



# Open Data as driver of critical data literacies in Higher Education

OER20 Workshop Instruments and Results

---

Authors: Juliana Raffaghelli, Javiera Atenas, and Leo Havemann

- A workshop session offered at the OER20 [online] conference
- <https://oer20.oerconf.org/sessions/o-060/>
- Wed, Apr 1 2020
- Theme: Open education for civic engagement and democracy
- [Recorded Session](#)

## 1. Background

Participation in today's datafied society, requires a series of transversal skills. In fact, we need technical abilities and media literacies interwoven in a critical approach in order to understand the socio-political and cultural structures and processes that affect individuals and groups. Higher Education (HE) must lead in the development of critical, socio-technical pedagogic approaches to understand and analyse data. To this end, adopting Open Data as Open Educational Resources as a basis for learning activities focused on data literacy development has great potential to trigger authentic learning. In this regard, this approach aims to include, but go beyond, the development of technical abilities to extract, elaborate and integrate Open Data in services, activities and projects. In fact, using data in research-based learning activities

such as practicing data journalism and civic monitoring techniques can be a catalyst for data ownership and activism and re/appropriation of datafied public spaces. On the basis of these pedagogical practices, HE can play a key role in fostering critical approaches. The abilities developed in HE should transcend the classroom, to understand datafication in society. In time, HE students and teachers would contribute to shape informed and transformative democratic practices and dialogue empowering citizens to address social justice concerns.

This envisioned strategy requires faculty development and engagement, as data literacies need disciplinary and pedagogical efforts to innovate in curricular and learning design. Furthermore, supporting faculty's awareness and practices to shape critical and ethical approaches to data implies care for spaces of dialogue at the juncture of technical and social needs; care for interdisciplinary thinking and understanding the differences between "Psyche and Tekné", building on Umberto Galimberti's conceptualisation of the problem of balance between ethics/social sciences and technological advancement.

## 2. Session description

This workshop explored the educational potential of Open Data as a driver of interdisciplinary dialogue in learning design and pedagogical practices. It offered instruments for designing educational interventions in two simple phases:

1. A conceptual (but dialogical!) introduction
2. A "hands on" exercise

The virtual environment used was Blackboard Collaborate as organized and supported by ALT and the OER20 Committee. In these conditions, 73 participants (conference attendees and external participants) engaged in the activity. The participants that expressed their geographical positions (when introducing themselves via the chat in the virtual conference environment) showed diversity, though most participants came from the UK, elsewhere in Europe, and some from Latin America.

### 3. Conceptual Introduction

The conceptual introduction aimed at presenting the principles, the policy context and existing practices in citizen science, responsible research and innovation and Open Data, and the connections with data literacy in HE were defined from the perspective of the researchers and their experiences in using Open Data for educational/learning purposes. An initial overview of the principles and resources to work with Open Data as OER in the context of Data in Education were introduced. Also, frameworks to develop data literacy in HE were considered with a focus on the issues hindering these practices.

The workshop was launched using three questions around the hypothesis of using Open Data to trigger critical data literacies in Higher Education: *Which data? Which Openness? Which care?* The questions addressed attention towards problematizing each of the components in the light of care as the axial concept, supporting all meaning making within the conference. We also used images as metaphors of the three main themes at stake (Openness, Data, achieving literacy as a form of care). An open padlock has a sense of access to something, of the possibility of opening. The keys are the right resources (both infrastructures and skills) to open the padlock, which we cannot consider open automatically. Underlying these premises, the rationale was: to describe the opportunity (open data), to describe the strategy (supporting the usage of open data as open educational resources to develop critical data literacies); to understand the actual problems and eventual lack of engagement with critical approaches to data literacy.

#### **The opportunity of Open Data**

One of the core principles of Open Data is universal participation, therefore the development of data literacies must have a focus in developing the skills needed to foster equal access to participation in society, as it is understood that all “citizens should have equal opportunities and multiple channels to access information, be consulted and participate. Every reasonable effort should be made to engage with as wide a variety of people as possible” (OECD, 2009, p.17).

