How to break the Western hegemony perpetuated by the university: decolonised courses in mathematics, and the history and philosophy of science

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Abstract

Colonial education changed values, and that is a key motive to decolonise the university. Values link to humanities, but colonial education came for science, NOT for humanities. Therefore, decolonising the humanities alone will not work. Contrary to the myth that science is value free, Western propaganda often attacks Islam (and all non-Western religions) as anti-science. The right response is to understand that cultural factors (church dogmas) have crept into Western mathematics and science which are hence *not* universal, and *not* superior, and must first be decolonised to explain alternative ways of doing math and science.

Colonial education came for the benefit of the coloniser, not the colonised. It used the authority of science to teach the colonised to mentally submit to Western authority and be loyal to it. Hence, many of the colonially educated, across the world, uncritically imitate the West and detest their own culture as "inferior". To decolonise we need to understand that colonial education was church education designed over centuries to indoctrinate those it educated to submit uncritically to its authority. The resulting imitative attitude and the capitulation to Western authority is *enforced* today by the slavish system of university rankings adopted by governments in OIC countries.

Western academic authority was established using the stock rhetoric of Christian/White/Western "superiority", based primarily on a fraud history of science. This fraud history was first concocted by the church, during the Crusades, and later used by racists and colonialists to claim racial and cultural superiority respectively. Regrettably, in two centuries, the colonised never once cross-checked the actual evidence for that fraud history, and never understood the trick of supporting false history with bad philosophy.

To strike at the root of colonial power, therefore, it is first necessary to introduce decolonised courses on the history and philosophy of science even for students of humanities. I explain how this has been done over the last decade in various countries: the course does not merely highlight non-Western achievements in science, but explains the *complete untrustworthiness* of Western authority, including Wikipedia.

Further, colonial education keeps humanities students ignorant of mathematics and science, to force widespread uncritical reliance on Western authority. To decolonise, it is necessary to remove this widespread ignorance of mathematics and science deliberately instilled by colonial education. This can be done using decolonised math courses which make math easy enough to be understood by humanities students. These courses have been tried out in various universities in three countries over the last decade with students of humanities and also science and engineering, for they enable students to solve harder problems. Teaching this alternative math also enables people to understand how cultural factors creep into Western science through Western (formal) mathematics.

Introduction

World War 2 weakened Western European nations to the point that they were forced to abandon direct control of their overseas colonies. Nevertheless, seven decades later, the colonised worldwide are increasingly recognizing that a second movement for decolonisation is necessary.

Colonisation involved a novel strategy of capturing the minds of the colonised to establish hegemony. This mind control persists until today as a long-term "post-colonial" legacy of colonialism. It needs to be shaken off by the colonised to achieve true freedom from colonialism. Because this mind control was achieved through colonial "education", overcoming it requires decolonisation of colonial education.

But which aspects of colonial education should be decolonised? For many people, the immediate concern is with human values: education is about values, and colonial education radically changed many traditional values of people. But can this change be reversed solely by changing education in the humanities? No. It is simplistic to believe that. Indeed, the colonial state did *not* advocate Western education on the grounds of "superior" Western humanities. It advocated Western education on the grounds that the colonised needed it for "superior" Western *science*. After "freedom", the governments of the former colonies too retained Western education on the same ground.

Colonialism succeeded because the colonised never understood its tricks. One key trick was to spread the myth that "mathematics and science are value free and universal". Another trick was to teach *faith* in science. Side by side it kept the vast majority of the colonially educated ignorant of mathematics and science, hence dependent on Western authority. Because of that ignorance about mathematics and science the colonised were easily convinced by Western authority that mathematics and science are irrelevant to a discussion of values. This article will try to explain why this myth is false, and how to decolonise education so as to overcome it.

A quick way to understand that there is a really a problem is to confront two contradictory claims: (a) the myth that "mathematics and science are value free and universal" with (b) the Western propaganda that "science is against Islam". A stock ground for the propagandist claim[1] (b) is to say that Islam does not accept the belief in "laws of nature". Many Muslim scholars respond by denying it; they say that Islam does accept the belief in "laws of nature". This wrong response overlooks the subtle difference between "regularities" or "habits" and "laws", a difference which is at the core of the Islamic value of "surrender to the will of Allah". It also overlooks the fact that the belief in "laws of nature" is not quite science,[2] but a church dogma, first enunciated in the Crusading theology of Aquinas.[3] That is, some aspects of science seem aligned to church dogma, while being against Islam, and indeed against all non-Western religions.

That is, because of the pressure to accept science, Muslim scholars just accept a church dogma which is hostile to core Islamic values. Because they refuse to recognize there is a problem, by insisting on the myth that "science is universal". Hence, they do not explore any other way to resolve the conflict (e.g. by eliminating cultural biases in mathematics and science) without compromising their core values. That is, while real science may be universal, Western science is not, but incorporates elements of church dogma packaged as science. Muslim scholars have not recognized this trick and the problem that this creates. They did not even ask why is there a conflict of Islam with science today, when there was none during the Golden Age of Islam?

Indeed, the undeniable fact is that colonial education changed indigenous math education. Why was it necessary to do so if math is universal? Colonial education changed math education by declaring Western math as superior. Even today, the official Indian school text for class IX teaches students to

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1 C. K. Raju, "Islam and science", Keynote address, University of Malaya, 2013. In *Islam and Multiculturalism: Islam, Modern Science, and Technology*, ed. Asia-Europe Institute, University of Malaya, and Organization for Islamic Area Studies, Waseda University, Japan, 2013, pp. 1-14. http://ckraju.net/papers/Islam-and-Science-kl-paper.pdf.

2 See the minutes of the discussion on "laws of nature" posted at http://ckraju.net/usm/Psc-minutes.html.

3 Thomas Aquinas, *Summa Theologica*, *First part of the Second Part*, 91,1, http://www.newadvent.org/summa/2091.htm.

accept Western math on the grounds that the math that developed universally in the entire non-Western world was inferior. The indoctrinated colonised mind does not have even the minimal common sense to ask how it can be simultaneously true that "math is universal" and also that "Western math is superior". This shows how the colonised mind is afflicted with superstitions.

