Dear reviewer,

We are thankful that you dedicate some of your time to provide feedback on our book chapter. This book chapter is part of our larger textbook project called "Organizing Openness". The aim of our project is to create the first open textbook on the different phenomena of openness. Open for us not just means that the final product will be available under an open license, but also that the community of practitioners and researchers interested in openness should be involved in the process of writing the book.

We think that the best way to include you – the community – is by opening up a draft of our chapter for comments. This chapter on **"Open Science and Education"** will therefore be open for comments for several weeks or months. During that time we will engage with comments on a regular basis and and try to address as many of them as possible. In order to make this feedback period as fruitful as possible, we came up with one guiding principle and five guiding questions:

Guiding principle:

Read the chapter through the eyes of a student, not an expert.

Guiding questions:

1. *Can you spot any language issues or factual mistakes?*
2. *Are there any logical inconsistencies or gaps?*
3. *Is the chapter well balanced (e.g. pro/con; general input/case studies)?*
4. *Are there sections that need further elaboration (e.g. examples, figures)?*
5. *Are there sections you find boring or redundant?*

If there is any feedback that you would like to communicate personally, please feel free to send us an email. Thank you for your help!

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Open Science and Education

Science and education are complex organizational phenomena in which people across organizations work together to create and disseminate knowledge. Traditionally, publicly funded or subsidised universities, research institutes, libraries, schools and archives host and organize respective knowledge creation and dissemination practices. Additionally, there are two important types of actors: publishing houses contribute by disseminating knowledge in form of books and articles in academic journals. Governmental institutions such as ministries set the formal "rules" within which education and science can be organized. Even prior to the rise of the Internet, these formal institutions and settings had been complemented by more informal networks and communities of researchers and educators, which engaged in professional exchange of material and practices.

Open science and *open education* are labels for sets of ideas on how the organization of these domains as known from the 20th century could be reconfigured in a more open way. Proponents of open science and open education hope to accelerate the creation and dissemination of knowledge. They argue that greater openness of science and education leads to a more equal and fair access to knowledge. This chapter provides a closer look at these promises based on some specific examples: Associated with open science, the idea of *open access* aims at making scientific results more widely accessible by finding alternatives to the subscription model of academic journals. Through *open peer review*, the processes through which academic articles are developed and revised should be made more transparent and participatory. Regarding open education, the chapter takes a closer look at the movement around *open educational resources*, which advocates for the creation of educational materials under alternative copyright licenses that allow for unrestricted use and remix. Finally, the chapter explores the organization of *massive open online courses* as a concept that promises to make not just study materials but higher education in general more widely accessible through online lectures and seminars.

1 Open Science

1.1 Introduction to Open Science

Traditionally, science is organized in order to fulfill two interrelated missions: On the one hand, science is a structured form of inquiry aimed at creating new knowledge about the world. On the other hand, science is a system that disseminates knowledge. Across academic disciplines, the way knowledge is created and communicated differs widely. Some disciplines follow more positivist approaches to knowledge creation, where hypotheses derived from theory or previous research are tested with quantitative measures. Other disciplines follow more post-positivist approaches, in which knowledge is derived through interpretation of text and other forms of qualitative data and analysis. Independent of the approach to knowledge creation, each discipline ultimately builds on the principles that new academic output needs to be made available to an academic community so that its quality can be assessed by this community. Research and researchers have always, to use one of the most-used quotes to describe both a scientific practice and mindset, been *standing on the shoulders of giants*. To cater these principles, the various actors involved in science have over time developed a relatively stable system on how to organize the scientific process. In many ways, this system is closed, from access rights to academic output (e.g. subscriptions to journals) to transparency about the processes in which new academic results are developed and calibrated (e.g. in the discussion between authors, reviewers, and journal editors).

Proponents of *open science* argue that the extant system of knowledge generation and dissemination can be improved at various points along the research process, by leveraging new digital technologies to re-organize for greater openness. The different forms of openness that should improve science fall into two broad categories: (1) Openness of scientific outputs - which obviously equals openness of inputs for future research - and (2) openness of the scientific process. Openness of outputs refers to the breadth and depth to which research results are accessible outside the immediate community of the researchers involved. Openness of process refers to the breadth and depth to which people outside the immediate community of researchers are actively engaged in the research process. Greater openness of scientific output

can be reached through various ways of open access publishing, in contrast to the previous model of closed access publishing. Greater openness of the scientific process is addressed through the idea of open peer review, as an alternative to the established system of academic quality control through (closed or “double blind” peer review).

1.2 Open Access

Before we can dive into various paths to open access publishing, we first need to understand how scientific publishing worked prior to the Internet age, a period which was dominated by a subscription model. There is one important caveat, though: in what follows, we mainly focus on the natural and social sciences with an article-based publishing culture. The publishing system in book-based disciplines such as in many humanities disciplines follows another logic, posing other challenges for increasing openness.

1.2.1 The Subscription Model of Academic Publishing

The dominant medium of scientific output is text. In many disciplines the most valued forms of text are articles in academic journals. Across disciplines, the majority of journals are not run by the scientists or scientific associations themselves, but rather by large private publishing companies. In 2015 five of these companies published more than 50% of all academic articles: Reed-Elsevier, Taylor & Francis, Wiley-Blackwell, Springer, and Sage.[1] While research universities generally operate on a non-profit basis, academic publishing is a highly profitable business, particularly for the dominant publishing houses. In 2010, the scientific publishing arm of market leader Elsevier registered a 36% profit margin (€841 million in profit on just over €2,3 billion in revenue) – higher than Apple, Google, or Amazon in that year.[2] In 2010, Elsevier’s scientific publishing arm reported profits of £724 million on just over £2 billion in revenue. It was a 36% margin – higher than Apple, Google, or Amazon posted that year.

The success of Elsevier and the other large publishing houses is based on the subscription model of academic publishing. Academic publishers who follow this business model earn money by selling subscriptions of their journals to university libraries. As the scientists employed by

[1] https://www.sciencealert.com/these-five-companies-control-more-than-half-of-academic-publishing

[2] https://www.theguardian.com/science/2017/jun/27/profitable-business-scientific-publishing-bad-for-science

universities need access to these journals to do their research, libraries need to subscribe to those journals considered relevant by the researchers in their institution. Libraries can, however, usually not pick the individual journals they need to support their researchers, but are urged to subscribe to larger bundles of journals (including a mix of high-quality and low-quality journals).

For researchers, publishing their work in academic journals (instead of just uploading it on their website or a university repository) serves multiple goals. First, journals serve as a filter and quality assurance mechanism. By submitting work to a journal, the researcher exposes the work to reviewers from her community. Only if the work passes the scrutiny of these community members, it gets published. This in turn means that, when looking for research, the brand of a journal serves as an - albeit questionable[3] - indicator for the quality of its papers. Arguably the most renowned "journal brands" are *Science* and *Nature*. Powerful brands in the field of organization and management studies are, for example, the *Academy of Management Journal* or *Organization Studies*. These days, journals however serve as more than an orientation and point of reference for researchers, but also as an evaluation criterion that is used for deciding whether a researcher gets hired or promoted. Even if researchers would be able to identify other relevant work without the cue of a journal brand, they still have a strong incentive to publish in the highest ranked journals of their field, as this supports their career advancement - from hiring decisions to grant applications.

The subscription model of academic publishing supports the work of academics as well as the creation and dissemination of knowledge. However, particularly due to the growing consolidation of the market for academic publishing over the last decades, the system and its underlying business model is subject to criticism. Most of the large publishing houses work on a for-profit basis and sell their journals at a large profit margin. At the same time, academics not only provide the journals' content free of charge, but also serve as reviewers and editors on a voluntary basis. Many critics argue that universities (private or state-funded) pay not only the researchers' salaries, but rather need to pay a second time for accessing their researchers' own results. Another and more general critique is that although science is generally understood as a system of organizations that works in the interest of the society at large and to a large part is funded by taxpayers' money, its results are only accessible to students and academic staff.

[3] https://www.nature.com/articles/nmat3566

Dissatisfaction with this closed system of publishing gave rise to the concept of open access publishing.

