OER and use of open data to develop transversal and citizenship skills

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OER AND USE OF OPEN DATA
TO DEVELOP TRANSVERSAL AND CITIZENSHIP SKILLS

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Introductions

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education.okfn.org/open-data-as-open-educational-resources-case-studies-of-emerging-practice
"A recent White House report on ‘big data’ concludes, ‘The technological trajectory, however, is clear: more and more data will be generated about individuals and will persist under the control of others’ (White House, 2014: 9). Reading this statement brought to mind a 2009 interview with Google Chairperson Eric Schmidt …[who stated] , ‘If you have something that you don’t want anyone to know, maybe you shouldn’t be doing it in the first place, but if you really need that kind of privacy, the reality is that search engines including Google do retain this information for some time … It is possible that that information could be made available to the authorities’ (Newman, 2009). What these two statements share is the attribution of agency to ‘technology.’ ‘Big data’ is cast as the inevitable consequence of a technological juggernaut with a life of its own entirely outside the social. We are but bystanders.”

(Zuboff, 2015)
Open Education/Open Data

- Are these opening movements ‘in conversation’?
- What can Open Data do for Open Education?
- And what can Open Education do for Open Data?
Opening movements … siloed conversations?

The idea of openness in education has come to be closely associated with technology-enabled approaches, such as Open Educational Resources (OER), and Massive Open Online Courses (MOOCs).

It has also been associated with other related, parallel but ‘siloed’ opening movements for Open Data, Open Access, Open Science etc.

More recently the term Open Educational Practices (OEP) has emerged via attempts to critique and reformulate the discourse around openness in education (Havemann, 2016).
A key strand of the drive to open education is the movement for **Open Educational Resources (OER)**, which proposes that the application of open, permissive licenses to teaching and learning resources is a means of widening access to knowledge and enhancing teaching quality.
Open data

The Open Data Handbook defines Open Data as:

“data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and sharealike.”

(Open Knowledge International, n.d.)

**Availability and Access:** the data must be available as a whole and at no more than a reasonable reproduction cost.

**Re-use and Redistribution:** the data must be provided under terms that permit re-use and redistribution, including the intermixing with other datasets.

**Universal Participation:** everyone must be able to use, re-use and redistribute. There should be no discrimination against fields of endeavour or against persons or groups.
Digital and data divides

“The illusion of access promoted by computers provokes a confusion between the presentation of information and the capacity to use, sort and interpret it.”

(Brabazon, 2001)

“as with the earlier discussion concerning the ‘digital divide’ there would, in this context, appear to be some confusion between movements to enhance citizen ‘access’ to data and the related issues concerning enhancing citizen ‘use’ of this data”

(Gurstein, 2011)
Using Open Data as OER

Many international organisations, governments, NGOs and academic researchers generate datasets, which are often freely available online and openly-licensed. This data can be used in learning and teaching (therefore becoming OER) to give students authentic experiences of working with the same raw data used by researchers and policy-makers (Atenas, Havemann & Priego, 2015; Atenas, 2016).
Sources of Open Data

- International agencies and organisations
  - World Bank; United Nations; EU
- National Governments and their agencies
  - UKOD; GermanyOD; USA
- Local governments
  - Sardinia; London; Barcelona
- Non-governmental organisations
  - ODI; Monithon
- Academic institutions and research centres
The practical value of Open Data

- Open data is an invaluable resource for scientific communities
- Supports scientific development and reproducibility
- Encourages more transparent research practices
- Can be used to model good practices in academia for research and teaching

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The civic value of Open Data

• Students construct knowledge by critically analyzing information from various sources, including data.

• We live in a “datafied” society, so being capable of analysing and interpreting data is becoming increasingly important.

• Students need to become critical, skeptical, socially engaged, global citizens to avoid the influence of fake news, hate ads and broken democracy.

When we are the consumers of free services, we are the product.
Open Data for social participation

“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).
Transversal skills

Transversal skills are defined by UNESCO (2015) as: “critical and innovative thinking, inter-personal skills; intra-personal skills, and global citizenship” (p. 4).

- Lifelong and lifewide, not simply employability.