By [definition](#), Open Data is “data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and share alike”, and it needs to meet a series of criteria, such as availability and access, which mean it needs to be stored where the public can retrieve and access it, guaranteeing its re-use and redistribution; also, it must promote Universal Participation, however this is challenging due to the gap in digital and data literacies, which effectively excludes a large group of the population from understanding or analysing data. Also, it is key that the open datasets are complete, because this is considered a primary source of information which needs to be timely and accessible; fragmented or incomplete data is not useful.

Furthermore, Open Data must be machine processable, comparable and interoperable, non-proprietary in order to improve Governance and Citizen Engagement, but more importantly, it needs to be non-discriminatory, as it should not target groups of people that can be put in disadvantage or discriminate against them, and this of course, includes data about students.

The value of using open data is related with its importance at various levels. For example, to foster participation, open data is key to conduct Civic Monitoring, which are activities in which a group of citizens evaluate the activities of a government, e.g. how money is spent. A good example is [Monithon Italy](#), which aims to “promote the citizen monitoring of development projects funded both by the Italian government and the EU through the Cohesion”. Also, Open Data is a key resource for scientific communities, as is clearly seen in the outbreak of the COVID-19, where lots of researchers and research centres are opening up their data to collaborate with others in order to find a cure, as can be seen in this [call for action](#), as it fosters transparent research practices, promoting scientific development and reproducibility. Also, Open Data, by creating a culture of collaboration, can help breaking the silos between teaching and research, by bringing data to solve real life problems using a wide range of research methods, which includes replicating or assessing previous research.

Open Data can be retrieved from a wide range of sources, for example International agencies and organisations such as [World Bank](#), [United Nations](#), [EU](#); National Governments and their agencies e.g [UKOD](#), [GermanyOD](#), [USA](#) or by Local governments e.g [Sardinia](#), [London](#), [Barcelona](#). Some other data producers are Academic institutions and research centres such as [CERN](#) or [NASA](#) and also, data can be retrieved from Open Research Data Platforms such as [ZENODO](#) and [FIGSHARE](#). While our presentation unfolded, the participants showed their engagement with the topic by sharing and commenting on the platforms and links that we brought to the discussion.

Some curated links from that conversation are:

- Group of repositories (OER action) of the Spanish university library network. You can see our collection here: [riunet.upv.es/handle/10251/192](https://riunet.upv.es/handle/10251/192)
- Part already included in Merlot:  
[merlot.org/merlot/materials.htm?userId=1384274&nosearchlanguage=true&fromAdvancedSearch=true&sort.property=dateCreated](https://merlot.org/merlot/materials.htm?userId=1384274&nosearchlanguage=true&fromAdvancedSearch=true&sort.property=dateCreated)
- Open data used to make a COVID-19 dashboard for Scotland  
[twitter.com/mhawksey/status/1244418520361897989](https://twitter.com/mhawksey/status/1244418520361897989) (data is being scrapped and stored in this repo [github.com/tomwhite/covid-19-uk-data](https://github.com/tomwhite/covid-19-uk-data))
- Data can be also scrapped from: [statistics.gov.scot/home](https://statistics.gov.scot/home)

### **Taking care: Open Data as OER, its value for Higher Education**

The following step was considering how to take care of those interested in exploring the territories of Open Data. These can be quite intricate if there is no guidance! In this part of the presentation we built on the coordinators experience in faculty development to adopt OD as OER, whose publications can be further consulted and the frameworks proposed can be tried.

How can Open Data be used in Higher Education? It can be used by collaborating with researchers in real research projects, promoting collaboration amongst students from various disciplines by creating scenario-based learning activities which can aim

at students helping their local communities in solving real life problems, as the use of open data can contribute to the development of critical thinking, research, teamwork and citizenship skills.