1.2.2 The Open Access Model of Academic Publishing

Open access describes the goal of making academic output accessible to everyone via Internet and without financial, technical, or legal barriers. What is oftentimes seen as the birth of the global open access movement is the *Berlin Declaration on Open Access.* It was signed on October 22nd 2003 by the German Max Planck Society (a non-governmental and non-profit association of German research institutes) as well as a number of leading international research institutes and cultural institutions. In 2018, the declaration had more than 600 signatories[4]. Since 2003, three "ways" in which journals can organize for open access have manifested: Gold open access, green open access, and hybrid open access.

Golden open access means that all articles of a journal are freely accessible to all readers and that the journal has found other ways of funding its operations. The most common ways are funding via institutional support (also referred to as "diamond" approach to open access, e.g. a university or a group of universities and research institutes funds the journal's operations) and the collection of mandatory publication fees. The latter are referred to as Article Processing Charges (APCs) and paid by the authors of a manuscript or their institutions. To cover APCs some university libraries have created open access funds that cover APCs for accepted manuscripts, when the respective outlet fulfills certain transparency and quality criteria. For example, in 2012 the Freie Universität Berlin launched their "Open Access Publication Fund", which covers APC's for publications in journals, which comply with requirements set by the German Research Foundation (DFG)[5]. Among others, the requirements include that the journal is a "genuine" gold open access journal (see "hybrid open access" below) and that the APC's do not exceed €2,000 per article. The Directory of Open Access Journals (DOAJ) gives an overview of open access Journals. In 2002, DOAJ listed 33 journals. In 2018 the directory lists more than 11,000 journals[6].

[4] https://openaccess.mpg.de/319790/Signatories
[5] https://www.fu-berlin.de/en/sites/open_access/finanzierung/publikationsfonds/index.html
[6] https://doaj.org/

Green open access describes a system in which access to articles through the journal itself remains subscription based, but in which journals allow authors to deposit certain versions of their articles on another server that is freely accessible without subscription. A common distinction is that between pre-print, post-print and publishers version. Pre-prints are completed manuscripts that do not yet include comments from peer-reviewers. Post-prints are manuscripts that have been revised based on the peer-reviewers' comments. Publishers' versions are manuscripts that have been professionally typeset by a publisher. Many publishing houses allow authors to make their articles immediately available as pre-prints, but only allow publication of post-prints several months or years after an article has officially been published by a journal. These repositories (or: preprint servers) can either be bound to a specific research institution or to an academic field. One of the first and most famous field-based repositories is ArXiv. It began as an archive for physics papers in the early 1990s and expanded to fields such as mathematics, computer science, or statistics[7]. By the end of 2014 ArXiv hosted more than one million articles, many of them green open access publications[8].

Hybrid open access means that – similar to green open access – publishers still stick to the traditional subscription model, but allow authors to pay an additional fee to make an individual article open access available. In the short term, this model has advantages for researchers who prefer to or are institutionally bound to publish their work as open access, but who also feel the need to publish in top-ranked publications, e.g. in order to fulfill the requirements for their career development. For institutions, however, this model means that they are likely to pay twice for the same article: first, through the hybrid open access charges and second, through the general subscription to the bundle in which the hybrid journal is a part of.

1.3 Open Peer Review

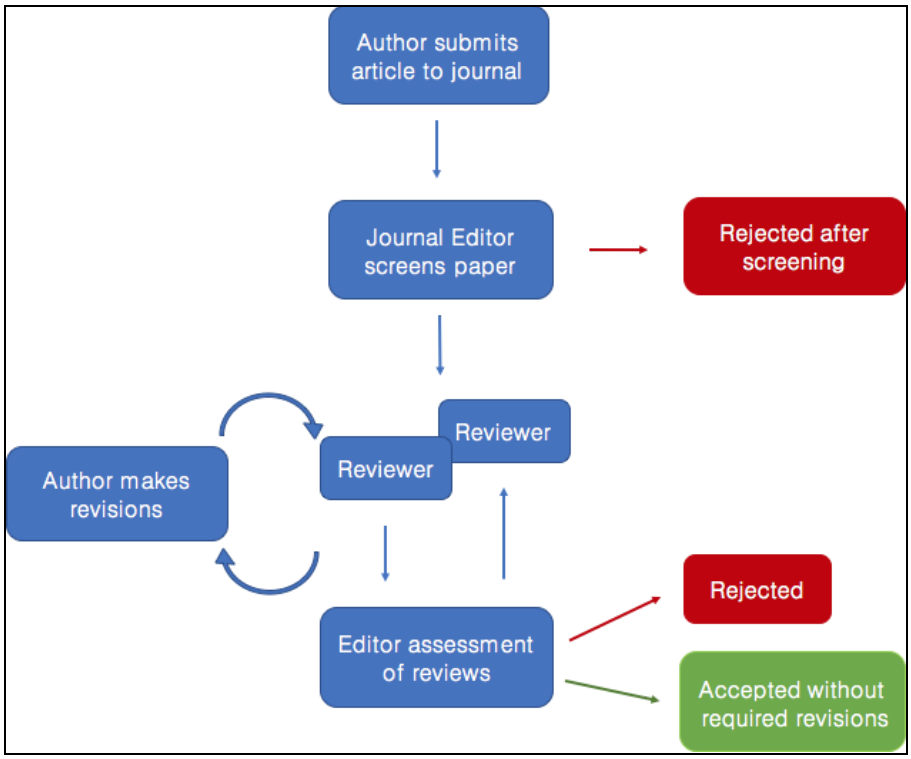
1.3.1 The Role of Peer Review

What researchers and academics do in their day-to-day work differs greatly across disciplines. Whilst some of them spend long nights at the lab working on experiments, others turn to libraries and archives, or leave the university campus to immerse in ethnographic fieldwork.

[7] https://arxiv.org/
[8] https://www.the-scientist.com/?articles.view/articleNo/41677/title/Q-A--1-Million-Preprints-and-Counting/

What unites all of them is that once they finished a project, big or small, they send their results into peer review in order to get it published in a journal, at a conference, or as a book. The traditional peer review cycle has the following structure: A researcher submits a manuscript to an outlet, oftentimes an academic journal. The editor of that journal screens the manuscript and decides whether the work is immediately rejected, or whether it meets the minimum requirements of the journal. If the latter is the case, the editor sends out the manuscript to one but usually more reviewers. Based on their reviews, the editor makes the decision to accept the manuscript, reject it, or invite the author to revise and resubmit the manuscript. This process repeats until a manuscript is either rejected or accepted. In the traditional peer review system, the reviews take place either "single-blind", where authors do not know reviewers' identities, or "double-blind", where both authors and reviewers remain anonymous.

Figure 1: Peer Review Process



Many scholars refer to the traditional peer review system as *a bad one, but the best we have*. A frequently discussed problem is that, as the reviewers are anonymous, there might be a temptation to reject a manuscript for reasons that lie outside its academic quality (e.g. personal

dislike of the research approach or topic). Further, in this system of peer review, the academic debate between authors, reviewers and editors that oftentimes fundamentally shape the final journal article, remain hidden to the wider academic community and the public. What also remains in the shadows is the selection of reviewers by the editor of the journal. Through selecting reviewers, editors can directly influence through which lens a paper is evaluated. This traditional peer review process is therefore sometimes compared to a “black box”.

1.3.2 Practices of Open Peer Review

Proponents of open peer review argue that traditional peer review has problems, but that at least some of these problems can be addressed by organizing for greater openness. As we have seen above, peer review is a rather complex process involving multiple actors, phases, and loops. When we think about opening up the peer review process, we therefore need to think about openness regarding a number of practices that can but do not need to be performed together.

Table 1: Exemplary open peer review practices (adapted from Ross-Hellauer, 2017)

Practice	**Description**
Open identities	Identities of authors and reviewers are revealed
Open reports	Reviews are published alongside accepted articles
Open interaction	Direct reciprocal communication between authors and reviewers is possible and encouraged
Open platforms	Peer review is not organized by the journal itself, but by another entity

Open identities. One way to open up the peer review process is by revealing the identities of authors and reviewers. This practice is also known as signed peer review or unblinded review. Maintaining author anonymity can help tackling publication biases, such as those with traditionally feminine names or names that hint at the nationality or religious orientation of its authors. Maintaining reviewer anonymity can protect them against undue influence and pressure from authors that are dissatisfied with the outcome of the review process. Opening up

identities can give credit for peer reviewers and increase quality of reviews. However, opening up identities can also cause that reviewers more often decline requests to review papers, or that reviewers (especially junior faculty) submits uncritical and superficial reviews in order to avoid causing offence. Identities can be revealed either only within the group of editors, reviewers, and authors, or to the general public as well.

