## University of Wolverhampton Research Indicators (Metrics) Policy

The aim of this document is to ensure the responsible use of impact indicators (metrics), when relevant. The University of Wolverhampton will avoid any implication that citation-based indicators or alternatives “measure” the quality of research. It will seek to use the term “Indicator” in preference to “metric” or “measure” as part of this. This reflects that indicators can give indirect information about likely scholarly or other impacts but never directly measure them. The University of Wolverhampton fully endorses the Metric Tide report guidelines for dimensions of metrics that should be considered.

* **Robustness**: basing metrics on the best possible data in terms of accuracy and scope
* **Humility**: recognising that quantitative evaluation should support – but not supplant – qualitative, expert assessment
* **Transparency**: keeping data collection and analytical processes open and transparent, so that those being evaluated can test and verify the results
* **Diversity**: accounting for variation by field, and using a range of indicators to reflect and support a plurality of research and researcher career paths across the system
* **Reflexivity**: recognising and anticipating the systemic and potential effects of indicators, and updating them in response.

The University of Wolverhampton’s mission includes research and teaching as well as scholarship contributing to regional economic, health, social and cultural development. This document applies primarily to those pursuing research. Scholarly impact indicators are not relevant to academics that focus on teaching and regional development. They also have little relevance to those researching topics that legitimately have primary impact and interest within the local community.

The University of Wolverhampton will always permit, but never require, those being evaluated to present indicators in support of any claims for the quality or impact of their work. Recognising that academic work can have long term or hidden impacts, the absence of high indicator scores of any type will never be used by managers as evidence that work has had little impact. Academics are encouraged to produce the highest quality and most impactful work possible, and all indicators considerations are secondary to this. Indicators should always support a narrative impact claim and never replace it.

**Recruitment**

The University of Wolverhampton recognises that many academics work in specialist areas that no Wolverhampton employees would have the expertise to fully assess. This is particularly critical during recruitment, when decision makers are likely to have insufficient expertise or time to read and effectively evaluate the works of all applicants. The University will encourage applicants to explain their publishing or creative output strategy (e.g., artworks, performances) as part of their applications and make a claim for the value or impact of their work. Applicants may, if they wish, provide quantitative or other evidence in support of their narrative claim for the value of their work, such as citation counts, the prestige of the publishing journal or scholarly press (books), or published book reviews. They may also wish to present career citation indicators as evidence for the overall value or impact of their work. Whist the support of indicators may strengthen an applicant’s impact claim, their absence will not be taken as evidence that their work has had no impact.

**Promotions**

The rules for recruitment also apply to promotions. University often solicits the opinions of external experts as part of its promotions process, some of whom may include indicators as part of their evaluations. These indicators will be ignored unless they are presented as supporting evidence for a specific claim. If used, they will be re-evaluated in the context of the advice in this document, paying particular attention to diversity, age and field difference issues.

**Self-evaluation**

Research-active academics at the University of Wolverhampton are encouraged but not required, for their own self-evaluation purposes, to annually monitor citation and attention indicators for their work, if relevant in their field. This may help them to detect publishing topics or strategies that find a receptive audience to pursue in the future.

**Publication venues**

Academics at the University of Wolverhampton are encouraged to publish their work in the most appropriate venues, paying attention to the size and nature of the audience that each venue will attract. This includes journals and book publishers, as well as art galleries and performance venues. Publishing in prestigious venues, such as high reputation journals or publishers, is encouraged to attract rigorous peer review and a large appropriate audience. Nevertheless, valid reasons for choosing alternative outlets are welcomed. Publishing in predatory journals or conferences that lack effective peer review is valueless and is strongly discouraged.

Academics that write journal articles may claim that their work is published in a relevant prestigious journal as part of their evidence about the article’s value. The use of Journal Impact Factors (JIFs) is discouraged because they vary over time, are not calculated robustly, and are greatly affected by the field nature of the specialism covered by the journal. Journal rankings within a field, such as JIF subject rankings in Clarivate’s Journal Citation Reports, are more relevant but still subject to arbitrary variations by narrow specialism, calculation method and time. Low subject rankings or JIFs will never be used by managers as evidence that an article is low quality.