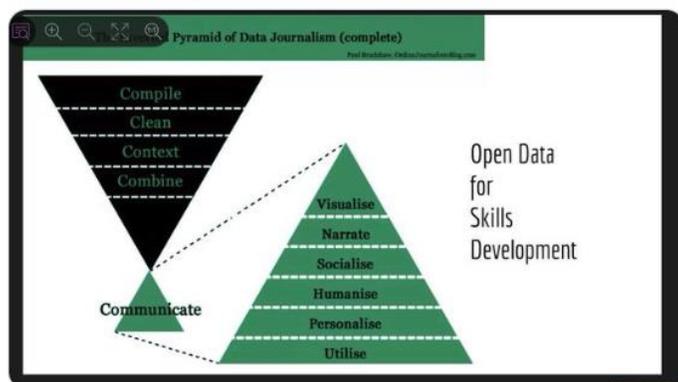
So, when working with students, we can embed open data in teaching and learning activities by:

- Identifying and describing the learning outcomes for the intended activities;
- Identifying the portals which will source the data;
- Clearly identifying and describing the challenges students might face;
- Providing training materials for the software students will need to analyse the data;
- Supporting the students in communicating their findings to local or wider communities.

While introducing these ideas, the audience reacted via Twitter expressing their interest in adopting some of the frames of competence to address design and evaluation on the advancement of such competences. This was the kernel of our endeavour, to promote such an approach to teaching!



**Gema Santos-Hermosa** @gsantoshe · 7h  
#opendata & #dataliteracies in Higher Education by @JulianaR71 @jatenas @leohavemann at #OER20



SPARC Europe and UOC biblioteca

**George Sfougaras** @gsfougaras · 6h  
Great model for research-led teaching and learning, using #OpenData I particularly like the Postgraduate advanced activity level - Via @leohavemann

@jatenas

@JulianaR71  
at #oer20

**Gabi Witthaus** @twitthaus · 7h  
@UoBHefi @CALDigitalEd Great model for research-led teaching and learning, using #OpenData - Via @leohavemann @jatenas @JulianaR71 at #oer20

Activity / Level	Initial	Intermediate	Advanced
All levels	Invite subject and data experts to discuss face to face or online with your students about local and global issues	Engage students with political and legal deliberations and discussions at local and global level asking to them analyse the data related to it	Establish a model for students to understand the process and engage them in policy making by reviewing and analysing data and official reports
Undergraduate	Engage students in evaluating facts and contrasting information by analysing data presented in news media	Encourage students to use digital tools to engage and monitor political activities and to assess reports and news by analysing their data	Support students in assessing data from their government to identify problems and compare local with global information
Postgraduate	Support students in identifying organisations that are campaigning in citizenship issues and enable instances for students to engage in civic monitoring activities and evaluate data driven arguments	Promote student collaboration with civil society organisations, in order to gain experience working with their data, supporting their activities, and enhancing their openness through data and publications	Support students in writing dissertations based on analysis of open data which engages with a real local or global problem; encourage them to publish findings in an open format

**Taking care further: the need of moving towards a critical perspective**

Beyond making considerations about developing a set of specific competences when dealing with Open Data, we further analyzed a number of Data Literacy frameworks. Going further with the metaphor presented in images, if the padlock is the data divide, as there was once a digital divide, there are many keys but only some open the padlock. A key could be cultivating data literacy, the ability of dealing with a complex concept of data. In our analysis data literacy comes out from information literacy, numeracy, statistical literacy and recently, several focused frameworks. We have frameworks of “competence” that fully focus on data literacy as a complex set of

abilities or part of a digital competence (like the [DigComp EU 2.1](#) model if there is still a Europe).

But our analysis of these models in recent (Raffaghelli, 2019, 2020) and upcoming publications showed that we still need a more critical perspective and there is far too much attention on the technical abilities needed to 'deal with' data. We need to be able to see the crisis, the biases, the pitfalls in data abundance. At this point, there is a need for reflection both from educational research and practice, and this is because we offered to do so through the hands on exercise.