Though colonial education came ostensibly for science, the fact is that it only made the mass of colonially educated *believe* in the authority of (Western) science: but ensured that the colonially educated never understand mathematics and science in depth so they cannot dream of changing it independently of the West. Therefore, it may be easier to understand the issues by looking at the *history* of colonial education.

The claim the colonised needed colonial education for science was stated quite explicitly, in the Indian case, by Lord Macaulay in his infamous Minute on Education[4] which initiated the change to colonial education in India. Anyone familiar with church propaganda will spot its familiar tone here: "we are superior, you are inferior, therefore imitate us".

To establish the "we are superior, you are inferior" part, Macaulay stated that, "a single shelf of a good European library [is] worth the whole native literature of India and Arabia...." and that "when we pass from works of imagination to works in which facts are recorded, and general principles investigated [i.e., science], the **superiority of the Europeans becomes absolutely immeasurable.**" He ridiculed indigenous beliefs as inferior since unscientific, and said that in teaching them

> we shall countenance, at the public expense, medical doctrines, which would disgrace an English farrier, --Astronomy, which would move laughter in girls at an English boarding school,--History, abounding with kings thirty feet high, and reigns thirty thousand years long,--and Geography, made up of seas of treacle and seas of butter.

In short, Macaulay proposed to bring in English language education for the sake of "superior" Western science, with a purported view to benefit the colonised by making them more scientific. A similar thing happened in French colonies, where French language education was introduced.

Of course, Macaulay made these claims nearly two centuries ago, but as we will see below, the same argument, in disguised form, is being used today in university rankings. Therefore, it is necessary to address that argument today.

There are four key points here which have gone unnoticed in two centuries.

Controlling revolt

The first is that the stated aim, of benefiting the colonised through science, was entirely fraudulent. Macaulay's real aim was to capture the mind through Western education, and establish hegemony—not only over the colonised but also over his own people, specifically the British poor. The conditions of the poor people in Western countries then were quite terrible. Hence, after the American war of independence (1775), Western Europe had witnessed a series of revolts and uprisings such as the London uprising of 1780, the French revolution (1789), and the Batavian revolution (1795), not to mention the Haitian revolution (1791). Even a half-century later, a spectre of revolt was indeed haunting Europe, but even ardent Marxists have failed to study and respond to the tricks by which the European aristocracy sought to exorcise that spectre.

4 T. B. Macaulay 1835. "Minute on Education". The Minute may be found online on many sites, such as http://www.languageinindia.com/april2003/macaulay.html#minute.

The truth emerged in 1847, when Macaulay, a member of the aristocratic upper house of Lords, gave a speech to British parliament,[5] proposing a way to permanently control revolts. His remedy? Free education for the British poor was the cheapest way to control revolt in Britain. His idea was that Western education taught people blind respect for Western authority. They learnt to respect authority so highly that they would never revolt against authority, any more than trained dogs. Hence, educating the poor, and thereby controlling their minds, like that of dogs, vastly reduced the need for military means of controlling revolt. (Macaulay's recommendation was limited to education for the poor, and he explicitly allowed that the rich may educate themselves differently.)

Church education

The second key point is this: Western education taught blind respect for Western authority just because *Western education then was 100% church education*. This key point has been persistently neglected in the whole debate on decolonisation. To reiterate, *Western education was church education when it first came to the colonies.*

Obviously enough, Western primary and secondary education came in the blatant form of Western missionary schools which were wholly-owned by the church and designed to work both covertly and overtly for its benefit. In India, the Western missionary schools came in 1508, in Cochin, to try and convert the local Syrian Christians. The Jesuits even set up a college in Cochin around 1550. But that was actually intended to harvest Indian knowledge. These mission schools had little influence on the Indian populace until colonialism brought in Western higher education with the promise of a government job to the colonially educated. At that stage mission schools became important as the best entry point to the university and hence to the eventual goal of a secure job.

Less obviously, Western higher education—meaning the renowned Western educational institutions, such as the universities of Oxford, Cambridge, Paris etc.—were entirely church institutions, set up *by* the church, *for* church purposes, and *owned and fully controlled by the church for centuries*. Indeed, at the time colonial higher education first came to the colonies, all Western education was entirely a church monopoly: the first bill for secular education was passed by the British parliament only in 1871. (This was restricted to primary education, to create a supply of industrial labour, and did not touch the universities.) Therefore, *the church provided the educational model for our universities today.*

Now, what was the church objective in setting up these universities? Obviously, it was not altruistic but these institutions were designed to benefit the church. What exactly was that benefit? Less obviously, the objective was not mere conversion: for these universities were first set up, in the Christian part of Europe where other ("pagan") religions had been physically eliminated. So why were they set up?

The oldest Western universities (not counting Bologna) were set up by the church, during the Crusades against Muslims. One aim then was to catch up with the Muslims in terms of knowledge, such as knowledge of bridge building, and the knowledge acquired through the mass translations of Arabic books at Toledo. But a subtler aim was to create an army of indoctrinated missionaries, to offset Christian military weakness then vis a vis the Muslims, even in Europe. That is, Western education was designed to create indoctrinated missionary minds, by teaching them faith, so that they would staunchly believe in the most far-fetched fantasies of church dogma. Because church dogmas may change from time to time, the church taught faith by teaching acceptances of authority. That is, Western university education was designed to create people who would remain stubbornly loyal to the West, and submissive to its authority above all facts and common sense. These are traits

5 T. B. Macaulay, Speech to the House of Commons, 18 April 1847. *Miscellaneous Writings and Speeches of Lord Macaulay*, vol. IV, Speeches of Lord Macaulay, http://www.gutenberg.org/files/2170/2170-h/2170-h.htm#2H_4_0031.

we can easily observe in the colonised mind today. In short, Western education captures the mind and establishes hegemony because it was church education designed over centuries to do so.

Obviously enough, it was on a broadly similar strategy, of establishing hegemony through mind control, that Western education was imposed at about the same time, not only in India, but in all colonies of Western Europe. Ironically, though colonial education was introduced to do propaganda, to offset the military weakness of the coloniser, it remains the sticky part of colonialism. "Post-colonial" societies, including post-revolution Iran, continued Western education, which, to reiterate, was church education. Basically all these governments accepted the argument (first stated by Macaulay) that Western education was needed for science and technology, which were essential to both economic development and military power. As a result, the colonial process of mind control through Western education persists in "post-colonial" societies.