Open reports. Another way to open up peer review is by making the review reports available alongside the accepted article. This way, the published results are enriched by providing additional context. Opening up reports might also lead to higher accountability and legitimacy of the academic results, as behind-the-scenes discussions and processes of improvement and assessment are made visible to third parties. When the published article reports the results of a complicated experiment, the reviewers' and the authors' responses to these reviews could for example include discussions on pitfalls or drawbacks of this experiment that have not been included in the condensed journal article. This information is not only valuable for researchers who want to work with a similar setup, but rather shows the rigor of the review process itself and thereby, strengthens the credibility of the journal. Opening up reports can also improve the quality of peer review as peer reviewers can now use their work as another dimension to gain reputation (e.g. by listing particularly elaborate reviews in their academic bibliography). Finally openly available reports can provide substantial guidance to junior scholars who are new to the practice and semantics of peer review.

Open interaction. In traditional peer review, editors, reviewers and authors correspond through long and rather formal letters. The idea behind open interaction in peer review is to enable and encourage more direct reciprocal discussion between the parties. This way, problems that are raised by reviewers can be discussed before they are addressed in the manuscript. Some journals also facilitate cross-peer review in which reviewers are able to comment on other reviewers' reports before the editor makes a decision (to reject, to accept, or to invite a manuscript for further revision).

Open platforms. Traditionally, peer review is organized by the journal to which a manuscript is submitted to. In the case of manuscripts that are rejected several times, this system requires a large amount of resources as every journal invited new groups of reviewers to review the same manuscript. The idea of open platforms tries to address this issue by decoupling reviews from

journals. Open peer review platforms are organizational entities that invite authors to submit manuscripts and organize peer review. Once the platform has gathered reviews, authors ask the platform to forward manuscript and reviews to their preferred outlet. Another way of organizing is that journals can browse reviews in order to identify interesting work themselves and offer their publication to authors. This form of peer review also shares some commonalities with the way Law Reviews in den US are organized, where academics submit their manuscript to a large number of journals at the same time. Once an academics get a publication offer (usually without extensive revisions to the original manuscript), they can use it to ask for "expedited review" by other, higher ranked journals[9].

1.3.1 Illustration: The Rouge Neuroscientist[10]

Sam Nastase was a young PhD in cognitive neuroscience at Dartmouth College and had recently handed in his latest research to a scientific journal[11]. Following the double blind peer review policy, unsalaried and anonymous peer reviewers would play a significant role in the decision over the publication. While waiting for any news on the publication from the publisher, Sam was assiduously working in the lab and suddenly finding a review of his research paper that a scientist had posted on Twitter.

Figure 2: Former PhD student Sam Nastase on Twitter[12]

9 https://medium.com/whatever-source-derived/the-law-review-submission-process-a-guide-for-and-by-the-perplexed-9970a54f89aa

10 https://www.wired.com/2017/03/rogue-neuroscientist-mission-hack-peer-review/

11 http://haxbylab.dartmouth.edu/ppl/sam.html

12 https://twitter.com/samnastase/status/780096532846612480

Sam was lucky to be reviewed by Niko Kriegeskorte, a cognitive neuroscientist at the Medical Research Council in the UK and the “Edward Snowden of peer review”, who decided to put an end to the intransparent policies which publishers impose. Whenever an interesting peer review request reaches Kriegeskorte, he searches for final drafts of the respective papers on preprint servers like arxiv or biorxiv. To not officially contravene the policies of publishers while still reviewing openly, Kriegeskorte relates to the final drafts in his open reviews he publishes on his blog and shares on Twitter and Facebook. If there is no preprint available, Kriegeskorte pulls the veil back and directly contacts the authors to propose to them to publish a preprint in exchange to his review commitment. If the scientists consent, they receive Kriegeskorte’s review twice: openly personalized on his blog and a few weeks later anonymised by the responsible journal editor. “It is very easy to kill any paper without ever having to bend the facts,” says Kriegeskorte. “All you have to do is look at the strengths and then look at the weaknesses and then focus attention on the weaknesses”[13]. This is how publishers and editors can easily prevent a scientist from publishing, keeping their judgements away from the scientific debate. Thus, the double blind peer review policy facilitates anonymized judgements that reviewers do not have to stand by for as well as causing tedious, intransparent publishing processes for scientists.[14]

Mini-Case Questions:

- What does the double blind peer review policy mean?
- Why is Kriegeskorte called the “Edward Snowden of peer review”?
- How does Kriegeskorte manage not to officially contravene publisher’s policies?

1.3.2 Illustration: European Journal of Neuroscience[15]

It is not unusual for a revolution to start with the third beer in quaint student-pubs, but in the case of the European Journal of Neuroscience the editorial office in Singapore was the location of choice. All papers submitted to the Journal from November 15th in 2016, the day when the editorial board had decided to establish a new transparent peer review system, were published with an attachment of peer review documents and the correspondence between editorial board

[13] https://www.wired.com/2017/03/rogue-neuroscientist-mission-hack-peer-review/
[14] https://newrepublic.com/article/135921/science-suffering-peer-reviews-big-problems
[15] https://hub.wiley.com/community/exchanges/discover/blog/2017/09/13/transparent-review-at-the-european-journal-of-neuroscience-experiences-one-year-on?referrer=exchanges

and reviewers. To protect the research community from potential harassment and to not affect the careers of young scientists negatively, reviews of rejected papers remain unpublished.[16]

Even though the revolutionist editors in chief, Paul Bolam and John Fox, had a significant number of fears and doubts, they decided to 'bite the bullet' in their dedicated fight for open review and transparency in science. Would you, as a Neuroscientists agree to review a scientific article if you knew your review and name would be published? Turned out the great majority of reviewers accepted and only 18 out of 3293 declined. The fear of a decreasing review quality also turned out contrary: Publishing the reviews transparently pushed for a higher quality of the reviews and strengthened the scientific debate. Also reviewers handed in their work prompter as they also started to profit from the publication of well structured and high quality reviews.[17] Especially for young neuroscientists every day in the publishing process counts:[18] every second competitors somewhere in the world could solve the structure of a new tau protein. As fears on loss of quality proved to be unfounded and hopes about smooth transition and positive response were confirmed, the European Journal of Neuroscience successfully started a revolution towards open peer reviewing and transparency in science.

Mini-Case Questions:

- What were the hopes and fears of the editors Bolam and Fox before opening up the peer review process?
- In what way did the European Journal of Neuroscience opened up its peer review process? In what way did it remain closed?
- Discuss the statement: "Transition to open peer review is only possible in high-paced disciplines such as neuroscience".