**Interpreting indicators**

Managers, appraisers and REF coordinators must consider time, field and career differences when evaluating any indicators presented by academics in support of their claims.

* The usefulness of citation indicators varies been fields and they are largely irrelevant in the arts and humanities. As a rough guide, managers should consult Table A3 of *Supplementary Report II: Correlation analysis of REF2014 scores and metrics* at <http://www.hefce.ac.uk/pubs/rereports/year/2015/metrictide/>.
* Average citation rates vary dramatically between fields. Citation counts, JIFs, h-indexes, career total citations should never be compared between different fields.
* Average citation rates vary between document types (e.g., journal articles, reviews, books, chapters) and should therefore not be compared between different document types.
* Average citation rates increase non-linearly over time and so managers should recognise that older articles are likely to be more cited than younger articles. Average citations per year is not a good substitute because of the non-linear accumulation pattern.
* Career-based indicators, such as total publication counts, total citation counts and the h-index are biased against females, due to their greater likelihood of career breaks for childcare or other carer responsibilities. They are also biased against people with temporary or permanent disabilities or illnesses, including all factor that counted as “special circumstances” in REF2014 that curtail their research productivities. Managers will make allowances for these factors when interpreting their value.
* The h-index should not be used because it conflates different types of research contribution.

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# Related documents are copied below, for information.

DORA

**General Recommendation**

1. Do not use journal-based metrics, such as Journal Impact Factors, as a surrogate measure of the quality of individual research articles, to assess an individual scientist’s contributions, or in hiring, promotion, or funding decisions.

**For funding agencies**

1. Be explicit about the criteria used in evaluating the scientific productivity of grant applicants and clearly highlight, especially for early-stage investigators, that the scientific content of a paper is much more important than publication metrics or the identity of the journal in which it was published.
2. For the purposes of research assessment, consider the value and impact of all research outputs (including datasets and software) in addition to research publications, and consider a broad range of impact measures including qualitative indicators of research impact, such as influence on policy and practice.

**For institutions**

1. Be explicit about the criteria used to reach hiring, tenure, and promotion decisions, clearly highlighting, especially for early-stage investigators, that the scientific content of a paper is much more important than publication metrics or the identity of the journal in which it was published.
2. For the purposes of research assessment, consider the value and impact of all
research outputs (including datasets and software) in addition to research publications, and consider a broad range of impact measures including qualitative indicators of research impact, such as influence on policy and practice.

**For publishers**

1. Greatly reduce emphasis on the journal impact factor as a promotional tool, ideally by ceasing to promote the impact factor or by presenting the metric in the context of a variety of journal-based metrics (e.g., 5-year impact factor, EigenFactor [8], SCImago [9], h-index, editorial and publication times, etc.) that provide a richer view of journal performance.
2. Make available a range of article-level metrics to encourage a shift toward assessment based on the scientific content of an article rather than publication metrics of the journal in which it was published.
3. Encourage responsible authorship practices and the provision of information about the specific contributions of each author.
4. Whether a journal is open-access or subscription-based, remove all reuse limitations on reference lists in research articles and make them available under the Creative Commons Public Domain Dedication [10].
5. Remove or reduce the constraints on the number of references in research articles, and, where appropriate, mandate the citation of primary literature in favor of reviews in order to give credit to the group(s) who first reported a finding.

**For organizations that supply metrics**

1. Be open and transparent by providing data and methods used to calculate all metrics.
2. Provide the data under a licence that allows unrestricted reuse, and provide computational access to data, where possible.
3. Be clear that inappropriate manipulation of metrics will not be tolerated; be explicit about what constitutes inappropriate manipulation and what measures will be taken to combat this.
4. Account for the variation in article types (e.g., reviews versus research articles), and in different subject areas when metrics are used, aggregated, or compared.

