

## ■ WHY WE NEED OPEN SCIENCE COMMUNICATION EXPERTS

by *Michela Vignoli and Jan Rörden*

**Abstract:** *The changing open science landscape leads to new requirements and expectations in terms of dissemination, communication and outreach. With the increasing importance of micro blogging, social media and other interactive Web 2.0 channels for communicating research outcomes to target audiences outside academia, pressure on researchers to apply more marketing-oriented communication strategies and produce related content increases. In this paper we discuss how research dissemination and communication as well as the roles of researchers and science communicators are transforming in an open science context. We argue that the introduction of new science communication roles and positions is necessary to solve current gaps in public science communication.*

**Keywords:** *Open Science; science communication; social media; Web 2.0; public relations; developing roles*

### WARUM WIR OPEN SCIENCE-KOMMUNIKATIONSEXPERTINNEN BRAUCHEN

**Zusammenfassung:** *Im Kontext von Open Science entstehen neue Anforderungen und Erwartungen an die Wissenschaftscommunities, was Kommunikation und Disseminierung von Forschungsergebnissen betrifft. Mit der steigenden Bedeutung von Mikro-Blogging, Social Media und anderen interaktiven Web 2.0 Anwendungen in der Kommunikation mit Zielgruppen außerhalb des akademischen Umfeldes steigt der Druck auf WissenschaftlerInnen vermehrt Marketing-orientierte Kommunikationsstrategien und Inhalte anzuwenden. In diesem Artikel diskutieren wir, wie sich Wissenschaftskommunikation sowie die Rollen von WissenschaftlerInnen und WissenschaftskommunikatorInnen durch Open Science verändern. Wir argumentieren, dass die Schaffung neuer Wissenschaftskommunikations-Rollen und Positionen zur Überwindung aktueller Herausforderungen der Wissenschaftskommunikation nötig ist.*

**Schlagwörter:** *Open Science; Wissenschaftskommunikation; Social Media; Web 2.0; Öffentlichkeitsarbeit; Rollenwandel*

**DOI:** <https://doi.org/10.31263/voebm.v72i2.3049>

© Michela Vignoli, Jan Rörden



Dieses Werk ist lizenziert unter einer

[Creative-Commons-Lizenz Namensnennung 4.0 International](https://creativecommons.org/licenses/by/4.0/)

**Acknowledgement:** *OpenUP received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 710722.*

## **Contents**

1. Introduction
2. Innovative Dissemination in Research
3. The Changing Role of Science Communication done by Researchers
4. Analysis of Existing Science Communication Roles
5. The Problem: A Science to Public Communication Gap Remains
6. Conclusion: The Key Role of Open Science Communication Experts

## **1. Introduction**

During the past two decades, dissemination of research has changed considerably. This is the result of two main developments. On the one hand, with the digitisation of science novel ways of disseminating research information, e.g. via blogs, social media or video streaming platforms, were increasingly adopted by research communities. On the other hand, a push towards public understanding of science and research accompanied by a growing emphasis on engagement and participation of non-research audiences can be observed since the 1980s (Beaufort 2016). Today, digital and innovative dissemination approaches are increasingly becoming an essential part of research projects.

In context of the growing demand to target audiences beyond academia, e.g. by research funders, researchers are confronted with the need to adopt different dissemination methods and skills than they are used to. An example is taken from the guidance for communicating EU research and innovation from H2020 projects issued by the European Commission, which clearly advises the funded consortia “to take part in various activities that will bring their research to the attention of as many relevant people as possible” (European Commission 2014, 1).

To communicate research outcomes to these target groups it is necessary to produce texts tailored to them, e.g. avoiding technical jargon or using alternative formats like video, GIF animations or comics. A survey done in context of the H2020 project OpenUP (Kraker et al. 2017, 21–33) revealed that while we could observe enthusiastic uptake of innovative dissemination approaches with specific groups of researchers, there was also a considerable gap in practice when it came to disseminating research through alternative channels or formats. The survey results suggest that

communicating to a wider audience is rather a developing norm with early adopters than a widely spread practice. Lack of knowledge about innovative dissemination channels and methods can be named as important barriers for adoption, especially for young researchers. The results suggest that the stakeholders involved need further support to meet the new requirements and expectations of funders and the society at large.