False propaganda

The third point which the colonised have persistently overlooked is this: the propagandist claim about Western superiority in science, how far was it true? The noticeable effect of mind control is that no one ever bothered to critically examine that claim of Western "superiority", though vast decisions were based on it.

Today, no doubt, the West does have a certain technological advantage, though that advantage is highly overrated, for the US still feels threatened by a small North Korea, and obviously China has caught up in terms of technology. Decades ago, when computers were little used in India, I understood at first hand how narrow the technology gap is when I helped to build the first Indian supercomputer in three years. But, in this article, we are speaking of the time when colonial education was first introduced in the colonies, in the 19th c. on the grounds of Western superiority in science. Were there any valid grounds *then* for claiming Western "superiority" in science?

Macaulay was dishonest. Let us, for example, take the case of medical doctrines cited by Macaulay. The fact is that the translated Arabic books of Ibn Sina (Avicenna), particularly al Canon fi al Tibb, were used as key medical texts from the 11th to the 17th c. in the leading Western universities, such as Oxford and Cambridge. So, did those prestigious universities disgrace an English farrier for centuries?

As another example, take the case of astronomy, cited by Macaulay. Copernicus is a celebrated name of Western astronomy. But it has long been known that his work simply copied that of Ibn Shatir of Damascus, who extended the work of Nasir al din Tusi of Maragheh.[6] Ibn Shatir's book was available in the Vatican library in Greek translation, and all that Copernicus did was to translate it from Greek to Latin (without properly understanding it). The next big name in Western astronomy is Tycho Brahe, Kepler's master, whose astronomical model is a carbon copy of the earlier model of Nilaknatha which Jesuits brought from India to Europe.[7] The immediate agenda of the Jesuits was to reform the defective Julian calendar adopted by the church, and to improve European navigation which was in a pathetic state then (and remained so until the 18th c. when the British Board of Longitude was set up by an act of the British parliament). But European knowledge of astronomy then was so pathetic that Protestant Europe did not even *understand* the need for the reformed Gregorian calendar, until the mid-18th c. (1752), and Newton died believing he was a

6 "The question therefore is not whether, but when, where, and in what form he [Copernicus] learnt of Maragha theory", N. M. Swerdlow and O. Neugebauer, *Mathematical Astronomy in Copernicus's De Revolutionibus*, Springer, New York, 1984, part 1, p. 47.

7 C. K. Raju, *Cultural Foundations of Mathematics: the nature of mathematical proof and the transmission of the calculus from India to Europe in the 16th c. CE*, Pearson Longman, 2007.

prophet since born on Christmas day on a wrong calendar! Doubtless that pathetic Western inferiority in science, until the 18th c., should move girls in a non-Western school to laughter!

These examples can be multiplied. For example, the calculus is the basis of science today, since the differential equations of physics are formulated using the calculus. But the calculus developed in India a thousand years before Newton and Leibniz, to whom it is credited today on the strength of the amazingly chauvinistic and genocidal doctrine of Christian discovery, according to which any piece of land or knowledge belongs to the first Christian to spot it.[8] Western history written using such disgraceful principles is nothing but a large scale fraud.

To summarise, the aim of church propaganda through university education was NOT to convert the "educated" colonised to Christianity, because that education was designed for Christians. The aim was to create obedient missionaries by instilling fanatical belief in church authority hence in all sorts of church dogmas. To this end, the key first step of Western education was to teach faith and obedience by making the colonially educated accept Western/church authority. This was achieved by making them look up to the West as "superior", and to hate and detest as inferior all other societies, cultures, and ways of living. As a result, the colonised learnt to hate and detest their own societies as deeply flawed, and learnt to uncritically imitate the West, believing that would make them superior. These beliefs are easily spotted among the colonially educated.

The most superficial observation shows that the colonially educated have deep respect for the West, and unthinkingly imitate the West in numerous ways. The stock example of unthinking imitation is the colonised man feeling superior wearing a warm suit and a tie (church hijab) when the temperature outside is 40 degrees centigrade. Another stock example is the adoption of the inferior Gregorian (Christian) calendar, which remains inferior even after the Gregorian reform, and which also adversely affects huge Indian economic interests in monsoon driven agriculture.[9]

Rhetoric of superiority

The Western rhetoric of "superiority" was invented for church propaganda, and originally based on *religious beliefs*. The pope maintained that Christians were "superior" and openly demanded that all non-Christians should be killed or enslaved,[10] and their lands seized. Noticeably this was what happened. In the Americas and Australia, indigenous people were decimated; on grounds that this was an act of high Christian *morality*. These genocides were never regarded in the West as a crime against humanity, which they were. On the contrary, while other attempted genocide which involved far smaller numbers are condemned, the Christian genocides are celebrated, as in Thanksgiving and Columbus day, and the underlying "moral" principles are still part of US law.

Killing off the original inhabitants made plentiful land available. But land alone was insufficient: a plentiful supply of cheap labour was required to work the land. Hence Africans were enslaved (and millions killed) as another act of high Christian morality. With regard to the African slaves in the Americas, a problem arose. Many of the slaves converted to Christianity. Now what was the "moral" justification to keep them enslaved? The church quickly found justification in the Biblical

8 C. K. Raju, *Cultural Foundations of Mathematics*, cited above.

9 C. K. Raju, "A tale of two calendars", in: *Multicultural knowledge and the university*, ed. Claude Alvares, Multiversity, 2014, pp. 112-119. Abstract at: http://ckraju.net/papers/ckr-calendar.html. Also, video at https://www.youtube.com/watch?v=MvpuC7Dg4e0.