**For researchers**

1. When involved in committees making decisions about funding, hiring, tenure, or promotion, make assessments based on scientific content rather than publication metrics.
2. Wherever appropriate, cite primary literature in which observations are first reported rather than reviews in order to give credit where credit is due.
3. Use a range of article metrics and indicators on personal/supporting statements, as evidence of the impact of individual published articles and other research outputs [11].
4. Challenge research assessment practices that rely inappropriately on Journal Impact Factors and promote and teach best practice that focuses on the value and influence of specific research outputs.

Metric tide (excerpt)

Responsible metrics can be understood in terms of the following dimensions:

* **Robustness**: basing metrics on the best possible data in terms of accuracy and scope
* **Humility**: recognising that quantitative evaluation should support – but not supplant – qualitative, expert assessment
* **Transparency**: keeping data collection and analytical processes open and transparent, so that those being evaluated can test and verify the results
* **Diversity**: accounting for variation by field, and using a range of indicators to reflect and support a plurality of research and researcher career paths across the system
* **Reflexivity**: recognising and anticipating the systemic and potential effects of indicators, and updating them in response.

Leiden Manifesto

## Ten principles

**1) Quantitative evaluation should support qualitative, expert assessment.** Quantitative metrics can challenge bias tendencies in peer review and facilitate deliberation. This should strengthen peer review, because making judgements about colleagues is difficult without a range of relevant information. However, assessors must not be tempted to cede decision-making to the numbers. Indicators must not substitute for informed judgement. Everyone retains responsibility for their assessments.

**2) Measure performance against the research missions of the institution, group or researcher.** Programme goals should be stated at the start, and the indicators used to evaluate performance should relate clearly to those goals. The choice of indicators, and the ways in which they are used, should take into account the wider socio-economic and cultural contexts. Scientists have diverse research missions. Research that advances the frontiers of academic knowledge differs from research that is focused on delivering solutions to societal problems. Review may be based on merits relevant to policy, industry or the public rather than on academic ideas of excellence. No single evaluation model applies to all contexts.

**3) Protect excellence in locally relevant research.** In many parts of the world, research excellence is equated with English-language publication. Spanish law, for example, states the desirability of Spanish scholars publishing in high-impact journals. The impact factor is calculated for journals indexed in the US-based and still mostly English-language Web of Science. These biases are particularly problematic in the social sciences and humanities, in which research is more regionally and nationally engaged. Many other fields have a national or regional dimension — for instance, HIV epidemiology in sub-Saharan Africa.

This pluralism and societal relevance tends to be suppressed to create papers of interest to the gatekeepers of high impact: English-language journals. The Spanish sociologists that are highly cited in the Web of Science have worked on abstract models or study US data. Lost is the specificity of sociologists in high-impact Spanish-language papers: topics such as local labour law, family health care for the elderly or immigrant employment[5](https://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351#b5). Metrics built on high-quality non-English literature would serve to identify and reward excellence in locally relevant research.

**4) Keep data collection and analytical processes open, transparent and simple.** The construction of the databases required for evaluation should follow clearly stated rules, set before the research has been completed. This was common practice among the academic and commercial groups that built bibliometric evaluation methodology over several decades. Those groups referenced protocols published in the peer-reviewed literature. This transparency enabled scrutiny. For example, in 2010, public debate on the technical properties of an important indicator used by one of our groups (the Centre for Science and Technology Studies at Leiden University in the Netherlands) led to a revision in the calculation of this indicator[6](https://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351#b6). Recent commercial entrants should be held to the same standards; no one should accept a black-box evaluation machine.

Simplicity is a virtue in an indicator because it enhances transparency. But simplistic metrics can distort the record (see [principle 7](https://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351#seven)). Evaluators must strive for balance — simple indicators true to the complexity of the research process.

**“Simplicity is a virtue in an indicator because it enhances transparency.”**

**5) Allow those evaluated to verify data and analysis.** To ensure data quality, all researchers included in bibliometric studies should be able to check that their outputs have been correctly identified. Everyone directing and managing evaluation processes should assure data accuracy, through self-verification or third-party audit. Universities could implement this in their research information systems and it should be a guiding principle in the selection of providers of these systems. Accurate, high-quality data take time and money to collate and process. Budget for it.