In this paper we present the main outcomes of our research done in context of the *OpenUP*<sup>1</sup> project. The transformation of research dissemination and communication in an open science context as well as related challenges and gaps that we observed are presented. In the conclusion we propose an approach to address these issues and explain why we think that creating new science communication roles and positions are necessary<sup>2</sup>.

## 2. Innovative Dissemination in Research

The changing open science landscape leads to new requirements and expectations in terms of dissemination, communication and outreach. To understand how the concept of dissemination is developing in an open science context, we analysed existing definitions of dissemination and compared them to novel dissemination approaches. Based on Wilson et al. (2010), dissemination is an activity that can be targeted at academia as well as at broader audiences. One of the crucial characteristics is that dissemination facilitates research uptake and understanding. It is a planned process that involves the consideration of target audiences; consideration of the settings in which research findings are to be received; and communicating and interacting with wider audiences in ways that will facilitate research uptake in decision-making processes and practices, where appropriate (Kraker et al. 2017, 9).

Between the years 2016–2017 we performed a landscape scan of projects applying novel dissemination methods. Another important evidence source was the OpenUP survey (see above), in which we asked researchers about their views on and experiences with innovative dissemination. In Kraker et al. 2017 we presented the resulting theories and models of dissemination going beyond academia as part of innovative scholarly communication, and discussed factors affecting engagement of the general public and other non-academic actors with science and technology.

The first most striking lesson learned was that, in an open science context, dissemination was increasingly done at earlier stages of the research lifecycle. This means that dissemination is becoming an integral part of

the whole research workflow, moving away from dissemination as mere end-product published upon conclusion of a research process. The second lesson learned was that dissemination in an open science context became more interactive. The consequence is that it becomes more difficult to draw the line between activities of dissemination and participation.

Another observation was that to reach public audiences dissemination of complex research knowledge was increasingly being done on a level that was accessible and understandable by non-expert audiences. Traditionally, this level of science communication was not a responsibility of researchers, but rather of science journalists or other science communicators. However, in the changing open science landscape also this boundary is becoming blurred.

To distinguish novel approaches of doing dissemination within an open science context – as opposed to more traditional ways of doing dissemination – we introduced the term *innovative dissemination* (Kraker et al. 2017, *ibid*). Innovative dissemination goes beyond traditional academic publishing (e.g. academic journals, anthologies, or monographs), conferences and workshops, and actively targets audiences outside academia. It also includes the characteristics observed above, i.e. that it is done iteratively and accompanies the whole duration of a research project, and that targeted audiences are able to engage in a dialogue or interaction with the research teams. An important distinction to participation in research is that innovative dissemination activities must facilitate the targeted audience's take up and understanding of the communicated knowledge. For example, a citizen science project that reaches out to citizens for data collection but does not educate them about the research methods or achieved results would not be considered as an example of innovative dissemination.

### **3. The Changing Role of Science Communication done by Researchers**

Communicating research results to businesses, the public, and other target groups outside the fellow researcher community is increasingly being expected in the developing open science landscape. However, this form of communication also requires specific skills. Researchers are traditionally not trained for this kind of dissemination but are rather used to communicating research results to peers and other expert audiences. This results in a competency gap on the side of researchers when they are confronted with the need to adopt innovative dissemination methods.

In many cases, research organisations rely on their marketing and communication departments, staff, or on specialist media for this task. However, with the increasing availability and importance of blogging and other social media for communicating research outcomes to target audiences outside academia (Jarreau 2015, Bik and Goldstein 2013, Yammine et al. 2018), pressure on researchers increases to apply more marketing-oriented communication strategies and content (Brown 2012, 964). The OpenUP survey results suggest that in terms of innovative dissemination there is a substantial gap. Only a minority of researchers targets non-academic audiences frequently, and also dissemination channels specifically designed for doing so are only used by a small share of researchers on a regular basis. Just 12% of respondents reported to having had achieved an outstanding result using innovative dissemination channels (Kraker et al. 2017, 23 ff.).

In practice, only limited support is provided to researchers for this kind of activity. This certainly is one of the reasons why innovative dissemination practices are picked up slowly by researchers. However, there is another important reason. Traditionally, science dissemination is divided between dissemination of research outcomes to peers, which is done by researchers (e.g. at conferences, in scientific publications); and popular, general public-targeted communication of research information, which is traditionally done by research journalists or communication departments. The impact of Web 2.0 communication channels is slowly but steadily blurring this division and requires rethinking of this distinct division of roles.