10 C. K. Raju, "The meaning of Christian 'Discovery'" *Frontier Weekly*, **47** (29) 25-31 Jan 2015. http://www.frontierweekly.com/archive/vol-number/vol/vol-47-2014-15/47-29/47-29-The%20Meaning%20of%20Christian%20Discovery.html

curse of Kam or the curse of Ham, and this religious justification that blacks could be enslaved because the Bible approved it, continued to be used right up to the time of the American civil war.[11]

But the economic situation changed. The American civil war itself was caused by two economic factors, neither of which involved any moral concerns. First, colonialism proved more profitable than slavery,[12] as many European nations had realized by this time. Since Western morality follows in the footsteps of Western economic benefits, many Western nations now started declaring slavery (and the profits from it) as immoral. Second, slavery depressed the wages of the European poor who had been exported to the "New World" (to solve the problem of European poverty), and this was a key reason for the American civil war. This collapse of the religious justification for slavery (due to economic reasons) led Western philosophers like Kant etc. to search for a new ways to justify the claim of Western superiority.

The second justification for claims of Western superiority was *racist*: that white-skinned people were "superior". Kant (and a host of other Western "philosophers[13]) justified racism, of course, but he did so on the pseudo-scientific grounds, that intellectual creativity was restricted to people with white skins. And Kant is regarded as the acme of Western philosophy! The key thing to understand is that Kant's nonsense *philosophy* of Western "superiority" was based on a fraud *history* of science first fabricated by the church. This trick of integrating false history with bad philosophy is something the colonised never understood. (The trick also works in the other direction, as in using a bad philosophy of mathematics to justify fraud history.)

That fraud history began with the rise of Baghdad in the 8th-9th c. The emphasis on knowledge in Baghdad led to a flood of books, and the growth of libraries across the Muslim world. Like any library, these libraries gathered books containing knowledge from all across the world. Istanbul, then, was a tributary of Baghdad, and many of these Arabic books were translated into Byzantine Greek. Because of their extreme Christian chauvinism, the Byzantine Greek translators (all priests) introduced some sentences in these texts falsely claiming an early Greek origin for them. Later, the 15th c., when these Byzantine Greek texts found their way to Europe, after the fall of Istanbul to Mohammed the Conqueror, they were routinely conflated with early Greek texts. There are, in fact, NO original early Greek texts in mathematics and science.[14]

This fraudulent history was developed further by the Latin church during the Crusades, when a huge Arabic library at Toledo was mass translated into Latin. The Roman church then frequently used to burn non-Christian books as heretical. So, how could it mass translate books captured from the religious enemy? The simple answer involved a fraud: all original content in those Arabic books was attributed to early "Greeks", real or imaginary, hence theologically correct, on the grounds that early Greeks were declared the only "friends of Christians" by Eusebius. All subsequent scientific work ("after the renaissance") was appropriated to Christians on the grounds of the doctrine of Christian discovery which asserts that the first Christian to come across a piece of land or knowledge becomes its "discoverer" hence owner. Subsequently, racists took over this false history and claimed that all science was the work of whites. Still later, after racism became somewhat inconvenient, and after the American civil war, as explained above, the colonialists took over, attributing all science to the West.[15]

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11 J. Priest, *Bible defence of slavery*, Louisville, Kentucky, 6th ed. 1851.

12 Eric A. Williams, *Capitalism and slavery*, University of North Carolina Press, Chapel Hill, 1944.

13 For detailed references, see, e.g., C. K. Raju, *Euclid and Jesus: How and why the church changed mathematics and Christianity across two religious war*s, Multiveristy, Penang, 2012.

14 For a detailed discussion, see C. K. Raju, "Not out of Greece", 5 lectures delivered at the University of South Africa, Jan 2017. Posted at http://ckraju.net/unisa.

15 C. K. Raju, *Is Science Western in Origin?*, Multiversity, Penang, 2009. Reprint, Other India Bookstore, Goa, 2014.

Thus, the stock Western view of the history of science was expressed by the "reputed" (read racist) historian Florian Cajori who said,

> A large number of astronomical and mathematical works were written by Arabic authors. Yet we fail to find a single important principle in mathematics brought forth by the Arabic mind. Whatever discoveries they made, were in fields previously traversed by the Greeks.... The Arabic mind did not possess that penetrative insight and invention by which mathematicians in Europe afterwards revolutionised the science. The Arabs were ... not original. [16]

This is nothing but an articulation of the most mindless racist prejudices disguised as "authoritative" Western history, the trick being that that the said "history" is used to reflexively support the very same prejudices, through philosophy. The evidence for this "history" is pitiful: indeed, since there is *not a single original early Greek text in mathematics and science*, and everything comes to us via Arabic or Byzantine Greek sources. Therefore, there is no evidence that Greeks said anything original, or they had any capacity for original thinking. Indeed, much of the pre-Arabic knowledge, today attributed to Greeks, was translated from Egypt, India and "Babylon" (Iraq), such as the *Hisab al Hind* of al Khwarizmi. This was all appropriated to early Greeks by Western fraud history.[17]

University rankings

This rhetoric of Western superiority is very much a problem today, and the issue is not limited to the higher salaries routinely paid to whites in universities across the Arab world. The problem of accepting the West as "superior" still deeply infects universities today through the system of university rankings, The Vision 1441 on Science and Technology adopted by the 10th session of the Islamic summit in Malaysia, in 2003, declared[18] that "OIC member states are committed to become a community that values knowledge and is competent in utilising and advancing S&T to enhance ... socioeconomic well-being". On this basis, the Organization of lslamic Conference decided[19] in Dec 2005 to urge Member States to strive for "quality education".

While the objectives are laudable, the catch lies in the "technical criteria" used to determine "quality", to evaluate performance of universities. A meeting of "technical experts" in Tehran in 2007 proposed[20] the criteria for ranking of universities in the OIC region. It adopted a "key performance indicator" which gives 50% weightage to research quality and output. But the *criteria* used to measure research quality are numbers like citation index and impact parameter. This is not proposed on any technical grounds, but on grounds (p. 11) that "it is internationally admitted" and that (p. 10) it is "according to the international standards only the journals classified by the Institute of Scientific Information (ISI) ... should be used both for counting publications and citations". These ISI journals are entirely controlled by the West, and those dependent on it (regardless of ethnicity).

