Google's Open Source and Interests of Internet Users on Searching It

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Abstract – This article starts with a discussion on why open source is important, especially for education. Although open source develops for all kinds of matter, but for education it will deliver long term effect for the society. Open source, has two types, one is offered in cheaper price, and other is offered in free of purchasing price, and we know it as Free and open source software (FOSS). Frankly, FOSS is part of technology and knowledge transfer and development to support Global Goals Part 17. Google, has role in FOSS development, and FOSS is as their spirit. When Google first launched their Open Source initiatives openly through opensource.google.com, it is interesting to see what are products that they offer to the society, and since Google is an internet-based information technology company, then we use Google Trends to see interests of internet users on searching for Google's Open Source. To support this research, we use Google Trends as our research tool, among several information given in Google only information's that related with user's interest that will be continue for discussion. Results shows that recently only two countries that show strong interest in Google's Open Source, they are India and United States. It can also be argued that although Google has been established for more than 10 years as it may be accessible to internet users as society, but Google still need to find ways to promote opensource.google.com to larger numbers of internet users, this resulted when writer tries to compare between Google's Open Source as keyword and Open Source as keyword, where Open Source as keyword have highest interest user in aggregate.

Keywords: Google, Open Source, Interests, Internet, User

Introduction

Technology meant to create more and more better life for society. Educators, as the actor, will need supporting materials as it will be useful to help them enhance their knowledge and able to share updated version of knowledge to society. If before educators accessed knowledge through printed materials, as book, or printed article, nowadays it is more accessible if accessed through digital technology. Digital technology, has changed the world, and it will continue to do so (europeancommission, 2014), educators from all grade levels are coming to realize the benefits of technology in the classroom (Newman, 2017), and with proper technology integrations it will guides students (as education beneficiary) towards greater understanding of all concepts covered that they received from educators (Norman, 2016). One type of digital technology, is what we know as software.

Software, known and as general term for various kinds of programs used to operate computers and related devices (Doig, 2006). And is is a major subsector of information and communication technologies (Unctad, 2014). From purchasing or acquiring method, software has many types, 1) shareware, 2) liteware, 3) freeware, 4) public domain software, 5) open source (Doig, 2006). But frankly, access to new knowledge are not that easy, we still find that knowledge is in bound with materials copyright that limit many of us to access it, that type of software known as proprietary software. For

proprietary software, it offers both advantages and disadvantages, 1) their advantages are able to have advantage for after sale service if any troubleshooting and when starting a setup purposes, have more features, and tailored to meet what are market needs, while on the other hand 2) their disadvantages are it drives user dependency upon software developer, not usually as adaptable with users dynamic needs so that it will get difficulties when it needs to adapt to such changes (Lewis, 2018).

Open source software, seeks way to fill in the gaps that cannot serve by proprietary software, as it is quicker to adapt to any changes or in other words offer flexibility to users, and though probably open source software is not usually free, but it is cheaper that what proprietary software offer (Lewis, 2018). As a pure applied knowledge and encourage a closer look when considering technology transfer issues (Unctad, 2014) then free and open source software (FOSS) is considered as important to support 17th global goals.

Knowledge sharing and cooperation for access to science, technology and innovation is part of goals target part 17 "partnership for the goals". The targets are 1) mobilize resources to improve domestic revenue collection, 2) implement all development assistance commitments, 3) mobilize financial resources for developing countries, 4) assist developing countries in attaining debt sustainability, 5) invest in least developed countries, 6) knowledge sharing and cooperation for access to science technology and innovation, 7) promote sustainable technologies to developing countries, 8) strengthen the science, technology and innovation capacity for least developed countries, 9) enhance sustainable development goals capacity in developing countries, 10) promote a universal trading system under world trade organization, 11) increase the exports of developing countries, 12) remove trade barriers for least developed countries, 13) enhance global macroeconomic stability, 14) enhance policy coherence for sustainable development, 15) respect national leadership to implement policies for the sustainable development goals, 16) enhance the global partnership for sustainable development, 17) encourage effective partnerships, 18) enhance availability of reliable data, 19) further develop measurements of progress.

However, one should be noted that, standard for open source definition according to The Open Source Initiative (OSI) are 1) unrestricted distribution, 2) source code distribution, 3) modification, 4) authors source code integrity, 5) no personal discrimination, 6) no restriction on application, 7) license distribution, 8) license must not be product specific, 9) no restriction on other software, 10) technology neutrality (Lakhan and Jhunjhunwala, 2008). In this article, writer put an effort to explore Open Source Google, as free and open source software, that may support the global goals target 17.6. However, it was stated that the goal is "knowledge sharing and cooperation for access to science, technology and innovation" with education as study object (Organization, 2018). Google, on 2016 was among the top 10 contributors to Linux kernel, and has a team of kernel developers who write code for Google's own needs, runs programs that expose students to open source (Bhartiya, 2016). Therefore, it may be concluded that Google can be considered as open source promoter among many other promoters.

