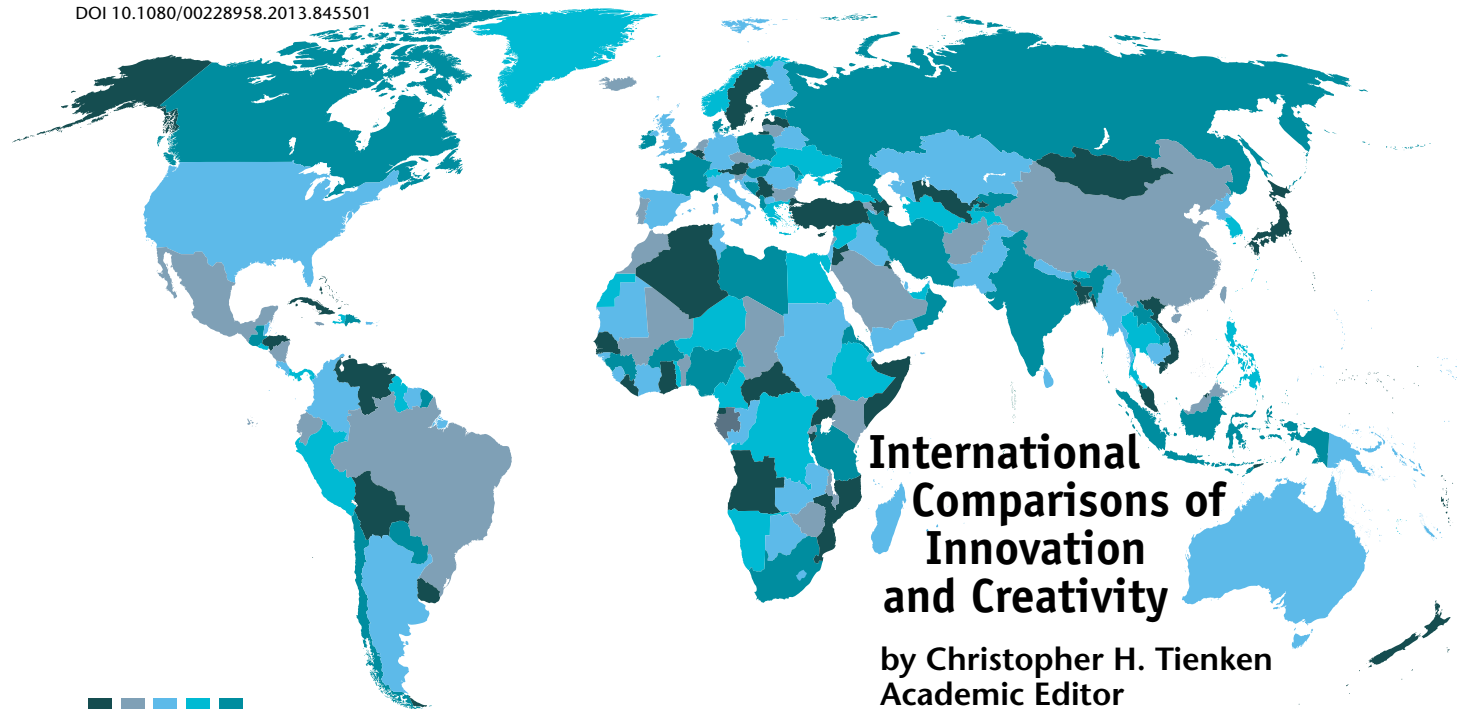


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International Comparisons of Innovation and Creativity

by Christopher H. Tienken
 Academic Editor



The release of the 2012 results from the Programme for International Student Assessment (PISA) on December 3, 2012, by the Organisation for Economic Co-operation and Development ([OECD], 2013) brought about another round of public education fear mongering on the part of bureaucrats and policymakers. However, weaknesses with the PISA test design, sampling, and score calculations brought to light by researchers call into question the results and rankings, and any conclusions drawn from them about the quality of a country's education system.

Sjøberg (2012) and Stewart (2013) provided comprehensive analyses that revealed serious weaknesses in PISA. Even researchers from the OECD (2010) cautioned not to use the results to infer that one country's public education system is better than another's. Basing important policy decisions on results from international tests of academic output is just bad practice; and given the recent disclosures of technical flaws in PISA rankings, it is potentially incompetent.

That is not to say that all international education outcome data are meaningless. In fact, there are many indices and international student surveys worth data mining. In this article, I present rankings and results from some potentially worthwhile indicators as a basis for starting a different type of discussion—one that rests at the intersection of standardization and creativity. I present data that calls into question the need to standardize the U.S. public school system. This data suggests that perhaps we should be talking about why the United States is not capitalizing on its global dominance of innovation and talent diversity.

The Nature of Creativity

Standardizing creativity is an oxymoron. By its nature, creativity is developed over a long period of time, and the outcomes of creativity are diverse and completely unstandardized. By definition, creative outputs are unique. In many ways, creativity can be partly in the eye of the beholder. That is one reason it is difficult to teach creativity aimed at a standard out-



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come. Likewise, a country cannot standardize itself into producing more creative citizens. Standardization is inherently uncreative.