Therefore, the "technical criteria" boil down to the same old propagandist rhetoric of superiority: "The West is superior, you are inferior, so imitate them". Science still provides the force behind this propaganda, for the non-West needs "quality science", and "quality" in science is to be judged by Western approval, and by how well the non-West imitates the West! This amounts to an extraordinary and superstitious denial of common sense in the name of science: for example, if some disease such as

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16 Florian Cajori, *A History of Mathematics*, Macmillan, London, pp. 116-117.

17 See the UNISA lectures "Not out of Greece", cited above, at http://ckraju.net/unisa.

18 Organisation of Islamic Conference, *Conference on Science and Technology, Vision 1441: Kuala Lumpur Declaration on Science and Technology for the Socio-Economic Well-Being of the Ummah*, 7-10 October 2003.

19 OIC Summit, Ten Year Strategic Plan, public statement, *Third Extraordinary Session of the Islamic Summit Conference, Makkah al Mukarramah, Kingdom of Saudi Arabia, 5-6 dhul qa 'dah 1426 h 7-8 December 2005,* sec. Vl..

20 OIC Report. (2007). *Report on adopted criteria, procedures and mechanisms for ranking of universities*. Tehran, April 2007. http://www.oic-oci.org/oicnew/poa/ranking.pdf.

malaria is relevant mainly to the non-West, working on it is *not* "quality science" on the definition adopted by the OIC.[21]

The West-dependent criteria for university ranking ensures that university academics in OIC countries are turned into total intellectual slaves. No academic in an OIC country can afford to incur the wrath of the West, or even choose to dissent, without sacrificing his or her career which is made dependent on approval by the West. Of course, the same is true not only for OIC countries, but throughout the former colonies. This is not a situation of "post-colonisation" but of accelerated neo-colonial mind-capture, all in the name of science.

The solution

So, what is the solution to the multiple evils of colonial education? According to the above analysis, the claim of Western "superiority" in science was used to change colonial education, and is still being used to hegemonise the university. That fake claim of "superiority" was based on a false history of science, and a related bad philosophy, which together declared that science was Western in origin. That false historical claim was used to make the colonised submit to Western authority, and trust it blindly. Therefore, it is necessary first *to critically examine* and reject that false history and related bad philosophy.

Western propaganda routinely misrepresents decolonisation as a demand for uncritical rejection of everything Western, therefore, I reiterate once again that decolonisation is a demand for **critical rejection** of the West, as has already been publicly reiterated[22] several times earlier, but somehow this does not get into the heads of either Westerners or colonised academics, because any non-Western critique of the West is beyond their imagination.

The key thing to recognise here is that false history was (and remains) a key *source* of colonial power.[23] Note how this differs from the mind-numbing cliché that "history is written by victors". In this case, the false history was first written by the losers in military conflict: the Crusades. However, centuries later, the power flowing from the lies of that false history helped to stabilise rule by mind control, over a vast colonial empire, despite the military weakness of the coloniser.

Therefore, the first step in decolonisation is to destroy the lies that are a source of colonial power. Now those lies are actively *maintained* today, therefore merely pointing out scientific and technology achievements of the non-West is NOT enough, for this fraud is a systematic process by which colonial education first instils uncritical trust in Western authority, and then exploits that trust. If the non-West continues to trust the West as a reliable source of knowledge, any claim to the contrary will be either blocked or soon subverted. A recent example is the way my article "To decolonise mathematics stand up to its false history and bad philosophy" was censored.[24] The colonised must understand that the coloniser engaged in systematic fraud over centuries, and continues to defend that fraud, so that Western academic authority from Oxford, Cambridge, or

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21 C. K. Raju, "Benchmarking science: a critique of the ISI (Thomson-Reuters) index", Universiti Sains Malaysia-Prince Songkla University conference in Hat Yai, Oct, 2011, in Proc. http://ckraju.net/papers/Benchmarking-science-paper.pdf.

22 See, C. K. Raju, "Be critical, choose what is best", http://ckraju.net/press/2011/the-Sun-29-Aug-2011-p16-clipping-ckr-response.gif. The complete context of the discussions following the editorial in the Sun, Malaysia, are posted at "Decolonisation: conversations in the Sun", http://ckraju.net/blog/?p=61.

23 C. K. Raju, *Ending Academic Imperialism: a beginning*, Citizens International, Penang, 2012. See, also, http://ckraju.net/papers/Academic-imperialism-final.pdf, and video at https://www.youtube.com/watch?v=zdvgH4gByfk.

24 C. K. Raju, "To decolonise math stand up to its false history and bad philosophy", article first published, went viral, and then censored by the *Conversation*, South Africa editor. Still at http://ckraju.net/blog/?p=117. *The Wire* put it back. https://thewire.in/history/to-decolonise-maths-stand-up-to-its-false-history. Now in Rhosdes Must Fall Group Oxford, *Rhodes Must Fall*, Zed books, London, 2018, pp. 265-270. Also in reproduced in J. *Black Studies*, **48**(3), 2017, pp. 256-278.

Paris, must be treated as totally untrustworthy, and potentially fraudulent until cross-checked against hard evidence.

Secondly, it is not enough even if some books and articles pointing out this or that non-Western achievement in science escape the academic system of pre-censorship (*secretive* "peer review") or post-censorship (as happened with my article). If these books are written by Westerners, such as Needham's series on science and technology in China, then they will contain a variety of subtle biases.[25] If written (or edited) by non-Westerners,[26] they will be treated as unreliable,[27] for the current university system is based on government-sponsored blind trust in Western knowledge and guidance. Therefore, such books will have no place in the academic curriculum, unless and until the curriculum itself is reformed. Because a false history of science was such a major source of colonial power, the curriculum in the history of science must first be reformed. Because the *history* of science is intertwined in a tricky way with the *philosophy* of science in the West, it is necessary to take up not the history alone, but both the history and philosophy of science.

In this direction, I anchored an intensive one week international workshop held in AlBukhari International University (AiU) in Malaysia in 2012.[28] The curricula of various universities in the world on the history and philosophy of science were examined. Obviously no Western university teaches about the history of non-Western science, except in passing, or in a nominal way, to give a false impression of fair-mindedness. Noticeably, also, no Western university teaches any aspect of non-Western philosophy of science: non-Western philosophy is always taught as "cultural studies", not philosophy, and certainly not philosophy of science. Under continuing colonial dispensation in present-day university academics, instead of reciprocating by teaching Western philosophy as "cultural studies" soaked in church dogma (see the case of the Western philosophy of mathematics below), it is taught as "universal" by universities even in colonised countries: for example, 80% of the philosophy curriculum in Delhi University is about Western philosophy.