**6) Account for variation by field in publication and citation practices.** Best practice is to select a suite of possible indicators and allow fields to choose among them. A few years ago, a European group of historians received a relatively low rating in a national peer-review assessment because they wrote books rather than articles in journals indexed by the Web of Science. The historians had the misfortune to be part of a psychology department. Historians and social scientists require books and national-language literature to be included in their publication counts; computer scientists require conference papers be counted.

Citation rates vary by field: top-ranked journals in mathematics have impact factors of around 3; top-ranked journals in cell biology have impact factors of about 30. Normalized indicators are required, and the most robust normalization method is based on percentiles: each paper is weighted on the basis of the percentile to which it belongs in the citation distribution of its field (the top 1%, 10% or 20%, for example). A single highly cited publication slightly improves the position of a university in a ranking that is based on percentile indicators, but may propel the university from the middle to the top of a ranking built on citation averages[7](https://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351#b7).

**7) Base assessment of individual researchers on a qualitative judgement of their portfolio.** The older you are, the higher your *h*-index, even in the absence of new papers. The *h*-index varies by field: life scientists top out at 200; physicists at 100 and social scientists at 20–30 (ref. [8](https://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351#b8)). It is database dependent: there are researchers in computer science who have an *h*-index of around 10 in the Web of Science but of 20–30 in Google Scholar[9](https://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351#b9). Reading and judging a researcher's work is much more appropriate than relying on one number. Even when comparing large numbers of researchers, an approach that considers more information about an individual's expertise, experience, activities and influence is best.

**8) Avoid misplaced concreteness and false precision.** Science and technology indicators are prone to conceptual ambiguity and uncertainty and require strong assumptions that are not universally accepted. The meaning of citation counts, for example, has long been debated. Thus, best practice uses multiple indicators to provide a more robust and pluralistic picture. If uncertainty and error can be quantified, for instance using error bars, this information should accompany published indicator values. If this is not possible, indicator producers should at least avoid false precision. For example, the journal impact factor is published to three decimal places to avoid ties. However, given the conceptual ambiguity and random variability of citation counts, it makes no sense to distinguish between journals on the basis of very small impact factor differences. Avoid false precision: only one decimal is warranted.

**9) Recognize the systemic effects of assessment and indicators.** Indicators change the system through the incentives they establish. These effects should be anticipated. This means that a suite of indicators is always preferable — a single one will invite gaming and goal displacement (in which the measurement becomes the goal). For example, in the 1990s, Australia funded university research using a formula based largely on the number of papers published by an institute. Universities could calculate the 'value' of a paper in a refereed journal; in 2000, it was Aus$800 (around US$480 in 2000) in research funding. Predictably, the number of papers published by Australian researchers went up, but they were in less-cited journals, suggesting that article quality fell[10](https://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351#b10).

**10) Scrutinize indicators regularly and update them.** Research missions and the goals of assessment shift and the research system itself co-evolves. Once-useful metrics become inadequate; new ones emerge. Indicator systems have to be reviewed and perhaps modified. Realizing the effects of its simplistic formula, Australia in 2010 introduced its more complex Excellence in Research for Australia initiative, which emphasizes quality.

Loughborough

**Using bibliometrics responsibly**

Loughborough University recognises the importance of using bibliometrics responsibly. To this end, Loughborough University's Statement on the Responsible Use of Metrics was approved by Senate on 16 November 2016.  The full [Senate paper](https://internal.lboro.ac.uk/info/media/Intranet/Content/Research-Office/Downloads/SEN16-P111b%20%28PVC%28R%29%20Responsible%20Metrics%29.pdf) is available to members of the university and the main statement is reproduced below.  There are many developments in the external environment around the use of metrics and whilst this is Loughborough University's first clear statement on the matter, it is unlikely to be its last.