#### **4. Analysis of Existing Science Communication Roles**

Up to now we focused on the dissemination and communication of research from the perspective of its changing role within the research process, and how the role of researchers is changing in this context. However, there is another group of actors that plays a key role in the developing science communication landscape. This group includes non-fiction authors, news and magazine editors, journalists, university public relations, as well as writers and bloggers communicating about research content. Brown and Scholl (2014, 2) define this group as popular science communicators. Their role is to “translate[...] science directly to lay audiences”. These actors can be in both paid and non-paid positions and have different backgrounds in science, journalism or mass communication. In their study

Brown and Scholl (*ibid.*) observed that in this group there was increasing difficulty to distinguish the roles and work of the various actors.

In the following we will focus on the role of science communicators in academic positions. To gain a better understanding of this role and to understand what is required and expected from science communication personnel today, we analysed job descriptions in calls for open positions at academic institutions in science communication, science journalism, and public relations (Berkeley Lab (2018), Woods Hole Oceanographic Institution (2018), Duke University (2018), University of Maryland (2018)).<sup>3</sup>

The analysed job descriptions mostly target early career researchers who desire to engage with the media and communicate with non-scientific and non-expert audiences (Duke University 2018). The minimum requirements for applicants were very similar in all job descriptions. Applicants should have at least a bachelor or undergraduate degree in communication, journalism, or have scientific education relevant to the research focus of the institute/organisation where the position is vacant. Applicants should be able to write and frame clear, compelling stories and releases for press and/or multimedia content, and quickly understand complex/sophisticated science topics and communicate them in an engaging way to a general audience. They should also have previous experience in the strategic use of social media, web publishing and communication tools/channels, and excellent written, oral, interpersonal, and communication skills. Finally, applicants should be able to interact effectively with researchers, administrators, and the press. Ulterior preferred qualifications defined by the analysed job descriptions were visual intelligence; photography/multimedia skills, as well as experience with desktop publishing or graphic design.

We can divide the prerequisites an aspiring academic science communicator needs to have in four categories: 1) a basic education in communication or journalism, or alternatively in an academic discipline (both is equally accepted); 2) communication and multimedia skills for producing communication content; this includes 3) social media and web publishing skills; and 4) communication and interpersonal skills for understanding and interacting with both researchers and intermediaries (e.g. press).

According to Leeming (2017), people willing to work in science communication are passionate about science, understand many different, difficult topics, and are able to interact with scientists as well as experts. Also, they should be able to convince others that communication is important and have confidence in their own expertise, on how to communicate and with whom (*ibid.*). An interesting observation from our analysis is that both having a background in science or in journalism or communications

enables you to become a science communicator. Deducting from the descriptions of required skills in the analysed job descriptions, we can derive that having a background in a specific research area is an essential asset for science communication positions.

If we compare the analysed requirements for science communication personnel with what is expected from researchers to fulfil their role in an innovative dissemination context, we see that there is no considerable difference. Science communication personnel are required to be considerably skilled in communication and multimedia in a contemporary Web 2.0 environment on the one hand; and have the ability to understand complex topics and concepts from specific research topics on the other hand. Researchers are increasingly expected to take over a similar role and gain more importance in the dissemination and communication of research in targeting groups outside academia.

This development reflects the demands on science communication in a developing open science environment. For instance, Brown (2012, 967) and Bubela et al. (2009, 517) recommend that researchers should be educated and trained in media and communications, as well as show how those influence the social and political context of science. Journalists also should become more aware of the research process and how logical conclusion-making is done in science.

Our results suggest that when it comes to communicating and disseminating research information to audiences beyond academia the once distinct roles of researchers and science communicators are increasingly merging. The consequence is that the boundaries of these professions are blurring, which leads to overlapping responsibilities on the one hand, and to increased pressure and work overload on the other hand. Doing science communication right is a not trivial task and it requires substantial effort and responsibility. It is no coincidence that research and communications are traditionally two different jobs.

