EDUCATION AS A BUILDING BLOCK IN OPENING UP GOVERNMENT DATA

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Abstract

This paper aimed at investigating the evolution of Open data concept and open government data initiatives as an ongoing dynamic process that needs continuous maintenance and collaborative updating process and has its own principles, challenges at each stage, as well as limitations and risks that will continue to emerge upon different and intergovernmental circumstances related to the social, political and economical context of each country and its system. Additionally, focus on the interrelated link with education as a fundamental aspect and a builging block for sustainable development that contributes strongly to economic growth. Where the OGD is the double facet as it serves educationists to develop their policies, plans and decisions accordingly and will empower public to understand and make use of the data and participate in decision and policy making.

Keywords: Open Data, Education, Phases, Initiatives

Introduction

Data in all its forms is the baseline of information, which is the crucial aspect towards openness that lead to democracy and sustainable development. Government Data is aimed at providing citizens with information that would educate, empower and provoke them to participate in decision and policy making, based on governance that leads to collaboration and cooperation within the government itself and between the government and other sectors, namely the private sector and civic societies. However, the issue of quality in open government data is inevitably raised, and it has to be balanced with the quantity if it is possible. By opening up data, government can help drive the creation of innovative solutions in dealing with emerging issues where education play a crucial role in this matter.

The Evolution of Open Government Data

In December 2007, Carl Malamud and Tim O'Reily in cooperation with Sunlight foundation, Google and Yahoo convened with 30 open government data advocates, in aims of

developing a set of principles that deals with open government data. Resulting with 8 principles that emphasize why open government is crucial to democracy, stating that data shall be complete, primary, timely, accessible, machine processable, non-discriminatory, non-proprietary and license free. [17]

Sunlight Foundation further developed the principles to include "permanence" as a 9th principle. The "Complete data" principle also evolved to include availability of the data on the internet for free. [18]

The Association of Computing Machinery's[19] issued a recommendation on open government in February, 2009 and added 3 more principles, namely, promote analysis, safe file format, provenance and trust. The Association of Government Accountants[20] also added to the principles, ones that were focused on the openness process, where it stated the need for public input and review.

Joshua Tauberer, added in his book titled "open government Data 2009" 3 additional principles namely interagency coordination, endorsement of technology, prioritization.[21]

Government Data shall be considered open if its made public in a way that complies with the principles below [22]

1. **Complete:** All public data is made available, on the internet for free. Public data is data that is not subject to valid privacy, security or privilege limitations.

2. **Primary:** Data is as collected at the source, with the highest possible level of granularity, not in aggregate or modified forms. Thus, open data publishers should provide low resolution data and make the full-resolution information available in bulk and in multiple formats to support different purposes.

3. **Timely:** Data is made available as quickly as necessary to preserve the value of the data. This also applies on the updates relevant to the provided data.

4. **Accessible**: Data is available to the widest range of users for the widest range of purposes. Where it should be published with current industry protocols and formats. Sufficient documentation should be provided to explain to the users the structure of

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[17] Open Government Data. "8 principles of open government data", open government working group, 2007. <http://www.opengovdata.org/home/8principles>
[18] Sunlight Foundation. "Ten Principles for Opening Up Government Information", 2010, <http://sunlightfoundation.com/policy/documents/ten-open-data-principles/>
[19] Association of Computing Machinery. "Recommendations on Open Government", 2009. <http://www.acm.org/public-policy/open-government>
[20] Association of Government Accountants. "Recovery and the transparency imperative", Annual CFO Survey, Grant Thornton, 2009.
[21] Tauberer, Joshua. Open Government Data: The book, 2012 <http://opengovdata.io/>
[22] Open Government Data. "8 principles of open government data", open government working group, 2007. <http://www.opengovdata.org/home/8principles>

and the abbreviations in the data.

5. **Machine Processable:**   Data is reasonably structured to allow automated processing.

6. **Non-Discriminatory:**   Data is available to anyone, with no requirement of registration. Anonymous access must be allowed for public data.

7. **Non-Proprietary:**   Data is available in a format over which no entity has exclusive control. Otherwise unnecessary restrictions might emerge.

8. **License-Free:**   Data is not subject to any copyright, patent, trademark or trade secret regulation. Reasonable privacy, security and privilege restrictions may be allowed.

9. **Permanent:** Data should be made available at a stable Internet location indefinitely. As Permanent web addresses would facilitate sharing the documents as it would merely include referring to the site than provide instructions.

10. **Promote Analysis:** "Data published by the government should be in formats and approaches that promote analysis and reuse of that data." As this would require the public to carry out their analyses of raw data, instead of passively relying on the government's analysis.