**1.      Preamble**

Loughborough University is proud of its achievements in research to date and has ambitious plans for the future in line with the ‘Building Excellence’ strategy. The quality of our research clearly affects the academic, social, economic and environmental impact it has. Maximising the visibility of our research is equally important to delivering that impact and bibliometric indicators are currently attracting much attention in these regards. As a university, we are keen to improve the quality and visibility of our research. While recognising their limitations, particularly in certain discipline areas, we also recognise that bibliometric indicators can be a helpful tool in monitoring progress against this goal.  Furthermore, we recognise that external assessments of our research quality already use bibliometric indicators and we might reasonably expect such use to increase in future. Relative to our peers, however, Loughborough does not perform as well on bibliometric indicators, even when they are field-weighted. In considering this, we have observed certain relationships. For example, publishing in journals characterised by high SNIP or SJR values and publishing with international co-authors correlate well with citation performance. This indicates how choices that are not directly related to output quality can have an important effect on output visibility and we should seek all means possible to maximise the visibility of our research.

While seeking to establish an agreed set of indicators for a variety of uses, including review at the individual and institutional levels, we are also committed to using bibliometric indicators sensibly and responsibly. The [Leiden Manifesto for Research Metrics](http://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351) (Hicks et al, 2015) outlines ten principles for responsible research evaluation and Loughborough University subscribes to these principles as outlined below.

**2.      Responsible research evaluation: the ten principles of the Leiden Manifesto in a Loughborough context. (*Key principles in italics*).**

***1) Quantitative evaluation should support qualitative, expert assessment.***

Loughborough University recognises the value of quantitative indicators (where available) to support qualitative, expert peer review. Indicators may be used in a variety of processes including recruitment, probation, reward, promotion, development appraisal and performance review but indicators will not supplant expert assessment of both research outputs and the context in which they sit.  Similarly, indicators may be used for collective assessments at levels from research units to the institution as a whole.

***2) Measure performance against the research missions of the institution, group or researcher.***

The “Raising Standards and Aspiration” theme of the University strategy drives our ambition to deliver research of the highest quality. At the same time, the visibility of our research is critical to maximising its impact on the communities it serves, in line with the “Growing capacity and influence” theme. To this end, indicators around the quality of the outlet (journal or conference), collaboration levels and citedness of outputs are helpful in monitoring progress against these strategy themes.  Working within an agreed framework that accommodates variation in missions and the effectiveness of indicators, goals will be set by each School with support from Research Committee.

***3) Keep data collection and analytical processes open, transparent and simple.***

There is a balance to be struck between simple transparent indicators, that may disadvantage some groups, and more complex indicators that normalize for differences but are harder for researchers to replicate.  Research Committee will work to ensure that indicators used support the ambitions of each School, as set out within Research Action Plans, and of the institution as a whole.  To this end and in consultation with the Pro Vice-Chancellor (Research), Schools will be able to select the indicators used to support evaluation of their publication performance at the individual and collective levels.  A list of relevant indicators, with their advantages, disadvantages and potential uses, [is provided](http://www.lboro.ac.uk/research/scholcomms/assessment/bibliometrics/).  Indicators selected should be used consistently across all areas of research performance monitoring.

***4) Allow those evaluated to verify data and analysis.***

The publication and citation tools used to collect and monitor research publication data at Loughborough University will continue to be made openly available.  Academics are therefore able to see the data relating to themselves, and to make corrections where necessary.  Staff managing publication systems will also endeavour to ensure that data are as accurate and robust as possible.

***5) Account for variation by field in publication and citation practices.***

It is recognised that research practices in disciplines vary widely and bibliometric indicators serve some disciplines better than others. For example, citation tools are currently only based on journal and conference outputs, not monographs or other forms of output.  International collaboration indicators will be less relevant to disciplines where academics tend to publish alone rather than in teams.  In line with best practice, indicators will be normalized wherever appropriate and based on percentiles rather than averages where a single outlier can skew the numbers.  The availability or otherwise of bibliometric data will not drive our decision making about research activities and priorities, either individually or collectively.

**6) Protect excellence in locally relevant research.**

It is recognised that most citation counting tools are inherently biased towards English-language publications.  It is important that academics producing work in languages other than English are not penalised for this.

