

114-GIVE ME THE DATA!!! ON TRANSPARENCY AND OPENNESS OF EDUCATIONAL ASSESSMEN IN THE BIG DATA ERA

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ABSTRACT

The Data Era led to a dramatic status change in all human societies: Almost all professional data is now accessible to almost anyone. The dramatic changes in the relationships between professionals and the public are generating conflicts. Many of them derive from confusion between the terms: DATA, INFORMATION and KNOWLEDGE. One more source of confusion is the public's misconception of professionalism. On the other hand, it is extremely important to acknowledge the public's right to know: the demand for data, information and knowledge is valid and just. This contradiction emerges in many scenes of collision between public and professionals (to name some: M.D's, politicians, teachers...), but it seems that in the field of measurement and assessment, this collision is worsen by the fact that professionals of this school are few, but their actions dramatically effects public life. The good news are that bridging over this gap is possible, by building open and transparent frameworks for testing, measurement and assessment. Participatory Measurement can take measurement up to the next level, and adjust the profession to the 21st century.

KEY WORDS: PARTICIPATIONARY SCORE REPORTING, POLICY PLANNING, BIG DATA, OPEN DATA, TRANSPARENCY, PARTICIPATORY MEASUREMENT, CHANGE

The Data Era

The 20th century brought humanity to a tipping point: the development in computation abilities made access to information so low-cost in resources, that almost anyone can now gain access to almost every sort of information. Does this means that anyone can KNOW everything?

Status Change: Professional Data is Accessible to Anyone

Until tipping over, professionals the central component of the profession, better access to knowledge differentiated professionals from others. Thus, all professional information was held within professional closed circles. Technological progress made it easy to share thoughts and ideas, so information began leaking outside, to the point where no information can be held within closed groups anymore. Because of this, many professions that once enjoyed high levels of prestige, lost somewhat (or much) of it. This starts with educators, and ends with M.D's and lawyers. Nevertheless, this

do not mean that these professions are obsolete and should perish. They do, however, need to adjust and become *Skill* oriented. It is no longer the control in access to information that makes one a professional, but one's accumulating experience in actually performing the task. This experience creates a professional approach to problem solving in the skilled area of problem solving and decision-making. This shifts the focus of the profession's core definition, and has many projections on the professionals' role in society, and the way they should interact with the public.

DATA, INFORMATION or KNOWLEDGE?

One important change in the relationship between professionals and the public, is the public's demand to be included in the decision making process. Nowadays, when one comes to the doctor's office, he or she expects to take an active part in the diagnosis process and to be consulted with in the prescription administering process. This expectation derives conflicts, especially when the professional language barrier kicks in: The professional community has an inner language, designed to communicate very complicate situations and specific situations. This language acquisition is a part of the proficiency acquisition, but along with the ability to diagnose, foresee and understand delicate subtleties and react to them correctly, the ability to relate and communicate gross and general situations becomes a demanding task. Sometimes, the expert feels that it is impossible to explain the professional considerations without using the professional language, which unfolds so much information within a relatively small system of terms and concepts. When the public's demand for participation encounters the professional language, an inevitable collision occurs. The nonprofessional feels disrespected and overlooked, and loses trust in the professional and the system he or she is operating in. When this frustration builds up through repetitive experience of misunderstanding, and confusion, the public gets agitated. Then, the smallest mishap leads to rage and public load protest. This kind of protest is actually a symptom of TRUST flaw in the relationship between the public and the professional system. This distrust, as suggested here, is a consequence of communication failure. If the professional's problem in this conflict derives from a language barrier, the public's problem derives from the confusion between these three utterly different concepts: Data, Information and Knowledge.

1. DATA is a series of measurements of a parameter. It is made by someone to serve a very specific purpose. It is just one possible way to view and make sense of some phenomena that is happening in reality that is too diverse to capture in one sample. DATA, therefore, always represents SOME aspect of reality, and whoever uses it, has to understand its limits.
2. KNOWLEDGE is the vast understanding of something in the world, with all complexities and different aspects of perception, experience and skill. Only experts can claim to have good level of KNOWLEDGE of something in the world. We all have good level of KNOWLEDGE about human faces, and how

they should look like, but only a few of us have good level of KNOWLEDGE about black holes and the way they behave.

3. INFORMATION is none of these. INFORMATION is a message conveyed from one place in the world to the other. It is something that one person, or one group KNOWS about the world, and informs others with it by delivering it in a certain place and time.

Most of the times, when public demands transparency, they actually want to be INFORMED. Sometimes, when public asks for specific data, this means they want to be better educated about the subject, and therefore, they seek for KNOWLEDGE. When someone outside of the system asks for a specific set of DATA, it usually means that they have some level of expertise, and all they need is a good professional explanation of the method, tools and instruments that were used to obtain it.