In this context, a model decolonised curriculum in the history and philosophy of science was constructed, and taught several times in AiU,[29] and later also in SGT University in India. To reiterate, the key point of the curriculum was not merely to highlight the achievements of the non-West, but to instil a *critical* attitude among students, and to highlight the academic fraud perpetuated by Western academics and their propagandist organs like Wikipedia.[30] This was achieved in a simple way by inviting students to focus on the actual evidence or the PRIMARY sources of history. For example, as part of the myth that science is Western in origin,[31] the stock story tells us that science developed in the West, first by early Greeks, and then by Europeans after the renaissance. However, there is absolutely no PRIMARY evidence that the early Greeks did anything in science or that they were mathematically competent to do so. To the contrary, the horribly defective Greek and Roman calendars provide ample counter-evidence of their laughable weakness in mathematics and astronomy. As a legacy, the Western calendar remains inferior to this day despite the Julian and Gregorian reforms. This is also despite tall stories of a non-existent Claudius Ptolemy and his supposed prowess in astronomy. (Actually, the name Ptolemy is a

25 J. Needham, *The Shorter Science and Civilization in China,* Vol. 2 (Abridgement by C.A. Ronan), Cambridge University Press. 1981, raises the question of why Chinese geometry was not like Western geometry. See, further, the section on decolonised math below.

26 e.g. Salim T. L. Al-Hassani (ed.), *1001 Inventions: The Enduring Legacy of Muslim Civilization*, National Geographic, Washington D.C., 2012.

27 e.g. https://www.frontpagemag.com/fpm/141447/fact-or-fiction-1001-muslim-inventions-comes-j-christian-adams

28 For a report, see http://ckraju.net/blog/?p=73.

29 http://ckraju.net/blog/?p=89.

30 The Wikpedia trick is to reject primary sources, and admits only Western secondary sources as "reliable". Secondly, while it is open to editing, this works both ways, and entrenched gangs in Wikipedia will soon un-edit any attempt to correct it.

31 C. K. Raju, *Is Science Western in Origin?* Multiversity, Penang, 2008. Reprint, Other India Bookstore, Mapusa, Goa, 2014.

reference to Egyptian astronomy texts translated into Greek since the time of the satrap Ptolemy, and appropriated to Western tradition through false history[32]).

The students of the decolonised course in history and philosophy of science were greatly pleased by the idea that they could so easily challenge Western authority and the false colonial rhetoric of "superiority" by demanding evidence for false Western history.[33] They realized that, in view of this long-standing fraud, Western authority (and Wikipedia) could not be trusted. But, of course, if Western approval is the sole government-approved criterion of academic "quality" in the university, as is the case today, it is very difficult to introduce such courses critical of the West into the academic curriculum. It is through such silly tricks and restrictions that colonial hegemony persists today. The non-West has no one to blame except itself for falling prey to such silly tricks at the behest of superstitious colonised minds posing as "experts".

Because the students wanted to probe deeper, a second course was designed and taught at AiU, which explored in depth the philosophical issues involved in false history.

Decolonised mathematics

Finally, let us return to the issue raised at the beginning of this article? How can science affect values, contrary to the myth that science is value-free? First, one might grant that science in some ideal sense may be universal, but Western science does not measure up to that ideal. Basically, the church dominated the mind of Western man for so many centuries that a variety of church biases inevitably creep into science as today understood in the West (irrespective of its historical origins). That culturally-coloured "science" should hence be called Western science (as distinct from universal science), because of its distinct cultural idiosyncrasies, and that is the science brought by Western education. At the beginning of this article, we already saw an example of how Western science is corrupted by the church dogma about "laws of nature", which creep into it, turning it against not only Islam but also a variety of other religious beliefs. This is not an isolated case of church dogmas creeping into "science".

There is a more systematic process by which biases and metaphysical dogmas creep into Western science. Any science is based on mathematics, and Western science is based on Western (formal) mathematics which again differs from the universal (normal) mathematics which existed earlier. Western math glorifies a biased metaphysics.[34] Under church influence, this exclusion of the empirical in formal math was uncritically declared a "superior" way of doing math and taught through colonial education. While the biased metaphysics of formal math[35] adds nothing to the practical value of math, it enables politically convenient beliefs and dogmas to be slipped into Western science, and economics etc., merely on the strength of Western authority.

Regrettably the colonised mind swallows the two conflicting Western myths that (1) mathematics and science are universal and value free, and (2) that science is nevertheless at war with religion. Indeed, the colonised mind does not even ask a common-sense question: if the church believed Western science and the church are at war, why did church institutions bring Western science to the non-Christian people in the colonies? Why did the church want to introduce one supposed enemy (science) to another (the non-Christian)?

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32 C. K. Raju, *Is Science Western in Origin?* Cited above.

33 See a short video of students reactions, posted at https://www.youtube.com/watch?v=ozQRBNk2alg. Full interview at https://www.youtube.com/watch?v=eCoLlle9ANA.

34 C. K. Raju, "Decolonising mathematics", *AlterNation*, **25**(2), 2018, pp. 12–43. https://doi.org/10.29086/2519-5476/2018/v25n2a2. If the doi is not active, use this link: http://ckraju.net/papers/Decolonising-mathematics-AlterNation-25-2-2018.pdf.

35 C. K. Raju, "Teaching Mathematics with a Different Philosophy. 1: Formal mathematics as biased metaphysics". *Science and Culture* **77** (2011) 275–80. . arxiv:1312.2099. Part 2: "Calculus without limits". *Science and Culture*, **77** (2011) 281–86. . arxiv:1312.2100.

