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Operationalisation of Higher Education Teaching Performance (HETP): recognising and rewarding teaching as a part of science is enabled by Open Scholarship

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5. Conclusion

5.1. Summary

First, I present a summary of the operationalisation of HETP, and its subsequent contribution to the appreciation of university teaching within the academic RRS. In chapter 2, I examined HETP from three educational theory perspectives. I found that an operationalisation of HETP, in both the Humboldtian sense (chapter 2.1) and the subject education perspective (chapter 2.2), only makes sense when qualitative tools are used. Both understand higher education and higher education teaching as complex structures in which the individual (i.e. the student) is at the centre and educationally relevant processes take place in interaction and interrelation with their environment. The educational goal here is not the specific development of certain skills that are useful in the labour market, but rather holistic personal development. From this perspective, HETP can only be measured qualitatively. Achievements in higher education teaching must be understood in their multidimensionality in the sense of Humboldt and subject education. Following on from this, chapter 2.4 deals with the qualitative operationalisation of HETP. It explains how university teaching performance can be assessed if a procedure similar to the peer review process is used. For example, it is discussed that a description of the didactic preparation of university teaching can be meaningfully collected as well as the question of whether the aim is to promote the personal development of students and a description of whether the teaching is socially relevant (chapter 2.4).

We see that a Humboldtian understanding of education and the subject education perspective provide a theoretical foundation for a qualitative operationalisation. In addition, the systems theory approach expands the view of HETP (chapter 2.3) and thus provides an argument for quantitative operationalisation. From a systems theory perspective, higher education is a functionally differentiated subsystem of society that primarily serves the production and reproduction of knowledge. It operates by means of specific forms of communication, such as lessons, teaching material and examinations, which are geared towards the codes true/untrue and pass/fail. It is therefore not about a complex structure of personality development but reduces complexity to manageable codes in order to make the structure tangible. This perspective makes it possible to define, quantify and compare HETP as system-relevant outputs. Quantitative operationalisation of HETP is sensible and desirable against the background of a systems-theoretical view of university teaching. This was explored in chapters 3 and 4.

Open scholarship enables the quantification of openly accessible outputs in higher education teaching. Free access to data and information allows for scientometric measurements in teaching that would not be possible without open scholarship. This is a great opportunity for the inclusion of university teaching in the RRS. The limitation, however, is that this data-driven approach can only take into account data that is available. Activities and products of university teaching that are not accessible are not taken into account.

To situate the quantitative operationalisation within a broader debate on scientometric open scholarship indicators, chapter 3 presents a mapping review. Extensive research was conducted into which open scholarship indicators are currently being used or discussed. The review has shown that these indicators focus on the area of research and largely ignore the area of teaching, although open scholarship as a concept is seen as more extensive than only research and also considers teaching (Tennant et al. 2019). The review highlights that there is a research gap in the scientometric measurement of university teaching output. A total of 248 documents were reviewed, of which 203

were empirical studies and 45 were discussion papers. In the review, the open scholarship indicators used were identified and presented in detail (chapter 3; Table 4). It is particularly relevant at this point that the indicators were only applied to OER or MOOCs four times (chapter 3; Table 5). All other empirical studies (199 studies) relate to research output or research infrastructure. This result was underpinned by the finding that the indexing of the documents shows a strong focus on research-related topics. There are hardly any teaching-related keywords (*education* only once), and the documents included in the review are predominantly (74.33%) in the disciplines of *information and library science*, *computer science* and *natural sciences and technology*. Other disciplines are only represented to a small extent ($\leq 2.3\%$). The review has shown that scientometrics has a blind spot in the field of higher education teaching.

Chapter 4 presents the development of OER Statistics and thus the quantitative operationalisation of open university teaching output. At this point, I argue that teaching material as the published products of university teaching is the scientometric equivalent of published research output. In the RRS, scientometric measurements of OER are thus the counterpart to the scientometric measurement of journal articles, books, conference proceedings or similar output in research. OER Statistics are developed in a three-stage process: a pre-study (chapter 4.1), a concept evaluation (chapter 4.2) and the presentation of the concept (chapter 4.3).

The pre-study includes a discussion of OER Statistics in their potential role in raising awareness of HETP in the RRS as well as positive and negative effects of these potential indicators (chapter 4.1). A focus group discussion with experts in the fields of OER and scientometrics was applied. The participants agreed on the possible consideration of OER as a teaching-related equivalent to research output and, due to the openness of OER, considered them to be fundamentally suitable for making teaching visible as part of open scholarship. However, they were also skeptical about the use of scientometric indicators. OER Statistics were rated more positively at an institutional level than at an individual level. For example, it was seen as an opportunity for universities to use OER Statistics to present and emphasize a teaching profile to the outside world. OER Statistics could also be used to present and monitor cultural change in open scholarship. The participants expressed their greatest concerns and worries about unintended effects regarding the use of scientometric indicators in teaching at an individual level. This was justified by negative experiences from the field of research. The concern was discussed that OER Statistics could create unintended incentives, so that OER would not be created primarily to give students free access to teaching material, but merely to increase their own OER count. This could have negative effects on the quality of OER and teaching. OER should be designed in such a way that students derive the greatest benefit from them and not in such a way that the OER count of teachers quickly skyrockets. In this respect but also in relation to institutional evaluations, the need for an accompanying qualitative evaluation was emphasized.