Research Method
Research tool of this research is Google Trends. This tool allows this research to have a clear understanding on popularity of search terms and trends. Google Trends, provides a time series index of the volume of queries users enter into Google in a given geographic area. Google Trends data, is computed using a sampling method and the results therefore vary a few per cent from day to day, and due to privacy considerations, there will be only queries with a meaningful volume are tracked (Choi and Varian, 2012). The advantage of using Google Trends as research tool is free in some degree, by navigating directly to trends.google.com, to see how popular as specific keywords or subjects are searched through this tool. It may be also useful to find idea, that in this matter is Google Open Source, and Google Trends useful for researched to track behaviour (Anastasia, 2015). Steps of this research are as follow: 1) writer seeks for findings through trends.google.com, its availability is public, interface is website, maximum number of sets of terms queried is five, and data structure is scaled to the highest result from 0 to 100 by typing keywords: open source google, within worldwide, for the past 12 months, all categories, and web search (Stocking and Matsa, 2017), 2) comparing between two keywords: 1)

open source google, and 2) open source, to see whether any interest overtime from google search engine visitor that resulted from it, 3) displaying data, 4) analysing data and discussion, 5) conclusions. Google trends display Google's analytic information, but what will be selected and continued for research purposes are as follows (Anastasia, 2015):1) Keyword trends: a graph showing how popular is the keywords, this would beneficial for understanding kind of language used by target audience, 2) Seasonal trends: shows when targeted audience are interested in seasonally, and when the content is topical then the target is more likely to engage.

Discussion

Google, believes that open source is can be useful for everyone. By being open and freely available, it enables and encourages collaboration and the development of technology, solving real world problems. There are four categories within Google Open Source: 1) education, 2) developer – tools, 3) programming, 4) mobile, while on the other hand there are approximately 2000 projects (opensource.google.com, 2018).

Table 1. Google's Open Source Project Related to Education and Science Theme (Source: opensource.google.com, 2018)

| No.	*Open Source Project*	*Products Brief Description*
1.	ArrowLogo	An **implementation** of the logo programming language
2.	Blockly	**Open source library** for adding drag and drop block coding to apps
3.	Blockly games	**Games** for tomorrows programmes
4.	Click-Attention Satisfaction Evaluation Model and Metric	A **collection of components** to collect data and train a user model and a corresponding search engine result page evaluation metric
5.	CodeWorld	Web based **educational computer programming environment** using Haskell
6.	Coding with Chrome	An **educational** IDE showing off various EDU technologies
7.	Course Builder	An **Education platform** for creating and delivering online courses
8.	GenomeWarp	GenomeWarp **translates** genetic variant from one genome assembly version to another
9.	Geodetic Velocities Visualization	A **data visualization** that renders Global Navigations Satellite System (GNSS) position time series data on top of an interactive Google Map
10.	goscope	An **interface** for digital oscilloscopes, most notably Hantek6022BE
11.	JTerm at Smith 2017 Course Materials: CS With Android	Starter code and example **solutions** for JTerm course, CS with Android, in January 2017
12.	Liquid Galaxy	Run panoramic **applications** to create an immersive experience
13.	Lisp Koans	Common Lisp Koans is **a language learning exercise** in the same veins as the ruby koans, python koans
14.	Melange	Old **website** for GSoC and GCI
15.	Open Science Journal	Science Journal **Android Code**
16.	Oppia	A **tool** for collaboratively creating and sharing interactive online lessons
17.	Quantum Computing Playground	**Source code** of quantumplayground.net
18.	RySim	Is a set of **implementations** of a simple SEIR simulation system
19.	Science-jounal-arduino	Science journal Arduino **firmware**
20.	Small Arms and Ammunition Trade Visualization	**Data visualization** of Global Trade of Small Arms and Ammunition

21.	TensorFlow Playgroud	An interactive in **browser visualization** of neural networks
22.	WebGL Globe	Is a **platform** for visualizing latitude longitude-based information using WebGL
23.	Zhi	**Interactive** LaTeX Paper Writing in Google Drive with Zhi

From table 1, there are 23 keywords, and can be classified as three categories, they are: platform, applications, tools. Therefore, these three categories are recent Google's open source project in terms of education and science that has been offered to the society. If relates with Goals 17.6, "knowledge sharing and cooperation for access to science, technology and innovation", it seems that Google's Open Source Project support the goal, wherein UNCTAD (2014) mentioned that FOSS is used for writing text, email, internet browsing, spreadsheets, statistics, and data management, and the like, in which Google's Open Source Project complied with.