## **5. The Problem: A Science to Public Communication Gap Remains**

The pressure put on both researchers and science communicators is a symptomatic reaction to the growing need for improved and more interactive public communication of fact-based science. Compared to a decade ago, researchers and research institutions invest considerably more time and effort into communicating with the media (Brown 2012, 964). It becomes evident that public communication of research cannot longer be carried

out solely by professional public and specialist media. Current issues in science communication perpetuate shortcomings and gaps from both research and science communicators' side. A not exhaustive list of issues that can be observed today includes misrepresentation of original science (both in press releases as well as public press and media), exaggeration of preliminary findings, over-simplification of complex issues, avoidance of discourses about limitations of research methods or conflict of interests, and inclusion of sensationalistic terms for selling purposes (Brown 2012). This is even increased by e.g. ideologically or politically motivated misrepresentation of research by private or public actors in social- and other media. The recent debate around "alternative facts" and "degraded public discourse" (Ferber 2018) is a recent example that emphasises the urgent need for improving the scientific research communication to public audiences. In the 21st century science and media landscape social media platforms such as Facebook, Twitter and YouTube play a crucial role to reach out to public audiences (Fingerle 2017). This requires science communication experts to adapt to these new media. Eagleman (2013), Libutti & Valente (2006), and already Callon (1999) made clear that communicating and interacting with the public is essential to improve perception and awareness of science. This is also confirmed by Brown (2012) and Bubela et al. (2009), who also list related challenges for both researchers and science communicators, which we cannot discuss more in detail within the scope of this paper.

Despite the on-going discourses and the calls for action to improve public science communication, our results suggest that in practice a gap between 1) dissemination of research outcomes to peers done by researchers (mostly behind closed doors to the public at conferences or in scientific publications), and 2) more popular, general public-targeted communication of research information (mostly done by research journalists, communication departments or intermediaries) remains. In other words, between scientific, "complex" dissemination to an expert public and a popular, "simplified" communication to public target audiences only little innovative dissemination and participatory science communication exists. However, it is exactly that kind of science communication that is mostly needed to fill the science to public communication gap.

Bubela et al. (2009, 517) conclude that science communication "remains driven by an ever-more-complex relationship between institutions, stakeholders, the media and a diversity of publics." They stress that science communication is lacking focus on "honest effort at relationship- and trust-building" with the public, and that we are missing a "clarification



about the goals and assumptions of science communication.” According to their paper, what is missing are new models for a professional science journalism and reporting, which is supported by foundations, universities, and governments to generate content and discussions involving users (ibid.).

## **6. Conclusion: The Key Role of Open Science Communication Experts**

To substantially improve science communication to audiences beyond the academic world, we need to rethink the established roles of researchers and science communicators. Communicating and interacting with the public is necessary to improve perception and awareness of science and to educate and inform the public. Mass media outlets have lost their former dominant position compared to the increasing importance of social media platforms such as Facebook, Twitter and YouTube to reach public audiences (Fingerle 2017). Traditional science media outlets only reach a small audience of science enthusiasts (Bubela et al. 2009, 515). Popular science communicators retain a key role in supporting intermediation between researchers, research organisations and media outlets, and contribute to disseminating complex research topics to audiences beyond academia. However, the need for researchers to increasingly become active and involved in public dissemination and debates instead of operating behind closed academic doors is evident. One challenge is that researchers are traditionally not trained in reaching out to public target audiences. Another issue is that the responsibilities of this newly emerging role are not well defined, and this causes an increased pressure on researchers to take on considerable amount of additional work on top of their daily research work. It is necessary to rethink science communication in terms of possibilities offered by Web 2.0 technologies and to create new positions for experts in this field.

To enable researchers to take on this task properly they need to be in a position where they can invest the necessary effort and have the required responsibility. As it is today, in many cases it is unrealistic to add the additional work of open science communication on top of the research work that needs to be fulfilled, as it is already a full-time job. Of course, next to the research work, dissemination of the results is an important responsibility. However, as we presented in this paper, innovative dissemination and engaging in interactions with the public has a considerably different focus than communicating to peers. It is legitimate for at least some researchers to focus on their research work and to leave public communication and

engagement tasks to other experts. Other researchers, however, are keen on taking over this role, which is demonstrated by the early adopters of innovative dissemination.