## 4. The Hands on exercise

Had all else held constant, the authors would have conducted a face to face workshop but COVID19 turned the setting virtual.

The "hands on" exercise yet consisted on a number of interactions using Mentimeter, which explored the concepts above connecting them to the participants' pedagogical practices and experiences, and their sense briefly commented (we would have expected a debate in presence!) discussed in the light of both practical and deontological implications. The educational potential of Open Data in the participants perspective aimed at understanding which of these data could be applied to personal pedagogical practices. Which datasets could be useful? Which are the critical issues that I could face to use open data in my pedagogical practices?

Given the time constraints and the medium, we focused on an initial level (for those not having been exposed to Open Data) to check to which extent there was "something" for them in that, and to share the initial impressions over using "real data" as Open Educational Resources. The reflections were collected into the Mentimeter interactions and the chat.

In the following, we present the interactions and comment on them.

## Informed Consent

We will publish this workshop data and its results to ZENODO (CC-BY 4.0). You will be able to use such data/results. We won't collect any personal information. In any case we'll take care of anonymizing any participants' information.

If you do not agree, you still can take part to the Open Data Expedition and follow the interactive presentation, but please do not send any reply.



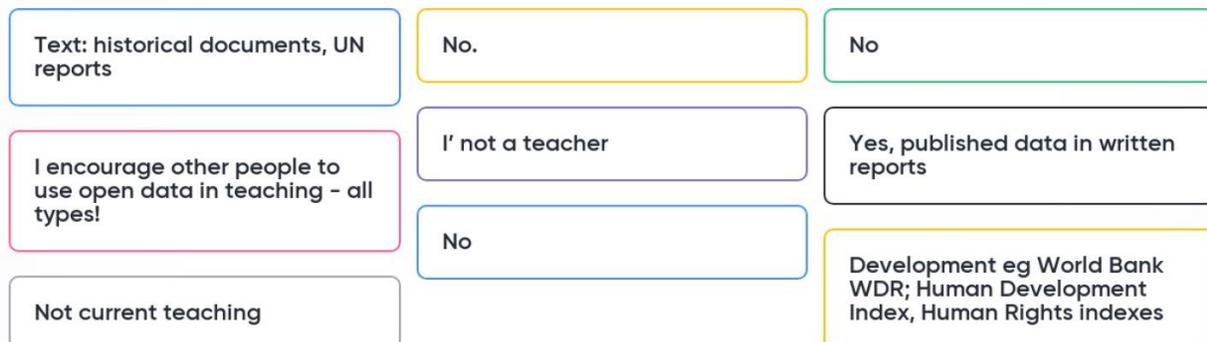
Over 73 participants, only 26 agreed to participate in the interaction with data collection. The rest of the participants got engaged through the chat.