[16] https://www.wired.com/2017/03/rogue-neuroscientist-mission-hack-peer-review/
[17] https://hub.wiley.com/community/exchanges/discover/blog/2017/09/13/transparent-review-at-the-european-journal-of-neuroscience-experiences-one-year-on?referrer=exchanges
[18] http://news.doccheck.com/de/169992/peer-reviewer-die-anonymen-schlammwerfer/

2 Case Study: From Lingua to Glossa

2.1 Elsevier: Making Money from Scientific Publishing

The five towers of the Elsevier headquarters overtop the surrounding buildings, a large, orange "E" emblazons the rooftop. It is located in an industrial area in the west of Amsterdam, just a five-minute walk from the North Sea Canal. However, there are only a few printed products left to be shipped. Over the last years, Elsevier has become one of the dominating science publishers, not least because of its ability to shape and to take advantage of the rapid digitalization of the industry.[19] Today, Elsevier is the global leader in academic publications in the field of natural, engineering and health sciences. 16% of all globally published scientific articles are accountable to Elsevier. Every month around 14 million users download scientific articles published by Elsevier – 29 of them every second.[20]

When the bookseller family Elsevier founded the family business in 1580, they translated and published the oeuvres of Galilei and Descartes, who were close friends of the family. Today's Elsevier has little in common with a family business anymore - except for its name and the emblematic company logo with an elm tree, which the businessman Jacobus George Robbers took over when relaunching the publishing house in 1880.[21] Today, Elsevier is a multinational corporation. With a 38.6% profit margin in 2017, it is on par with the iconic US technology corporation Apple. 2010 Elsevier had even outpaced the profit margins of both Google and Apple.[22]

The business model of subscription-based publishers like Elsevier, Taylor & Francis and Springer is simple, but extremely profitable: Scientists produce research papers, largely funded by governments. They give these to publishers for free and often lose their copyrights, as their reputation is highly dependent on being published in well renowned journals. The scientific

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[19] https://medium.com/@jasonschmitt/can-t-disrupt-this-elsevier-and-the-25-2-billion-dollar-a-year-academic-publishing-business-aa3b9618d40a

[20] https://www.elsevier.com/about/this-is-elsevier#digital

[21] https://en.wikipedia.org/w/index.php?title=Elsevier&oldid=841391740

[22] https://www.timeshighereducation.com/news/elseviers-profits-swell-more-ps900-million

validity is checked by other scientists in a process called the double-blind-peer-review-policy. Neither do the authors of the papers get paid for handing over their material to the publishers, nor do the peer reviewers get compensated. In the end the publishers sell their journals back to government-funded university libraries where they are read by scientists who produced their content in the first place.[23]

Publishing houses are of course not entirely useless, even if their profit-oriented strategy attracts the wrath of many scientists. Publishing consultant Kent Anderson came up with as many as 96 things academic publishers do[24]. Among these things are the creation and maintenance of technological infrastructure (software and hardware) for peer review and publication, the management of metadata and tags for academic outputs, layout and composition, and social media dissemination of published articles. For none of these tasks, however, there seem to be strong arguments that speak against their organization through not-for-profit publishers.

2.2 The Cost of Knowledge: A Boycott Gains Ground

Although scientists and universities know that they support a profit-oriented business model when dealing with academic publishing houses like Elsevier, the majority does not dare to resist the big publishers in order to not jeopardize their scientific career. This results in universities struggling to pay unproportionally high subscription fees. For instance, in the United Kingdom subscription spendings (by a sample of ten universities to seven of the biggest publishers) increased by a fifth to £16.1 million between 2013 and 2016. In addition, these universities spent £3.4 million on APCs in 2016, up from about £750,000 in 2013 (Figure 3). To some degree, some might argue that publishers like Elsevier could be held responsible for faculty cuts and increased tuition fees.

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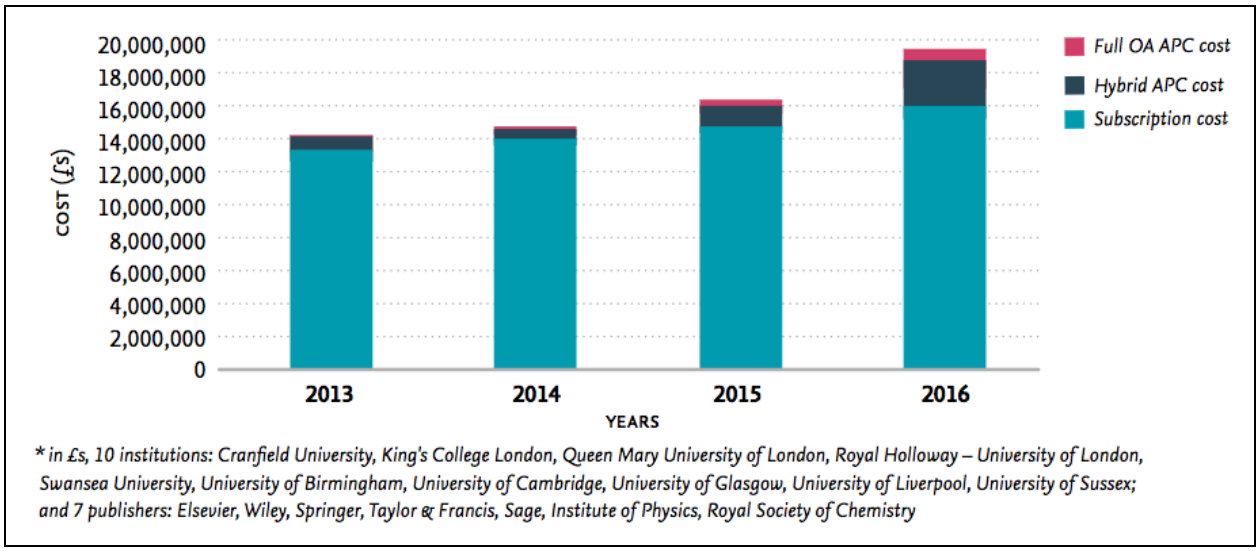
[23] https://www.theguardian.com/science/2017/jun/27/profitable-business-scientific-publishing-bad-for-science

[24] https://scholarlykitchen.sspnet.org/2016/02/01/guest-post-kent-anderson-updated-96-things-publishers-do-2016-edition/

Figure 3: Total subscription and APC expenditure, 2016*[25]



Nevertheless, without the subscription, libraries could not provide access to the latest research, which the scientists urgently need. Even though Elsevier advertises "Open Access Approaches" on its website, this still means that scientists have to pay about $1800 in APCs per article, which only very few institutions can bear afford.[26][27] Accordingly, access to the latest scientific products remains reserved for an elite lucky enough to do research at well-funded universities in the Global North. The scientific progress of the Global South is, thus, massively hampered. Over the last years, this situation has concerned scholars around the world, including Hajji Ayadi, a researcher in the field of Arts and Humanities at the "Ecole Nationale d'Engineers in Sfax", Tunisia. To express his concerns, Ayadi signed the boycott "The Cost of Knowledge":

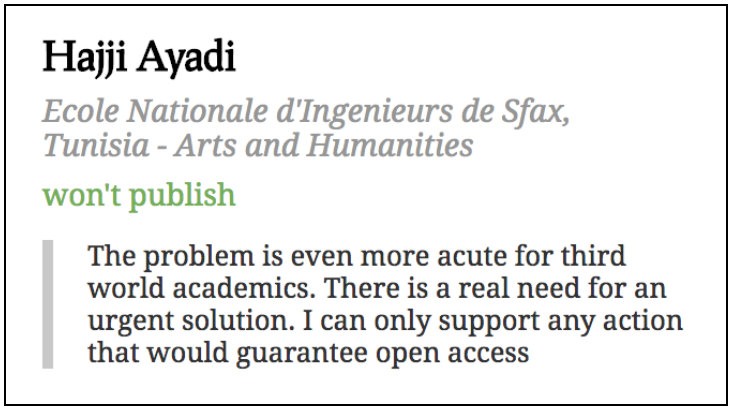
Figure 4: The Cost of Knowledge[28]

[25] https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2017/monitoring-transition-open-access-2017.pdf [Note: This figure is licensed unter a CC-BY-NC license, it is therefore excluded from the CC-BY license of this manuscript]

[26] https://www.insidehighered.com/news/2015/11/02/editors-and-editorial-board-quit-top-linguistics-journal-protest-subscription-fees

[27] https://www.elsevier.com/connect/addressing-the-resignation-of-the-lingua-editorial-board

[28] http://thecostofknowledge.com/



The Cost of Knowledge is a boycott initiative against Elsevier initiated in 2012 by the prominent, Fields-Medal-awarded mathematician William Timothy Gowers. By 2018, 17,000 researchers across various disciplines signed the declaration and pledging not to support any Elsevier journal unless the publisher radically changes how it operates. The declaration points to three major concerns: inappropriate prices, obligatory bundle purchases, and lobbying efforts against open access.

Excerpt from *The Cost of Knowledge* website:

1. They charge exorbitantly high prices for subscriptions to individual journals.
2. In the light of these high prices, the only realistic option for many libraries is to agree to buy very large "bundles", which will include many journals that those libraries do not actually want. Elsevier thus makes huge profits by exploiting the fact that some of their journals are essential.
3. They support measures such as SOPA and PIPA that aim to restrict the free exchange of information.[29] (Find out more about SOPA and PIPA below)

In its statement of purpose, the initiators of The Cost of Knowledge substantiate why establishing an alternative model of open access publishing is “not easy” – mainly mentioning the lack of reputation of newly upcoming journals which would keep scientists from publishing.[30] Aware of the risks, the revolution started within Elsevier's own ranks: with the entire editorial board of the linguistics magazine Lingua.