These include:

- Language and communication
- Information, media and data literacies
- Critical thinking
- Analytical skills
- Research capabilities
- Ethical practices
- Teamwork
- Citizenship

(European Union, 2011, p. 18)
# Open Data for developing transversal skills

<table>
<thead>
<tr>
<th>Skills / Level students can</th>
<th>Basic</th>
<th>Intermediate</th>
<th>Proficient</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical thinking</strong></td>
<td>Understand basic concepts of critical thinking</td>
<td>Use data to verify information from the media</td>
<td>Analyse phenomena from their region using data and write reports critically analysing solutions</td>
<td>Present data visualisations to present their findings using complex statistical modelling</td>
</tr>
<tr>
<td><strong>Data analysis skills</strong></td>
<td>Analyse data using quantitative and qualitative methods</td>
<td>Use proficiently software for data analysis such as SPSS - NVivo</td>
<td>Use proficiently software for data analysis such which are relevant for their own discipline</td>
<td>Develop their own databases using systems such as ORACLE</td>
</tr>
<tr>
<td><strong>Data curation skills</strong></td>
<td>Organise datasets in simple folders</td>
<td>Identify different sources of datasets and organise it in databases</td>
<td>Use digital tools for data curation and share it with others</td>
<td>Develop databases and organise datasets, and embed metadata into the files to facilitate access to the resources</td>
</tr>
<tr>
<td><strong>Data management skills</strong></td>
<td>Identify datasets from different sources</td>
<td>Select datasets from different portals in different formats</td>
<td>Extract, filter and compare data from different data sources creating a single dataset</td>
<td>Filter and format data in different formats analyse it creating complex datasets</td>
</tr>
</tbody>
</table>
# Open Data for developing transversal skills

<table>
<thead>
<tr>
<th>Skills / Level students can</th>
<th>Basic</th>
<th>Intermediate</th>
<th>Proficient</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Mining skills</strong></td>
<td>Locate CSV files on the internet</td>
<td>Extract datasets from PDFs</td>
<td>Extract datasets from different sources</td>
<td>Use complex methods for developing datasets</td>
</tr>
<tr>
<td><strong>Data visualisation skills</strong></td>
<td>Create graphics and charts</td>
<td>Use online software to develop simple infographics</td>
<td>Use graphic design software to develop infographics</td>
<td>Use data modelling software to create complex data visualisations</td>
</tr>
<tr>
<td><strong>Research skills</strong></td>
<td>Understand the scientific method and are familiar with basic quantitative and qualitative methods</td>
<td>Structure their research and apply different techniques to obtain results</td>
<td>Replicate experiments and studies following research methods explained in the literature</td>
<td>Compare data and information from different data sources and research papers and replicate experiments and studies to produce new research articles</td>
</tr>
<tr>
<td><strong>Statistical skills</strong></td>
<td>Perform basic statistical operation including averages, media and median</td>
<td>Perform statistical operations using clusters, using standard deviations, significance, chi square, correlation or regression analysis</td>
<td>Use data modelling techniques for different statistical methods such as forecasting to predict future events</td>
<td>Programme databases to perform complex statistical analysis and create models and complex graphs and visualisations</td>
</tr>
</tbody>
</table>
## Open Data for civic engagement

<table>
<thead>
<tr>
<th>Civic engagement / Level</th>
<th>UG</th>
<th>PG</th>
<th>All levels</th>
<th>All levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>Support students in assessing government to identify problems to solve</td>
<td>Enable instances for students to discuss how they can get involved in civil society organisations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>Encourage students to use digital tools to engage and monitor political activities</td>
<td>Support students to select, support and develop activities related with the civil society that have a personal interest to them</td>
<td>Engage students with political deliverations asking them to analyse the data related to it</td>
<td>Establish a model for students to engage in policy making by reviewing data</td>
</tr>
<tr>
<td>Advanced</td>
<td>Invite subject and data experts to discuss face to face or online with your students local and global issues</td>
<td>Consider the opportunities to embed civic engagement as a core component of the modules aims and objectives supporting data journalism activities</td>
<td></td>
<td></td>
</tr>
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</table>
### Open Data as OER at different levels

