

IMMUNISING THE MIND

How can education reform contribute to neutralising violent extremism?

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INTRODUCTION

Engineers seek ... to shape an entire techno-social world. In this sense, engineering denies history. It has no sympathy with the conflict, compromise and happenstance that brought the world to its present state. It collapses is into ought ... (Ken Alder)¹

The purpose of this paper is to explore research on whether there are links between the sort (rather than the amount) of education that young men and women receive, and their susceptibility to radicalisation. It starts with the apparent correlation, which has been well noted, between technical degrees – especially engineering and, to a lesser extent, medicine – and Islamist radicalisation; but goes on to note the corollary, which is the apparent *opposite* impact of education in the humanities and social sciences on the same process. I raise the question of whether a purposeful and focussed approach to education reform in the Middle East and North Africa (MENA) region, using these insights, might yield powerful results. It would involve both ‘humanising’ the teaching of scientific and technical subjects, and reinforcing the often sadly neglected status of research and teaching in the social and human sciences across the region. I also question whether current teaching of the STEM subjects in the region, but also in Europe and the US, provides enough of the broad-based education that would give vulnerable students the intellectual tools they need to develop and maintain an open-minded, interrogatory outlook. I note a specific British expertise in providing just this kind of breadth of science education. And I suggest that this would be fruitful field for thought and action, both as it affects education reform in the Middle East and North Africa, and as it touches on the education received by the large numbers of students from the region who come to the UK for education. Finally I suggest that it also has possible implications for educational thinking in the UK.

I acknowledge, necessarily, the paucity of statistics and the extent to which such a discussion is anecdotal, and I am aware of the tendency of writers in an area where statistics are hard to come by and very ‘soft,’ sometimes to elide Western and Middle Eastern samples. But I believe that the conclusions, if handled with proper scepticism, are enough to warrant further investigation and – for the British Council in particular – reflection on the focus of its education work in the Middle East and the wider Muslim world.

Radicalisation – a caution

The process of ‘radicalisation’ is very complex, talked about with great authority, but actually only very partially understood. Much useful observation and analysis have been done, but there is no very convincing broad synthesis. In adducing single reasons, or easily described routes of progression, we probably deceive ourselves: the process is infinitely variable and unique to every individual sucked into it. One way to think of radicalisation is as a kaleidoscope, filled with many small pieces of glass which arrange themselves differently with each turn of the barrel. If we are looking for the holy grail of *causes*, focusing on one piece, or several pieces, of glass to the exclusion of others is always wrong. Nonetheless, each piece needs to be examined in turn to see how it fits into the seductive patterns that the kaleidoscope makes.

This short paper takes a superficial look, based almost entirely on existing research, at educational background as one component, one piece of coloured glass, without claiming that it

¹ Ken Alder, *Engineering the Revolution*, Princeton 1997, p15. He continues “to shape a world more consonant with human desires,” but he is writing of Paris in the 1780s, not Cairo or Damascus in the 1980s, where presumed divine rather than human desires fuel the motor.

is the single answer. It is clear that the very provisional conclusions reached here – and the much more substantial ones that will result as the British Council takes this question forward – are simply one part of an answer that is not only multiple, but protean, changing as we watch. Understanding how education, and the mindsets bred by different sorts of education, push individuals towards, and hold them back from, radicalisation is an important *contribution* to understanding – and to designing remedies. This is as true of Britain or the Netherlands as it is of Egypt or Tunisia, and would, if satisfactorily demonstrated, have real and potent policy implications in Europe and the Middle East. But it is only part – albeit I think an important part – of a bigger picture.

EDUCATIONAL BACKGROUND AND RADICALISATION

Any suggestion that radicalisation is linked to low levels of education is easily enough refuted by citing the fairly large numbers of jihadis – and indeed ‘non-violent extremists’ – with secondary and tertiary education. Graduate jihadi leaders like Ayman al-Zawahiri (medicine) and Osama Bin Laden (engineering), as well as foot-soldiers like Mohammed Atta (engineering) and the June 2015 Sousse murderer, Seifeddine Rezgui (electrical engineering) can be adduced in reasonable numbers to suggest that jihadis recruit effectively amongst the educated. There are indications that this may be changing to some extent, and that the present generation of Daech recruits, particularly in the Middle East and North Africa, may be beginning to draw upon less educated people with more mundane and even mercenary motives.² Analysis by Diego Gambetta in 2007 concluded that almost half (48.5%) of the jihadis recruited within the MENA region had higher education of some sort, and that “the over-representation of university-educated in our sample relative to the general population of their countries is significant.”³

My purpose here however is to focus not on the quantity of education – interesting as it is – but on the subjects studied by the various graduate recruits, and through those on the place of education in the much broader and more complex process of radicalisation. Dismissing the suggestion that jihadis are uneducated, Dr Subhi Al-Yazji of the Islamic University in Gaza is reported as saying: “Contrary to how they are portrayed by the West and some biased media outlets, which claim they are youths of eighteen to twenty years who have been brainwashed, most of the people who sacrificed their lives for Allah were engineers and had office jobs. They were all mature and rational ...”⁴ What Al-Yazji draws attention to here, though it isn’t intended to be his main point, is the fact that so many of them are engineers.

There has been a certain amount of comment on the prominence of engineers amongst jihadis, and I shall return to it below; but it is part of a larger argument. The statistics on educational background are very thin, particularly when it comes to subject studied, so one must generalize with care, but studies by Diego Gambetta and Steffen Hertog on engineering,⁵ and rather more

² For example an interesting story in *TelQuel*, 13-19 March 2015, *Daech: Sur la route di jihad*, by Reda Mouhsine

³ Diego Gambetta and Steffen Hertog, *Engineers of Jihad*, Sociology Working Papers 2007-10, Department of Sociology, Oxford University., p10.