It is the professional's responsibility to differentiate the three, and present the products of the professional work in various methods and by its traits, so the different public needs for data, information and knowledge can be met.

Public Misconception of Professionalism

Since data and Knowledge (but not information) of any field is available to anyone with a keyboard and a screen, people often mistake availability of access, with professional understanding. This happens in any field of expertise, and the best example for this is the profession of Medicine: data and information about almost every function and malfunction of human body is available online. Every second patient comes to the doctor's office with a self-produced diagnosis. Now, not only that the doctor has to deal with the professional process of diagnosis, but also with the misconceptions, the patient has because of lack of **skill** in the practice of medicine, and needed information that comes in time to the M.Ds professional group, but not to others (i.e. via professional journals, websites, healthcare authorities and so on).

If we reflect this on the profession of measurement, we can see that it is the same problem: we measure everything, all the time. Psychologists and educators understand that every aspect of human behavior relates to others in some way. Big data analysis is the new method technology has created for studying human behavior, and makes huge progress in any field of life with it. This accessibility to information, data creates, especially within the technological community, the wrong impression that everything can be inferred from a data set that is big enough. Big Data methods are usually based on finding correlations between different factors in the database, and clustering them, in many shapes and forms (i.e. factor analysis). These correlations are wonderful, but they may lead technical people to wrong conclusions, when they allow themselves making them without professional guidance in the field of investigation (like the notorious Israeli School's Efficiency and Growth Index reports publication incident, which has led, for the time being, to the suspension of the

examination throughout the whole system. See references for more information). In this end of the conflict, the technological Hubris is the main obstacle.

What we all need to realize is, that the vast and immediate access to data and information did not made a profound change in the way people gain KNOELEDGE, and that professionals will always have better understanding of the subject in matter than someone who has no actual firsthand experience with it. M.D's will always be better in diagnosis then patients, and professional measurement people will always have better understanding of the measurement applications and limits and boundaries then the general public.

This, of course, does not mean that professional understanding of the measurement can only be gained within the inner circle of psychometrician, or that patients shouldn't learn and educate themselves about their illnesses, or seek for a cure by themselves. Actually, the whole of society benefits when both parties combine their efforts to solve the problem. After all, solving the problem is the joint interest of both parties. This, in turn, leads us to the next argument:

The Public Has the Right to Know: The Public Demand Represents a Valid and Just Need for Data, Information and knowledge

The public has a strong case: In a democracy, everyone has to have the same opportunity to gain access to the society's resources. We all agree that knowledge is power. So theoretically, in a just society, everyone should have the access to every information and data, so they can gain any desired knowledge. This is, of course, an ideal, but as in ideals, this should be the inspiration for the principle decision making. This is the same principle that had led the Israeli supreme court of justice to order the publication the School's Efficiency and Growth Index reports, and this principle will apply again on every dispute between information and data holding professionals, and the general public, for the same reason. Therefore, professionals should adjust their role in this equation, and develop the means to present professional data and information in a way that will meet the public's needs for data, information and knowledge. Each presented in the right context and offered in the right time, for the right reasons. This approach for opening the professional data, information and knowledge in open communities is called ACCESSIBILITY.

Before anything else, what we need to understand about accessibility is that it is simply an **adjusted** way to get in. The same way we cannot build a staircase for everyone, and expect wheeled chair man to stroll right in, we cannot open up some database, and expect everyone to get to the KNOWLEDGE it represents without professional guidance. The biggest mistake in this kind of conflict is uncontrolled release of data, without having built a framework for understanding it beforehand. It is our obligation and duty to understand the different "costumers" we have for our work, and build the right framework that will allow every type of consumer to get what they need, when they need it.

Minding the Gap: How to Build Open and Transparent Frameworks for Testing, Measurement and Assessment Products

In the opening session of the scientific counsel, prof. Ronald Hambleton spoke about his novel approach to score reporting. Hambleton illustrated how many times we harvest the data, and only then, we begin thinking on who should consume it. It should be the other way around, he said: We should set the data operation with a well-defined propose, that is known and understood not only by the professionals themselves, but by decision makers, who pay for the operation, the public – who is the subject of the operation, and the stakeholder of the operation. Therefore, we can set the first principle of Open and Transparent Assessment:

Take Variety under consideration

the measurement process has three very different target audiences: stakeholders, decision-makers, and colleagues. Any act of measurement should take under consideration the interests and needs of each them

Once we pay attention to all consumer types, we will inherently become **Transparent** and give everyone who is involved in the act of measurement the information they need, at the time they need it. Technology comes here to our assistance in various methods of interaction with the consumers, and allows as building a unique, adjusted (and therefore – accessible) place for each type of consumer. Namely, we can build a different user experience (UX/UI) for each consumer type, so every audience can easily access the data or information that is needed in a specific time. Here are some gross guidelines for data and information release for these three audiences are:

Colleagues: By the inner circle definition of formal professional reports - usually includes a full description of research and development process, for replication and peer-review purposes.

