

Metrics Literacies: Introduction of researcher personas for the understanding and use of scholarly metrics

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1. Overview

Scholarly metrics, such as h-index or impact factor, are widely applied in academic tenure and funding decisions, but often inappropriately. The quantification of research impact has created a pressure to publish that harms all scholarly disciplines by creating adverse effects, such as plagiarism, gratuitous self-citation and honorary authorship. The Metrics Literacies project (Haustein, 2018) aims to reduce the misuse of metrics and adverse effects by improving the understanding and use of scholarly metrics in academia through the development, testing and dissemination of multimedia resources. Specifically, it seeks to support researchers and research administrators in developing metrics literacies—an integrated set of competencies, dispositions and knowledge that empowers individuals to recognize, interpret, critically assess and effectively and ethically use scholarly metrics.

Levering expertise of research evaluators, video producers and podcasters, the project will produce, test and disseminate multimedia resources that explain scholarly metrics in an efficient, effective and engaging manner. Therefore, the interdisciplinary team aims to make empirical and practical contributions to bibliometrics and multimedia education and promote metrics literacies in the academic community at large. It will lay the groundwork for future educational efforts on other metrics and inform the Association of College and Research Libraries' efforts to create a metrics literacy framework. Aiming at reducing the misuse of metrics and adverse effects, the project is relevant to policy makers, funders and the general public.

2. Personas

Incorporating the use of storytelling elements and human embodiment, we are currently using design thinking and user-centred design to develop five personas that represent researchers and a research manager. This document serves as an *introduction* of our five personas, which will be used in the creation of educational resources in the first stage of the project with focus

on the h-index (Hirsch, 2005). Overall, the project is divided into three phases, which are mapped to the Knowledge two Action (K2A) framework (Haustein, 2020; Wilson et al., 2011). These phase are:

1. Creation of educational resources,
2. Testing impact of educational resources using a randomized controlled trial,
3. Testing online popularity of educational resources.

Ensuring ethnic, cultural and gender diversity, personas come from different disciplines, different career stages and display various levels of experience and challenges with the h-index. Therefore, realistic examples of researchers and their publications are considered as well as feedback from researchers which can relate in any professional way to one of the personas. Please note that the personas and their examples are a work-in-progress and we are welcoming comments and feedback via bit.ly/MetricsLiteraciesPersonas.

At a further stage, producers of the educational resources will be equipped with descriptions and sketches of the personas as well as storytelling elements that relate to the h-index issues. These storytelling elements are excluded from this introduction in order to avoid any bias within the study.

In the first and iterative development round our research team established the following five researcher personas (Figure 1) with their descriptions and draft portrait sketches (by Isabelle Dorsch):

- Paulo Barbosa, PhD student in Public Health from Brazil
- Dr. Maryam Hashemi, PhD in biotechnology, Iran
- Prof. Dr. Ying Wang, Department of Physics, USA
- Prof. Dr. George Clark, Department of English Literature, UK
- Prof. Dr. Rashida Khumalo, Dean of a Management Faculty, South Africa



Figure 1. Sketch portraits of the five researcher personas

2.1 Paulo Barbosa



Figure 2. Sketch portrait of Paulo Barbosa

Paulo Barbosa is a 26-year-old Brazilian (Figure 2). He is single and a workaholic. He is in the middle of his PhD in Public Health at a public University in Pernambuco State, Northeast region of Brazil, the leading region to fight, investigate and research about Zika virus outbreak in 2015-2016. It was that fight against Zika that motivated Paulo to start his PhD in neglected diseases. During the long hours of experiments in the lab, Paulo began listening to podcasts, which made him become interested in science communication and open science. He believes his research must be accessible to everyone, including the general public. Paulo currently receives a doctoral research grant from the Federal Government (CAPES) and is always worried about receiving laboratory supplies and ethics committee evaluation on time. He has started publishing preprints and is excited with the feedback and visibility his work receives online. But he is also concerned about getting cited and publishing in prestigious international journals, which would be a huge advantage to get a postdoc or faculty position at a good university.

Recently he has submitted a paper to a journal but he got asked by one of the reviewers to cite a number of papers, all by the same author. He was surprised by this request because it was not directly related to his study and talked to his professor about the reviewer's request. His professor suggested that the reviewer was trying to increase his own citation rates, because the h-index and other bibliometric indicators are used for hiring, promotion and academic awards. So, additional citations to their papers might have boosted the reviewer's h-index. Even though

Paulo decided against citing the reviewer's papers arguing that they were not directly related to his work, but he still feared that the reviewer might reject his paper because of it.

After talking with his professor, he noticed that the h-index suffers from other problems. For example, it is possible for one researcher to have different h-indices based on the database. Paulo thinks that there is confusion because everyone assumes that they have exactly *one* h-index, while in fact the metric might differ between Scopus, Web of Science, Google Scholar, and other citation databases. When asked about his h-index, Paulo usually goes with his Google Scholar score, because that's where he performs best.