Google Apps for Education is one of many products that offered by Google to society. Google Apps for Education established first in 2006, with idea to help educators and students as learner to share and learn together in what Google said as innovative ways. Products then develop over time, like Classroom and Hangouts, tools that Google believe can transcend the meaning of what app means today, tools that are powerful alone but even better when they work together (Rochelle, 2016).
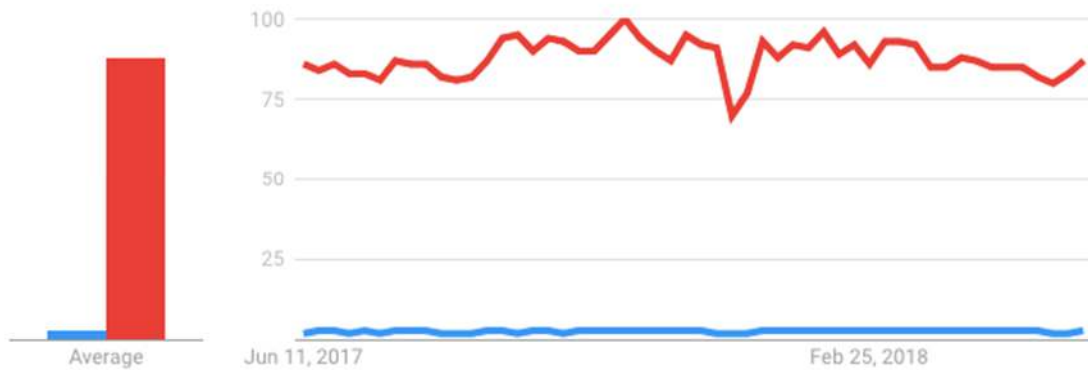
The trends for open source shows interest over time in worldwide basis, below.

Figure 1.
Search Index for "Open Source Google"
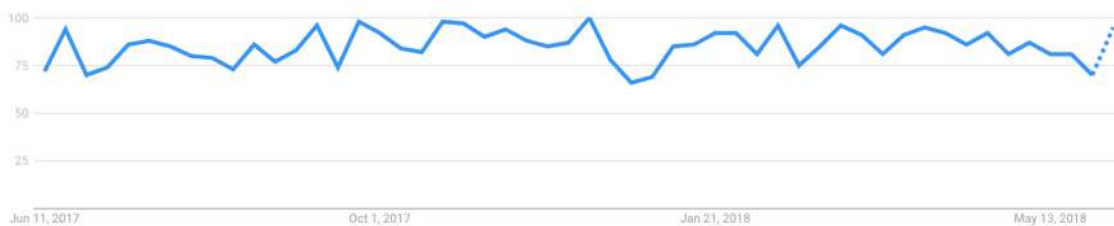
Interest Trends calculated from June 11th 2017 – June, 11th 2018 (source trends.google.co.id, 2018), it represents that the highest point, a value of 100 is the peak popularity and a value of 50 is half as popular, and from the Figure 1, we may know that popularity is almost popular although it is fluctuated within one year. What can be imply from this result is that Google Open Source as keywords needs to get promoted more of the time, since its popularity fluctuated.

Figure 2.
Search Index for Comparison Between "Open Source Google" and "Open Source"

Interest Overtime Trends Comparison Between Open Source Google and Open Source shown above. According to Graph 1 and graph 2, then we could see that although internet searches on open source google as keyword draws quite interesting finding, but, if it is compared to internet searches on open source as keyword then results shows that in average, "Open Source" as a keyword has been the highest search in average compared to "Google's Open Source" as a keyword, therefore what implies from here is that Google Open Source has not yet reach too much attention from internet users. Google compiles and aggregates search data, reflecting the interest in certain keywords or concepts (datawrapper, 2017). Therefore it may be concluded that "Google's Open Source" as keywords still need to promote themselves to larger numbers of audience to get more interest from them. However, one should be noted that Google, did not provide absolute number of searches, but an aggregation (datawrapper, 2017), and number represent search interest relative to the highest point on the chart for the given region and time (googletrends, 2018). Therefore in aggregate, "Open Source" as keyword has almost the peak popularity as it shows movement between 70 – 100 within one year of aggregation, this is if compared to "Google's Open Source" as it has less that 25 as value, then "Open Source" as keyword is more popular than "Google's Open Source".