[29] http://thecostofknowledge.com [Note: This screenshot is included as a pictorial citation]
[30] https://gowers.files.wordpress.com/2012/02/elsevierstatementfinal.pdf

What is SOPA and PIPA?

The Stop Online Piracy Act (SOPA) is a bill introduced in 2011 in the US House of Representatives[31]. PIPA is a similar bill from the same year which was introduced in the Senate. Both are aimed at enabling American copyright holders to prevent the unlawful distribution of their content on the Internet. While supporters emphasize the protection of intellectual property,critics stress the massive dangers of the laws to the freedom of expression and knowledge. In the course of protests against SOPA and PIPA, Wikipedia made its English-language website inaccessible for 24 hours on 18 January 2012. This was blended with a black protest notice:

Figure 5: Wikipedia campaign banner against SOPA and PIPA[32]

While the page of WordPress remained black that day, Google censored its logo. Even companies such as Yahoo, Facebook, and Twitter joined the protest. Following further criticism by the European Parliament, Lamar Smith, chairman of the House Judiciary Committee, announced on January 20, 2012 that the SOPA bill would not be prosecuted because of fierce criticism and would therefore not be implemented.[33] Due to the protests and costs of $47 million through 2016 to cover enforcement costs as well as the hiring and training of new staff, a vote on the PIPA bill was postponed to an indefinite period.[34]

[31] https://en.wikipedia.org/w/index.php?title=Stop_Online_Piracy_Act&oldid=837456219

[32] https://en.wikipedia.org/wiki/Wikipedia:SOPA_initiative/Blackout_screen_designs#/media/File:WP_SOPA_Screen_Dark_Simple.png

[33] https://en.wikipedia.org/w/index.php?title=Protests_against_SOPA_and_PIPA&oldid=840067927

[34] https://en.wikipedia.org/w/index.php?title=PROTECT_IP_Act&oldid=834097402

2.3 From Lingua to Glossa

In the last week of October 2015, all six editors and all 31 editorial board members of the highly renowned linguistic journal Lingua resigned en masse and together founded the open access journal Glossa. French Linguistics Professor Johan Rooryck had been working for Elsevier for 17 years when he finally initiated the mass-layoff. Being a proponent of open access Rooryck had been trying to push for a transformation of the hybrid open access model which asked universities to pay $2,211 for shared online access to the journal (or $1,966 for a print copy). The only chance to publish open access for authors was to buy themselves out of the restricted subscription-based access – for $1,800 per article.[35][36] Rooryck as executive editor and his colleagues from Lingua demanded to substantially lower the APCs. Further they demanded that the authors could retain copyright of their articles. As their demands remained unheard after months of negotiations, the whole team of editors and 31 editorial board members resigned.[37][38] Glossa was founded immediately, as Johan Rooryck describes in an interview with Unravel:

> "I had been thinking about this for four to five years. As subscription prices continued to rise, I was confronted by the increasing unsustainability of journal publishing. A movement to boycott Elsevier and other publishers had begun, and many reviewers and authors I spoke to said they would not publish with *Lingua*. As a result, I began to feel like I was fighting for the enemy. Once I had decided to push for open access, it didn't take more than a week to convince the entire editorial board. The decision was unanimous."[39]

Glossa is hosted by the publisher Ubiquity Press, who is specialized on open access publishing. Authors who publish in Glossa are asked to pay APCs of £330, yet only in case they have access to open access funds through grants of their institution. If authors confirm that they do not have access to such grants, the APCs are waived and covered by LingOA, a fund created through grants from the *Association of Dutch Universities* (VSNU) and the *Netherlands*

[35]https://www.insidehighered.com/news/2015/11/02/editors-and-editorial-board-quit-top-linguistics-journal-protest-subscription-fees
[36] https://www.elsevier.com/authors/journal-authors/open-access
[37]https://www.insidehighered.com/news/2015/11/02/editors-and-editorial-board-quit-top-linguistics-journal-protest-subscription-fees
[38] https://www.elsevier.com/connect/addressing-the-resignation-of-the-lingua-editorial-board
[39] https://unravellingmag.com/dialogue/open-access-publishing/

Organisation for Scientific Research (NWO) with long-term funding provided by the Open Library of Humanities (OLH).[40]

Rooryck calls the foundation of Glossa a truly idealistic act as neither the editorial board nor the editors are paid. The latter used to work voluntarily for Lingua already, while having faced the drawback through Elsevier's access restrictions themselves. Rooryck states that he earned less then he would have made flipping burgers in a fast food restaurant. Still he does not suggest that publishers should work entirely voluntarily as it costs money to employ people, print volumes, and market journals. Nevertheless, Glossa represents a prototype of an open access publishing model which pays respect to the nature of funding as well as the duty to distribute and communicate scientific results more widely: "The general public needs to understand that profits of 36% are simply unacceptable for something that is completely dependent on public funding", he says. He rejects that the unpopularity of Glossa and the lack of an impact factor could diminish its success stating that Lingua's reputation resulted from the editorial board and not from the publisher itself.[41] Numbers are on his side proving that market power of publishers is contestable and that scientists and editors have the possibility to turn to open access: in 2016, only running for little more than a year, Glossa received about the same number of articles as were submitted to Lingua in 2013, 2014, and 2015.[42]

2.4 From Pioneer to Role Model

Over 11,000 journals with nearly three million articles are registered in the Directory of Open Access Journals in 2018[43]. The independent, community-curated online directory indexes and provides access to high quality open access, peer reviewed journals. However, not only the number of open access journals has increased immensely, also the boycott of Elsevier has drawn circles: Project DEAL, a German initiative, pursues to nationwide phase out license agreements for the entire portfolio on e-journals of the publisher Elsevier. The effects of a consortium agreement at the federal level are intended to provide financial relief to the individual institutions and to improve access to scientific literature at a sustainable level. While Springer

[40] https://www.glossa-journal.org/about/submissions/
[41] https://unravellingmag.com/dialogue/open-access-publishing/
[42]https://netzpolitik.org/2017/open-access-transition-von-lingua-zu-glossa-wider-die-die-gnadenlosen-geschaeftspraktiken-elseviers/
[43] https://doaj.org

Nature and Wiley engaged in negotiations, negotiations with Elsevier remained fruitless. At the end of 2017, around 200 universities, universities of applied sciences, and research institutions have announced that they will no longer renew their contracts with Elsevier, including the Humboldt University in Berlin and the renowned Leibniz Institute.[44]

Case Questions:

- Portray the business model of Elsevier in a chart. Why do critics say that Elsevier exploits government funding?
- Imagine you are a scientist signing the Cost of Knowledge boycott. Write a statement backing up your personal reasons.
- What are the factors that are important for the survival of Glossa? How can you as a student contribute?
- Why do not all journals follow the example of Johan Rooryck and transition to a gold open access model?
- What are SOPA/PIPA and why was Wikipedia inaccessible on the 18th of January 2012? How do these events relate to the creation of open access journals?

3 Open Education

3.1 Introduction to Open Education

Historically, institutions like home schooling or distant education, where students correspond with universities via letters, can be seen as predecessors of a more recent open education movement that envisions a much broader access to education. Two of the most prominent concepts associated with the open education movement are open educational resources (OER) and massive open online courses (MOOCs). While the rationale behind OER is to make learning and teaching materials more accessible and useful by altering their copyright regime, the idea behind MOOCs is to allow everyone and at every location on earth (and beyond) to participate in seminars by offering them online.

[44] https://www.projekt-deal.de

3.2 Open Educational Resources

Educational resources are central to the daily life of students and teachers. In the “traditional” system, most educational resources, like textbooks or workbooks, are created by educational publishing houses. Schools buy books from these publishing houses and are only allowed to use the material in very specific ways, e.g. to copy only a limited number of pages per book. The concept of open educational resources aims at changing the copyright regime around educational materials by making them freely available to everyone and allowing everyone to share, change, and remix them.