⁴ http://www.memri.org/clip_transcript/en/4318.htm - visited 9.6.2015

⁵ Gambetta and Hertog, *op. cit*, *passim*. Dr Gambetta is reportedly preparing a book of the same title for Yale University Press.

superficially by Stephen Schwartz on medicine,⁶ do suggest that there may very well be an imbalance in favour of these (and perhaps other) technical and scientific subjects when it comes to jihadi disposition. Gambetta, in his sample, finds that 44% of graduate jihadis recruited within the region had degrees in engineering,⁷ as did 59% of the much smaller proportion of graduates among western-recruited jihadis.⁸ This is at least very suggestive. Other analysts find similarly. Rabasa and Benard, looking just at British Muslims implicated in terrorist attacks, find that 18 of the 31 whose educational background they can establish with some confidence had completed or were studying for tertiary degrees, of which eight were in engineering, IT or systems design and one in the related field of architecture; three in business; two in science (earth science and biomedical science); one each in statistics, sport science, pharmacy and maths. Only one – an uncompleted Arabic degree from the University of Damascus – was in the Humanities or Social Sciences.⁹

Both Schwartz and Gambetta suggest why this might be so. Schwartz, writes that “the radicalization of Muslim doctors is ... systematic. They occupy a superior stratum of their society and, as such, are targeted by radical ideologues.” In explanation, he adds that “the manner in which US and European universities teach medicine,” focussing “primarily on hard science” is damaging to the ability of young medical students to think critically on a broader canvas.¹⁰ The growing appeal of creationism amongst British Muslim medical students, and the boycotting of lectures on evolution at UCL medical school in 2011 under the influence of the Muslim creationist Harun Yahya are perhaps symptoms of this.¹¹ With evidence emerging of quite large-scale recruitment of doctors by Daech, or ‘the Islamic State’ (British-Sudanese medical students seem to have left Khartoum for Raqqa in significant numbers, and several groups, to take only one example¹²), it is worth considering whether the way in which medicine is taught, or even the emotional coping-mechanisms, amounting sometimes to cut-off, that doctors need to learn in order to handle dissection, pain and death, are themselves vulnerabilities when it comes to recruitment.

Looking with more rigour at engineers amongst 196 graduate jihadists out of a total sample of 404 (the remainder either didn’t have tertiary education, or information on their education was unavailable), Gambetta finds the heavy representation noted above, and *some* over-representation, though much weaker, in ‘non-violent extremists.’¹³ Across a range of international research, much of it in non-Muslim countries, he finds a tendency for engineers (whether Muslim or Christian) to be conservative (i.e. towards the ‘right’ of the political spectrum), and religious, but above all to be markedly over-represented in the overlapping category ‘religious-and-conservative.’¹⁴ He hypothesizes a specific and identifiable ‘engineering mindset,’ and argues

⁶ Stephen Schwartz, *Scientific Training and Radical Islam*, Middle Eastern Quarterly Spring 2008, pp3-11, access at <http://www.meforum.org/1861/scientific-training-and-radical-islam>, unpaginated – accessed 10.7.2015

⁷ Gambetta and Hertog, *op. cit.*, p11

⁸ Gambetta and Hertog, *op. cit.*, pp19-21

⁹ Angel Rabasa and Cheryl Benard, *Eurojihad: Patterns of Islamic Radicalization and Terrorism in Europe*, Cambridge: CUP, 2015, pp 60-65, 81-2, 93-5

¹⁰ Schwartz, *op. cit.*, unpaginated

¹¹ For instance Steve Jones, *Islam, Charles Darwin and the Denial of Science*, Daily Telegraph, 3rd December 2011

¹² Mark Townsend, *What happened to the British medical students who went to work for ISIS*, The Observer, 12th July 2015, <http://www.theguardian.com/world/2015/jul/12/british-medics-isis-turkey-islamic-state>

¹³ Gambetta and Hertog, *op. cit.*, p27

¹⁴ Gambetta and Hertog, *op. cit.*, pp51-3

persuasively that the phenomenon of jihadi engineers in the Middle East is a product of interaction between circumstance (the interrupted upward mobility of poorer Middle Eastern students in the 1980s and 90s¹⁵) and this mindset that leads towards, and is reinforced by, an engineering education.¹⁶ Both of these factors need to be unpacked.

WHY ARE ENGINEERS AND DOCTORS OVER-REPRESENTED AMONGST EXTREMISTS AND JIHADIS?

Jihadi organisations need doctors to staff hospitals and engineers to make bombs and IEDs, run oil refineries and build roads: the claim of Daech to be a state amplifies this need. In September 2014 Abu Bakr al-Baghdadi issued a call for recruits in which he specifically identified the need for “judges, doctors, engineers and people with military and administrative experience.”¹⁷ In part the need for engineers in late 2014 reflected the haemorrhage of oilfield engineers over the previous few months that was having a serious impact on the Caliphate’s oil revenues,¹⁸ but clearly there was, and is, also a military need.¹⁹ Across the whole spectrum of violent Islamism there are examples of highly skilled terrorist-engineers with identifiable specialities, including Yahya Ayyash,²⁰ an electrical engineering graduate known as ‘the Engineer,’ who was Hamas’s chief bomb-maker; Dirar Abu Sisi,²¹ with a PhD in military engineering from Kharkov Military Academy who ran Gaza’s only electrical plant and built Hamas rockets; Akram Juda,²² who ran the technical side of the tunnels across the Egyptian border (as well, allegedly, as making rockets); Ibrahim al-Asiri,²³ AQAP’s chief bomb technician, and reputedly a chemist or chemical engineer; or Azhari Husin,²⁴ another engineer who made the bombs for the Bali attacks of 2004 and 2005.²⁵ But many other, less mythologized, bomb-makers are ex-soldiers, electricians and mechanics with hands-on experience and aptitude, but no higher education at all.