11. **Safe File Formats**: "Government bodies publishing data online should always seek to publish using data formats that do not include executable content." Executable content within documents poses a security risk to users of the data because the executable content may be malware (viruses, worms, etc.).

12. **Provenance and Trust:** "Published content should be digitally signed or include attestation of publication/creation date, authenticity, and integrity." This would help the public validate the source of the data they find, thus, trust that the data has not been modified since it was published.

    When addressing open data government, one should tackle what government agencies should open and how to do it, the principles below provide preliminary guidance:

13. **Public Input:** Public input is crucial to disseminating information in such a way that it has value, as they better evaluate their needs. Thus, the government should understand the information that the public wants and deliver it, and if the public are not sure what they need, the government should help them define it.

14. **Public Review:** Ensure that the data disclosed is accurate and reliable, and show that process to users.

15. **Interagency Coordination:** When two data sets refer to the same kinds of things, the creators of the data sets should strive to make them interoperable. This makes the data

more valuable and facilitates deriving new uses from such combinations. Noting that since such a process might come at the cost of time, the governments must weigh the advantages of distributing non-interoperable data quickly against the net gain of investing in interoperability and delaying a release of the data.

16. **Endorsement**: Avoid technological choices that would essentially endorse a single entity, as such endorsement might create a conflict of interest if controlled by a private sector, or might create an incentive for the parties to be involved in policymaking.

17. **Prioritization**: Limited resources hinders governments from meeting all standards of openness instantaneously and simultaneously, thus, prioritization of time over data precision is likely to occur.

Towards Turning Principles into Best Practices [23, 24]

Usually people start the work with the intention to reach excellence and this could be the easy part of the innovation process. Institutionalization is the key aspect of sustainability, where we turn the innovation into best practice as a building block of the system. And in dealing with OGD principles to be turned into best practices, certain steps should be followed:

1. Publish Government Information Online[25]: Governments enable public access to information by making it available online. It should be in formats that allow access to and reuse of information. This will promote accountability, informed public participation, as well as create economic development opportunities. Additionally, the public should be given the opportunity to give their feedback and request public records, which the government should respond to.

2. Create and Institutionalize a Culture of Open Government: To promote an open government culture and accountability the government should:

   a. Develop and publish an Open Government plan, which describes how each governmental body will enhance and develop transparency, public participation, and collaboration.

   b. Upon implementation, evaluation should be conducted to assess the application of the principles and the government's responsiveness, where the results would be published.

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[23] Open Government Directive, Memorandum for the heads of executive departments and agencies, Executive Office of the President, Washington D.C, 2009.
[24] Tauberer, Joshua. Open Government Data: The book, 2012 <http://opengovdata.io/>I
[25] Ibid OGD

   c. Best practices on innovative ideas to promote transparency, collaboration and public participation should be disseminated, to provoke further development.

3. Create an Enabling Policy Framework for Open Government: To affirm sustainability of a more open government, cooperation among various professional disciplines within the government should occur to define and develop open government solutions. This requires reviewing existing policies to identify obstacles to open government and to the use of new technologies and, where necessary, issue clarifying guidance and/or propose revisions to such policies, noting that the guidance and the proposed policy should be published.

Common challenges facing the process of opening up Government data

Open data is an ongoing dynamic process that needs continuous maintenance and collaborative updating on each phase where each phase of the process has its own challenges, that will continue to emerge upon different and intergovernmental circumstances related to the social, political and economical context of each country and its system.

Phase one: opening up data

1. **Lack of assessment of the enabling environment:**

- Lack of integration with existing legislation and regulations, [26] such as Licensing and intellectual property difficulties, where there is a Lack of regulations that would allow the release of open government data under permissive licenses and that would provide protection to private information.[27]Also Lack of digital data and data itself, due to unavailable or poor statistics.

2. **National infrastructure and policies:**

- IT Infrastructure   : governments need to develop the right infrastructure to hold all the data. [28]

- Outreach and citizen engagement: Governments should raise citizens' awareness and orientation towards utilizing the data to enable their participation in decision-making. [29]

- Poor marketing from data activists and public administrations regarding the benefits of having data available and the opportunities it creates.[30]

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[26] Sandoval Almazán, Rodrigo. The Two Door Perspective: An Assessment Framework for Open Government, 166 – 181, In eJournal of eDemocracy, 2011 <http://www.jedem.org/article/view/67>
[27] World bank, "How to Note: Toward Open Government Data for Enhanced Social Accountability", 2012.
[28] Fiorenza, Pat. "3 Challenges for Big Data and Government Agencies, Govloop blog, 2012. <http://www.govloop.com/profiles/blogs/3-challenges-for-big-data-and-government-agencies>
[29] Fioretti, Marco. Open Data: Emerging trends, issues and best practices, Laboratory of Economics and Management,   Sant'   Anna   School   of   Advanced   Studies,   Pisa,   2011. <http://www.lem.sssup.it/WPLem/odos/odos_2.html>

3. **Personnel/Workforce:** empower personnel to attain strong skills in statistics, to help analyze and generate added value from the data. [31]

4. **Identifying scope of work**[32] on which the data will be utilized for decisions.