The church interest in bringing science to the colonies is patently obvious, even today: most of the leading (=highest ranking) colleges for undergraduate education in science, in major metropolises in India, are church institutions. These include Stephen's College, Delhi, Loyola College and Madras Christian College, Chennai, Xavier's College, and Wilson College, Mumbai, Loreto College, Kolkata etc. If Western science and the church are indeed at war, why are church institutions still so terribly keen to teach Western science to non-Christians? Obviously, the tricky aim is to teach mainly *faith* in science, hence mental subordination to Western authority. As for real science, it is obvious that the West uses all sorts of political arm-twisting, e.g. as in Iran, to prevent the non-West from getting ahead in science and technology.

The colonised never understood this simple trick of using science to make them accept Western authority. Uncritical belief in Western science has led the non-West to capitulate to Western academic authority, as in the system of university rankings accepted by all OIC countries. This capitulation to Western academic authority can be and is misused in a variety of ways. In particular, it can be misused to glorify devious aspects of Western science, which promote a church agenda,[36] and to attack non-Western religious beliefs. The vast majority of the colonised are helpless, since they conflate science with Western authority, and colonial education leaves them too ignorant to understand even the theoretical possibility of any science not approved by the West.

However, the only serious solution to the clash of values between science and non-Western religious beliefs is to first de-Westernise science by eliminating the cultural biases in it. Since those cultural biases arise from formal math, as a first step it is necessary to decolonise mathematics by rejecting Western (formal) math. This can and HAS been done over the last decade. The question is only that of society at large understanding and accepting it—at least enough to try teaching it, even as a parallel course.

The calculus is the key to the applications of mathematics to science, since all the differential equations of physics are formulated using the calculus. Accordingly, that is where decolonisation of math must begin, and decolonised calculus courses have been taught in various universities, around the world, over the last decade.

The Western history of the calculus that it was invented by Newton and Leibniz is just another fraud based on the infamous doctrine of Christian discovery, that any piece of land or knowledge belongs to the first Christian to come across it. Actually, calculus was invented in India a thousand years before Newton and Leibniz.[37] It was used to develop infinite series expansions to derive very accurate trigonometric values (accurate to about nine decimal places). These trigonometric values and the related astronomical model was badly needed by Europeans to solve their navigational problem. Accordingly, the related Indian books on mathematics and astronomy were translated by Jesuits in their Cochin college and sent to Rome. This knowledge suddenly started appearing in Europe towards the end of the 16th c., starting with the precise trigonometric values, and the astronomical model of Nilakantha, today attributed to Tycho Brahe. However, while Europeans understood some aspects of the imported knowledge, they (Clavius, Galileo, Cavalieri, Descartes, Newton and Leibniz, Fermat, Pascal) failed to understand how Indians summed infinite series, even the infinite geometric series. This was emphasized by Berkeley in his objections to Newton and Leibniz.

36 C. K. Raju, "The Christian propaganda in Stephen Hawking's work", *Daily News and Analysis*, 16 Jan 2011. https://www.dnaindia.com/lifestyle/review-the-christian-propaganda-in-stephen-hawking-s-work-1495047.

37 C. K. Raju, *Cultural Foundations of Mathematics: the nature of mathematical proof and the transmission of the calculus from India to Europe in the 16th c. CE,* Pearson Longman, 2007.

Eventually, by the 20th c., Europeans evolved a different metaphysical method of summing infinite series, involving a metaphysics of infinity such as formal "real" numbers, and formal set theory etc. This is the method that is half-taught today in university, and is a major stumbling block for students because of its formidable difficulties: though university calculus texts are huge, they do not teach formal "real" numbers or the related formal set theory, settling for naive set theory.

Decolonised calculus reverts to the original way in which calculus developed in India as the numerical solution of differential equations. Infinite series were summed using non-Archimedean arithmetic[38] and a different philosophy of mathematics as an inexact and practical science, a philosophy today called zeroism.[39]

Another great advantage of teaching decolonised calculus is that it makes calculus easy enough to be taught in five days. Because it makes calculus so easy, students are able to solve harder problems not covered in ordinary calculus courses. Making math easy has the advantage that students of social science and humanities can not only study it, but can move on to other aspects of mathematics dependent on the calculus such as statistics. This avoids the deliberate "ignorantification" of humanities students, due to colonial education and the difficulties of (formal) mathematics that it brings in its wake, difficulties which result in no additional practical value.

Specifically, even students of social science and humanities can now hope to understand how church dogmas and political opinions creep into science and social science through the metaphysics of formal math, and how that enables Western science to be used as an instrument favouring church dogma against all non-Christian religions. It also enables students to understand how Western politics can be slipped into social sciences such as economics, on the authority of mathematics and science. Needless to say, decolonised math also enables an alternative decolonised science,[40] but explaining that in more detail would take us too far afield.

The practical agenda

Let me close by summarising and reiterating the practical agenda. As more and more universities around the world wake up to the need to decolonise and start thinking critically about Western education, it is necessary to move beyond articulation of the theoretical critiques to a practical agenda of teaching alternative decolonised courses. However, due to (1) a deep-seated problem of colonial indoctrination, (2) the peer pressure due to globalisation of colonial education, and (3) the governmental pressures to imitate the West through university rankings, the fact is that universities, even those favouring decolonisation, are unable to break free of colonial education. Indeed, university academics are so tightly tied down that they are unable to take even the first steps towards freedom from the West and its hegemonic practices.

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38 C. K. Raju, "Calculus" in *Encyclopedia of Non-Westerm Science, Technology, and Medicine*, ed. Helaine Selin, Springer, 2016, pp. 1010–1015. http://ckraju.net/papers/Springer/ckr-Springer-encyclopedia-calculus-1-final.pdf. Also "Calculus transmission", pp. 1016–1022. http://ckraju.net/papers/Springer/ckr-Springer-encyclopedia-calculus-2-final.pdf.

39 C. K. Raju, "Zeroism", in *Encyclopedia of Non-Westerm Science, Technology, and Medicine*, ed. Helaine Selin, Springer, 2016, pp. 4604–4610. http://ckraju.net/papers/Springer/zeroism-springer-f.pdf.