So engineers may be sought out by Daech as by any other graduate recruiter. Why though do they respond so disproportionately – “over-represented among Islamic radicals by two to four times the size we would expect”?²⁶ The Caliphate’s need for engineers, and even its targeted recruitment of them (among other professionals) simply makes more pressing, without answering, the question of why so many engineers find violent jihad compelling and congenial, when the opposite seems true of economists and anthropologists. Gambetta concludes, after examining the possibility that the prominence of engineers is skills-based, that engineers are widely recruited into *non*-technical management roles in most jihadi organisations, and that

¹⁵ Gambetta and Hertog, *op. cit.*, pp59-69

¹⁶ Gambetta and Hertog, *op. cit.*, pp77-9

¹⁷ BBC, *ISIS leader calls on Muslims to ‘build Islamic State,’* BBC News website, 1st July 2014, www.bbc.co.uk/news/world-middle-east-28116846

¹⁸ Hugh Tomlinson, Tom Coughlin, *ISIS oil bonanza cut by half as engineers flee Caliphate*, The Times, 20th September 2014, <http://www.thetimes.co.uk/tto/news/world/middleeast/article4205141.ece>

¹⁹ Shrin Jaafari, ‘The Islamic State needs doctors and engineers too, PRI,’ 21st May 2015, <http://www.pri.org/stories/2015-05-21/islamic-state-needs-doctors-and-engineers-too>

²⁰ <https://www.jewishvirtuallibrary.org/jsource/biography/ayyash.html>

²¹ http://mfa.gov.il/MFA/AboutIsrael/State/Law/Pages/Indictment_Gazan_engineer_Dirar_Abu_Sisi_4-Apr-2011.aspx

²² <http://www.jpost.com/Arab-Israeli-Conflict/Israel-indicts-Hamas-tunnel-engineer-381466>

²³ <http://www.theguardian.com/world/2014/jul/03/al-qaida-bombmaker>

²⁴ Gambetta and Hertog, *op. cit.*, p40

²⁵ Gambetta and Hertog, *op. cit.*, give a useful summary of examples at p3ff

²⁶ Gambetta and Hertog, *op. cit.*, p34

bomb-making is generally done by a small corps of specialists who are often of a lower level of theoretical expertise than engineering graduates. And, in a conclusion that may be a little deflating for jihadi engineers, “it is doubtful that violent movements with a larger share of engineers have mustered a greater destructive power than groups without.”²⁷

Moving on, it is important first of all to try to make a provisional distinction between the two categories, of violent jihadis and non-violent radicals. I have noted that Gambetta finds the over-representation of engineers amongst the latter to be slighter, though still significant, than amongst jihadis.²⁸ He notes that “though engineers are over-represented in both [violent and peaceful Islamic groups], holders of ‘Other Elite Degrees’ (i.e. medicine and natural sciences) “are much more strongly represented among the latter. Islamism seems to be appealing to both, but engineers seem much more prone to take the step to violence.”²⁹ A 2010 Demos report on radicalisation notes interestingly that “terrorists were more likely to hold technical or applied degrees – medicine, applied science and especially engineering. [Non-violent] Radicals, by contrast, were much more likely to study arts, humanities and social sciences.”³⁰ This, if corroborated, would suggest that the transition from one category to the other is not at all the smooth and slippery slope that anti-terrorism theorists imagine and which forms the basis of much security rhetoric.

The distinction made by Demos is with specific reference to British extremists and British jihadis. In the Middle East and North Africa, there is the divergence between engineers and ‘Other Elite Degrees’ noted by Gambetta, but the Faculty of Letters seems less well represented, apart from Islamic Studies. A recent writer on the non-jihadist and historically rather less violent Muslim Brotherhood, Hazem Kandil, says that “One look at members’ educational backgrounds reveals that highly educated Brothers (including 20,000 with doctoral degrees and 3,000 professors) come overwhelmingly from the natural sciences.” He notes that there are clerics, lawyers and businessmen, and even a handful of literature students. “Absent, however, are students of politics, sociology, history and philosophy.” Kandil analyses the Brotherhood’s top leadership, finding veterinarians, agronomists, engineers, geologists and doctors, but virtually no social scientists. He quotes one former Brother as saying, “In social sciences one learns that someone made an argument; another criticized it; and history validated or disproved it. Questioning received wisdom is welcomed. In natural sciences by contrast, there are no opinions, only facts. This type of matter-of-fact mentality is more susceptible to accepting the Brotherhood’s formulas which present everything as black or white.”³¹

Similar preponderances of engineers and scientists have been noted elsewhere, for example among the FIS leadership that emerged during the civil war in Algeria, referred to in 1999 as “les technocrates et modernistes du FIS.”³² More recently a study carried out by the General Union of Tunisian Students and published in June 2015, which polled students across the country’s universities in search of explanation for the country’s huge production of jihadists, commented (with grim prescience in view of the murderous rampage by an electrical engineer at Sousse only

²⁷ Gambetta and Hertog, *op. cit.*, p40-41

²⁸ Gambetta and Hertog, *op. cit.*, p27

²⁹ Gambetta and Hertog, *op. cit.*, p35

³⁰ Jamie Bartlett, Jonathan Birdwell and Michael King, *The Edge of Violence: A Radical Approach to Extremism*, London: Demos, 2010, p24

³¹ Hazem Kandil, *Inside the Brotherhood*, Cambridge 2015, pp34-5

³² *Le porte-drapeau des ‘technocrates.’ Itinéraire d’un ingénieur fondateur du FIS*, Service Etranger, Libération, 23 November 1999

weeks later) “that science rather than liberal arts students are most attracted to jihadist groups.”³³ An article reporting the research comments that “according to the study, students in mathematics and technology disciplines have the highest rates of recruitment to extremism – 19 percent, followed by natural sciences, chemistry, and physics at 21 percent, then Benzert engineering with 14 percent, and finally literature and law at the end of the list at 3.3 percent.”³⁴

Gambetta, as I noted above, offers two main factors in explaining the preponderance of engineers, and they need to be explored separately. On the one hand, he posits a crisis of unmet expectations amongst engineers from low and middle income families, leading to discontent and radicalisation; and on the other, he describes a distinctive ‘engineering mindset,’ which he regards as more susceptible to jihadi doctrines than other educationally defined mindsets.