One of the founding moments of the OER movement was a meeting of educators and technologists in Cape Town in 2007, convened by the Open Society Institute and the Shuttleworth Foundation. The initial title of the meeting was “*Open Sourcing Education*” revealing the motivation to translate principles and experiences from the field of open source software (see Chapter 8) to the field of education. The outcome of this meeting was the Cape Town Open Education Declaration articulating “the belief that everyone should have the freedom to use, customize, improve and redistribute educational resources without constraint”[45]. In 2018, the declaration has been signed by over 270 organizations and more than 2500 individuals[46].

3.2.1 Defining the "Open" in Open Educational Resources

David Wiley, one of the participants of the Cape Town meeting in 2007, has provided a widely-used definition of OER as copyrightable work that is licensed in a manner that provides users with free and perpetual permission to engage in the 5R activities[47]:

1. **Retain** - the right to make, own, and control copies of the content (e.g., download, duplicate, store, and manage)
2. **Reuse** - the right to use the content in a wide range of ways (e.g., in a class, in a study group, on a website, in a video)

[45] http://www.capetowndeclaration.org/read-the-declaration
[46] http://www.capetowndeclaration.org/list_signatures
[47] http://www.opencontent.org/definition/

3. **Revise** - the right to adapt, adjust, modify, or alter the content itself (e.g., translate the content into another language)
4. **Remix** - the right to combine the original or revised content with other material to create something new (e.g., incorporate the content into a mashup)
5. **Redistribute** - the right to share copies of the original content, your revisions, or your remixes with others (e.g., give a copy of the content to a friend)

For OER the most widely used set of licenses are Creative Commons (CC) licenses. CC licenses were initially released on December 16, 2002 by Creative Commons, a U.S. non-profit organization founded in 2001. The creator of a copyrightable work can give people the right to share, use, and build upon a work by associating one of the different CC licenses. Depending on the degree of openness that a creator wants to attach to her work, she can choose between four different conditions for how the work can be used.

Table 2: Types of rights available for Creative Commons licenses[48]

Icon	Right	Description
	Attribution (BY)	Licensees may copy, distribute, display and perform the work and make derivative works and remixes based on it only if they give the author or licensor the credits (attribution) in the manner specified by these.
	Share-alike (SA)	Licensees may distribute derivative works only under a license identical ("not more restrictive") to the license that governs the original work. (See also copyleft.) Without share-alike, derivative works might be sublicensed with compatible but more restrictive license clauses, e.g. CC BY to CC BY-NC.)
	Non-commercial (NC)	Licensees may copy, distribute, display, and perform the work and make derivative works and remixes based on it only for non-commercial purposes.
	No Derivative Works (ND)	Licensees may copy, distribute, display and perform only verbatim copies of the work, not derivative works and remixes based on it.

[48] https://en.wikipedia.org/w/index.php?title=Creative_Commons_license&oldid=841826293

Out of these four rights, there are seven types of CC licenses that are commonly used. Some of them turn educational resources into OER, others do not meet the minimum requirements according to the definition by Wiley. For two of the licenses that contain the non-commercial attribute, it remains contested whether the licenses material can be considered open, or if the attribute puts too many restrictions on Wiley's 5Rs.

Table 3: Types of CC licenses and their compatibility with OER[49]

Icon	Description	Acronym	OER
	Freeing content globally without restrictions	CC0	Yes
	Attribution alone	BY	Yes
	Attribution + ShareAlike	BY-SA	Yes
	Attribution + Noncommercial	BY-NC	Contested
	Attribution + Noncommercial + ShareAlike	BY-NC-SA	Contested
	Attribution + NoDerivatives	BY-ND	No
	Attribution + Noncommercial + NoDerivatives	BY-NC-ND	No

3.2.2 How to Organize the Creation of OER Textbooks

A common argument by critics of OER is that when more liberal copyright is applied to books and other material, professional publishers will not be able to capitalize on their work anymore.

[49] https://en.wikipedia.org/w/index.php?title=Creative_Commons_license&oldid=841826293

The production of educational resources would therefore be shifted to educators, increasing their workload and most likely reducing the quality of the material as well as the teaching. Most proponents of OER agree that for educational resources to be opened up sustainably, new modes of allocating public funds to private or non-profit organizations that specialize in the creation of educational content need to be developed. Different models have been proposed:

Pre-financing through public tender

OER books could be created in a similar way in which governments create infrastructure like streets or bridges: by pre-financing them through public tenders. In this model governments specify requirements for an OER book, define a budget, and choose one of the bidders in a transparent process. In this model, content creators on the one hand face the risk that their bid will be unsuccessful, but on the other hand have even more financial certainty than in a system where revenue depends on the number of textbook copies sold. This is a winner-takes-all model.

Post-financing based on usage

Another way in which OER books could be funded mimics a system of remuneration for musicians. In Germany, artists whose music is played on the radio are refunded by a state-authorized organization (GEMA) that tracks how often a specific artists is featured in relation to others. Artists whose music is played more often and on frequencies with a greater audience receive more remuneration than others. It seems possible to translate this system to OER books, too.. Content creators would hereby create OER books using their own funds, but get remunerated by the state depending on how many students use their textbooks. This model thereby allows for the co-existence and funding of several different textbooks. This is not a winner-takes-all model.

Financing through delayed openness

Another way to organize for OER textbooks is a funding model that works through delayed openness. In this model, states allow textbook producers to offer their books as restrictively licensed materials for a certain temporal period (e.g. five years) or for a certain volume of sold books (e.g. 25% of the market volume). When this threshold is reached, content producers are obliged to make the textbooks available under a license that complies with the OER definition.

3.2.3 Illustration: Norwegian Digital Learning Arena

The 20th of September in 2006 changed the life of Norwegian school teachers and their students: the Norwegian Ministry of Education and Research allocated 50 million Norwegian Kroner (more than $6.3 million) to incentivize the creation of open educational resources. Four months later, the Chief Executives of Education of the 18 Norwegian counties agreed to establish a joint OER platform. On the 26th of September 2007, Prime Minister Jens Stoltenberg officially launched the Norwegian Digital Learning Arena (NDLA) as a vehicle for the creation and dissemination of OERs for subjects taught at upper secondary school level. In 2008, the funding of the project was shifted from the Ministry of Education and Research to the participating Norwegian counties. Since then, NDLA operates on an annual budget of around 64 million Kroner (more than $8.1 million), which means that Norway spends 20% of its teaching material budget on the OER initiative. About 200.000 school students attend upper secondary education in Norway annually, making the investment in OER roundabout $40,5 per student and year.[50]

NDLA is setup as a distributed organization and, instead of a central administration and editorial team, consists of a group of 100 teachers from all parts of Norway. Together, this group develops OERs for 37 different subjects in upper secondary education, including textbooks, e-lecture materials (e.g. lecture slides), as well as materials for vocational education and training. The pool of teachers is divided in smaller editorial groups. The material created is sent out to external independent experts for feedback before it gets published in order to guarantee the quality of the material. Using the open source content management system Drupal, most of the material is published under the Creative Commons Attribution-ShareAlike license CC BY-SA 3.0.[51]

Case Questions:

- How are OERs funded in Norway ? What are advantages and risks of this funding model?

[50] https://www.ssb.no/en/utdanning/statistikker/vgu/aar/2017-03-14
[51] https://wiki.creativecommons.org/wiki/Case_Studies/Norwegian_National_Digital_Learning_Arena

- How does the production process of OERs in Norway differ from the traditional ways of creating educational materials?
- Discuss the statement: “When the creation of educational resources is moved from the market to the state, the quality of the material will decline”.
- In what way has the NDLA made education in Norway more open? In what way did it create new forms of closure?

3.3 Massive Open Online Courses

The first massive open online course (MOOC) dates back to the year 2006. However, the concept only became known to a wider audience in 2012, described by the New York Times as “the year of the MOOC”[52]. The notion of a MOOC is to enhance the practice of a university course through digital technologies up to the point that the entire course is conducted online. MOOCs can be organized in various ways, all shedding a slightly different light on the ideal of openness: One way to organize a MOOC is as a new, less hierarchical, and more networked way of learning very different from more hierarchical way known from schools and most universities. Another way to organize a MOOC is as a more modern form of distance learning, whereby correspondence via letters, radio, or television can now be organized through the Internet.