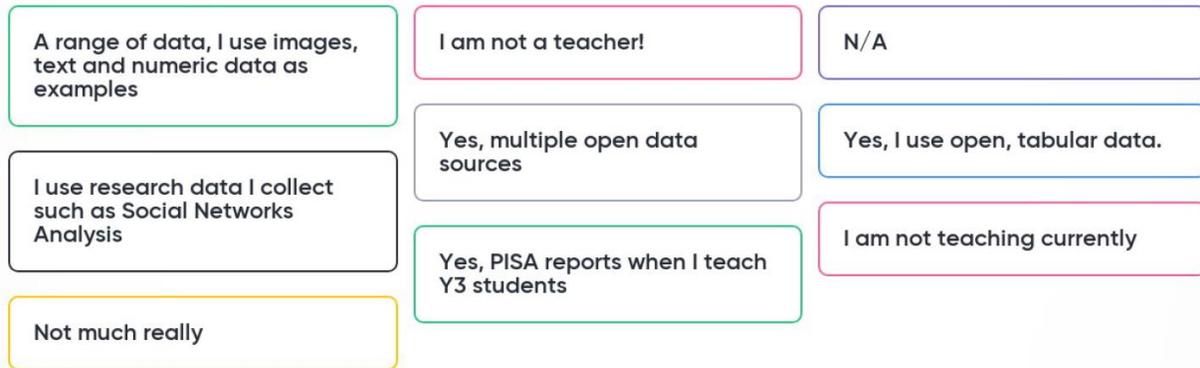
### First Interaction

In this interaction our aim was to understand the expertise brought by the participants over using OD as OER. It turned out (different from past workshops) that practices are advancing and there were cases of engagement with such practice, both Open Government Data and Open Research Data. But there were also colleagues at the starting level.

### Do you use data in your teaching activities? Which type?

Mentimeter



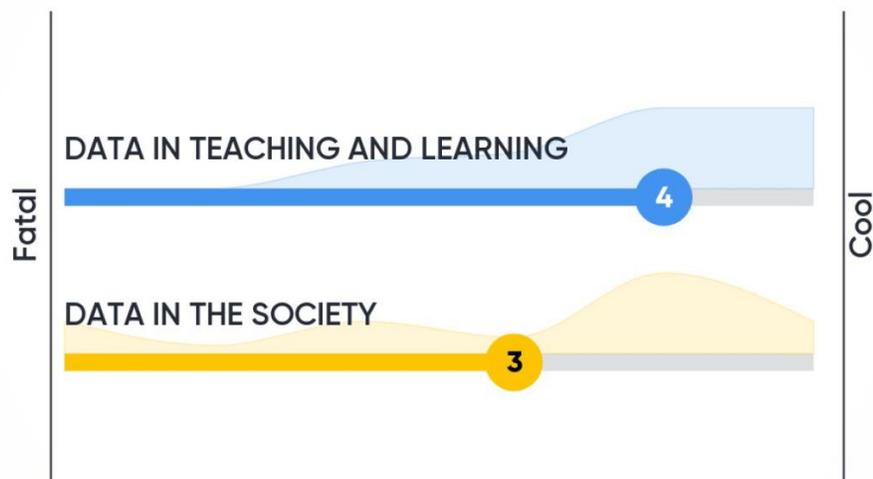


## Second interaction

We aimed here at exploring the participant's feelings about DATA as an entity, considering the way it was presented at the initial part of the workshop. Whether they are comfortable or not with the idea of data practices, beyond the concept of Open Data. We offered a quantitative scale with a definition of the extremes of a continuum (I feel fatal/I feel Cool). It was not surprising that most participants felt more comfortable with data handling within a controlled environment as it is the teaching and learning (Average=4, Rs=25), but a little less comfortable with data practices in the society ((Average=3, Rs=25). One interesting thing here is that the rather positive or positive opinions about data surpassed the negative opinion on it. It is to be considered that we suggested to stick to the idea of data as it has been presented. Open Data was indeed introduced under a positive light and assumed that connotation.

## How comfortable do you feel with the word "DATA"

Mentimeter



25

### Third interaction

When exploring these feelings through more complete expressions, two main “critical” trends emerged: A) the ethical concerns of using data as scientific and “objective” instrument to understand the reality, where power and biases could be embedded; and B) the lack of skills by the faculty and most educators to deal with Open Data and other forms of research data within teaching. In fact there are complexities in designing for learning with Open Data (considering the students’ level, the type of statistical skills required or to be developed along the activity, the type of graphical/visualization skills, etc.). Most of these skills also require a good level of data literacy for the same educators. A third trend consisted of those with experience in the approach, who also highlighted the ethical concerns, but also their engagement in working with such approach.

# Could you share why do you feel (FATAL/COOL) about DATA?

Data sounds very scientific, very positivistic... but it isn't necessarily so!

Data leads to understanding, but we need to be careful with it

it does not really properly describe what it is in one word

Possible biases (lack of information about the methods)

Who produces the data?

Data can be used to give us information about society. You don't need to be a data scientist to make use of it or understand its potential.