Decision Makers: Brief and exhaustive summary of the results. Illustrations, color-coding and simple, quick and dirty descriptions are obligatory.

Stakeholders: This group of consumers is made of many sub-groups, such as: Students (the subjects of measurement), Teachers (whom are judged by student performances), Educators (who develop ways to better student's performances), Parents (who want their children to do well). Here each measurement developer should define the relevant stakeholder sub-groups, and decide what sort of information (and very rarely – data) each group will need at each time. R. Beyth-Marom et al (2008), and Goodman D.P. and Hambleton R.K. (2004), suggest that reporting to this group will take prescriptive form, and let the stakeholders know what is the best way for them to use the information given to them to better their performances or gain better level of knowledge.

The second principle: Openness

Be open: it builds trust, saves time, R&D resources. It lets innovation thrive and creates social and commercial value

Openness tends to startle professionals, because they are aware to the dangers of misinterpretation of the data. However, When one understands that both public (the stakeholders) and decision makers are not interested in the raw data, but in INFORMATION, and that that information release lays in the professional's hands, the experts can understand that the consumers of raw data are simply the last audience – the colleagues. In most cases, colleagues will use the data for innovation. Sometimes they will use it in political way (and as discussed, in a democracy, we want this to happen). In both cases, it will not be the original purpose of the measurement, so the burden of proof lies with the external innovative developer and not with the professional who designed the measurement in the first place.

Moreover, if the system is a transparent one, where the stakeholders and decision makers are well informed, TRUST could emerge. If all audiences TRUST the system, any new perspective of the measurement and its products will be examined by itself, with all due critical thinking. No outrage and agitation will emerge. Additionally, one should realize that the data expulsion also means that no one at no time can have complete and full data and information about anything. This means that most people, most of the time, will choose to trust the system rather than handle raw data. It is simply impossible...

The Open Knowledge Foundation (creative commons), show three main reasons for opening data: Transparency, Releasing social and commercial value, Participatory Governance. Adjustment of these principles to the measurement processes will be:

1. **Transparency.** Openness of data increases transparency. Transparency builds TRUST. It also allows sharing and reuse: Understanding what the data represents, requires not only professional analysis, but a good and simple visualization of the results. Visualization should be done by experts. Visualization experts can create different products that present the data in many forms, for different purposes. Open databases allows this to happen spontaneously, by the actual public needs, may they be political, educational or commercial.
2. **Releasing social and commercial value.** In a digital age, data is a key resource for social and commercial activities. Everything from finding your local post office to building a search engine requires access to data. Opening up data stimulates innovative business and services that deliver social and commercial value. In measurement, this means better educational options with lower costs.

3. **Participatory Measurement.** Much of the time, the stakeholders are only able to engage with the measurement processes sporadically. Maybe just in court or by approaching their parliament delegates. By opening up data, stakeholders can be directly informed and even get involved in decision-making process (in a well-defined place and time).

To become OPEN, the measurement framework has to accept the assumption that there may be other uses to its data. These are unpredicted, and will emerge from aggregation and analysis of the current data with various sources of other data, that is generated elsewhere. When a system opens its data, it gains rapid growth in its own knowledge, innovation in application and fast and various feedback from the outside world (bottom-up feedback), which can be channeled back into future development of the measurement instrument, and thus, lower R&D costs.

To be considered open, the measurement system has, for the very least allow free access to machine readable data. This data needs to be as primary as possible, i.e. be as close to the collected data as possible (without violation of privacy, of course: the database should not allow inference of personal data). It should be noted that the Sunlight Foundation (2010), defined nine more principles for opening governmental information, which elaborate the different aspects of Odata (open data). Help and support for policy makers, who wish to enjoy the benefits of open data is offered.

Taking Measurement Up to the Next Level: Participatory Measurement

When openly interacting with the public, it is important to invest careful thought in setting the goals of the operation and in constructing a well-defined process to get there. In measurement, this means that after getting to a good definition of the purpose that the measurement should serve, one should point out the exact places in the development process, in which public feedback will catalyze the build of the validity complex. This may form as using focus groups, building think tanks, or arising public debate on the subject through different media (social or conventional).

Well-constructed dialog with the masses will produce higher validity for the theoretical construct as a whole, will allow the emergence of exceptional insights, shed light on difficult decisions, and increase face validity.

Some examples for gross and basic participatory assessment processes:

This paper's author has established a volunteer organization aiming to build a public participatory evaluation system for technological means to prevent child forgotten in car accidents. This system is being built by volunteers who has never met each other face to face, and for now - with no monetary investment.