SOCIOLOGY OF THE ENGINEERING PROFESSION

The trajectory of the engineering profession in the Middle East is particular, and important. Before the end of the colonial period, engineering, as a coherent profession, existed nowhere in the Arab world except in Egypt. There and elsewhere it developed fast after decolonisation, taking a leading role in state-led national development, and then grew rapidly, closely entwined both with government itself and with the state’s modernisation project. In the 1960s and 70s the fast-expanding engineering profession absorbed many young men of poor and middling backgrounds, offering them funded training, entry into a state-sponsored elite, security, salary and social advancement. Engineers were, in the words of Ali El-Kenz, “les enfants gâtés des nouveaux états” – the spoiled children of the new states.

After a quarter of a century of increasingly taken-for-granted job security, status and prosperity, engineers’ prospects began to crumble in the 1980s with economic crisis and the ‘liberalisation’ and privatisation of the state initiated by Sadat in Egypt, and widely followed across the region. This of course particularly affected the young, who emerged from their education into a job-market that was not able to absorb large numbers of newly fledged engineers, and who found their hopes and aspirations dashed. They reacted in different ways in different countries, reflecting the different histories of each, but in Egypt and Algeria, and to a lesser extent in Morocco, Tunisia and Syria, disgruntled engineers turned to organisation, to politics and – substantially – to Islamism.³⁵ The Tunis study quoted above as stressing the presence of science and technical students among jihadis, notes “that most recruited students come from universities in the poorer governorates, especially the universities of Qairawan, Benzert, Qabes, and Sidi Bouzid, regarded as the cradle of Tunisian revolution. Extremists may have an easier

³³ Wagdy Sawahel, *Some 1,300 Tunisian students are jihadist fighters*, University World News, no. 370, 5th June 2015

³⁴ Msaddak Abdel Nabi, *Why Tunisia is the Top Supplier of Students to the Islamic State*, Al-Fanar, 8th July 2015. As the observant reader will have noticed, the figures don’t quite make sense, and it seems likely that there is a typographical error in the second percentage cited. http://www.al-fanarmedia.org/2015/07/why-tunisia-is-the-top-supplier-of-students-to-the-islamic-state/?utm_source=Al+Fanar+list&utm_campaign=af56834603-New+Beirut+Leader%3B+Egyptian+Renaissance+Woman+15%2F7&utm_medium=email&utm_term=0_8b6ddcac65-af56834603-%5BLIST_EMAIL_ID%5D&ct=t%28Terrorism%E2%80%99s+Cost+Hits+the+Classroom+1%2F7%29

³⁵ Ali El-Kenz, *Les Ingénieurs et le pouvoir*, Tiers-Monde, 1995, vol 36, no 143 pp 565-579

time recruiting these students, the report said, due to 'the deterioration of social circumstances ...'³⁶

This differentiated advance can be seen in two election processes noted by Gambetta. The Egyptian professional associations of engineers, doctors and pharmacists were the first to fall to the Islamists in the mid-1980s: the hitherto leftist lawyers' association held out until the 1990s. And in the Cairo University faculty committee elections of 1990-91, he records the clean sweep of the engineering faculty (Islamists winning 60 out of 60 seats in what had been a leftist bastion), medicine (72 of 72), science (47 of 48) and contrasts these with economics and political science, where Islamists managed to win only 13 of 49 seats).³⁷ This would seem to reflect the fast-growing politicisation of the free professions, perhaps particularly the engineers, in a hostile social environment; and their turn to Islamism – but also a resistance, to which we shall return, in the social and human sciences.

THE ENGINEERING MINDSET

The second element in Gambetta's hypothesis, mindset, is more important to my argument (though the relative importance of his two main factors is impossible to pin down). He explores it in a way that is particularly interesting. He quotes a British Intelligence dossier, describing jihadi recruitment in the UK as seeking individuals who are "very inquisitive but less challenging," and noting concerted attempts to recruit "people with 'technical and professional qualification,' particularly engineering and IT degrees."³⁸ Citing Reinhard Schulze's ascription to Islamic radicalism of a "cybernetic view of society,"³⁹ Gambetta reads across to an analysis of right-wing extremism (in which engineers are also significantly over-represented, while the opposite is true of leftist extremism) and picks out three traits that characterise the 'engineering mindset': *monism*, *simplism* and *preservatism*. "Whether American, Canadian or Islamic, and whether due to selection or field socialisation, a disproportionate share of engineers seems to have a mindset that inclines them to entertain the quintessential right-wing features of "monism" – 'why argue when there is one best solution' – and of "simplism" – 'if only people were rational, remedies would be simple.'" As for *preservatism*, "its underlying craving for a lost order, its match with the radical Islamic ideology is [sic] undeniable: the theme of returning to the order of the prophet's early community is omnipresent in most salafist and jihadist ideology."⁴⁰

Marc Sageman, former CIA agent and authority on terrorist networks, sums it up thus: "The elegance and simplicity of [Salafism's] interpretations attract many who seek a single solution, devoid of ambiguity. Very often these persons have already chosen such unambiguous technical fields as engineering, architecture, computer science, or medicine. Students of the humanities and social sciences were few and far between in my sample."⁴¹ And the Tunisian study quoted above makes much the same point, that "the Tunisian educational curriculum in science, math and technical disciplines does not generally give students analytical or research skills or the ability to do critical thinking, according to [Ahmed] Al-Zawady [head of the General Union of Tunisian Students]. Teaching is dominated by what are regarded as proven facts with no room

³⁶ Msaddak Abdel Nabi, *loc. cit.*

³⁷ Gambetta and Hertog, *op. cit.*, p 26

³⁸ Gambetta and Hertog, *op. cit.* p42

³⁹ Gambetta and Hertog, *op. cit.* p48

⁴⁰ Gambetta and Hertog, *op. cit.*, pp48-9

⁴¹ Marc Sageman, *Understanding Terror Networks*, Philadelphia 2004, p116

for discussion. That makes those students easy prey for recruitment, while literature students, who are more inclined to debates, discussions, and research in their theses, are less susceptible.”⁴²

