

The Usefulness of Useless Knowledge

ABRAHAM FLEXNER

With a companion essay by
ROBBERT DIJKGRAAF

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A short, provocative book about why "useless" science often leads to humanity's greatest technological breakthroughs

A forty-year tightening of funding for scientific research has meant that resources are increasingly directed toward applied or practical outcomes, with the intent of creating products of immediate value. In such a scenario, it makes sense to focus on the most identifiable and urgent problems, right? Actually, it doesn't. In his classic essay "The Usefulness of Useless Knowledge," Abraham Flexner, the founding director of the Institute for Advanced Study in Princeton and the man who helped bring Albert Einstein to the United States, describes a great paradox of scientific research. The search for answers to deep questions, motivated solely by curiosity and without concern for applications, often leads not only to the greatest scientific discoveries but also to the most revolutionary technological breakthroughs. In short, no quantum mechanics, no computer chips.

This brief book includes Flexner's timeless 1939 essay alongside a new companion essay by Robbert Dijkgraaf, the Institute's current director, in which he shows that Flexner's defense of the value of "the unobstructed pursuit of useless knowledge" may be even more relevant today than it was in the early twentieth century. Dijkgraaf describes how basic research has led to major transformations in the past century and explains why it is an essential precondition of innovation and the first step in social and cultural change. He makes the case that society can achieve deeper understanding and practical progress today and tomorrow only by truly valuing and substantially funding the curiosity-driven "pursuit of useless knowledge" in both the sciences and the humanities.

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Muhsin Dogan says

Flexner Amerikan eitim sistemine ve genel olarak bilime katkilar? çok büyük olan birisi. Princeton'da kurdu?u ?leri Ara?t?rmalar Enstitüsünde sadece "merak" ve "istek" ile bir sürü ünlü bilim insan?n? toplay?p bilime katk?larda bulundu. Bu küçük kitab?nda da bu dertlerini nas?l bir motivasyonla yapt???n? özetlemekte. Kitab?n kendisi küçük ama içindeki fikirler epey büyük ve etkileyici.

Faydas?z diye ifade etti?i bilgi türü sayesinde modern dünyada uçaklar?m?z ve bir sürü teknolojik yenili?imiz var.

Flexner bir çok politikac? ve bilim insan?n?n görmezden geldi?i bir noktaya dikkat çekiyor: zihinlere gerçek anlamda bir s?n?r konmazsa o zaman bir ilerleme mümkün olur!

Bilal Y. says

Ki?isel fayda yerine merak duygusuyla, bilimsel hızla ve ö?renme iste?iyle elde edilen bilginin daha do?ru sonuçlar verdi?ini anlatan, bana da yanl?? yolda oldu?umu hat?rlatan bir kitap oldu.

Marconi örne?i çarp?c? bir örnekti. Radyonun mucidi olarak bilinen Marconi haz?ra konanlardanm??. Ama bu yolda yap?lm?? zor hesaplama ve deneylerden ba?ar?yla ç?km?? bilim insanlar? Maxwell ve Hertz imi?. Bu iki ?ahsiyet merak duygusu ve bilimsel hızla gerçekle?tiriyorlarm?? yapt?klar?n?. Ne var ki, onlar?n yapt?klar? üzerinden ki?isel ç?kar sa?layan Marconi imi?.

Anlat?lmak isteneni ya da kar?? ç?k?lan noktay?, biraz da, okuma al??kanl??n?n zevkle de?il de fayda sa?layacak umuduyla yap?lmış? gerekti?ine olan inanca benzetebiliriz..

Claire says

Both essays are a quick read (done in a day). Both are inspiring and focused on the reminder that the core inventions of the modern era came about not from direct and continuous focus on achieving set and measurable academic goals, but instead through focusing on building knowledge for the sake of knowing. The application of knowledge comes after the tomfoolery. This is especially important as in the US today we devalue the humanities and arts, or discourage those who aimlessly pursue their interests, because they lack immediate quantifiable applications of their knowledge. Written in the 1930's I can think of no better way than for world-renowned geniuses (Flexner and Dijkgraaf), to remind our society that HUMANITIES MATTER and even DILY-DALLYING MATTERS. "The whole calculus of probability was discovered by mathematicians whose real interest was the rationalization of gambling. It has failed of the practical purpose at which they aimed, but it has furnished a scientific basis for all types of insurance, and vast stretches of nineteenth century physics are based upon it." (Flexner, p63). If we're going to live and learn, let's relieve the pressure of immediate application and try to tap into the love of learning for the sake of knowledge itself.

Peter says

Flexner's essay argues the centrality of curiosity to human invention, and Dijkgraaf's essay is an echo.

