The Future of Scholarly Knowledge
For Discussion – RU "Science & Diplomacy"

Kenneth Prewitt
Director, Future of Scholarly Knowledge (Columbia U.)

Twentieth century principles, practices, and institutional arrangements for scholarly knowledge production (traceable to von Humboldt & the U. of Berlin, 1804) are under pressure from 21st century conditions. More specifically, the 20th century "usefulness of useless knowledge" narrative (Flexner's clever update of von Humboldt) is being pushed aside in today's relentless demand for measurable impact and along with it commercial application in the "knowledge economy."

There is push-back to being pushed aside. The push-back plays out differently across the three disciplinary clusters: natural sciences, social sciences, humanities (see below). It is also plays out differently even across the universities claiming direct descent from von Humboldt – those of western Europe, North America, Australia and Japan. Even greater variation occurs where von Humboldt's principles meet the very different cultures of Asia, Latin America, and Africa. Academic freedom and academic self-governance were two of his key principles (the third is linking teaching to research), neither of which, for example, much characterizes China at present, the fastest growing university system in history.

In these notes, I stick fairly closely to European/North American universities (for consideration of Africa, see companion note on Inflection Point); and, I primarily focus on the research task with only glancing reference to teaching and curriculum -- not because the latter is less important but because I focus on knowledge creation more than knowledge transmission. *

The push-back is obvious if we contrast the familiar terminology launched by von Humboldt, basically renewed by Newman a half-century later (*The Idea of a University*, 1854), with his insistence that knowledge is an end in itself, requiring no utilitarian pay-off to justify

itself -- the university as ivory tower; knowledge for knowledge's sake (and in the same period, art for art's sake) was still dominant as WWII ended, despite the very utilitarian purposes of war effort science. A commissioned history of the National Science Foundation (1950's) is sub-titled, *Patron of Pure Science*.

If written today, the sub-title would surely be: *Patron for Economic Growth & National Security.* In fact, in his *Science the Endless Frontier,* you will find Vannevar Bush arguing that the "free play of free intellects" is the surest and quickest route to "national defense, economic growth, and social welfare." This was Flexner's point in his justly celebrated 1939 essay titled *The Usefulness of Useless Science*, in which he writes "throughout the whole history of science most of the really great discoveries which had ultimately proved to be beneficial to mankind…were driven not by the desire to be useful but merely the desire to satisfy … curiosity." Put differently by Wolfgang Rohe, "when science funders are especially demanding, it is possible to sooth them with the utility narrative." But if pressure is excessive, science defends itself "by recalling the curiosity narrative." Rohe's insight on Flexner's insight is that science policy chiefs controlled both the curiosity and the utilitarian narrative.

This carried us through the 20th century; but, note many, it is doubtful that it is robust to 21st century conditions. Why else would we need new terminology: mission-oriented research, strategic research, use-inspired basic research, translational science, evidence-based-policy, etc., all in my view efforts to adjust science policy and practice to 21st century realities. This is not just a word game; these various terms are often attached to institutional developments -- technology transfer, policy schools, re-written university mission statements promising social benefit, Grand Challenges, stakeholder science, public engagement, the science of science communication, the return of the civic university, university & business partnerships, and, always, more interdisciplinary research (now being updated with the term "convergence" as a proper science goal).

Within these changing terms, labels, and institutional forms, what argument protects and promotes the core purpose of research universities, especially their collective responsibility to navigate the

(porous and complex) boundaries between curiosity and utility or, as more often presented, between autonomy and accountability. Here, by way of illustration, are a few issues, selected from a very long list.

Differences Across the Three Disciplinary Clusters

The usefulness of useless knowledge was primarily designed for the natural & biological sciences, and it works for them. Deep insight into their subject matter has time and again proven the truth of Flexner's insight: curiosity has utilitarian pay-offs. Recall Faraday's oft-cited reply to Gladstone's inquiry about the social benefit it of experiments with electricity – "One day, Sir, you may tax it." Today, on research university campuses, the distance between the biochemistry lab and medical treatment is maybe the building across the street, as it is for data analytics and the engineering school.

The narrative doesn't work nearly so well for the social sciences. They were founded to solve late 19th century social problems: the social pathologies of rapid industrialization, boom-bust economic cycles, unplanned & unsafe cities. The social sciences were always two joined projects; the science project (study stuff) so that nation-building (fix stuff) would benefit. The tool was "better policy," but if the attribution challenge is difficult in the natural sciences, it is orders of magnitude more so in the policy/political sphere. The gravitation of social sciences to positivism wasn't an answer, and now we find "mixed methods" the route to tenure. Policy schools, now numbering in the hundreds, are less than a half-century old, but spreading rapidly across the world.

If the usefulness of useless knowledge poorly matches to the social and behavioral sciences, it is more or less useless, and maybe destructive, when deployed on behalf of the humanities. The humanities are not justified by promising an improved product or workable policy, and are not a guarantee of national well-being or economic growth. Humanities interpret a world that has no inward order of its own, that without history, literature, and art would be experienced as alien, chaotic, random. To characterize humanistic understanding as the usefulness of useless knowledge, let alone as some utilitarian project (bringing tourist dollars to our national history museums) is a non-starter.