Based on these results, the concept of OER Statistics was then developed, considering all the concerns identified in the pre-study. This concept was evaluated by means of expert interviews (chapter 4.2). The evaluation led to a differentiation of the concept, i.e. the indicators were adapted following the expert interviews. For example, following detailed discussions about percentile indicators, it was decided that these would not be used in the OER Statistics. This decision is because these indicators claim to achieve a level of precision that they can only meet under certain data-related conditions. To avoid misinterpretations in this respect, we decided against indicators whose complexity could lead to misinterpretations. Two categories of indicators were added to the concept of OER Statistics at the individual level. The first relates to the reporting of OER certifications, which records whether the individual or institution is certified or not. Secondly, it refers to the transfer indicators that had also been added at institutional level, recording the exchange of knowledge from research to teaching and vice versa.

Finally, the concept of OER Statistics is presented (chapter 4.3). Considering the tension between accuracy and detail, the concept distinguishes between the different aggregate levels (institutional level and personal level). These different levels require different indicators (Rescher 2006). The concept of OER Statistics addresses the following indicators at both individual and institutional level: productivity indicators, cooperation indicators, resonance indicators, openness indicators and transfer indicators. At the individual level, altmetric indicators and OER certifications are also considered. For the institutional level, support indicators are also discussed, which include OER certifications for institutions. For contextualization, the theoretical background of scientometric methods was presented in detail, the OER definition underlying the concept is explained and possible evaluative and explorative applications of OER Statistics are discussed.

5.2. Limitations of the operationalisation of HETP

The primary limitation of this thesis and the operationalisation of HETP is that it can only serve as a representation of actual performance, never as the performance itself. Every operationalisation (both qualitative and quantitative) reduces the complexity of performance to measurable units and is therefore only an approximation. Every form of measurement abstracts from reality and inevitably entails distortions. This applies not only to the measurability of university teaching but also to the measurability of research. Operationalisations (including scientometric methods) can make both research output and teaching output tangible and thus accessible to the RRS, but this tangibility always represents a limited view of performance. Just as, for example, scientometric performance measures cannot represent research in its entirety, neither can they represent teaching in its entirety. To counter this limitation, a transparent presentation of the operationalisation process is essential. It must be clear whether the HETP has been assessed qualitatively or quantitatively, on what data the assessment is based and what criteria were used. This is the only way to ensure that the recorded teaching performance is not only measurable but also appropriately interpreted in its context.

This thesis examines both the qualitative and quantitative operationalisation of HETP, with a focus on the quantitative perspective. This is due to the fact that the academic RRS is significantly characterized by quantitative procedures and there are political calls for a broadening of the range of accepted publication formats (DFG 2022). This demand is the central starting point of my thesis. However, qualitative methods also play an important role. They are not only complementary, but also indispensable in order to effectively support quantitative methods and increase their informative value. For this reason, the thesis also deals with the qualitative approach.

I see three limitations in the qualitative operationalisation of HETP. First, it is inherent in the qualitative method that there is little standardization and limited generalizability. Qualitative data provide in-depth insights into specific teaching material and teacher performance but are difficult to generalize and compare. This goes hand in hand with the second point: qualitative operationalisation is highly subjective, and assessment depends on individual perspectives, which can lead to different interpretations of the same teaching performance. Peer review can also be influenced by social factors such as personal relationships, hierarchies or institutional interests. Third, these procedures are very time-consuming and resource intensive. For example, if the performance of an entire country is to be considered, it would be difficult to qualitatively assess all the OER in an entire country. The choice between qualitative and quantitative methods depends on the use case.

The disadvantage of the qualitative approach is also the advantage of the quantitative approach (Figure 9). The qualitative approach (peer review) has its limitations more between the macro and

meso levels, i.e. at the level of global development and in a national context. The quantitative approach (bibliometrics), on the other hand, has its limitations more between the micro and meso levels, i.e. at the level of individual people or publications.