In conclusion we can state that a clear distinction of roles when it comes to public science communication is needed. In an extensive analysis, acatech (2017) formulated recommendations to adapt research dissemination and communication for the digital world. They state that Institutions, academies and policy makers are responsible for setting the right incentives and directives for researchers who want to actively contribute to public communication. They stress that traditional science dissemination, science journalism and dissemination through social media are complementary activities that should not be played against each other. Research institutions as well as researchers should take on responsibility for providing the public with reliable information. Policy makers should support independent science information provision and science journalism activities with funding (analogously to research funding). According to acatech, a clear division between fact-based science communication and science marketing is needed. Appropriate training opportunities for researchers should be created, and researchers should be encouraged to take on this role. On the one hand, research institutions should encourage researchers to position themselves publicly as experts. On the other hand, a clear definition and division of various roles that can be taken on by researchers with the necessary expertise (e.g. scientist, science communication expert for a specific field) should be created. Acatech recommend ensuring transparency of roles taken over by researchers involved in public communication. Their corresponding role (for example expert, teacher or private person) should be made transparent in the communication process, and they should deal responsibly with time and financial resources available to them alongside their research and teaching (ibid.).

Summarising, we conclude that for the developing open science communication to be sustainable and efficient it is of utmost importance to support newly emerging niches facilitating researchers, open science communicators and PR departments to closely work together. We need to think out of the box and develop feasible solutions. For an immediate and interactive open science communication to work it is important to have, next to PR and marketing staff, trained field experts with the necessary scientific background and skills, who are also well trained in communicating to and interacting with audiences outside the research community using the web and social media. As Jessica Eise (2016) puts it, “All forms of professional communication require the same broad, cross-cutting skill

set. Yet each sub-discipline requires an orientation and focus on different pieces.” To achieve this, appropriate training opportunities for scientists as well as dedicated roles or even positions at research institutions and science communication departments or organisations should be provided. Targeted and interactive open science communication should be supported on institutional- and on policy level to increase active participation by researchers. Additional funding for science communication activities, setting appropriate incentives and providing communication and soft-skills training for researchers are key factors to sustainably support an improved and timely science communication to public audiences.

Mag.<sup>a</sup> Michela Vignoli

ORCID: <https://orcid.org/0000-0002-9495-5697>

AIT Austrian Institute of Technology GmbH

E-Mail: [michela.vignoli@ait.ac.at](mailto:michela.vignoli@ait.ac.at)

Jan Rördén, MA

ORCID: <https://orcid.org/0000-0002-5824-8397>

AIT Austrian Institute of Technology GmbH

E-Mail: [jan.roerden@ait.ac.at](mailto:jan.roerden@ait.ac.at)

## References

- acatech – Deutsche Akademie der Technikwissenschaften, Nationale Akademie der Wissenschaften Leopoldina, Union der deutschen Akademien der Wissenschaften (Eds.) (2017). *Social Media und digitale Wissenschaftskommunikation. Analyse und Empfehlungen zum Umgang mit Chancen und Risiken in der Demokratie*. München, 76 pages.
- Beaufort, M. (2016). *Vom Verstehen zum Beteiligen*. Texte vol. 18, 6–11.
- Berkeley Lab (2018). *Science Communications & Media Relations Specialist*. Job description no 84993. <https://lbl.referrals.selectminds.com/jobs/science-communications-media-relations-specialist-796> (Retrieved on 2018-05-23)
- Bik, H. M., Goldstein, M. C. (2013). An Introduction to Social Media for Scientists. *PLOS Biology* 11(4), e1001535. <https://doi.org/10.1371/journal.pbio.1001535>
- Brown, P. (2012). Nothing but the truth. Are the media as bad at communicating science as scientists fear? *EMBO reports* 13(11), 964–967. <https://doi.org/10.1038/embor.2012.147>