What is the future of the usefulness of useless knowledge as a narrative to justify public funding, as an insistence that leaving us alone (autonomy) is a good bet? If it doesn't work for the social sciences and the humanities, what does?

The Metric Problem

Metrics, a source of endless complaint but also put to use in both trivial and more substantial ways by our research universities. A trivial example is the university ranking systems, with which research universities not only cooperate, but at times aggressively deploy in their fund-raising campaigns, maybe even promising institutional changes to improve their ranking, and, sadly, embarrass themselves by gaming the numbers.

More consequential is the turn to bibliometrics as basis for claiming a positive return on investment in basic science. Many funders expect and even clamor for this magic bullet, but magic is not in the scientific arsenal. What do we risk by inviting data science to the party of evaluating science? Are algorithms replacing scholarly judgement – tenure cases based on citation counts?

Public and philanthropic funders increasingly impose performance metrics. This is understandable. For more than two centuries, modern science has steadily pushed its way into society – generating research findings relevant to just about everything: how to stay healthy – find a terrorist – explore outer space – defend the homeland – build a just society – reform a school – improve productivity -- raise a child.

If research universities are steadily pushing their way deeper and deeper into the polity, the economy and the society, it should be no surprise that polity, economy and society are pushing their respective agendas and interests back into the sphere of knowledge production. The emerging accountability regime is arriving because wissenschaft matters, and society wants a say in what it does.

Daniel Innerarity (*The Democracy of Knowledge)* writes: "Social changes are not going to be produced through the initiative of a science to which society responds passively or by a social mandate directed at a

Rosalind Morris 7/23/2017 11:01 PM
Deleted:

science that is assigned specific tasks. Science has forced its way into society and society into science." The emerging metric-based accountability regime is arriving because knowledge matters, and what matters is not going to be left alone. The public for whom scholarly knowledge is said to be good has reason to want its priorities and interests taken into account. It is this that gives us the terminology noted above: stakeholder science, public engagement, Grand Challenges, etc.

Kenneth Prewitt 7/24/2017 8:08 AM
Deleted: ,
Kenneth Prewitt 7/24/2017 8:08 AM
Deleted: ,

Now our task gets difficult. As the public makes its claim, we want to insist that scholars can best judge what constitutes reliable knowledge, and who is most likely to produce it. Scholars are our best bet for knowing which methods are suitable to which research questions, for recognizing the break-through finding, for putting this finding together with others to advance general theory, and for deciding who among them is smarter, more imaginative or determined. Scholars are not perfect at these tasks, but the view that those lacking scholarly expertise could do it better is wrong.

This bedrock fact must be linked to another bedrock fact. *Only* those in the spheres of commerce, government, and civil society have the experience to judge how and when scientific evidence can be used to make a better commercial product or government policy or social practice.

This leads to the idea of negotiated accountability between science and society. That this will involve some role – perhaps a major role – for performance metrics is inescapable. The goal is to negotiate these measures. If imposed from outside science, it will be a less strong system, perhaps a badly flawed one as we saw in the U.S. education sector and the perverse incentives of "teaching to the test." But if negotiated, it has a chance of do what society wants to achieve, without fouling the scientific waters.

The metrics should meet three criteria. First, as we endlessly emphasize, research methods internal to science are designed to avoid self-deception -- to detect and correct for bias, fraud, error, or, more generally, weaknesses, flaws, and failures. The authority of science derives from its methods, transparently and fully described in order to

allow replication, and from the coherence and scope of its theories, again fully and carefully specified. Metrics used to assess the contributions of science in sectors beyond science must be equally intent on avoiding self-deception, especially in exaggerating the social benefits of scientific findings. If in the practice of science itself we find evidence of a human weakness to exaggerate the importance of a given finding, that tendency is multiplied many times over when it appears in claims of contribution to society.

Second, the metrics will be forthcoming in explaining what can be measured reasonably reliably. That is: What do we know? What is poorly understood, but with additional work can offer reasonable estimates? What is beyond our current measurement capacity, its social importance notwithstanding? The rate and causes of school dropout are in the first grouping – we can do it right. Value-added in the classroom is in the second grouping – it is inadequately measured at present, but not out of reach. But consider this assertion: invest in education in order to produce good citizens for the nation's future. That is an aspirational statement, not a conclusion of research. It doesn't belong in any serious metric system at present. The point is obvious. Metrics by which to assess the extent to which government funded science contributes to society cannot game the system. Negotiated metrics are possible only if each side believes the other to be playing fair.

Finally, as suggested above, the new, negotiated accountability and the type of metrics needed will differ across the disciplinary spheres – natural sciences, biological sciences, engineering, social & behavioral sciences and the humanities. The differences across these spheres are compounded because social benefits are expected in three spheres: in policies, in products, and in practices.