<table>
<thead>
<tr>
<th>Activity / Level</th>
<th>Initial</th>
<th>Intermediate</th>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>All levels</td>
<td>Invite subject and data experts to discuss face to face or online with your students about local and global issues</td>
<td>Engage students with political and legal deliverances and discussions at local and global level asking to them analyse the data related to it</td>
<td>Establish a model for students to understand the process and engage them in policy making by reviewing and analysing data and official reports</td>
</tr>
<tr>
<td>Undergrad</td>
<td>Engage students in evaluating facts and contrast information by analysis data sources news from newspapers</td>
<td>Encourage students to use digital tools to engage and monitor political activities and to assess reports and news by analysing their data</td>
<td>Support students in assessing data from their government to identify problems and compare local with global information</td>
</tr>
<tr>
<td>Postgrad</td>
<td>Support students in identifying organisations that are campaigning in citizenship issues enable instances for students engage in civic monitoring activities and evaluation of data driven arguments</td>
<td>Promote collaboration between civil society for students to gain work experience supporting their activities through data and publications, enabling instances for students to work in real scenarios with their data</td>
<td>Support and encourage students to write their final dissertations using open data aiming to find applicable solutions to local and global problems and support them to publish them in an open format to make accessible to the public</td>
</tr>
</tbody>
</table>
Open Data in learning and teaching

1. **Focus**: defining the research problems and their relation to the environment.

2. **Practicality**: matching technical applications and practices to expected solutions.

3. **Expectations**: setting realistic and achievable expectations for data analysis.

4. **Direction**: seeking data portals which contain appropriate information.

5. **Training**: providing training materials for the software students will need to use to analyse the data.
Open Data in learning and teaching

6. **Location**: using global, local and scientific data which is as granular as possible.

7. **Modelling**: developing model solutions to guide students during the challenges and activities.

8. **Collaboration**: supporting students to work collaboratively and at multidisciplinary level.

9. **Communication**: enabling students to communicate their findings to local or wider communities.

10. **Criticality**: encouraging students to consider how data are were collected and manipulated, by whom, and for what purposes.
The University of Nottingham used open data in a postgraduate computer science programming course to teach students to code with networks, files and data structures.

They used Python, which is a free open source community-based programming language (Python Software Foundation, 2017).

Data were obtained from e-Book text files sourced from Project Gutenberg and City Council Carpark status data.

The assignment combined conceptual knowledge with authentic applications for public and educational use.
The Scuola di OpenCoesione is a MOOC designed for Italian High School students to challenge them to:

1. find out how public money is spent in a given area,
2. assess the progress and challenges facing funded projects, and
3. monitor public investment.

Data are obtained from the OpenCoesione portal, the Italian National Institute of Statistics and other public sources.

Participants collaborate in teams on projects involving open data analysis, data journalism and creating infographics related to real-life civic issues.

(Ciociola & Reggi, 2015)
Open data and knowledge societies

- MSc students studying towards Information Management or Information Technology qualifications at the University of Bristol use open datasets and websites to consider the benefits of being able to make sense of data for individuals, organisations and society.
- Website statistics and visualisation tools are used to help students consider the role of information and knowledge management and data literacy in knowledge societies and knowledge economies.
- Students are asked to interrogate and analyse trends and developments using open data to deepen their understanding of how data is used to provide information and deepen knowledge, but also how it is produced, consumed and commodified.
- This case study has been shared internally as an exemplar of practice at Sharing Approaches to Learning and Teaching (SALT) meetings and Faculty forums. (Power, 2015)
Open Migration

• Open Data can be used to support learners to understand socio-political phenomena, such as the refugee crisis.
• This Italian project used journalistic techniques, such as fact-checking (Annenberg Public Policy Center, 2017) in civic and data-led research and data-expeditions (School of Data, n.d.).
• Students engaged with migration data to challenge stereotypes and influence public opinion and policy.
• The project trained students, researchers and citizens to understand the real numbers and issues for refugees in Italy in order to support their integration into the community.
• Open Data was used in this project to create a replicable pedagogical pathway to improve media and data literacy.

Over to you

• How can we make more datasets openly available for use as OER?

• How can we raise awareness that Open Data can be used as OER?
References & resources