5. **Funding:** Supporting the infrastructure for OGD requires a streamline of funding. Sustaining high precision and accuracy in processing the data requires further funds. Thus, OGD's success is dependent on sufficient funds. [33]

6. **Interoperability:** Enable OGD's wider distribution [34], however, it entails costs, skills, efforts and in some cases comes at the expense of timeliness.

Phase two: Implementation

1. **Data provenance:** [35] identifying the origin of data is necessary for authentication, documentation and further analysis and utilization.

2. **Data manipulation and misuse:** [36] Data published might be manipulated by the source or might be published in a convoluted manner, not allowing the public to reuse it or understand it.

3. **Active civil society** as end up users.[37]

4. **Institutionalization:** Sustaining financial and human capital resources to integrate OGD into the system. [38]

5. **Overcoming resistance** from beneficiaries of a closed system of government information. [39]

6. **Data Quality:** [40]Affirm data has an acceptable level of precision and accuracy and provide sufficient documentation, to allow the data user to understand structure and abbreviations in the data.

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[30] Ibid, Fioretti.

[31] Fiorenza, Pat. "3 Challenges for Big Data and Government Agencies, Govloop blog, 2012. <http://www.govloop.com/profiles/blogs/3-challenges-for-big-data-and-government-agencies>

[32] Ibid, Fiorenza.

[33] Tauberer, Joshua. Open Government Data: The book, 2012 <http://opengovdata.io/>

[34] Ibid, Tauberer.

[35] Davies, Tim. " Ten Building Blocks on an open data initiatve", Open Data Impact Blog, 2012. <http://www.opendataimpacts.net/2012/08/ten-building-blocks-of-an-open-data-initiative/>

[36] Fioretti, Marco. Open Data: Emerging trends, issues and best practices, Laboratory of Economics and Management, Sant' Anna School of Advanced Studies, Pisa, 2011. <http://www.lem.sssup.it/WPLem/odos/odos_2.html>

[37] World bank, "How to Note: Toward Open Government Data for Enhanced Social Accountability", 2012.

[38] World Bank, "Realizing the vision of open government data: Opportunities, challenges and Pitfalls", Open Development Technology Alliance, 2011.

[39] World Bank, "Realizing the vision of open government data: Opportunities, challenges and Pitfalls", Open Development Technology Alliance, 2011.

[40] Tauberer, Joshua. Open Government Data: The book, 2012, <http://opengovdata.io/>

7. **Collaboration with external partners:** Governments should be mindful of other partner's priorities when setting their OGD plan, in order to achieve institutionalization.[41]

8. **Feedback:** Governments should develop a feedback mechanism to utilize upon implementation, to assess the impact of OGD in order to modify it and update it accordingly.

Risks and limitations of OGD initiatives

1. **Privacy and Confidentiality:[42]** the public worry that private information may somehow be collected and published online, and that in case databases of different agencies where combined, the resulting combination of information might negatively impact them.

2. **National security: [43]** Publishing data should be balanced against the risk of exposing information that might threaten national security. The problem lies in identifying which data falls under this category, taking an extreme approach to protect national security might defeat the purpose of OGD.

3. **Loss of control over the release of information** [44]

4. **Sustainability and continuity:** [45] The time and resources required to carry out this initiative might not always be sustainable, which limits OGD's application.

5. **Data Misunderstanding:** [46] Analysis and interpretation of data requires skills that the majority of the public lacks, thus, leading to the occurrence of manipulation and misunderstanding on the public's end.

6. **Unequal Access / Social Division:** [47, 48] Access to the data requires knowledge and capacity, that citizens do not all have or can afford, this in turn causes a digital divide and further social division, because the citizens that are usually in dire need for the

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[41] U.S Department of Housing and Urban Development (HUD). Challenges to Utilizing Open Government, 2012, <http://portal.hud.gov/hudportal/HUD?src=/open/plan/challenges>

[42] U.S Department of Housing and Urban Development (HUD). Challenges to Utilizing Open Government, 2012, <http://portal.hud.gov/hudportal/HUD?src=/open/plan/challenge>

[43] Alonso, José M. Open Data in Developing Countries, towards local sustainable ecosystems, Open Government Data Camp, Warsaw, 2011.