- Brown, P., Scholl, R. (2014). Expert interviews with science communicators: How perceptions of audience values influence science communication values and practices. [Version 1; Referees: 2 approved with reservations]. *F1000Research*, 3:128, Last updated: 25 December 2016. <https://doi.org/10.12688/f1000research.4415.1>
- Bubela, T. et al. (2009). Science communication reconsidered. *Nature Biotechnology* 27(6), 514–518. <https://doi.org/10.1038/nbt0609-514>
- Callon, M. (1999). The Role of Lay People in the Production and Dissemination of Scientific Knowledge. *Science, Technology and Society* 4(1), 81–94. <https://doi.org/10.1177/097172189900400106>
- Duke University (2018). Science Communications Specialist. Job description (via indeed.com). <https://www.indeed.com/viewjob?jk=cfa6dbe9fade715e&tk=1cdknu0o55skubvf&from=serp&ajs=3> (Retrieved on 2018-05-23)
- Eagleman, D. M. (2013), Why Public Dissemination of Science Matters: A Manifesto. *Journal of Neuroscience* 33(30), 12147–12149. <https://doi.org/10.1523/JNEUROSCI.2556-13.2013>
- Eise, J. (2016). Science communication vs. communication. Blog post (2016-06-14). <https://jessicaeise.com/2016/06/14/science-communication/> (Retrieved on 2018-05-23)
- European Commission (2014). Communicating EU research and innovation guidance for project participants. Version 1.0, 25 September 2014. [http://ec.europa.eu/research/participants/data/ref/h2020/other/gm/h2020-guide-comm\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/other/gm/h2020-guide-comm_en.pdf) (Retrieved on 2019-04-19)
- Ferber, D. (2018). Fighting back against ‘alternative facts’: Experts share their secrets. *ScienceMag* (Feb. 17, 2018). <http://www.sciencemag.org/news/2018/02/fighting-back-against-alternative-facts-experts-share-their-secrets> (Retrieved on 2018-05-23)
- Fingerle, B. (2017). Social Media and Scientific Communication: A minor role for Open Science in the statement? ZBW Blog about Open Science, Science Policy, Innovations and more (July 2017). <https://www.zbw-mediataalk.eu/2017/07/social-media-und-wissenschaftskommunikation-statistenrolle-fuer-open-science-in-der-stellungnahme/> (Retrieved on 2018-05-23)
- Jarreau, P. (2015). All the Science That Is Fit to Blog: An Analysis of Science Blogging Practices. LSU Doctoral Dissertations. [https://digitalcommons.lsu.edu/gradschool\\_dissertations/1051](https://digitalcommons.lsu.edu/gradschool_dissertations/1051) (Retrieved on 2019-08-28)
- Kraker, P. et al. (2017). D4.1: Practices evaluation and mapping: Methods, tools and user needs. <https://doi.org/10.5281/zenodo.2557357>

- Leeming, J. (2017). Science communication: What it takes. Nature Jobs Blog (10 Feb 2017). <http://blogs.nature.com/naturejobs/2017/02/10/science-communication-what-it-takes/> (Retrieved on 2018-05-23)
- Libutti, L., Valente, A. (2006). Science communication and information dissemination: the role of the information professional in the ‘Perception and Awareness of Science’ project. *Journal of Information Science* 32(2), 191–197. <https://doi.org/10.1177/0165551506062335>
- University of Maryland (2018). Science Communications Coordinator. Job description (via indeed.com). <https://www.indeed.com/viewjob?jk=83e1c484d5711333&tk=1cdknu0o55skubvf&from=serp&vjs=3> (Retrieved on 2018-05-23)
- Vignoli, M., Rörden, J. (2018), D4.2: Role description: Dissemination to businesses and the public. <https://doi.org/10.5281/zenodo.2557370>
- Wilson, P. M., Petticrew, M., Calnan, M. W., & Nazareth, I. (2010). Disseminating research findings: what should researchers do? A systematic scoping review of conceptual frameworks. *Implementation Science* 5(1), 91. <http://doi.org/10.1186/1748-5908-5-91>
- Woods Hole Oceanographic Institution (2018). Science Writer & Multimedia Producer. Job description (via indeed.com). <https://www.indeed.com/viewjob?jk=b5ed5efbbc0503d7&tk=1cdknu0o55skubvf&from=serp&vjs=3> (Retrieved on 2018-05-23)
- Yamine, S. Z., Liu, C., Jarreau, P. B., and Coe, I. R. (2018). Social media for social change in science. *Science* 360(6385), 162–163. <http://doi.org/10.1126/science.aat7303>
- 1 <https://www.openuphub.eu/>
  - 2 The reported research done in context of the *OpenUP* project was first documented in the deliverable *Role description: Dissemination to businesses and the public* (Vignoli & Rörden 2018).
  - 3 Transcripts of the analysed job descriptions were included in Vignoli & Rörden (2018, Appendix II).