Figure 3.
Countries Interest on Google's Open Source as Keyword

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Related topics rising in worldwide (Source: trends.google.com, 2:36 pm, 11th June 2018). As Figure 3, we may find which countries interest in certain word of concept is stronger or weaker. And we may see in which countries will it be, as it mentions in Figure 3 eventually there were only two countries that their society has put their interest on Google's Open Source, while later in Figure 5 and Figure 6, it shows that India is the one that has stronger interest in Google's Open Source as keywords and followed by United Stated that also shows interest on it.

Figure 4.
Eagerness of Google's User Data
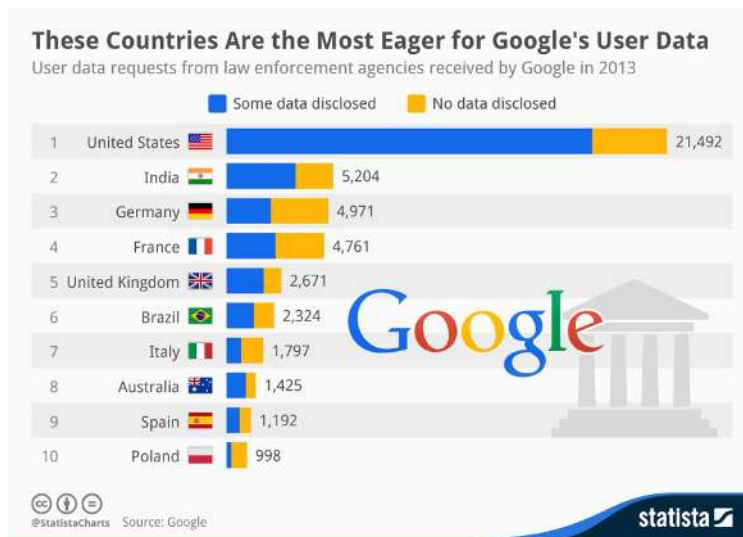
If we use secondary information, United States and India has been the most eager for Google's User Data, according to Statista (Richter, 2014). Then this would make sense if two countries have strong interest on Google rather than other countries.

Figure 4.
India and Stronger Interest

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Moreover, it can be explained by using secondary information, that on 2017 that it was during the aggregation was computed, India has place their statements as follow (Choudharry and Moglen, 2017) : 1) stands to benefit economically from the open worldwide Net, 2) take an American free-market position with respect to the US platform companies is to endorse an immense act of digital colonialism, in which the private lives of more than a billion Indian citizens are delivered "free" to the data miners", 3) Indian internet companies can provide global digital service platforms that protect, rather than destroy, privacy, 4) Indian internet industries can provide reasonably priced reasonably in local terms in all the developed and developing societies. Therefore it is make sense, that India has the strongest interest on Google's Open Source if related with four logic mentioned above, it seems that India is seeking to find ways to get more and more knowledge on Google's Open Source, while on the side they develop for their own purpose as to make the world in a better way.

Figure 5
United States and Interest

While, United States found to be the next country that shows interest on Google's Open Source as keyword. Apparently, Google created their open source as a single destination on 2017, Vaughan-Nichols (2017) wrote that in 2017 alone, Google has open sourced their products, then it stimulates Google to develop one source that can make everyone find almost of all Google open source code, through opensource.google.com. if we go back to the issue highlighted in this research, about FOSS, then FOSS is known and relatable with Google. As Norriss (2017) stated that FOSS has been part of Google technical and organizational foundation since Google's early beginning, then opensource.google.com ties together all of Google initiatives with information on how Google, release and support open source. Therefore, it may be concluded that United States has interest in FOSS that in this case is Google's Open Source.

Global targets according to Target 17.6 is "Knowledge sharing and cooperation for access to science, technology and innovation", that tries to enable regionally and internationally cooperation on and access

to science, technology, and innovation, and in order to enhance knowledge sharing on mutually agreed terms, in particular through a global technology facilitation mechanism (globalgoals, 2018). If we relate Global Targets to Google's Open Source as initiatives establish and initiate by Google, by finding fact on how interest is internet users on using FOSS that invented in Google's Open Source Project, then we may know that there were two countries that put their interest on the project, this would be the sign of urgency on promoting the project to wider countries, especially those countries that in need for FOSS, the developing countries.