Engineers seem to have left fingerprints all over the Islamist ‘violent extremism enterprise.’ The fact that (after Islamic Studies) medicine and natural science follow next, if at a bit of a distance, suggests that there is a broader educational phenomenon here – that, as Gambetta puts it in passing, “‘engineer’ may well be a proxy for a type of person attracted by and present in other technical-scientific degrees too, though not as frequently as among engineers”⁴³ (and a footnote referring to an article by Simon Baron-Cohen suggests tentatively that this may even relate in some part to the over-representation of high-functioning autists amongst engineers⁴⁴, a thesis also explored by Steve Silberman in his article *The Geek Syndrome*⁴⁵). He concludes, in other words, that something in the type of mind attracted to engineering, reinforced by the nature of the discipline and the way it is taught, propels engineers disproportionately towards jihad.

THE SILENCE OF THE SOCIAL SCIENTISTS

Just as important, and obvious enough in the light of these arguments, is the other side of the coin: the almost complete absence of identifiable social scientists from the jihad. It suggests that the humanities and – particularly – the social sciences may confer on their students a capacity for critical, nuanced thinking that gives them resistance to the doctrinaire babble of the extreme Islamists. (Intriguingly this, like the prominence of engineers, seems to be a specific characteristic of Islamist movements, faintly reflected in other right-wing movements, whereas leftist movements may perhaps reverse the polarity, with an over-representation of social scientists and arts graduates in, for example, the Red Army Faction, Baader Meinhof, the Japanese Red Army and US and Latin American leftist groups of the 1960s.⁴⁶)

Adherence to salafi and salafi-jihadi organisations demands uncritical acceptance of ex cathedra pronouncements and interpretations, and the suppression of any capacity for critical examination. ‘Aimen Dean,’ the pseudonymous Saudi al-Qa’ida terrorist who has ‘come out’ as an MI5 agent, talked recently about the way doubt had been sown in his own mind, and thus of how to attack the ideological solidity of jihadists: “Isis is offering simple answers to all questions – so you need to encourage complexity: 100% certainty means a committed militant; 95% certainty means a confused militant; a confused militant is a disarmed militant. That is what is needed. To confuse them, not convince them.” And what Dean, a theologian rather than a social scientist, calls confusion might be better described as ambiguity, nuance and the multiplicity of meaning.⁴⁷

⁴² Msaddak Abdel Nabi, *loc. cit.*

⁴³ Gambetta and Hertog, *op. cit.*, p57

⁴⁴ Gambetta and Hertog, n63, p58, refers to research done by Simon Baron-Cohen, which finds a slight but perceptible increase in the number of near relatives of engineers (as against other graduates) suffering from high-functioning autism.

⁴⁵ Steve Silberman, *The Geek Syndrome*, Wired 9.12, http://archive.wired.com/wired/archive/9.12/aspergers_pr.html also explored in his 2015 book *Neurotribes: The Legacy of Autism and the Future of Neurodiversity*.

⁴⁶ Gambetta and Hertog, *op. cit.*, p31, where sometimes impressionistic results for different movements are gathered in a table.

⁴⁷ Ian Black, *Confusing the message is the key to disarming Isis, says ex-terrorist*, The Guardian, 6th June 2015

One could argue about the balance between, on the one hand, the aversion of radical groups to critical thinking (meaning that like the Brotherhood they actively resist recruiting people who are going to cause dissension by questioning authority); and on the other the prophylactic effect on the susceptibility of intelligent young men and women of *learning how to think*. There is also a social and intellectual differentiation in the recruitment to the two branches of learning in Middle Eastern universities (to which I shall return below), but it seems at least highly likely that, one way or the other, the intellectual attitudes and the imperative for unfettered critical thinking that come from good, and even indifferent, teaching in the social sciences do not mix well with radicalisation, a point well made by Marc Sageman and Hazim Kandil, both quoted above. The British Intelligence dossier cited by Gambetta is very clear in its implication: jihadi recruitment is of those who are intelligent and curious, but unquestioning of authority. These are not the characteristics of a good social scientist.

THE SOCIAL SCIENCES IN THE ARAB WORLD

The MENA region certainly has its internationally distinguished social scientists, though many of them keep at least one foot overseas (80% of the research work of Algeria's 30 most productive authors was published abroad; 66% of the 50 most productive; and 45% of the top 200 – though in Morocco and Tunisia “the brain-drain is *only* [my italics] half as important”⁴⁸). For those who stay, energies are dissipated by popularisation, journalism and other external work, so that “social scientists are more visible as consultants and political militants than just scholars.”⁴⁹

Taken as a whole, the social sciences form a profession and a discipline very different to those in the anglophone and francophone West. “Arab countries that create a hospitable environment for [social science] research are rare. Political repression, censorship and lack of research-based policy hinder the development of such environments,” as a 2014 report from ESCWA puts it.⁵⁰ In other words, the nature and role of the social sciences has not been, as in Europe and North America, a critical role predicated on government's generally acting on evidence-based policy. “The fundamental question,” as the same report puts it, “for social sciences after Independence, and this is true for all postcolonial societies, is how to serve the state, the nation or the modern project pursued by the nation. This project, whether communist, socialist, nationalist or even pro-American, was concerned with the country's needs for a modern administration and economic sector. This absorbed the social sciences into resolving technical problems rather than being critical of them.”⁵¹ It also, in the absence of evidence-based policy, tended to subjugate them to ideologically driven policy. There was in this a marked tension with the colonial inheritance of sociology, ethnology, history, anthropology and so forth, which tended to be viewed with suspicion, even delegitimized; and against which many, but not all, scholars reacted strongly. Arguably, however, it was just this reaction – this intense and often hostile, though not infrequently creative, interaction with the colonial intellectual legacy – which provided the immunisation.