40 See, for example, "Decolonising math and science education". In: *Decolonising the University*, ed. Claude Alvares and Shad Faruqi, USM and Citizens International, 2012, 162–195. http://ckraju.net/papers/decolonisation-paper.pdf. For the latest developments, see the extended abstract of the keynote address to have been delivered at Palestine Technical University, "Decolonising mathematics: why it makes science better (and enables students to solve harder problems)", http://ckraju.net/papers/palestine-extended-summary.pdf. This was censored by the Israeli refusal to grant a visa. Or see the abstract for the panel discussion at the University of Cape Town "Three ways to decolonise science", posted at http://ckraju.net/papers/uct-panel-decolonising-science-ckr-summary.pdf, or the video at https://www.youtube.com/watch?v=ckbzKfRIi6Q.

In this context it is important to reiterate that the decolonised courses mentioned above are actual decolonised courses, that have been developed and actually taught to undergraduate and post-graduate students in humanities, social science and engineering. As such, they provide an agenda of practical action for universities interested in decolonisation, provided they have the courage to implement it. Therefore, these courses, and their summary practical benefits for decolonisation are explicitly listed below.

1. **History and philosophy of science-1**. This course exposes the tricks used by Western academics to concoct and systematically preserve a fraud history of science which glorifies the West as the originator of all science. The course teaches students how to focus on primary evidence to critique the "grand narrative" of a Western origin of science. It thus strikes at the root of colonial power and the argument that Western education is needed for science. It also exposes Western academic authority (and related instruments such as Wikipedia) as *untrustworthy*, since they deliberately neglect primary evidence, like Wikipedia. That counters the "trust the West" agenda of colonial education which seeks to make the non-West mentally submit to Western authority. The course curriculum is not rigid, and should be locally modified, to emphasize achievements and thinking of a particular region or culture. Some details of the course as taught in AlBukhari International University, Malaysia, and SGT University, India are posted online.[41]

2. **History and philosophy of science-2**. The above course quickly became very popular with students in AiU, Malaysia. Therefore, to answer deeper questions raised by students, a second course was introduced. This course focused on the philosophy aspect explaining tricks like imposing a normative "universality", through the bad Western philosophy of mathematics. Non-Western philosophy is excluded from Western courses in philosophy (and treated as cultural studies), and this is the first course which also explains how non-Western philosophy is comparatively better suited to both mathematics and science.

3. **Decolonised calculus ("Calculus without limits") for mathematics, science and engineering.** As explained above, calculus is a key aspect of science, and it is important to understand how Western metaphysics gets into it. The fraud Western history of the calculus attributes its origin to Newton and Leibniz who did not even fully understand its infinite series or how to sum them. Eventually, in the 20th c., the West came up with a metaphysical understanding of the "exact" sum of infinite series using "limits", formal "real numbers", set theory etc. Students are not actually taught these things, in a first university calculus course, only indoctrinated into the belief that the related metaphysics is necessary. Formal real numbers are postponed to a course on "real analysis", and even most professional mathematicians never learn formal set theory. Therefore, it is important for the colonised to know that there is a better way to do calculus the way it originated as the numerical solution of differential equations, using non-Archimedean arithmetic and a different philosophy of mathematics called zeroism, which regards mathematics as practical knowledge about the real world, hence inexact. This course[42] has been tried out with three batches of pure and applied math students, and also post-graduate math students, at the Universiti Sains Malaysia, as also with a large batch of engineering and science students in SGT University, Delhi.[43]

4. **Decolonised calculus ("Calculus without limits") for humanities and social science.** Same as the above course, but further simplified, and with practical examples drawn not only from physics

41 Online summary documentation of HPS-1 and HPS-2 courses (and a decolonised philosophy course) are at: http://ckraju.net/Decolonised-curricula/Decolonised-curricula-Hps-1-hps2--philosophy.pdf. Photos of the students are posted at: http://ckraju.net/blog/?p=89. A short video of student reactions is posted at https://www.youtube.com/watch?v=ozQRBNk2alg. Full interview at https://www.youtube.com/watch?v=eCoLlle9ANA.

42 Summary online documentation for this course on "Calculus without limits for science and engineering" is posted at http://ckraju.net/Decolonised-curricula/Calculus-without-limits-summary-documentation.pdf.

43 See group photos of SGT University students and Vice Chancellor at: https://www.facebook.com/media/set/?set=a.835427293287604.1073743087.151010081729332&type=3.

and chemistry but also from economics, psychology, etc. It should be emphasized that this course[44] have been tried out with various batches of students, including one batch at the Central University of Tibetan Studies, Sarnath, India,[45] one batch of non-math students at the Universiti Sains Malaysia, one batch of students at Ambedkar University Delhi,[46] and one batch of students at the Centre for International Scientific Studies and Cooperation, Tehran.[47]

5. **Statistics for humanities and social science.** Statistics is used widely in business and marketing of course, but also in social sciences such as economics. Statistics is even used in humanities, today, for example, to analyse the writing style of a person, today made possible with the advent of mass digitisation. Accordingly, a course on statistics for social science has been prepared.[48] But a minimal understanding of calculus (hence the course on calculus without limits for social science) is a necessary pre-requisite for a critical understanding of any of the above uses. For example, as regards values, much medical research is based on statistics. Therefore, any intervention in medical ethics requires a *critical* understanding of statistics. This knowledge which was previously inaccessible is made possible with the decolonised math course.

Further decolonised courses have been designed, including those at school level.[49] But the above decolonised courses should suffice to kick-start the practical agenda of decolonising university education, to break the hegemony of the West. The most important thing is to take the first step.

44 Summary online documentation for this course on "Calculus without limts for social science" is posted at http://ckraju.net/Decolonised-curricula/Callculus-without-limits-social-sciences.pdf.

45 See group photo of students and Vice Chancellor of Central University of Tibetan Studies, Sarnath, at: http://ckraju.net/blog/?p=34.

46 See photos of Ambedkar University Delhi students and Vice Chancellor at: http://ckraju.net/blog/?p=83. .

47 See photos of Centre for International Scientific Studies and Cooperation, Tehran, students and Director, at: http://ckraju.net/blog/?p=84.

48 Summary online documentation for this course on "Statistics for social science and humanities" is posted at http://ckraju.net/Decolonised-curricula/Statistics-for-social-science-and--humanities.pdf.

49 See a summary list of courses at http://ckraju.net/Decolonised-curricula/decolonised-curricula.html.