An example of intuitive assessment of political actions and parliament members' performances assessment instrument is the parliament members' map. Adam Kariv (2012), from the "Open Knesset" project (of the Israeli Public Knowledge Workshop), developed this instrument. The map (see figure 1 below) shows all legislative motions done by the 18th Knesset, by parliament member, so all legislative collaborations between parliament members are visualized, revealing surprising relationships between different parties in the Israeli parliament. The on-site map shows all

parliament members by name (represented by a dot on the map), party by color, and legislative collaboration as a line drawn between two dots (parliament members). The user can increase and decrease the number of joint legislative motions needed to form a connection between two members to see different levels of collaborations between parties and specific members. This visualization is a small scale and very simple demonstration of the endless creative ways technology can offer for professionals to communicate data and information to the public. One can only imagine what can burst out of the combination between professional assessment knowledge and guidance with the energy and enthusiasm of open code volunteers in educational assessment.

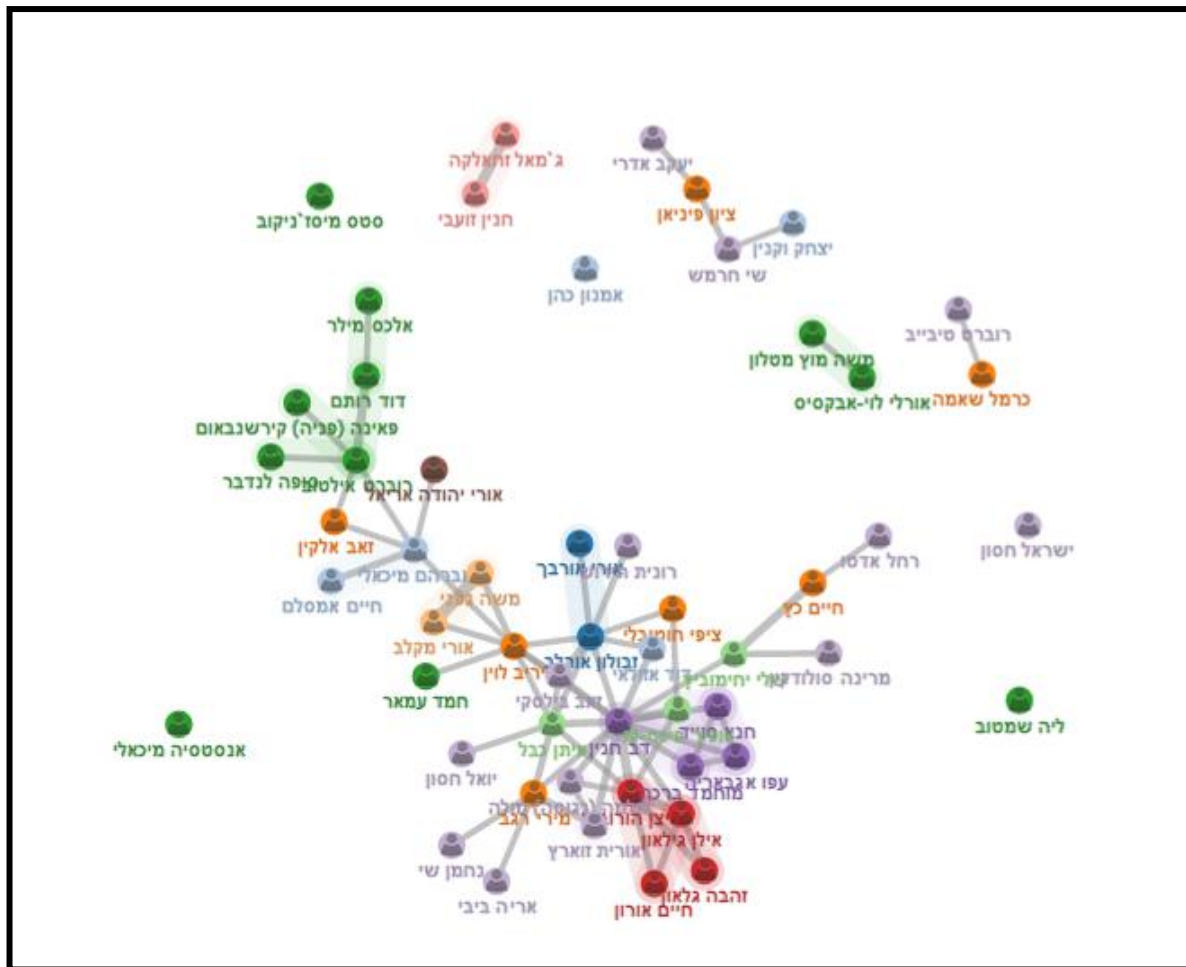


figure 1: the parliament member map

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