A paean to freeing the human spirit by offering unfettered opportunity to pursue passions and interests, Abraham Flexner's 1939 essay makes the case for self-directed learning that we are hearing choruses of today. He does so in the context of his experience as the founder of Princeton University's Institute for Advanced Study, an institute that housed at different times such scientific greats as Albert Einstein, John von Neumann, and Robert Oppenheimer.

The essay is brief, in four short parts, and while in this slim volume the essay numbers 36 pages, with each page at about 170 words, it makes for a quick read. This is suitable. The prose is light, the argument simple, the structure clear.

Curiosity is the most important quality, Flexner argues in part one. Utility limits us, he says. Instead, so many pervasive inventions emerged from useless research, he continues in part two. In part three he suggests first that this is because useless knowledge grows and aggregates such that practical minded people can later put it to use, and then, second, that it is therefore most honorable to create spaces where people can pursue their interests with unbounded time and access. This all cumulates in part four, where Flexner pitches the Institute for Advanced Study as one such place.

That context, of course, pushes the question: is this kind of freedom appropriate at all developmental stages? As adults, we see and feel Flexner's point: let us break the bonds of our mundane jobs and lives! For our children, too, we certainly seek to avoid mundanity, but do we not also believe that a broad, liberal arts education is appropriate for most if not all students? An education built solely around a student's interests, without guidance to think and develop skills in a range of disciplines, leaves children without balance.

There is a middle ground, of course: a broadly-based education taught in ways that provide choice and flexibility. Teachers can provide opportunities for curiosity, individuality, and pursuit of imagination in the context of a well-rounded curriculum. Perhaps this is the key takeaway for non-graduate-level educators. Flexner founded a college prep school that ran for 15 years (1890 - 1905), and one wonders about the details of its implementation.

What of Robbert Dijkgraaf's companion essay? It celebrates Flexner, raises notice that Flexner's call for greater basic research is increasingly important today, and offers some memorable stories both extending part two of Flexner's essay and also trumpeting the importance of imagination. ?

The essays are published with Dijkgraaf's essay first, which makes as much sense to me as placing scholarly essays about a Shakespearean play before the play itself — we haven't read the play yet; how can we appreciate the essay?! — so I skipped to Flexner's essay first and then read Dijkgraaf after. This made Dijkgraaf's essay, titled "The World of Tomorrow," unfortunately anticlimactic.

Do I recommend it? Yes, for teachers and people fostering innovation.

Would I teach it? No, but I'd quote it.

Lasting impression: Part of a growing collection of resources I'll turn to as justification for autonomy in a range of settings.

Maria says

Firstly, I found it difficult to get into Dijkgraaf's commentary, having not read the original essay, nor knowing a good deal of the knowledge Dijkgraaf takes for granted (what can I say? I grew up reading classics and romance novels, not analyses of the world post World War II. Previous to that I'm reasonably (or quite, depending on the time period), knowledgable).

Flexner's essay, however, is wonderful. It's interspersed with short examples of knowledge or technology we take as useful (for instance, the radio), but points to the very necessary, "useless" knowledge that came before; the reams of theory produced by scientists over the ages and then compiled into one ingenious device by Marconi.

The essay is still relevant today (the entire point of Dijkgraaf's commentary, in addition to filling out this little booklet), and has a remarkably friendly feel. The difference in writing style over the decades is felt (even with a sample size of two). Dijkgraaf's writing seems to me much more "useful" (that is, more direct and economical), and therefore somewhat less enchanting.

Richard Zhu says

Written in the 1940s, Flexner's essay uses many examples to sell intellectual freedom in the pursuit of basic science and fundamental research. Flexner cites many examples to support this argument (penicillin, Manhattan Project, spaceflight program), but I'm not convinced by its relevance today, especially in an age where investment in scientific research is dwindling, funding grants are more difficult to get, and the absolute number of 'academic' researchers that America can support is tapering off and even dropping. Even so, I think that cloud has a silver lining - industry investments in research have never been higher.

Iskent says

FAYDASIZ B?LG?N?N FAYDASI | THE USEFULNESS OF USELESS KNOWLEDGE | ABRAHAM FLEXNER (1866 - 1959)

Cümleten Merhaba De?erli Kitap Dostlar?!

Okudu?um bu minik kitab? çok be?endim?

Princeton'daki ?leri Ara?t?rmalar Enstitüsü'nü 1930'da tasarlay?p kuran ve 1939'a kadar kurucu yöneticisi olan Abraham Flexner'in 1939 y?l?nda ayn? isimle Harper's Magazine taraf?ndan yay?mlanm???. Fakat bu makalenin temeli 1910 y?l?nda yay?mlanan Flexner Raporu'na dayan?yormu?. Öyle ki bu rapor sonras?nda t?p okullar?n?n yar?s? kapanm?? yar?s? da reformdan geçmi?.