⁴⁸ Rigas Arvanitis, Roland Waast and Abdel Hakim Al-Husban, 2010 World Social Science Report *Knowledge Divides, Background paper: Social sciences in the Arab world*, UNESCO/ISCC 2010, p17 <http://unesdoc.unesco.org/images/0019/001906/190653E.pdf>

⁴⁹ Rigas Arvanitis, Roland Waast and Abdel Hakim Al-Husban, *op. cit.*, p16

⁵⁰ *The Broken Cycle: Universities, Research and Society in the Arab World, Proposals for Change*, Beirut: ESCWA, January 2014, p42

⁵¹ *Ibid.* p44

It certainly wasn't the quality of education, or research, in the social sciences. Except in Lebanon and, for very different reasons, Syria, such social science research as there is has been concentrated outside the universities in NGOs, and has tended to be viewed with suspicion by governments, its activities often confined, again in ESCWA's words, to "perfunctory research with the output often consisting of an unpublished report."⁵² Actual, critical and internationally recognized social science research has often been seen as inherently oppositional, and its determined practitioners harrassed and sometimes maltreated. This is not to suggest that there aren't very significant Arab social scientists – names like Mohamed Tozy, Hassan Rachik, Ali El Kenz, Fatima Mernissi, Ali Dessouki, Sari Nusseibeh, Ahmed Driss and Saad Eddin Ibrahim stand out – but that they are relatively few, and correspondingly important.

As for the university faculties, it has not escaped the attention of Middle Eastern governments that the humanities and social sciences offer the cheapest way, per capita, of educating students. When governments are faced, as most are, by intense pressure to accommodate the population bulge that is still working its way through their educational systems, this is important. As I heard one morose Egyptian academic comment at a conference recently, the expansion of higher education simply means more students, disproportionately women, studying the humanities and social sciences at underfunded provincial universities. Across the region, "human and social sciences account for two-thirds to three-quarters of the total [university] enrolment," though "faculty members account for one-third to half of all academic staff."⁵³

And it need hardly be said that, if engineers face unemployment problems, that problem is more acute for graduates from the faculty of letters. Taking as an example Algeria, one of the two countries where the engineering-to-extremism progression is most marked, graduate unemployment runs at 28.7% for the social sciences, 27.3% for the humanities, 18.1% for science and 14.8% for engineers (against a national headline rate of 9.8%).⁵⁴ Across the region the whole situation is shaped by the contraction of public sector employment for which the humanities and social sciences have historically provided unconditional entry-tickets. There have even been recent academic suggestions that jihad is a reasonable and economically logical graduate career choice.⁵⁵

Professor Mohammed Tozy, perhaps Morocco's leading sociologist, described in 2014 "a sense that [his profession] was withering for lack of funding and organization, and because planning for its future was entirely inadequate. He described a profession in crisis, with a deeply disturbing succession profile, a lack of quality control and a severe shortage of actual research."⁵⁶ The single most important report on the social sciences in Morocco, known as the *Cherkaoui Report*, after its author, paints a deeply gloomy picture. Morocco may – indeed does – boast some of the most significant sociologists and anthropologists in the whole region, but as Cherkaoui points out, only 45% of its faculty in the social sciences have ever published a single word; and of what *is* published, a disturbing proportion is in 'Islamic Studies,' much of which amounts to little more than religious polemic.⁵⁷ (And it must here be remembered that Islamic Studies, somewhat oddly

⁵² ESCWA, *op. cit.* p42

⁵³ Rigas Arvanitis, Roland Waast and Abdel Hakim Al-Husban, *op. cit.*, p16

⁵⁴ David Furceri, IMF Working Paper WP/12/99, Unemployment and Labour market Issues in Algeria

⁵⁵ For example J-P Azam, How to Curb 'High Quality' terrorism, <http://www.idei.fr/doc/wp/2006/terrorism.pdf> - visited 9.6.2015

⁵⁶ Speaking to a conference in Agadir in 2014. Quoted in the introduction to *Academic Publishing in Morocco*, by Peter Davison, British Council Morocco, 2015

⁵⁷ Cherkaoui, M., 2006. *Rapport de la première phase de l'enquête sur [l'évaluation du système national de la recherche dans le domaine des Sciences Humaines et Sociales]* (Rabat: Ministère de l'Enseignement Supérieur, de la Formation des Cadres et de la Recherche Scientifique) and Cherkaoui,

classified in most countries of the region as a social science, provides significant numbers of graduates to jihad, albeit at nothing like the rate of engineers.) Social science in the Western tradition, in other words, is a small island under threat from all sides. The situation in other countries of the region varies, of course, but although less dire in some, is not often fundamentally different.

Although they fall outside the direct scope of this paper, it is important to note that here have been systematic theoretical attempts to resolve this dilemma *within* a Muslim context. Such initiatives, of which the 'Islamisation of Knowledge' project is one flag-bearer, highlight the implications of the failure to develop critical thought of a specifically Muslim nature which can engage with the dominance of 'Western' epistemology and science. The project itself proposed to "recast the modern social sciences within the framework of Islam," but seems to have faltered and is regarded by some contemporary critics as too limited. As one writer in this critical tradition puts it, "It is important that Muslims recognize that knowledge is always a human construct that results from human beings' endeavours to understand the world. The classical knowledge that is based on the Islamic epistemology ... is not absolute and unchangeable." Many would agree with Suhailah Hussien that "The elevation of Shariah to the level of the Divine has eliminated Muslims' role as active meaning-makers," reducing Islam to a "totalistic ideology." Muslims "become passive receivers rather than active seekers of truth and Islam becomes an ideology rather than an emancipating religion."⁵⁸ As Ziauddin Sardar puts it, "ideology is the antithesis of Islam. It is an enterprise of suppression and not a force of liberation. Islam is an invitation to thought and analysis, not imitation and emotional following."⁵⁹ This seems very clearly to be true, and offers another strand in approaches to education reform, but the fact that it needs to be said suggests that the latter – "imitation and emotional following" – remains the general rule, with the kind of results identified throughout this paper. Abdelwahab el-Affendi sums it up nicely: "We need really to develop a new learning paradigm that encourages students to develop wings, rather than attaching deadweight to their feet."⁶⁰

What then is truly remarkable is that something rubs off on these students. If, even in the frequently abject state of teaching that prevails today, the social sciences confer a relative immunity to Islamic extremism, both violent and probably also non-violent, how much more could they do, well taught and even re-imagined? And what are the implications of continued collapse in the graduate employment market, especially in the public sector, in terms of potentially greater radicalisation of these hitherto resistant students? Both questions need urgent answers, and the consequences of failing to understand their importance may be serious.