[44] Alonso, José M. Open Data in Developing Countries, towards local sustainable ecosystems, Open Government Data Camp, Warsaw, 2011.

[45] Learning Initiative on Citizen Participation and Local Governance (LogoLink). "Resources, Citizen Engagements and Democratic Local Governance
(ReCitE), A TOPIC GUIDE, International Workshop on Resources, Citizen Engagements and Democratic Local Governance (ReCitE), Porto Alegre, 2004.

[46] Ibid, Fioretti.

[47] Ibid, Fioretti.

[48] World bank, "How to Note: Toward Open Government Data for Enhanced Social Accountability", The World Bank group, 2012.

data, are poor, marginalized and/or without the right education, so are unable to actually discover it and use it.

Upon identifying the main challenges governments come across when opening up data as well as the risks and limitation, light should be shed on how to evaluate which data to exclude from OGD, while there is no exhaustive list, custom follows mandates the exclusion of any data that could cause damage to national security regardless of its level.

Additionally, data that deals with matters of foreign countries and secured personal records such as health records and social security should also be excluded.

Open Government Data Initiatives and Education

Education is fundamental to development. It contributes strongly to economic growth. It also holds substantial, proven benefits for people—in terms of higher earnings, better health, and greater resilience to shock. [49]

Initiatives started to emerge upon many circumstances on the global level, among those are the following:

1. Open Data Initiative by the World Bank: it highlighted the importance of education status and better utilization of data, freeing up development data for use to stakeholders worldwide. The new website at underlines the importance of data collection and utilization for better tracking trends in global development. Education statistics are prominently featured on the new site and serve as major indicators for two of the eight Millennium Development Goals (#2 universal primary education and #3 gender equality).

2 .The EdStats, World Bank's Education Statistics database, has been around since 1997 and is an important resource for the development community that collects, generates, and synthesizes data from partners such as the UNESCO Institute for Statistics, Education Policy and Data Center, and others. The World Bank EdStats Query holds around 2,500 internationally comparable education indicators for access, progression, completion, literacy, teachers, population, and expenditures. The indicators cover the education cycle from pre-primary to tertiary education. The query also holds learning outcome data from international learning assessments (PISA, TIMSS, etc.), equity data from household surveys, and projection data to 2050. [50]

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[49] World Bank, "Education and the World Bank: Education Year in review", The World Bank group, 2012 <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTEDUCATION/0,,menuPK:282393~pagePK:162100~piPK:159310~theSitePK:282386,00.html>

[50] World Bank, "Education Statistics", the world bank group, 2012. <http://data.worldbank.org/data-catalog/ed-stats>

3. Education Data Jam: As part of this initiative the U.S Department of Education White House and held a workshop called "Education Data Jam" with a diverse set of educational technology experts , to brainstorm how freely available datasets—i.e. open data—might be utilized by entrepreneurs and innovators. The Participants developed a number of ideas about how open data can be put to use, including: College and Career Pathway Planner, which is a personalized career planner based on students' unique interests and performance, the Education Data Initiative has two fundamental goals. First, it seeks to work with data owners inside and outside of government to make education-related data available, machine-readable, and accessible, while ensuring personal privacy is protected. Second, the initiative fosters collaboration with private-sector entrepreneurs and innovators by ensuring that they are aware of existing and new types of data and encouraging them to leverage these data for new products and services that improve student success. The Education Data Initiative also encourages schools to enable students to securely download electronic copies of their own transcript and assessment data to store in their personal learning profiles and use in personalized learning tools. [51]

4. Open Government Partnership: In September 20, 2011, eight governments namely Brazil, Indonesia, Mexico, Norway, Philippines, South Africa, United Kingdom and United States convened to endorse an Open Government Declaration, and announced their country action plans, aimed at securing concrete commitments from governments to promote transparency, empowering citizens, fighting corruption, and harnessing new technologies to strengthen governance.[52]

Participating countries must meet a minimum eligibility criteria that entails fiscal transparency, access to information laws, disclosure related to elected and senior public officials and citizen participation and engagement in policymaking and governance.[53] Upon joining countries must embrace a high-level Open Government Declaration; deliver a country action plan developed with public consultation; and commit to independent reporting on their progress going forward. Since September the count increased to 47 countries and its bound to increase by 12 more next April.[54]