Merak?n ve hayal gücünün insanl???n temel nitelikleri oldu?unu, insan zihnine duvar örülümemesi gerekti?ini vurgulayarak s?n?rs?z ara?t?rma yapmas?na olanak sa?lanmas?na vurgu yapm???. Ve fakat bu ortam?n ise

ancak dü?ünce özgürlü?ünün oldu?u yerde meyve verece?ini özellikle vurgulam??.

S?n?rs?z ara?t?rmalar sonucunda elde edilen bilgilerin bir amaca hizmet etmek yani "fayda sa?lamak" zorunda olmad???n?, bilimin bir nehir oldu?unu, küçük derelerin yani O zaman için neye yarad???n? ya da yarayaca??n? bilemedi?imiz bilginin ba?ka küçük derelerle / fikirlerle bulu?tu?unda engin nehirlere dönü?ece?ini vurgulamakta. Bu yönde bilimsel icatlardan ve bilim insanlar?ndan örnekler veriyor.

Bu kitab?n ad? Flexner?'n makalesinin ad?n? ta??makla birlikte, bu makaleyi esas alarak ?leri Ara?t?rmalar Enstitüsünün yöneticisi Robbert Dijkgraaf?'n yazd??? ba?ka bir makale de önsöz ?eklinde kitab?n giri?inde yer almaka ki onu da ayr?ca çok be?endim♥

?ahsen s?k?c? bulmadan merakla ve keyif alarak okudum. Okurunu bo?an de?il bilgisini artt?ran bir minik kitap oldu?unu dü?ünüyor, ilgi duyabileceklerin ilgisine sunmaktan mutluluk duyuyorum. Sevgimle ilettim.

A?a??daki al?nt?lar umar?m ki sizi bu kitaba yönlendirsin?

??"Bilimsel yarat?c?l?k, deli gömle?i giydirilmi? hayal gücüdür ." sf.29

??"Güzellik bakan?n gözündedir; dünyan?n ve zihnin güzelli?i bizim içimizdedir. Deneyler ve denklemler, teoriler ve teleskoplar, kütüphaneler ve laboratuvarlar gökten dü?medi. Hepsi gezegenimizde yap?lan zanaatt?r. ?nsan zekâs?n?n, merak?n?n ve gözüpekli?inin bilimde son derece h?zl? ilerlemeler kaydedilmesini sa?layarak varolu?umuzun etraf?ndaki s?r perdesini gittikçe daha fazla aralad??? s?rad??? bir ç?da ya??yoruz." sf.41

??"Neredeyse her ke?fin tarihi uzun ve kestirilemez niteliktedir. Biri burada, ba?ka bir ki?i ise ?urada bir parças?n? bulur. Ard?ndan üçüncü bir a?ama gelene ve bir dâhi ç?k?p parçalar? birle?tirene ve belirleyici katk?y? yapana dek böyle gider." sf.65

??"Bilim veya hümanizm alan?nda, zihinsel özgürlü?ün me?rula?t?r?lmas?, yarat?c?l?ktan çok daha öteye var?r; çünkü bu, insanı farklı?l?klar yelpazesinin tamam?na kar?? ho?görüyü içerir. ?nsanl?k tarihi kar??s?nda, ?rk ya da din temelli sevgi ya da nefretten daha aptalca ve gülünç ne olabilir? ?nsanl?k senfoniler, resimler ve engin bilimsel hakikati mi istiyor, yoksa H?ristiyan senfoniler, H?ristiyan resimler, H?ristiyan bir bilim veya hukuk da Musevi senfoniler, Musevi resimler, Musevi bir bilim mi istiyor? ?nsan zihninin sonsuz zenginli?ini ifade etmek için illa Müslüman ya da M?s?rl?, Japon, Çinli, Amerikan, Alman, Rus ya da komünist veya hukuk da muhafazakâr m? olmak gerekiyor?" sf.68

Bill Lawrence says

A little gem. An introduction to a paper from 1939, both about 40 pages. The value of research for research sake and a useful dig at modern metrics. A lot to be learnt regarding the dubious paths we have followed in the last 30 years.

Siddhartha Banerjee says

Flexner's thesis rests on the fact that everyone should be free to pursue his or her interests without regard for

usefulness of the pursuit: a laudable ideal, but it is just too idealistic. Having recently finished American Kingpin, where libertarian ideals clash with the need for individuals to have a responsibility towards society, this essay's message was all the more abhorrent to me. It seems to shirk the responsibility that researchers have to today's society in favour of potential unclear benefits to the future.