There are things that can be gained by developing countries through FOSS, especially in education field. It may make difference not just from the economic perspectives, since FOSS is actually cost savings from spending for purchasing a software, and also, usually FOSS may offer universal access, like in this case Google's Open Source, it actually developed in a universal manner. Although it may rise cynicism like in law context, however even Google itself has claimed that they guarantee legal security and it was declared throughout their products (not just Google's Open Source).

Conclusion

This article seeks to explore Open Source Google, as free and open source software, that may support the global goals target 17. Writer use Google Trends as primary data, and other data that can be accessed openly to support discussion. Findings from Google Trends shows interests from internet user on searching Google's Open Source as keywords. Interests somehow will be a positive signal of curiosity, and from there, if supported, it will motivate internet users from just relieving their thirst of curiosity to actions. If this relates with education, and FOSS as subject, then if Google Open Source able to support education through accessible open source product then society as real target users will achieve enormous benefit.

References

Anastasia. (2015). How to Use Google Trends. Retrieved June 11, 2018, from https://www.cleverism.com/how-use-google-trends/

Bernard, Z. (2017). Here's how technology is shaping the future of education. Retrieved June 11, 2018, from https://www.businessinsider.sg/how-technology-is-shaping-the-future-of-education-2017-12/?r=US&IR=T

Bhartiya, S. (2016). How Google Uses and Contributes to Open Source. Retrieved June 11, 2016, from https://www.linux.com/news/how-google-uses-and-contributes-open-source

Choi, Hyunyoung; Varian, H. (2012). Predicting the Present with Google Trends. *The Economic Record*, *88*, 2–9. https://doi.org/doi.org/10.1111/j.1475-4932.2012.00809.x

Choudhary, Mishi; Moglen, E. (2017). How Indian IT Can Compete With Google and Facebook and Show the World a Better Way. *Indian Times*. Retrieved from https://economictimes.indiatimes.com/tech/software/how-indian-it-can-compete-with-google-and-facebook-and-show-the-world-a-better-way/articleshow/58889621.cms

Commission, E. (2014). *Modernisation of Higher Education: Report to The European Commission in New Modes of Learning and Teaching in Higher Education*. Luxembourg. https://doi.org/10.2766/81897

Doig, M. (2006). Software. Retrieved June 11, 2018, from https://searchmicroservices.techtarget.com/definition/software

Lakhan, Shaheen; Jhunjhunwala, K. (2008). Open Source Software in Education. Retrieved June 11, 2018, from https://er.educause.edu/articles/2008/5/open-source-software-in-education

Lewis, J. (2018). Advantages & Disadvantages of a Proprietary System vs. an Open Platform. Retrieved June 11, 2018, from http://smallbusiness.chron.com/advantages-three-disadvantages-proprietary-system-vs-open-platform-38010.html

Newman, D. (2017). Top 6 Digital Transformation Trends In Education. *Forbes*. Retrieved from https://www.forbes.com/sites/danielnewman/2017/07/18/top-6-digital-transformation-trends-in-education/#51850aaa2a9a

Norman, S. (2016). 7 Benefits Of Technology Integration In The Education Sphere. Retrieved June 11, 2018, from https://elearningindustry.com/benefits-technology-integration-education-sphere

Norris, W. (2017). A New Home for Google Open Source. Retrieved June 12, 2018, from https://opensource.googleblog.com/2017/03/a-new-home-for-google-open-source.html

Organization, G. G. (2018). Partnership for The Goals. Retrieved June 11, 2018, from https://www.globalgoals.org/17-partnerships-for-the-goals

Richter, F. (2014). *These Countries Are the Most Eager for Google's User Data*. Retrieved from https://www.statista.com/chart/2120/google-user-data-requests/

Rochelle, J. (2016). Introducing G Suite for Education. Retrieved June 11, 2018, from https://blog.google/topics/education/introducing-g-suite-education/

Stocking, Galen, Matsa, K. E. (2017). Using Google Trends Data for Research? Here are 6 Questions to Ask. Retrieved June 11, 2018, from https://medium.com/@pewresearch/using-google-trends-data-for-research-here-are-6-questions-to-ask-a7097f5fb526

Unctad. (2014). *Transfer of Technology and Knowledge Sharing for Development: Science, Technology and Innovation Issues for Developing Countries*. Geneva. Retrieved from http://unctad.org/en/PublicationsLibrary/dtlstict2013d8_en.pdf

Vaismoradi, Mojtaba; Jones, Jacqueline; Turunen, Hannele; Snelgrove, S. (2016). Theme Development in Qualitative Content Analysis and Thematic Analysis. *Journal of Nursing Education and Practive*, *6*(5), 11. https://doi.org/10.5430/jnep.v6n5p100