or prescriptive, especially in determining where to publish. Some question whether universities are "encouraging lasting, lingering scholarship by this method" (participant 9).

Despite the various constraints on their publishing strategy, our participants report that they maintain *academic autonomy*. While a pressure to publish with particular outlets is acknowledged, many feel that they have "complete academic freedom" (participant 7) when it comes to their choice of research topic. A number described themselves as "lucky" to be able to maintain their level of autonomy and consider themselves better off than colleagues in other departments or universities.

5 Discussion and Next Steps

It has been argued that the publishing system emphasises the product value of research (Johnston and Riemer 2014), and encourages incremental research that fits comfortably into existing paradigms as maintained by high-impact journals (Alvesson and Sandberg 2014). Findings from this research-in-progress align with this view and help refine questions regarding the influence of metrics on academics' research choices. It is clear that managerial practices in universities are shaping academics' research choices and conceptions of academic freedom. Universities are driven to lift their research performance in ERA and in ranking systems. This goal creates policies which emphasise publishing in high-impact journals which are seen favourably by metrics. Academics in our study were, for the most part, conscious of these pressures and deliberate in developing publishing strategies to satisfy institutional requirements. The pressure to publish what is measured and valued by institutions makes today's environment especially difficult in relation to book publishing and publishing non-generalisable, context-specific research. Despite conversation around non-academic engagement and impact in many universities, citation-based metrics continue to be key to university research strategies and promotion processes. Our preliminary findings reveal a disconnect between academics' recognition of metrics influencing their choice of publishing outlet and their perception of autonomy in topic and research orientation. This reconfiguration of autonomy will require further investigation to resolve.

The next steps for this research will examine more explicitly the influence of metrics on publishing practices, including choice of outlet, topic and research orientation. Furthermore, the use of institutional systems or dashboards to measure research performance across the university requires further study. A related issue is the impact of institutional policies, such as journal ranking lists, promotion policies, and hiring requirements, which are co-created by those metrics. We also plan to examine differences in attitudes and behaviours between junior and senior academics in more depth to examine changing conceptions of academic freedom. This pilot study has highlighted that interactions between the various stakeholders (academics, university administrators, government, publishers and aggregators) needs to be considered holistically, as each has a role in influencing the system of academic publishing. For instance, universities aim to satisfy the goals of assessment exercises and ranking systems; governments want to demonstrate benefits from the investment of public funding; and publishers and aggregators wish to preserve the status quo through maintaining prestigious journals and providing the underlying data source for research assessment activities. However, these goals do not always align with or support the creative and sometimes very innovative questions that drive intellectual inquiry. Relying on metrics in place of a more holistic, qualitative assessment of the merits and contributions of academic work runs the risk of entrenching an inadequate system on the next generation of academics potentially undermining academic autonomy.

This study currently investigates the effects of metrification in the context of academia. However, findings arising from this research are of relevance to a broader IS discourse on the increasing use of data-driven metrics for the purpose of managerial decision-making (e.g. Newell and Marabelli 2015). Claims of using seemingly 'objective' and 'unbiased' data for the purpose of performance measurement are not limited to academia. As this research progresses, implications for the wider conception of data-driven metrics are anticipated.

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