**7) Base assessment of individual researchers on a qualitative judgement of their portfolio.**

Loughborough University acknowledges how indicators are affected by career stage, gender and discipline and will seek to take these factors into account when interpreting metrics.  It is also recognised that academics undertake a wide range of research communication activities, not all of which can be easily measured or benchmarked.  When assessing the performance of individuals, consideration will be given to as wide a view of their expertise, experience, activities and influence as possible.

**8) Avoid misplaced concreteness and false precision.**

Where possible, Loughborough University commits to using multiple indicators to provide a more robust and wide-ranging picture. Indicators will avoid false precision; for example, metrics may be published to three decimal places to avoid ties but, given the limitations of citation counts, it makes no sense to distinguish between entities on the basis of such small differences.

**9) Recognize the systemic effects of assessment and indicators.**

It is accepted that any measurements can, in themselves, affect the system they are used to assess through the inevitable incentives they establish.  To minimize such effects, a suite of indicators will be used, wherever practical.

**10) Scrutinize indicators regularly and update them.**

As the research activity of the University and the external environment develop, the bibliometric indicators we use will be revisited and revised where appropriate. This will be the responsibility of the Pro-Vice Chancellor for Research.

York

# Policy for research evaluation using quantitative data

This document outlines a set of principles by which research evaluation and assessment should be conducted at the University of York focusing on the responsible use of quantitative data and indicators. [[1](https://www.york.ac.uk/staff/research/governance/research-policies/policy-for-research-evaluation-using-quantitative/#Note1)]

The policy has been informed by (and aligns with) the [Leiden Manifesto](http://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351) and has been developed through consultation with subject matter experts amongst current staff. It is intended to act as an enabling code of good practice and provide clarity for staff on evaluation activities.

## Introduction

The University recognises that quantitative indicators on research are now sufficiently well developed that their usage is becoming more frequent. While such analysis may be established practice in some research disciplines, it is not in others. There is therefore a need for the University to provide clear guidance in this area. Peer review remains the method of choice for assessment of research quality. By providing guidance on good practice, however, the principles outlined herein support those who wish to use quantitative evaluation measures as a complement.

## Context

Bibliometrics is a field of ‘research about research’ that focuses on scholarly publication and citation data using the latter as a proxy for research quality. Bibliometric data have been used by governments, funding bodies and charities, nationally and internationally, as part of their research assessment processes and are being considered by the UK government as an optional component of the next Research Excellence Framework (REF) exercise where the research discipline is appropriate.

It should be noted that bibliometric data are most informative in the sciences and social sciences and less so for arts and humanities disciplines.

More recently the field of ‘altmetrics’ has emerged in relation to scholarly publications. Altmetrics focus on the online communication and usage of research and can include download data, discussions on research blogs, citations in policy documents and social media mentions.

Other types of quantitative data one might use in research assessment include research grants, research income, industrial partnerships, postgraduate training and commercial activities (e.g. patents, spin-outs, knowledge-transfer partnerships - KTPs).

## Application

The policy applies to collective assessment of performance at the level of departments, faculties and the University as a whole. The assessment of individual research performance using solely quantitative indicators is not supported. Such analysis is problematic both in principle and in practice and should be avoided.

The principles are not intended to provide recommendations on the application of specific quantitative measures. It is recognised, however, that there is a need for advice in this area and further guidance will be made available in due course. Nor do the principles cover the use of altmetrics or indicators around non-academic impact which are less well-developed, difficult to benchmark and not always applicable to more narrative outcomes such as these.

## Policy and principles

Listed below are nine principles for research evaluation and assessment at the University of York.

### Principle 1: Quantitative indicators should be used to support not supplant peer-review

The expert judgement and narrative context provided by peer review [[2](https://www.york.ac.uk/staff/research/governance/research-policies/policy-for-research-evaluation-using-quantitative/#Note2)] is a well-embedded part of the research and publication process. Quantitative indicators, however, can be useful to challenge preconceptions and to inform overall decision-making. As such, the expectation is that both should be used when assessing research quality. It is recognised that the balance between quantitative and qualitative approaches will vary by discipline.