2.2 Maryam Hashemi



Figure 3. Sketch portrait of Maryam Hashemi

Maryam Hashemi is a postdoctoral researcher at a university in Tehran in Iran. She has a PhD in biotechnology from the same university (Figure 3). She is 34 years old and looking for a tenure-track position in a biology department, preferably at a Canadian University. Maryam got married last year, her husband is also an academic. She knows that in her field, the h-index plays an important role in hiring and promotion and is therefore debating whether or not she should include it in her CV when applying for a position. She has only three peer-reviewed publications of which one is cited 291 times in Google Scholar. Maryam is really proud of it, because it's her first first-authored journal article and it was published in a very important journal in her field. Her other two papers are cited 12 times and once, respectively. Her h-index is 2: she has two publications that received at least two citations each.

Maryam has heard her doctoral supervisor talk about some advantages of the h-index. For example, it aims to measure the productivity and impact of a researcher simultaneously in a single indicator. It's mathematically very simple and also readily available via Google Scholar, Scopus and Web of Science. However, she heard a fellow postdoc say that the h-index is unfair when it comes to measuring the success of early career researchers, who have not yet published a lot. Even if having a single number that measures scientific performance would be convenient to rank researchers, the h-index can only increase the longer the academic career. She totally agrees with her fellow postdoc, it's unfair that the h-index completely diminishes the success of her highly cited article! She thinks that even if she has only produced one highly cited publication so far, she has shown that she can produce impactful research. Maryam believes that she doesn't need dozens of articles to be known internationally. It all depends on how her work impacts the lives of others. She hopes that there is a measuring system that captures the multidimensionality of scholarly communication: publication frequency, journal and peer review quality, citations from peers and use in teaching and interested members of the public. In her opinion, her low h-index does not reflect her scientific success. She wonders whether she should still include it in her application or if there are other metrics that would better reflect the impact of her work.

2.3 Ying Wang

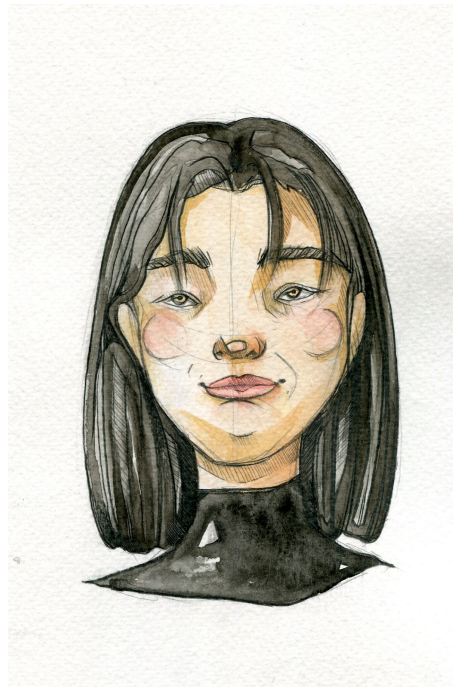


Figure 4. Sketch portrait of Ying Wang

Ying Wang is a tenure track professor at the Department of Physics at a university in the midwest in the US. She studied physics at a university in Beijing, China before she moved to the US for her PhD and postdoc. She has a child together with her husband who also has a

Ph.D. in physics, but works in industry. Ying is expected to go up for tenure this year. She has heard from her colleagues that the evaluation committee will take the h-index into account during the tenure and promotion process, so she has been checking her citations and h-index frequently. Her h-index is 11. She has read that in physics for faculty at major research universities, $h \approx 12$ might be a typical value for advancement to tenure (Hirsch, 2005). Hence, she thinks that she needs to acquire more citations to increase her h-index.

Ying believes that the problem with the h-index is related to the time that has passed for the accumulation of citations. She knows that each paper needs time devotion, research, and publishing in a journal. A paper takes several months to get listed on a database. Hence she usually shares the preprints on her research blog before her papers are formally published. She hopes that the committee uses other metrics that can include citations and discussions on research blogs.

Furthermore, she gets asked by her colleague who is her friend to cite his paper. But the citation is not relevant for the argument. Her friend says if you cite the works of me instead, I will cite you in a similar way. Ying is going up for tenure this year and she really needs to get more citations to improve her h-index. Citing the works of her friends or colleagues in return for citations for her work would be a possibility to increase her h-index. So far and during her career, she recognized that this is not an uncommon practice in some fields. Considering this option, she finally decided against such a practice. Her main focus is in doing research and she really wants this tenure track position, but she does not want to be part of this fraudulent system.