I work with repositories and have been a teacher of Open Access and INFOLIT

Fatal - there are too many criticality's I cannot see enough of them Cool - I am doing quite a lot criticising what is data in the stuff I am teaching

I have used data and the more I use it the more comfortable I feel.

26

in T&L as it is my training but in society I do not feel those who are propagating say in Social media have the ethical or analysis training or critical thinking capability

Cool - as trying to learn due to very uncool use of big data - to be critically aware and share critical awareness

Responsibility for the data we use.

there are too few provisions for data privacy and data use

I'm happy to use data in teaching because I can foreground ethics. I real life, people have poor grasp of data, stats or visualizations

Need to question assumptions about data. It is not a given, it socialised, the product of social relations.

My main concern is how is data is interpreted and used.

I am within the average ratio of emotional engagement: I use and share open data but I am careful about ethical implications

where is the data coming from -trust issues

A first question arose from these couple of interactions

- Q: Hello there thx for your presentation I have a question from an educational perspective, to what extent data we use in teaching and learning are open since most are confined within the walls of a given institutions ?
- Our Answer (OA):
  - depends of where you retrieve your data from
  - you use data from an open data portal it will be open but used in a class as a teaching material
  - It's really a question of whether the data you are using is openly licensed or not - teachers use both open and non open data

- research data very often needs to be released openly now, same with open government data
- Q: is "open data" always openly licensed?
  - OA: it should ... but the licenses differ from OER, as government data tends to prefer Open Gov Licenses

## Fourth interaction

The fourth step was what we called the Open Data expedition, borrowing the concept from the [School of Data](#). The idea was just to taste real Open Data as educators, to see, as we proposed, “If there is something in it for me”.

Due to the time constraints, we offered three portals, with diversified approaches to data:

- <http://data.uis.unesco.org/> - A portal devoted to international data produced by a Statistical Unit from an international body: (UIS) *is the official and trusted source of internationally-comparable data on education, science, culture and communication. As the official statistical agency of UNESCO, the UIS produces a wide range of state-of-the-art databases to fuel the policies and investments needed to transform lives and propel the world towards its development goals.*
- <https://www.europeandataportal.eu/en> - A portal aggregating the data produced by both the EU member states' governments. *The European Data Portal harvests the metadata of Public Sector Information available on public data portals across European countries. Information regarding the provision of data and the benefits of re-using data is also included.*
- <https://zenodo.org/> - A portal aimed at self-archiving research resources, with particular focus on Open Data - *Built and developed by researchers, to ensure that everyone can join in Open Science. Connected to the OpenAIRE project, in the vanguard of the open access and open data movements in Europe, the portal was commissioned by the EC to support their nascent Open Data policy by providing a catch-all repository for EC funded research. CERN, an OpenAIRE partner and pioneer in open source, open access and open data, provided this capability and Zenodo was launched in May 2013.*

## OPEN DATA EXPEDITION!

- Go to: [<http://data.uis.unesco.org/>]
- OR: [<https://www.europeandataportal.eu/en>]
- OR: [<https://zenodo.org/>]

We observed during the activity some manifestations of enjoyment so the activity was at least possible (it had been conceived for a FTF environment!) There were questions and reactions such as:

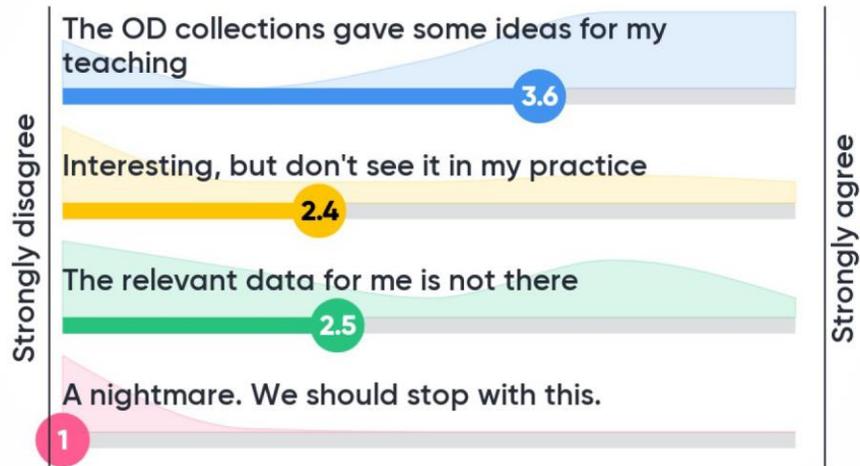
- done! [data.uis.unesco.org](http://data.uis.unesco.org)
- done! Unesco
- Love Zenodo has RCTs!
- done! Unesco
- What is UIS?
- ready! Zenodo
- Euportal
- European Data
- ....
- I love zenodo, easy to navigate
- very interesting links, thanks
- Thanks!!!! It has been great so far!

### Fifth interaction

The fifth and last interaction was aimed at sharing the experience on the portals. It was very short experience, but we took care of collecting the initial impressions about the portals through very simple questions:

# YOUR EXPERIENCE AS EDUCATOR

Mentimeter



26

It prevailed a sense of cautious enthusiasm (Average agreement=3.6 from 26 votes) against disagreement with regard to the idea that there's nothing in Open Data that can be used into teaching practice (average agreement 2.4 "interesting but not connected to practice"). The opinion was also rather disagreement when coming to the relevance of the data found (or considered to be in the portals) and its relevance. Probably all participants considered that the experience was positive, not a "nightmare".

There were many further questions about the Open Data Portals, sparking ideas for teaching in the open!

Q: Would be interesting to create student-researcher data communities ?

OA: You can all create your community for your class and put the data and resources there

Other reaction: I would love to help!

Q: Is there a way to create an individual collection of items on Zenodo?

OA: of course. Do really like Zenodo, though

OA: Also, if you want to start using data, you can assess your data led project using the data ethics canvas by the ODI [theodi.org/article/data-ethics-canvas](http://theodi.org/article/data-ethics-canvas)

## 5. Conclusions

We used three slides to try to wrap up the several inputs received by the participants. The idea was to consider the different positionings relating an emergent phenomenon as it is the issue of data abundance and data usage.

The first image presented a continuum connecting reactive epistemologies (those that are mostly focused on the downsides of data usage. Those that prefer to live without the data infrastructures and would not see any data circulating. Whereas others still believe in the constructive power of data for good, particularly if it's public. However, the worst is the naïve approach which did not appear amongst the participants, as expected. This last positioning embraces the narrative of Big Data as game changers and the possibility (in the field of education) of using data to reveal the complexities of learning.

It followed a quadrant graph, in which we further represented these tensions. Open Data can be for public good, but which data? Collected how? Is that a luxury? If we come to all the data that is collected from private companies, that could become easily a commodity...to which extent should we try (anonymizing it) to ask the companies to release it as a public good?

We interpreted (and there were no strong reactions from the participants on the chat) the participant's expressions along the active part of the session as adherence to some Reactive positionings but mostly Proactive: Data must be explored and we need the skills to do it, but it's necessary to cultivate critical approaches to data. In this regard, the Naïve approach was not present, or at least none of the presents manifested that

form of enthusiasm over data practices as game changers without warnings about their human impacts.

One reaction about the quadrant:

Tensions - Absolutely! - how to not collude with the polarisation of wealth and poverty of access / awareness - part of the wider literal divide

The ideas shared by the participants showed the different positionings and the need to keep on exploring, through pedagogical practices engaging students and institutions in learning how to address the problem of data cultures in Higher Education. We said indeed: *“it turns out to be that we as educators are well in the middle of them, and we’ll need more research and practice to generate constructive practices.”*

The third slide regarded just our perspective on the components to deal with when coming to design for learning and assess the impact of using Open Data for learning. We proposed just three dimensions of data literacy in higher education, where it should be explored how Open Data could play a role to think about the boundaries of data collection and our positionings as citizens.