M., 2009. *Rapport de synthèse* (Rabat: Ministère de l'Enseignement Supérieur, de la Formation des Cadres et de la Recherche Scientifique)

⁵⁸ Suhailah Hussien, *Critical Pedagogy, Islamisation of Knowledge and Muslim Education*, in *Intellectual Discourse*, Vol 15, no. 1, pp85-104, 2007

⁵⁹ Ziauddin Sardar, *Islam, Postmodernism and Other Futures: A Ziauddin Sardar Reader*, London 2003, p171

⁶⁰ Abdelwahab El-Affendi, *Thinking of Reconfiguration*, in *Critical Muslim 15, Educational Reform*, London 2015, pp 49-58

DEFECTS IN SCIENCE AND IN SOCIAL SCIENCE EDUCATION

Stephen Schwartz's remark, which I quoted above in part, emphasizes the targeted recruitment by jihadists of professionals and particularly doctors. What he goes on to say (and I quote it here in full) is this: "The problem is compounded for immigrants studying in the West and their progeny, by the manner in which US and European universities teach medicine. Because they focus primarily on hard science, Muslims can go through the courses with very little exposure to the arts and humanities, and therefore not have their sometimes simplistic views of religion challenged. In Britain, where medicine is an undergraduate field, the chance that Muslims doctors will receive any college-level training in the humanities is slim."⁶¹

This is true across the Middle East and North Africa – but as Schwartz points out and other sources confirm, it is true in Europe and the UK too. The problem is not just the poor delivery and lack of respect for the social sciences; but the way in which the hard sciences – the STEM subjects – are taught. Describing his own intellectual trajectory, a Muslim colleague of mine stressed to me recently that the situation is little better in Europe, that the culture of science teaching resolves all too easily into binary right and wrong, correct and incorrect – and that only when he had immersed himself in the sociology and philosophy of science as a postgraduate did he find himself liberating and articulating his own thinking, right across the board. In other words the *inadequate* teaching of the 'hard' sciences, which pre-conditions the mind in a binary framework of right and wrong, is potentially as damaging as the lack of respect for (and the poor teaching of) the social sciences, which at their best undermine such a framework.

Across the Muslim world – indeed across much of the world – both these areas of silent disaster loom large. In the UK a tendency is very noticeable, when cutting Higher Education budget, to protect STEM research and teaching while directing the reductions elsewhere. This innovation-focussed, economically driven prioritisation is near-universal amongst Islamists and governments in the Arab World, as well as in the West, enshrining the contentious assumption that economic growth is the overriding aim of education – and that only STEM subjects really drive growth. Utilitarian instruction that underpins 'technological innovation,' 'progress' and 'economic growth' is to be encouraged: the more indefinite, less obviously practical disciplines that encourage students to question authority and orthodoxy take the funding cuts. "In a paper issued October 18 by the Islamic State's ... Diwan of Education, the Islamic State eliminated the faculties of archaeology, fine arts, law, philosophy, political science, sports, tourism and hotel administration ...the diwan also cancelled classes involving studies of democracy, non-Islamic culture and human rights in all faculties. It forbids studies of drama and novels, money lending, ethnic and geographical divisions, historical events contradicting Islamic State's revisionism and Iraqi civics."⁶²

This *prioritisation*, if not the ruthless implementation of it, finds echoes in the education policies of most Middle Eastern governments. The subjects of study that are encouraged and privileged are those that are imagined as supporting economic development; the rest is viewed with profound suspicion not just by government, but by the religious establishment, which doesn't easily cope – today at least – with ambiguity and multiple meaning. This is of course particularly so where that establishment has been influenced, however indirectly, by the doctrinaire singularities of Wahhabi Islam and its derivatives. "The humanities, social sciences, and liberal arts cannot be expected to develop in highly conservative and authoritarian setting – which explains the

⁶¹ Stephen Schwartz, *op. cit.*

⁶² Quoted in <http://www.al-fanarmedia.org/2014/11/islamic-states-plan-universities/> - visited 10.6.2015

expected focus of the new curricula on the ‘exact sciences’, and the expected ‘domestication’ of the social sciences within a framework of social engineering.”⁶³

RECRUITMENT TO HIGHER EDUCATION IN THE ARAB COUNTRIES

It is worth noting that throughout the Arab Muslim world university entrance tends to be organised according to a fixed hierarchy of faculties, by which a secondary school leaver’s final exam mark qualifies him or her to enter a faculty with an entrance requirement at that or a lower level. Medicine and engineering are the top two faculties, followed by natural science, with letters some way behind. The elite faculties – but not the faculty of letters – operate a fixed inscription quota, a *numerus clausus*. So the students with the highest marks tend to go into medicine, engineering and science, and the low scorers go to the very much larger faculties of letters to read humanities and social sciences. It is relatively unusual for a student to select a faculty below his or her entitlement. This hierarchy means that engineers are by definition considered to be amongst the most intelligent of the young men and women entering higher education (just as those entering letters *may* be generally less so) – and this too needs to be factored, with caution, into an understanding of ‘the engineering mindset.’ Gambetta, in isolating engineers as 44% of graduate jihadis, also produced total figures for what he describes as ‘elite degrees’ (i.e. engineering, medicine and science) which were studied between them by 56.7% of all graduate jihadis, a figure rising to 63.4% if economics and business are also included on the basis that in some countries, like Egypt, they too have selective admission.⁶⁴ This might suggest that it is the selective and prestigious nature of the degree as much as the specific content that appeals to intelligent young men and women. And it might also suggest that jihadis recruit the holders of such degrees because they are disproportionately represented in national elites – but these counter-hypotheses do not account satisfactorily for the over-representation of jihadi engineers amongst elite degree holders.