And yet, I give this essay a high rating as it is well written, well reasoned, and the message of pursuit for pursuit's sake is only problematic when taken to the extreme; just as the scenario that Flexner argues against is problematic where pursuit of answers occurs only by virtue of utility

Noah says

I found some good stuff here. The bits of intellectual history were fun, even inspiring.

But on the whole it was a bit ... overwrought. Lots of saccharine stuff about the human spirit taking wings and soaring high over the warm brown turds of practicality. Take this passage which summarizes nicely the book's main thrust:

"The real enemy of the human race is not the fearless and irresponsible thinker, be he right or wrong. The real enemy is the man who tries to mold the human spirit so that it will not dare to spread its wings..."

It does not seem to have occurred to Flexner that precisely one of the ways that "fearless and irresponsible" thinkers go wrong is by arriving at conclusions which "seek to mold the human spirit." Take Marx. Or Rousseau.

Besides, we now know what Flexner did not know at the time he wrote this essay in 1939: That "useless knowledge" can quickly become worse than useless—as, for example, our knowledge of the atomic world may well do before long. Sure, the discoveries of Einstein, Bohr, etc. have been thrilling. But we have yet to learn whether, in the end, we won't decide we would have all been better off without them.

If Flexner's thesis is that we should rejoice in all knowledge, then I agree. But we should rejoice with trembling.

Lyndsey says

Bought this for my dad for Father's Day. Previewed it (of course) before I give it to him on Sunday.

What a perfect, tiny but powerful argument for the importance of curiosity as the essential foundation for education and discovery.

Satyajeet says

This is a fascinating paper about the importance of curiosity in fundamental discoveries. The pursuit of **utility** limits human curiosity and the freedom of scientists to explore. Flexner believed that scientists should not be bothered to produce utility but instead pursue problems out of sheer curiosity and eventually utility

could be derived from their findings. He also pleads for the abolition of the word 'Use' when it comes to fundamental science. He believes that scientists should be free to focus on the problems that they find interesting without needing to worry about the immediate applicability of their discoveries. Science should be made for the sheer purpose of satisfying one's curiosity.

"Thus it becomes obvious that one must be wary in attributing scientific discovery wholly to anyone person."

Almost all scientific discoveries are the fruition of the work of multiple people along several decades.

- Gauss's "Non-Euclidian Geometry" seemingly had no practical application at the time. His work was essential to Einstein's work on relativity without which we would not have satellites orbiting the earth today. From Gauss to Einstein, to the practical use of satellites several centuries went by. This is one of the great examples that goes to show that major advancements in science, although they seem not to have immediate applicability, are able to completely change human lives several decades later.

- This paper was written in 1939 previous to the launch of the atomic bombs on August 6 and 9 of 1945. The atomic bomb was developed by a team of scientists, amongst the brightest minds at the time.

This is a very interesting video of Feynman discussing the "**morality**" of his contributions to the 'The Manhattan Project':

(Click on this image to watch the video)

Pete Wung says

This little monograph gives us two related essays. The first essay is contemporary and written by Robbert Dijkgraaf, the present director of the Institute of Advanced Studies. In this essay he serves up a history lesson of sorts, giving us some autobiographical detail on Abraham Flexner, the founding director of the Institute of Advanced Studies. He goes into the Flexner's beliefs which was the founding principles of the Institute as well as its role in the history of American innovation as the place where creativity and research into basic and fundamental research takes place. He goes into how the founding belief in the meaning of the title forms the guiding principle of the institution. He very nicely frames Flexner's basic belief. We are then given Flexner's original essay on why seemingly useless knowledge is more important than just practical knowledge; indeed, should be the bedrock principles of scientific and humanities research in the United States.

You can read the passion and purpose in Flexner's essay, he resolutely defends his idea against every plausible objection anyone can raise in opposition. It is inspirational to read this essay, written in 1939, it demonstrates just how prescient Flexner was in insisting that the Institute of Advanced Studies be the exception to the pragmatic tendencies of American science and resist the commercial bent of the American mindset.

Dijkgraaf skillfully demonstrates, with the examples from the Institute's history, of just how the useless knowledge being pursued by the researchers at the Institute end up contributing to the applied knowledge of the world. In a way, the contemporary essay serves as vindication of Flexner's conviction.

This book will be read many times, as a beacon for myself when my belief for basic research is faltering.

Deane Barker says

Wonderful book form of a classic, 80-year-old essay from Harpers. One of my favorite pieces of writing. Not all who wander are lost, and we fail to appreciate the shocking number of innovations discovered by people who were just kinda screwing around...

Linda says

Presents an urgently needed corrective to the current pull away from non-product-based science, and indeed, under our current government, a wholesale resistance to science generally!