However, opportunities to engage in experiences and use behaviors and skills that relate to creativity can be offered to students through problem-based, project-based, and activity-based curricula. These types of curricula, by design, require students to develop nonstandard solutions to unstructured problems. Visualize the opposite of the one-size-fits-all monitoring system set up through the Common Core State Standards and national standardized testing, and you would be moving your thinking in the right direction.

Indicators of Creativity

We need to jettison the idea that all students must know the same set of narrow content and skills, at the same level of difficulty, and demonstrate that knowledge in exactly the same manner. Only then can we embrace the idea of individual interests and passion, and begin to imagine a creative curriculum. For those who find themselves engrossed in standardization and planetary competitiveness, some global indicators offer a counterargument to universal standardization.

There exist multiple indices and indicators of creativity and the output of creative efforts. One indicator is the Global Creativity Index, produced by the Martin Prosperity Institute (2011). So how do countries rank in terms of global creativity? The United States ranked second behind Sweden, and ahead of countries like Finland, Denmark, Australia, Norway, Japan, Germany, and Singapore. China ranked 58th. In economic terms, what can creativity look like? One outgrowth can be entrepreneurship.

Some Outcomes of Creativity

According to the Global Entrepreneurship and Development Index (Acs & Szerb, 2010), the United States ranked third on the overall

Global Entrepreneurship Index, behind Denmark and Canada and ahead of countries like Japan, China, Singapore, and Finland. The United States ranked sixth on the index of Entrepreneurial Attitudes, behind countries such as New Zealand, Canada, Australia, and Sweden. The United States ranked ahead of Finland, Norway, Germany, Japan, and Singapore. China ranked in the lower third of the world. The United States ranked first on the Entrepreneurial Aspirations Index and sixth in the world on turning those aspirations into reality (i.e., Entrepreneurial Activities Index), once again ahead of Japan, Germany, Singapore, and Finland. Denmark was first and China was near the bottom of the world rankings.

Innovation is also one possible outcome of creativity. The Global Innovation Index ranked the United States fifth in the world behind Switzerland, Sweden, United Kingdom, and Netherlands (Dutta & Lanvin, 2013). China ranked 35th. Some outcomes of innovation include utility patents and Nobel Prizes.

According to the U.S. Patent and Trademark Office (2012), the United States was granted 121,026 utility patents in 2012. Utility patents are “issued for the invention of a new and useful process, machine, manufacture, or composition of matter, or a new and useful improvement thereof” (U.S. Patent and Trademark Office, 2013). The 195 countries of the world outside the United States combined for 132,129 utility patents, only 11,103 more than the United States alone; Japan had the second most patents approved in 2012 with 50,677, almost 40% of the rest of the world’s output.

Nobel Prizes also can be used as a related indicator of creativity and innovation. Since 1901, the Nobel Committee has issued 915 prizes in the areas of Chemistry, Economics, Literature, Medicine, Peace, and Physics. Nobel Laureates born in the United States represented the most of any country, with 262. The next most awarded country of origin, with 82, is the United Kingdom, followed by what is now Ger-

many with 70. Laureates born in India have been awarded 9 prizes and China 11. In the specific area of Nobel Prizes in the Sciences, the United States ranked first again with 191 U.S.-born Laureates, followed by the United Kingdom with 66 and Germany with 60 (Nobelprize.org, 2013).

Scientific Creativity

“Scientific creativity” might seem like an odd pairing of words. However, some great scientific discoveries have come about because of creative thinking on the part of the scientist. Beveridge, as cited in Smith (2012) stated, “Facts and ideas are dead in themselves and it is the imagination that gives life to them. But dreams and speculations are idle fantasies unless reason turns them to useful purpose” (p.108). Though not all scientific endeavors can be labeled creative, scientific output certainly has some relationship to creativity and innovative thinking in many cases.

The number of scientific papers published is a leading indicator of creativity, albeit scientific creativity, and innovation. U.S. scientists, ranking first in the world, published 3,049,662 scientific papers in 2011 (Thomson Reuters, 2011). Chinese scientists published 836,255 papers, and scientists from Germany and Japan published approximately 784,316 and 771,548 papers, respectively. Publication numbers alone, however, do not give readers insight to the quality of those papers.

One hallmark of quality for scientific publications is how many times they are cited. Citations provide an indicator of the level of acceptance of scientific ideas and also of how well those ideas have been vetted and determined to be worth pursuing. Papers from U.S. scientists garnered 48,862,100 citations. The country with the next closest number of citations was Germany with 10,518,133. Papers from Chinese scientists gathered 5,191,358 citations.

Rankings, Rankings, Everywhere

There are a host of international rankings and comparisons one can make. To look at only one ranking from one test, based on one set of narrowly developed questions from one subject area, and make important decisions about the quality of a country’s school system is a fool’s errand. The current policy-level discussions about rankings from one or two international tests are myopic.

We need to expand our ranking horizons and look at a larger basket of indicators of education quality. If we do so, we might find that the United States already has the system that its policymakers and bureaucrats say they want. All they need to do is open their eyes and their minds. ■

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