3.3.1 Organizing for Connectivity: The cMOOC

The concept of cMOOCs was developed by George Siemens and Stephen Downes, two researchers that are oftentimes associated with the idea of “connectivist pedagogy”, according to which learning is the process of building networks of information, contacts, and resources that are applied to real problems[53]. A cMOOC aims at rather small community of learners. There is no specific number, but the educational philosophy aims at the possibility for each learner to connect with as many other learners of the same course as possible. Further, a cMOOC is open to any interested learner. Learners in cMOOCs ideally have explicitly diverse backgrounds and different levels of expertise. This structure should allow that knowledge is not primarily transferred from a single expert to a relatively homogeneous group of recipients, but ideally

[52] http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html?pagewanted=all&_r=0 [This article is paywalled]

[53] http://www.irrodl.org/index.php/irrodl/article/view/890/1663

between the participants of the course itself. To facilitate this exchange, cMOOCs aim at using technologies and educational resources with as little copyright restrictions as possible. A cMOOC takes place online by using various distribution platforms and services, such as web conferencing tools, blogs, wikis, etherpads and social media services like Twitter or Facebook. The course content of cMOOCs is usually not predefined, but rather supposed to emerge in the interaction of course participants, who share and develop their knowledge in a networked manner. Course participants are encouraged to answer each others questions and to co-develop lines of inquiry.

3.3.2 Organizing for Scale: The xMOOC

Rather than a radical shift, the concept of xMOOCs is more of a continuation and refinement of traditional forms of distance education. An xMOOC usually consists of a number of video sequences, readings, quizzes, and homework elements. Through this structure, xMOOCs can take massiveness seriously and are able to scale up to very large numbers of students. One of the first xMOOCs, "*Introduction Into AI*", offered by two researchers from Stanford University, famously reached 160,000 students. Like cMOOCs, xMOOCs are accessible at no cost and without academic entry requirements. However, other than cMOOCs, xMOOCs are mostly hosted on closed proprietary systems and work with educational resources that are usually not openly licensed. xMOOCs are designed to teach a fixed curriculum to a flexible number of students. Knowledge dissemination takes place through one or more experts who address an audience. In their basic form, xMOOCs can be taken by interested students at any time, as learning takes place individually and not necessarily embedded in a group of learners.

Table 4: Differences between cMOOCs and xMOOCs[54]

cMOOCs		**xMOOCs**
Community and connections	**Massive**	Scalability of provision
Open access and license	**Open**	Open access – Restricted license
Networked learning across multiple platforms and services	**Online**	Individual learning in single platform

[54] http://publications.cetis.org.uk/2014/898

Develop shared practices, knowledge and understanding	**Course**	Acquire a curriculum of knowledge and skills

3.3.3 Democratizing Knowledge?

Despite their growing popularity, OERs and MOOCs are not without criticism. Most commentators generally applaud efforts to make education more openly accessible. Some, however, raise concerns that by making available educational content online, Western institutions unfairly present themselves as leading forces towards the democratization of knowledge and against global inequality. On his blog, the Canadian e-learning and distance education consultant Tony Bates elaborates on this argument and directly addresses OpenCourseWare[55], a project from the Massachusetts Institute of Technology that aims at making all educational materials from its undergraduate and graduate-level courses openly available:

> "[T]he claim that MIT's OpenCourseware will radically change learning in Africa and other developing countries is another example of the arrogance of assuming you can just take content from one country and dump it into another, like giving away free coal. Content needs not only to be contextualized but also adapted for independent or distance learning. If MIT really wants to improve learning in Africa, it should redevelop the materials with African partners, build in learning activities, ensure that the learners have well trained instructors, locally or from MIT, to support the teaching, ensure a full learning context is provided, and work with African partners on the ground. It should then give those that graduate an MIT degree. Perhaps then I won't get my regular e-mails from poor students in developing countries asking me how to get into MIT."[56]

This blogpost hints at a broader postcolonial critique of open education initiatives: Do Western educational institutions really democratize knowledge by disseminating open content, or do they rather reinforce Western and marginalize non-Western categories of knowledge?

[55] https://en.wikipedia.org/w/index.php?title=MIT_OpenCourseWare&oldid=841374376
[56] https://www.tonybates.ca/2011/02/06/oers-the-good-the-bad-and-the-ugly/

4. Case Study: Kiron Higher Open Education

4.1 Sitting, Waiting, Doing Nothing: Barriers to Higher Education

It was 2015 when 1,255,600 applications for asylum were asked in the European Union, the Islamic State forced hundreds of thousands of Syrians to flee, and the ISAF Mission left Afghanistan in a new inflammation of Taliban attacks. The majority of the refugees seeking asylum in the European Union was in the working age, oftentimes with educational qualifications and work experience.[57] In the hope to educate and integrate themselves, many refugees were interested in higher education. A report by McKinsey and the German Stifterverband estimated that between 80,000 and 110,000 refugees could be enrolled at German universities by 2020. However, a lack in language skills, document procurement, health problems, and financial barriers prevented the majority of prospects from studying. Taking these barriers into account, the estimate number of refugee students was much lower – between 32.000 and 40.000 – in many cases after years of waiting to fulfill the admission requirements. At the same time, the motivation to study and the ability to succeed in studies is proven to be particularly high in the first few months after arrival in Germany.[58] Valuable potential is lost – both for the German labour market and for the reconstruction of the countries of origin.

The German legislation is complex as higher education policy falls within the competence of the federal states. In Berlin, where international and English-taught courses of studies are the most common, the access to higher education for asylum seekers and tolerated refugees was strictly prohibited until September 2015.[59] Many obstacles remain, although the legal situation has improved and many higher education institutions are trying to provide qualified refugees with access to studies. General requirements for admission to a German-taught study program are proven German language skills and a university entrance qualification.[60] In the case of Nouman Mallo, a Syrian student of international relations at Technische Universität Dresden, presenting

[57] http://ec.europa.eu/eurostat/documents/2995521/7203837/3-04032016-AP-DE.pdf/9fcd72ad-c249-4f85-8c6d-e9fc2614af1b
[58] http://www.hochschulbildungsreport2020.de
[59] https://www.tagesspiegel.de/wissen/innensenator-lehnt-erleichterung-ab-studieren-in-berlin-fuer-asylbewerber-verboten/12145590.html
[60] https://www.daad.de/medien/der-daad/handreichung_hochschulzugang_geflüchtete.pdf

a copy of his diploma was sufficient. Nevertheless, for the great majority this is not an option, as these proofs are missing or universities only accept originals. School qualifications oftentimes cannot be recognized and thus, prospective students have to wait months, often even years, before they can start their studies: to gain the university entrance qualification at specialized colleges, refugees often need longer than two years due to the lack of language skills. However, the chances of getting one of the rare places at these colleges or in the coveted German courses is difficult, particularly if the Federal Ministry for Migration has not yet decided on the asylum status. This also applies to the financing of studies: Refugees whose asylum process has not been completed are not eligible for a student loan. At the same time, financial support for refugees ends on the day a refugee starts to study. Furthermore, refugees are often sent from one place to another during their first months in Germany.[6][16][26][3] Thus, valuable potential is lost as qualified refugees, especially during their first few months in Germany, have little choice but to wait and do nothing.

4.2 Founding Kiron Open Higher Education

„Please close your eyes and think of the three most important things you would take with you, if you would have to leave your home within one minute. Now open your eyes again and raise your hand if you have thought of your high school diploma.“ With these words Vincent Zimmer introduced the audience of his presentation at the TEDx conference in Berlin in March 2016.[64] Only a few years ago, at age 25, he completed his Masters in public administration and international economics in London and Göttingen. During his studies he wrote the concept paper “University 2.0”, thinking about the future of MOOCs.[65] As “traditional” MOOCs faced difficulties with high dropout rates and course drop out[66], Zimmer wanted to team up with the most successful MOOC providers and add offline services in order to create a linkage between the anonymous mass services and the studying individual. Based on his previous entrepreneurial experiences, he developed the idea to found an easy-access online university together with Markus Kressler, a communications student at the University of Arts in Berlin.