Science talks to the government in the arena of policies and regulations, to the commercial sector in the arena of products, and to society more generally in the arena of practices: whether the professional practices of teaching, lawyering, managing, entertaining, designing, constructing, policing; or, at the level of individuals their families and communities -- when they parent, take their pills, cast a ballot, and buy products.

If it is within our capacity to make contributions to policies, products, and practices, is it within our capacity to join with our stakeholders in designing an accountability regime?

Use of Scholarly Knowledge in Social Policy: A Social Science Failure

Above I mentioned the emergence of a new specialty -- the science of science communication. It is unfortunate that there is no parallel "science of the use of science," that is, systematic study of the conditions that facilitate the use of scholarly research findings in the policy process.

The question is not whether knowledge is unused or misused; it is why we know so little about the when and how of use, a very different question. We know so little because what is obviously a social process has *not* been systematically studied by disciplines equipped to do so. Understanding use is not a task for biochemists or art historians. It is a task for political science, behavioral economics, cultural anthropology, sociology, and history. The failure to understand use is their failure, the result of academic arrogance. "We have learned a lot; it's relevant; it should be used; you can look it up in our peer-reviewed articles."

A recent National Academies of Science consensus report was very deliberately titled: *Using Science as Evidence in Public Policy*. This title is presented as an alternative to evidence-based-policy, characterized in the report as important but limited. Using science as evidence casts a broader net. I draw on this report, starting with its focus on political argumentation.

Policy making emerges from an interactive, social process that assembles, interprets, and *politically* (at least in democracies) argues over science and whether it is relevant to the policy choice at hand and, if so, using that science as evidence supporting political arguments. Argument as a form of situated, practical reasoning directly leads to a concern with how evidence, in the specific way now defined, is used rather than how it is produced.

This framework includes attention to social science findings relevant to policy choices, but is much broader. Very many issues that figure in

public policy involve substantive content based on research of the engineer, literary critic, biochemist or ethicist – safe transport, effective teaching, health, and, trade-offs. The extent to which knowledge on those matters is used in policy making, however, is a social phenomenon. Use occurs, or not, in groups making decisions about what to pay attention to. To understand what is paid attention to is to investigate "what makes for reliable, valid, and compelling policy arguments from the perspective of policy makers and those they need to persuade."

The lack of that investigation is a handicap, that is, our (social science) failure to understand use weakens our claim on public funding. We strengthen that claim if we first understand how knowledge is embedded in political arguments, and then take the next step of providing knowledge in such a way that it informs those arguments. For example, the statement that a particular consequence follows from a particular intervention embeds multiple premises. Surfacing these premises tells us why this rather than that decision prevails. Arguments often cite probabilities, and use flawed statistical reasoning. Only by taking this into account, and compensating for it, can we improve the correct use of research findings in the policy process. And so forth.

There are many such examples; they have rarely been assembled in coherent, systematic explanations of using science as evidence in public policy. "What Works?" is a phrase often encountered in evidence-based-policy discourse (basically evaluation research). The more ambitious application would ask what works where policy arguments take place, especially to explain when and how research results are influential. This involves treating "using science" as a self-conscious dependent variable rather than, as now, an incidental finding in studies targeted elsewhere -- on coalition building or the politics of budgetary choices. Also, oddly but disturbingly, the use of sciences as described here seldom appears in the curricular offerings of public policy schools, where we might most expect it.

Where do we start and how do we make headway on a science of the use of science?

Self-Inflicted Wounds

Here the issue is whether there is need for and/or merit to a focused conversation about practices or flaws that expose our research universities to criticism. Everyone's list differs, and I focus only on the U.S. research universities. This is a sampling of what might fall under the self-inflicted wounds label: excessive bureaucratization, conflicts of interest, actual fraud, the controversial "safe spaces" for ethnic or gender groups, low replicability in some disciplines, research fueled social advocacy, failure to align graduate programs to career opportunities; internal inequalities (a tenured elite, leaving heavy teaching duties to poorly paid adjunct faculty), less than robust defense of academic freedom, gaming the ranking systems (which should be treated and punished as malpractice).

There are the particulars of each of these topics, and whether there has been failure to rigorously self-police regarding fraud and conflicts-of-interest, for example. There is also, and quite different in kind, the risk-to-reputation when the media misrepresents and exaggerates even though the actual problems are limited and in some cases – replication, for example – is discovered and being corrected by standard scientific practice. Finally, there are legitimate differences of viewpoint about, for example, safe spaces or what academic freedom means or when defending science becomes inappropriate advocacy– and public airing of these differences is what universities should do.

It is worth asking – what is the scope and what are the consequences of self-inflicted wounds? What correctives are called for?

……..

*There is a further relevant factor I ignore: the ecosystem of research universities – professional associations, academic publishing, libraries, museums, think-tanks, independent research organizations, government labs, the internet, commercial sources of data, contract houses. Pieces of this ecosystem are more or less under the direct control of universities (academic publishing), other pieces based on active research partnerships (IPCC, Max Planck), yet others in competition (consulting firms), and then the yet to be worked out

interaction with the commercial purveyors of knowledge (the Googles of the knowledge economy).

Dec 6, 2017