### Principle 2: Research evaluation should have clear and strategic objectives

There should always be clearly articulated reasons for the incorporation of quantitative indicators and these should align with relevant departmental, Faculty and University strategies. The expectation is that this alignment be specifically stated in any analysis.

### Principle 3: Differences between research disciplines should be accounted for

Contextual information on any disciplinary differences in research indicators should be provided to those undertaking assessment (e.g. average grant sizes, common publication routes, citing conventions) and explicitly acknowledged by them. It should be recognised when it is not appropriate to provide certain types of quantitative data; for example, citation data are not reliable for arts and humanities disciplines. It is recommended that appropriate caveats regarding likely differences between research fields should be acknowledged in any analysis.

### Principle 4: Journal-level indicators should not be used exclusively to determine the quality of papers

Journal-level indicators (e.g. JIF) assess journals and should not be used solely to predict the quality of individual papers. High-impact papers can be found in low-impact journals and vice versa. While there is likely to be a broad correlation of journal quality and paper quality it is not necessarily prescriptive. Furthermore, calculation of the Journal Impact Factor does not account for any of the following: publication type (reviews tend to be cited more frequently than articles), research field (e.g. biomedical research is published more frequently and is quicker to accumulate citations than engineering research), journal publication frequency, career stage, skewed underlying data (citation counts do not follow a normal distribution). It is recommended that paper quality should be assessed using peer review and where appropriate for the discipline, informed by normalised citation impact data.

### Principle 5: A combination of indicators should be used, not a single measure in isolation

It is important that research assessment seeks a variety of perspectives; for this reason we recommend that a suite of quantitative indicators be used rather than a single measure in isolation. The latter is highly unlikely to provide the nuance required for robust evidence-based decision making. The expectation is that multiple indicators are used in any analytical approach.

### Principle 6: Data sources should be reliable, robust, accurate and transparent

Source data should be made available where possible. For example, if a department is evaluating its publication portfolio, researchers should be given information on how publications have been sourced (e.g. Scopus, Web of Science) and able to see the publication and citation data included. They should also be given guidance on how to request corrections via these systems. Similarly, researchers should have access to research grants data for the awards with which they are associated and the internal routes for error correction clearly advertised. It is recommended that such information be provided on the appropriate Information Directorate (Library) webpages.

### Principle 7: Data analysis processes should be open, transparent and simple and researchers should be given the opportunity to verify their data

Where possible, the criteria of evaluation should be available to researchers and the quantitative indicators used should be easily reproducible. Awareness of potential factors that could bias interpretation of the data should be raised.  Existing training for individual researchers and small groups is delivered by the Library Research Support Team within the RETT programme; no training currently exists on strategic usage.

### Principle 8: Research indicators and data sources should be regularly reviewed and updated

The systems of evaluation that are used should be sensitive to the evolving needs as an institution, responsive to the changing nature of the research landscape and reflexive. As the institutional understanding of quantitative indicators increases, the institution should also seek to enhance the measures used. The expectation is that a recommended list of indicators be provided to departments and reviewed annually.

### Principle 9: There should be a shared understanding of best practice in research evaluation

Institutional webpages should be used to share best practice and the pitfalls of unreliable indicators (e.g. h-index). Those undertaking evaluation using quantitative indicators should have basic statistical training and an understanding of the limitations of the data sources being used. There should be avoidance of false precision; for example, a particular indicator may, in theory, be calculated to three decimal places to avoid ties but, the nature of the underlying data can render discriminating between such values pointless. It is recommended that appropriate information and training be developed in a Faculty-specific context by staff with the necessary expertise.  As noted above, the Library’s Research Support Team provides one-to-one support for users of bibliometric indicators, and training for small groups, within the RETT programme.

Approved by University Research Committee (URC): 15 November 2017

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### Notes

1 The term ‘metrics’ in relation to quantitative data has gained currency in the UK higher education sector. It is important to note, however, that there are very few true ‘metrics’ of research performance - they are more accurately ‘indicators’ e.g. citations are an indicator not a measure of research esteem. We have therefore used the term ‘indicator’ throughout.

2 The evaluation of academic work by others working in the same field.