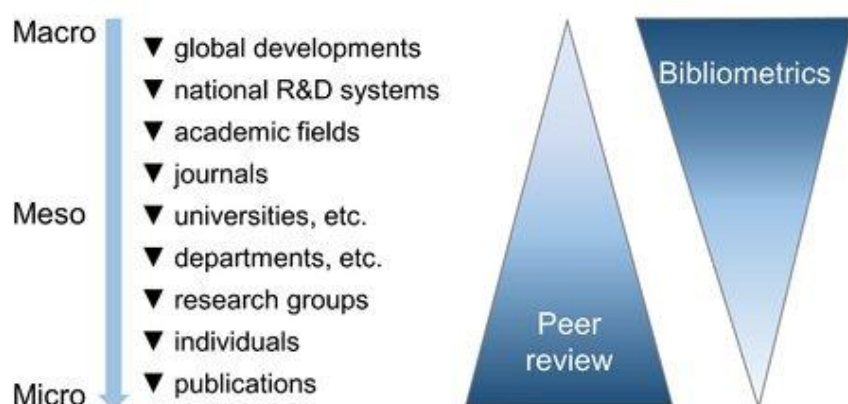


Figure 9. peer review vs. bibliometrics (Tong et al. 2023; Hinze 2014).

The two most obvious limitations of the quantitative operationalisation of HETP (OER Statistics) are the exclusive representation of teaching/learning materials (without consideration of interactions without material or documentation) and the need for openness of these materials. This means that it is not possible to represent the output of higher education teaching in its comprehensive totality. The teaching material represents only a part of higher education teaching, not teaching in its entirety, as conversations, discussions or consultations, for example, are not recorded in the form of material. In addition, this teaching material can only be scientifically recorded if it is open and available without access restrictions. It should be emphasized that the OER Statistics do not directly record performance, but only open teaching material. I thus follow the limitation described at the beginning, namely that operationalisations of academic performance are always only a representation and never the performance itself. This limitation is not restricted to the field of HETP but also applies to scientometric procedures in research. Another limitation is that OER Statistics consider very diverse and hardly comparable artefacts and documents of teaching/learning materials. This is due to the underlying definition of OER (chapter 5.3.1). This stipulates that the OER Statistics only take into account material that is of sufficient quality and level of creation. We must assume that the respective storage locations of the OER ensure this. A manual check of the quality and level of creation of the OER could be carried out, which would establish a link to the qualitative approach and is desirable if time and human resources are available. With regard to the OER to be considered, it should also be pointed out that these open teaching/learning materials can appear in very different forms and formats. Research publications often appear as articles, books or proceedings. OER, on the other hand, can be published in a much wider variety of forms. They can be PowerPoint presentations, videos, text documents, figures, exercise sheets, curricula or other formats. These are more difficult to compare, as small figures are of course different to entire online courses with a certificate of completion. Another limitation of OER Statistics is that there are no common quality assurance procedures in the OER landscape. A fundamental principle of the OER movement is that teaching and learning materials are shared with other educators and learners, even if they are not of the highest quality. A low threshold for publication is desired and required. However, this means that we must assume very different qualities for OER. This is somewhat different for research output, as a peer review process usually exists in this area and ensures quality to a certain extent. This assurance is not absolute either, as the peer review process is not flawless,

and the quality of research or teaching cannot be assessed objectively. The rise of predatory publishers also raises questions about the extent to which the quality of research is actually verified. Nevertheless, at this point I see a difference between the use of scientometric methods in research and in teaching, which must be considered in the use and interpretation of these analyses. Other aspects that complicate the handling of OER in the context of scientometric assessments are the handling of versioning and a lack of everyday practice in the citation of OER. Different versions of the same OER are established practice and lead to a lively approach to OER. These are not rigid entities but materials that should be further processed. This poses a challenge for the quantitative operationalisation of teaching material (like different versions of the same preprint in the research area). It is also a challenge that although OER must always be cited (if only because of the license), however, these citations follow less standardized practices than the citation of research material.

These scientometric limitations are not new. They are known from application in research and must be addressed with good scientometric practice in teaching and research. This includes sufficient metrics literacy among the creators and users of scientometric analyses. All decisions made must be considered and named both during planning and implementation. Users must know that OER Statistics do not measure quality or performance but rather count and quantitatively record OER. In addition, all scientometric surveys must adhere to good-practice-guidelines such as the Leiden Manifesto (Hicks et al. 2015). These guidelines have been in place for several years and must be part of everyday practice. Finally, it should be noted that the most important answer to all limitations and difficulties lies in clear and transparent documentation of data preparation and analysis. When it is understandable which decisions were made, for example, when dealing with versioning and recording citations. It must be clear which citation window has been chosen and how the sufficient level of creativity and quality of the OER is justified. The GLOBAL reporting guideline is currently being developed as a guideline for documentation of the scientometric analyses (Ng et al. 2024). This suggests what should be documented so that all decisions are understandable. This is necessary to counter scientometric limitations.