2.4 George Clark



Figure 5. Sketch portrait of George Clark

George Clark is a full professor at the Department of English Literature at a Russell Group university in the UK (Figure 2). George is 56 years old, married, and has two kids. He has been doing research in English Literature since he began his PhD more than 30 years ago. Before becoming a professor and moving to his current university in his early 40s, he was a lecturer at his alma mater, a university in his hometown in England. He also spent two years as a postdoc at an ivy-league university in the United States.

George is currently applying for his university's Researcher of the Year award, which is a prestigious prize and comes with £10,000 of research funding. George was encouraged by some of his colleagues, who thought he would have a great shot at winning since he recently received recognition from the Royal Society of Literature. His faculty's research office was also happy to hear that he wants to apply and is helping him to fill out the substantive application package, which also asks for his number of publications and his h-index. They told him that he has an h-index of 5 in WoS. This means that 5 of his publications had been cited 5 or more times in the Web of Science. As a full professor in English Literature, George has authored over 60 publications, many of which were monographs and edited volumes, which are apparently not indexed in the Web of Science. George and George's disciplinary colleagues only really care about monographs and judge each other on the quality of those and the reviews that they receive in journals.

George has published 28 journal articles so far, the most of which has been cited only 10 times. He is applying for his university's Researcher of the Year award and the application package must include the professor's h-index. As he read up on the h-index, he found that the inventor estimated that an outstanding researcher would have an h-index of 40 after 20 years (Hirsch, 2005). George has been an active researcher for more than 30 years and with a h-index of 4, he is far from making the cut of what Hirsch (2005) calls a "successful scientist" (i.e., $h=20$ after 20 years). He looked up the engineering professor who received the research award last year and found out that his h-index was 45 and he was even a couple of years younger than George. When George told his colleagues that he will be judged on the h-index (which he had to explain to them), they expressed astonishment because citations are not important at all to any of them. They sometimes even disparage highly cited scholars in their field as chasing popularity (by studying Shakespeare, who is seen as far too heavily researched) rather than doing proper research. They are worried that a focus on citations will kill the essence of English Literature by forcing them to produce work that is widely read, such as Shakespeare, rather than exploring the full breadth of the discipline.

With his low h-index, George is worried that he will not stand a chance to win the award. Even if the £10,000 research funding would help him to hire a research assistant for his current project, he wonders whether it's worth going through the hassle of applying at all.

2.5 Rashida Khumalo



Figure 6. Sketch portrait of Rashida Khumalo

Rashida Khumalo is a Dean of the Faculty of Management in a public university near Cape Town, South Africa (Figure 4). She is a full professor, 48 years old and married with two children.

In her role as Dean, Rashida is responsible for assessing the performance of faculty members for tenure and promotion. She believes that scholarly works are essential to demonstrate one's contribution to research, but that quality should be far more important than quantity. Rashida has been noticing throughout her career that many of her colleagues obsess over journal rankings and scholarly metrics like the h-index. For example, the Financial Times FT50 or the Australian list with the aim to identify good quality journals are really popular and frequently used by hiring and promotion committees. Many of Rashida's colleagues swear by those lists to evaluate the quality of researchers' publications. Many of them also use those lists to pick highly-ranked journals to publish their research there in the hope of impressing others. Rashida is concerned and worries where this obsession with rankings and metrics will lead. She thinks that research quality can not be measured by crude indicators and rankings.

Rashida's research team conducts qualitative as well as quantitative research studies and she instructs her team to publish in journals that fit the scope of the research. Of course, this can be journals from such top lists, but she does not set this as the first requirement for the selection

process. Furthermore, most of these journals lay their focus on more quantitative studies and established research topics instead of more risky or new groundbreaking studies. Rashida also knows that some of her colleagues, therefore, adjusted their research scope to topics perfectly fitting such journals.

At her former university, publishing in highly ranked journals was rewarded financially. Based on all her experiences, she became more and more interested in research evaluation during the last years. One of her goals as a Dean has been to go against the obsession with metrics and instead evaluate faculty members based on their leadership roles in research and training.

When Rashida was promoted to full professor, she did include her h-index in her application package, because she knew that it was something that the committee would value. Her h-index is 38 on Google Scholar (19 in Web of Science), but she knows that this is mostly due to the length of her career. She thinks that her best work is not her most cited. Now that she calls the shots, she is making an effort to discourage committee members from using the h-index.

3. Usage and Outlook

As the introduced personas are specifically designed for the Metrics Literacies project, this document and the introduced personas are available under CC BY-NC-ND 4.0. Therefore, the personas should only be used within the projects' context and according to their license. Our next step within the persona development involves obtaining further feedback as well as further development of the storytelling elements relating to the h-index issues.

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Invitation to provide feedback

The personas presented here are still work-in-progress and we welcome feedback to make further improvements. Please use [this form \(bit.ly/MetricsLiteraciesPersonas\)](https://bit.ly/MetricsLiteraciesPersonas) to let us know what we could do better or contact the PI Stefanie Haustein at [firstname].[lastname]@uottawa.ca.

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