[61] https://www.gesetze-im-internet.de/asylblg/BJNR107410993.html
[62] https://www.gesetze-im-internet.de/baf_g/BJNR014090971.html#BJNR014090971BJNG000201310
[63]https://www.tagesspiegel.de/wissen/luecken-in-der-gesetzgebung-wie-fluechtlingen-das-studium-schwer-gemacht-wird/12788314.html
[64] https://www.youtube.com/watch?v=9XGgD_lvzCA
[65] https://www.zeit.de/2016/19/kiron-fluechtlinge-studium-start-up
[66] http://wrap.warwick.ac.uk/65543/1/WRAP_9770711-cs-070115-edulearn2014.pdf

When they both met Odai, a Syrian refugee their age who was highly motivated to study and make something out of his life, their idea gained shape and an emblematic name: *Kiron* - the eldest and wisest of all centaurs in Greek mythology, famous for his superior knowledge and teaching abilities.[67] The two entrepreneurs decided to sacrifice Zimmers dissertation, Kresslers communications degree, and a prominent part of their sleep to build an online university that should give refugees the opportunity to study without any locational or administrative barriers.

Three years later, 3000 refugees in four countries study at Kiron Open Higher Education. The non-profit organization asks no other documents than a prove of being a refugee. Refugees in Jordan, Turkey, France, and Germany only need access to the Internet and a smartphone or tablet to start their degree in business and economics, mechanical engineering, computer science, political science, or social work. The educational model behind Kiron combines MOOCs with offline services to guarantee location and access flexibility, while providing pedagogical and integration support. During the first two years, Kiron students study with a completely modularized curriculum which meets the standards of the European Higher Education Area. Most of the MOOCs that Kiron works with were developed by MOOC providers edX and Udacity. After two years students should ideally have managed to procure their documents and be prepared to switch to one of the partner universities Kiron teamed up with. The Kiron Credits they earn through MOOCs will be transferred entirely to the institution and students can finish their Bachelor's degree after another two years of studying. As there is a partner university in Turkey as well, students can finish their degree even if their application for asylum gets rejected. As Kiron is funded by the German Ministry of Education and Research, Google, Volkswagen, and several other companies and foundations, refugees study for free while Kiron counts 70 employees and a pool of 200 worldwide volunteers. With costs of 500 Euro per student and semester, the online university concept operates with significantly lower expenses than conventional universities.[68]

The first Kiron MOOCs started in 2015. By early 2018 a number of students has already successfully transferred to partner universities. Mansour Tumeh is one of them. Having had started his Bachelor degree of informatics in Syria, he had to flee from his hometown Damascus

[67]https://hochschulforumdigitalisierung.de/de/blog/hochschulforum-digitalisierung/kiron-university-mitgründer-vincent-zimmer-im-portrait
[68] https://kiron.ngo

to Egypt, Turkey, and finally Germany. Only a few months after his arrival he started studying with Kiron in July 2016. As he followed the MOOC schedule and Kiron modules, Tumeh successfully transferred his Kiron Credits to the partnering Fernuniversität Hagen in April 2018, where he aims to finish his Bachelor's degree within the next two years.[69]

4.3 Offline Services: Refining the Concept of MOOCs

Although thousands of people enroll in MOOCs, the completion rate for the majority of courses is below 13%. A study by the University of Warwick examined the reasons for course dropout and came to the conclusion that lack of time, course difficulty, as well as lack of support and a study environment are major factors.[70] As refugees are often not familiar with the Anglo-American teaching style most MOOCs work with, sometimes are under a lot of psychological pressure, and do not have access to a quiet study environment, the completion of modules becomes even harder for them. This is why Kiron does not only offer online courses but follows the approach of blended learning and provides a comprehensive number of student services.

> Excerpt from Wikipedia:
>
> **Blended learning** is an education program (formal or non-formal) that combines online digital media with traditional classroom methods. It requires the physical presence of both teacher and student, with some element of student control over time, place, path, or pace. While students still attend "brick-and-mortar" schools with a teacher present, face-to-face classroom practices are combined with computer-mediated activities regarding content and delivery.[71]

To address the major integration barrier of language and prepare students for their transfer to a partner university, online and offline language courses led by professional teachers are provided. While traditional MOOCs usually do not include direct contact with professors or peers, Kiron added personalized teaching and learning formats to ensure individual support and study motivation. Volunteer lecturers from universities and academic institutions support Kiron

[69] https://www.fernuni-hagen.de/universitaet/stimmen/Tumeh.shtml
[70] http://wrap.warwick.ac.uk/65543/1/WRAP_9770711-cs-070115-edulearn2014.pdf
[71] https://en.wikipedia.org/w/index.php?title=Blended_learning&oldid=838739146

students through synchronous live tutorials in Google Classroom, through hangouts, and via a help desk. It provides answers to program specific questions, ranging from technical support to partner universities. Within the student forum Kiron students can have discussions and build study groups with fellow students and volunteers who provide peer support. In several German cities students are matched with a “buddy” who studies at a German university and helps them to integrate into the local student environment. Via the mentoring program, Kiron students based in Germany even meet experienced professional mentors from companies who provide support with personal and career-related topics during several offline meetings. This way Kiron refined the online concept of MOOCs by individualizing the studies. To ensure an active identification of the studying individual with its studies, Kiron mobilized the help of more than 200 volunteers and partner institutions. Several universities do not only provide consultation, but also work spaces and laptops specifically for Kiron students.[72]

4.4 European Qualifications Passport for Refugees

Kiron Open Higher Education was developed as a social start-up: Zimmer and Kreßler as entrepreneurs developed a solution to a social problem which was not sufficiently addressed by the government. Kiron can be seen as pioneer project within the education sector, although most European countries had already pledged to make an effort for refugees' access to higher education. On 11th September 1997 most of the European countries signed the Lisbon Recognition Convention. In section VII of the Convention, it says:

> “Each Party shall take all feasible and reasonable steps within the framework of its education system and in conformity with its constitutional, legal, and regulatory provisions to develop procedures designed to assess fairly and expeditiously whether refugees, displaced persons and persons in a refugee-like situation fulfil the relevant requirements for access to higher education, to further higher education programmes or to employment activities, even in cases in which the qualifications obtained in one of the Parties cannot be proven through documentary evidence.“[73]

Since then, fairly little action has been taken by the majority of signatory states. Exceptions are the Norwegian, British, Italian, and Greece national information centers working on recognition

[72] https://kiron.ngo/our-kiron-model/student-services/
[73]https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=090000168007f2c7

issues. Together they developed the European Qualifications Passport for Refugees (EQPR), which presents information on the refugee's education level, qualifications, and work experience. Its format is supposed to portray the qualifications in a way that the assessment can be used for Europe-wide access to higher education or employment.[74][75] A pilot project was already successfully tested in Norway in 2016 with further pilot projects being launched across Europe. To receive an EQPR, applicants are asked to fill out a questionnaire. Three weeks later, they meet with a qualified evaluator for a personal interview. After no more than five to six weeks, applicants are expected to receive a decision whether an EQPR is issued or not. The issued document is valid for five years.[76]

Case Questions:

1. You are meeting a Syrian of your age who has recently come to Germany as a refugee. Describe the concept of Kiron Open Higher Education in a brief, comprehensible way.
2. Briefly name and explain the major four obstacles preventing refugees from accessing higher education.
3. In what way did Kiron open up the German system of higher education? What are the aspects of higher education that remain closed for Kiron students?
4. How does Kiron realize the concept of blended learning? What are the advantages and disadvantages of blended learning compared to traditional MOOCs?
5. Kiron Open Higher Education only serves refugees. Come up with arguments for and against this strategic decision.
6. How does the European Qualifications Passport open up education? How does this approach differ from Kiron? Do you see complementarities between the projects?

[74]https://www.coe.int/en/web/education/recognition-of-refugees-qualifications
[75]http://www.unhcr.org/news/press/2018/3/5aba426d4/european-qualifications-passport-refugees-integration-education-employment.html
[76]https://www.coe.int/en/web/education/-/second-evaluation-for-european-qualification-passport-for-refugees-held-in-greece

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