These three dimensions were the politics, the techniques and the aesthetics of data (see the descriptive table in the slides), highlighting the complex nature of critical data skills. We need the technical skills to understand the object, but we need to consider the political layer as a social structure where the data comes out or it is embedded. The aesthetics play a crucial role in understanding the semantic layers of data storytelling, which refer to the need of interpreting data also as part of meaning making and to be interpreted, adopting a semiotic lens.

In the interesting discussion that followed, the participants posed questions connected to educators’ skills and the concerns of working with data without statistical abilities.

Participant: I just wanted to point out the elephant in the room: how well trained in statistics and mathematical knowledge digital educators are?

To this regard, during the conversation we pointed out that

- a) It is important to develop literacies from the very basic level, a resource that is very helpful is [School of Data](#), that has lots of tutorials to start navigating and using data for any kind of project and use [techniques from data journalism](#)
- b) If possible, interdisciplinary work has to be considered from curriculum design to designing for learning and in co-coordinated experimental projects.
- c) Students' can be engaged in generating data from their own research through crowd science models, from experimental/lab work to community field-work. They have to be encouraged to use secondary data for project-based learning too.

To wrap up: the best is yet to come!

Thank you for your incredible participation.

## Resources

- [Slide deck](#)
- [Mentimeter Interactions](#)

## References

- Atenas, J. & Havemann, L. (2019) Open Data Sectors and Communities: Education. In T. Davies, S. Walker, M. Rubinstein, & F. Perini (Eds.), *The State of Open Data: Histories and Horizons*. Cape Town and Ottawa: African Minds and International Development Research Centre. Print version DOI: <https://doi.org/10.5281/zenodo.2677851>
- Atenas, J., Havemann, L., & Priego, E. (2015). Open Data as Open Educational Resources: Towards Transversal Skills and Global Citizenship. *Open Praxis*, 7(4), 377–389. <https://doi.org/10.5944/openpraxis.7.4.233>
- Manca, A., Atenas, J., Ciociola, C., & Nascimbeni, F. (2017). Critical pedagogy and open data for educating towards social cohesion. *Italian Journal of Educational Technology*, 25(1), 111–115. <https://doi.org/10.17471/2499-4324/862>
- Raffaghelli, J. E. (2017). Alfabetizzare ai dati nella società dei big e open data: una sfida formativa. *Formazione&Insegnamento – European Journal of Research on Education and Teaching*, 25(3), 279–304. [https://doi.org/107346/-fei-XV-03-17\\_21](https://doi.org/107346/-fei-XV-03-17_21)
- Raffaghelli, J. E. (2018a). Educators' Data Literacy Supporting critical perspectives in the context of a “datafied” education. In M. Ranieri, L. Menichetti, & M. Kashny-Borges (Eds.), *Teacher education & training on ict between Europe and Latin America* (pp. 91–109). Roma: Aracné. <https://doi.org/10.4399/97888255210238>
- Raffaghelli, J. E. (2018b). Open Data for Learning: A case study in Higher Education. In A. Volungeviciene & A. Szűcs (Eds.), *Exploring the Micro, Meso and Macro Navigating between dimensions in the digital learning landscape. Proceedings of the EDEN Annual Conference, 2018* (pp. 178–190). Genoa, Italy: European Distance and E-Learning Network. <https://doi.org/978-615-5511-23-3>
- Raffaghelli, J. E. (2019). DEVELOPING A FRAMEWORK FOR EDUCATORS' DATA LITERACY IN THE EUROPEAN CONTEXT: PROPOSAL, IMPLICATIONS AND DEBATE. In *International Conference on Education and New Learning Technologies EDULEARN* (pp. 10520–10530). Palma de Mallorca: IATED. <https://doi.org/10.21125/edulearn.2019.2655>