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[51] White House, "Fueling Education Innovation with Open Data", office of technology and science, 2012. < http://www.whitehouse.gov/blog/2012/07/30/fueling-education-innovation-open-data>
[52] Open Government Partnership, "About Open Government Partnership", Tides Foundation, 2012. <http://www.opengovpartnership.org/about>
[53] Open Government Partnership, "Eligibility for Open Government Partnership", Tides Foundation, 2012. <http://www.opengovpartnership.org/eligibility>
[54] Open Government Partnership, "Declaration for Open Government Partnership", Tides Foundation, 2012. <http://www.opengovpartnership.org/open-government-declaration>

Lessons Learned: Hybrid Models

In setting their action plans, governments incorporated education as a core element to work from, where the Danish action plan covers broadly the challenges of the future regarding education, knowledge, innovation among other issues.[55]

The Mexican government's action plan focused on increasing the quality of education by endorsing projects that promote transparency and public integrity. These projects include utilizing public contests to continue and increase the hiring of better qualified teachers and to continue publishing information regarding the performance of education centers that allow assessment of whether students have acquired basic competence.[56] Brazil's action plan included an interactive school development plan that is aimed at helping institutions by strengthening the underlying policy education framework in order to expand and boost the quality of education. This government undertook to make the tool available to all public schools and to publish the individual action plans of the participating interactive school PDE schools to increase transparency and foster public oversight. [57] While the Slovakian government endorsed an amendment to the Act on Universities which sets publishing the theses on the internet as an obligation, to reduce the degree of plagiarism and to promote the use of these works to be put into practice. [58]

Similarly the Kenyan government developed a National Research and Education Network named KENET (Kenya Education Network) which promotes the use of ICT in Teaching, Learning and Research in Higher Education Institutions in Kenya. Where, it will interconnect all the Universities, Tertiary and Research Institutions in the country by setting up a cost effective and sustainable private network with high speed access to the global Internet.[59] As for the Albanian government, its promoting quality of education in numerous ways including the digitalization of the management system of the Public Agency for Higher Education Accreditation (APAAL), which will assist in the evaluation and accreditation procedures of higher education institutions and will also serve to support cooperation and

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[55] Open Government Partnership, "Denmark's Action Plan", Tides Foundation, 2012.
<http://www.opengovpartnership.org/countries/denmark>
[56] Open Government Partnership, "Mexico's Action Plan", Tides Foundation, 2012. <
http://www.opengovpartnership.org/countries/mexico>
[57] Open Government Partnership, "Brazil's Action Plan", Tides Foundation,
2012.<http://www.opengovpartnership.org/countries/brazil>
[58] Open Government Partnership, "Slovakia's Action Plan", Tides Foundation,
2012<http://www.opengovpartnership.org/sites/www.opengovpartnership.org/files/country_action_plans/OGP%20Action%20plan%20Slovakia%20Final_1.pdf>
[59] Open Government Partnership, "Kenya's Action Plan", Tides Foundation, 2012
<http://www.opengovpartnership.org/countries/kenya>

awareness with both stakeholders and the general public.[60]Additionally, the Ministry of Education has adopted and published the regulation: "Ethics in research and publishing", aimed at maintaining the originality and authenticity of work and to fighting plagiarism, through obliging institutions and researchers to publish and authenticate by modern methods on the relevant official website every scientific Master's thesis, PHD dissertation and other forms of research and publication.

Additionally, putting the publications online will enable researchers to be informed about other research group projects, which will spread scientific achievements locally and internationally.[61]

Conclusion

Governments nowadays are in need to Open Government and Open Government Data to fulfill the needs and demands of citizens to know what their government is doing. And By opening up data, citizens are enabled to be much more directly informed and involved in decision-making. It is more than transparency: it is about making a full involvement of society not just about knowing what is happening but being able to contribute and participate. In this case education is a prerequisite and a post-requisite to the success of this initiatives, where citizens should be formerly educated to be able , share, use, and reuse the information through understanding, analyzing and visualizing their own matters.

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[60] Open Government Partnership, "Albania's Action Plan", Tides Foundation, 2012<http://www.opengovpartnership.org/sites/www.opengovpartnership.org/files/country_action_plans/Albani an%20OGP%20Action%20Plan_2.pdf>
[61] Open Government Partnership, "Albania's Action Plan", Tides Foundation, 2012<http://www.opengovpartnership.org/sites/www.opengovpartnership.org/files/country_action_plans/Albani an%20OGP%20Action%20Plan_2.pdf>

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