5.3. Relevance and outlook

The aim of this thesis is to operationalise HETP for the academic RRS. The relevance of this operationalisation lies in the contribution that my thesis makes to the discourse on the representation and thus the appreciation of university teaching in the academic RRS. University teaching and the education of the next generation is of extraordinary importance not only for students but also for society. Education influences social change and plays a crucial role in the development and fulfilment of social potential. Building on this responsibility, it is appropriate to value those who do the work. Following this line of reasoning, HETP must be included in the academic RRS. My work provides a theoretical model for this.

The movement toward open scholarship is laying the foundation for incorporating HETP into the quantitative RRS. When teaching and learning materials are published as OER, scientometric methods can be applied to teaching performance in a manner similar to the use of quantitative indicators in research. However, implementing my conceptual model for operationalising HETP requires a cultural shift toward greater openness in sharing teaching practices. In this context, Nosek

(2019) illustrates key elements for fostering such a cultural change toward Open Science and Open Scholarship in the form of a pyramid (Figure 10).

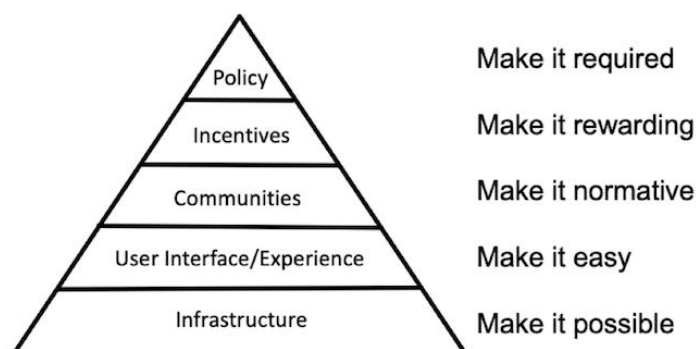


Figure 10. strategy for culture change (Nosek 2019).

The pyramid consists of five interconnected levels, each building upon the previous one. In order for one level to be fully realized, it is necessary to ensure that the level below makes it possible. An open science infrastructure is needed to enable cultural change (first level). Certain user interfaces and experiences should make these practices easy (second level), communities need to make open science practices normative (third level), incentives need to be created for a change in the culture so that open science practices are rewarding (fourth level), and policies provide the top of the pyramid that ensures these practices are required (fifth level). My thesis is positioned at the fourth level (*incentives – making it rewarding*). The operationalisation of HETP serves as a foundation for establishing incentives to promote the creation and use of OER.

Follow-up research should start at all levels of the pyramid of Open Science cultural change. At the infrastructure level, further research is needed into how the OER ecosystem should best be set up with regard to the inclusion of HETP in the academic RRS. Currently, there are many different infrastructures for OER and not all academics have options to publish their OER in high-quality infrastructures. Thus, we need more research on how an infrastructural ecosystem for OER can be best established to make using and sharing OER easily possible. At the user interface/experience level, the experiences of academics with open teaching and the appreciation of these practices should continue to be studied. Sharing and citing OER are complex as we do not have proper infrastructures and standards like metadata. Here, we need more efforts and research to facilitate the adaptation of OER activities like sharing and citing OER. At the community level, the connection between scientists needs to be further normalized and investigated. This specifically includes sharing and citing OER as a form of connection and exchange. Conferences, training courses and workshops are another form of community building. These can also be drivers of an open science culture change and must be examined in their function as an exchange platform.

When these three levels are investigated, they build a strong basis to implement the theoretical concept of my thesis. Regarding the top level of policies, I hope that the results and outcomes of my thesis will be considered. Policies should be established to ensure that the desired practices are mandatory (make it required). These desired practices include the implementation of university teaching as well as the implementation of open practices and the design of OER. Policies that address good scientific practice and scientific careers should take university teaching into account and recognize both research and university teaching as parts of science.

One example of such a policy is the *Coalition for Advancing Research Assessment* (CoARA 2022). The agreement is a European initiative to reform research assessment. Three aspects of this policy coincide with the main line of argument of my thesis. Firstly, in the first commitment of the agreement, CoARA supports my idea that HETP should be considered in the RRS: “Recognize the diversity of contributions to, and careers in, research in accordance with the needs and nature of the research [...] activities including teaching, leadership, supervision, training and mentoring.” (CoARA 2022, 4-5). Secondly, the first commitment also calls for openness to be valued and promoted: “practices that contribute to robustness, openness, transparency, and the inclusiveness of research” (CoARA 2022, 5). Thirdly, in the second commitment, CoARA emphasizes the importance of the interplay between qualitative and quantitative approaches in the RRS: “Base research assessment primarily on qualitative evaluation for which peer review is central, supported by responsible use of quantitative indicators” (CoARA 2022, 5). As we can see, my doctoral thesis is a contribution to an already existing discourse. The journey toward greater recognition of university teaching within academia is already underway.