An alternative argument might plausibly maintain that success at secondary school leaving exams and entry into the elite faculties requires precisely the passive acceptance of right and wrong, and the faithful reproduction of knowledge learned by rote that engineering and jihadism seem also to require. In this case the entire education system in most Middle Eastern countries is a selection mechanism for the engineering mindset. To suggest this, however diffidently, is to draw a causal connection between the progress of education reform and social resilience to extremism and jihad.

EDUCATION FROM THE BOTTOM UP – THE BIGGER CHALLENGE

The challenge of course reaches right down to the very beginning of education. In a region where total and functional illiteracy are much more rife than any government likes to admit, and where pædagogy remains to a large extent rote-based, teacher-centred and exam-governed (not to mention built frequently to this day on the shaky foundation of the *msid*, or *kuttaab*, the pre-school drill-hall of quranic memorisation), the quality of learning needs radical overhaul. The

⁶³ Romani, V., *The Politics of Higher Education in the Middle East: Problems and Prospects, in Middle East Briefs*. 2009, Brandeis University, Crown Center for Middle Eastern Studies: Waltham, Mass., quoted in Rigas Arvanitis, Roland Waast and Abdel Hakim Al-Husban, *op. cit.*, p6

⁶⁴ Gambetta and Hertog, *op. cit.*, p11

Moroccan philosopher Mohamed Abed Al-Jabiri wrote of the schools: “the main form of teaching in in the Arab world today is either technological instruction, cut off from all reflection on sense, which moulds minds that work in a mechanical and dogmatic way; or a mythicising education, in effect brainwashing, which congeals minds. These two types of education have in common the complete absence of critical questioning: the question of why and how is never asked.”⁶⁵ The Tunisian Riadh Sidaoui described the same phenomenon, but applied it to the education systems as a whole: “a spirit used to learning correct and unarguable formulas, ready to accept spiritual beliefs ready-baked, with the same ease and automaticity with which it accepts scientific laws.”⁶⁶

Those ready-baked beliefs and their early inculcation were well illustrated recently in the Moroccan press, in a row over explicitly anti-human-rights and anti-evolution exam questions (and teaching) in schools’ ‘Islamic education’ exams. Exam papers recently set were quoted as stating that advocates of human rights “incite violence, tobacco addiction, sexual harassment, profanity and the destruction of public property,” and asking candidates to refute the ‘theory of evolution’ through its contradiction of religious texts. As the writer noted, “This dichotomy in Moroccan education contributes to creating a bruised individual, torn between a mystical fear of [divine] judgement and the natural curiosity of the human being. It is clear that in the national education system, ‘Islamic education’ monopolizes the lion’s share of the teaching of values. The conclusion is obvious: when ‘Islamic education’ puts forward a reading that is contrary to science, it is reason that must go on the back burner.”⁶⁷

In education reform across the Middle East today there is much talk of soft skills, of the need to develop aptitudes and habits for the twenty-first century, the ‘transversal skills’ of team-working, synthesis, presentation, critical analysis and argument which a globalised economy demands – but less understanding that those skills cannot be delivered in isolation, like a spoonful of cod-liver oil. To have any impact on the still costive societies of the region, they must form part of a very different classroom experience, the careful, structured development of intellectual and moral autonomy and critical intelligence.

Change in this area is not at all easy. “The few countries that have attempted to introduce higher-order cognitive skills as a pedagogical objective have not been successful in changing teacher practice,” as the World Bank reported in 2008. The education systems “mainly reward[ed] those who [are] skilled at being passive knowledge-recipients,” and “group-work, creative thinking and proactive learning are rare. Frontal teaching ... is still a dominant feature even in countries that have introduced child-centred pedagogy.”⁶⁸ And five years earlier, the Arab Human Development Report of 2003 noted soberingly that “curricula taught in Arab countries seem to encourage submission, obedience, subordination and compliance, rather than free critical thought.”⁶⁹

If the objective is (and few MENA educational planners would put it in quite this way) to help construct not the “very inquisitive and less challenging” mindset noted by British intelligence as a

⁶⁵ Quoted in Riadh Sidaoui, *Les islamistes et les sciences exactes*, Le Temps, 16 October 2001 (my translation)

⁶⁶ Riadh Sidaoui, *Les islamistes et les sciences exactes*, Le Temps, 16 October 2001 (my translation)

⁶⁷ Amine Belghazi, *Comme l’Education nationale contribue à la radicalisation des jeunes*, Medias24, 8th June 2015: http://www.medias24.com/SOCIETE/156310-Comment-l-Education-nationale-contribue-a-la-radicalisation-des-jeunes.html#sthash.xfhu8oF5.uxfs&st_refDomain=t.co&st_refQuery=/2emdS9ockw (my translations)

⁶⁸ World Bank, *The Road Not Travelled: Education Reform in the Middle East and North Africa*, 2008, pp88-9

⁶⁹ UNDP, Arab Human Development Report 2003, *Building a Knowledge Society*, New York: UNDP 2003, p53

target for jihadi recruiters, but the 'very inquisitive and very challenging' mindset that can help generate immunity, there is still a long way to go.

BROADENING SCIENCE EDUCATION

The idea of a broad education in the sciences and engineering that encompasses social sciences and humanities is not new, and is particularly, though of course not exclusively, associated with the US system of higher education, where student engineers and scientists are generally required to take courses outside their area in their freshman year. There are many examples in Britain too, to one of which, at Imperial, I shall return below. Others include the work done at Warwick in the 1990s with Rolls Royce and Rover to broaden engineers' creative thinking, soft skills, questioning, lateral thinking and so on. Similar work has been done at other universities, including Napier, UCE, Loughborough and Cranfield, but it remains the exception rather than the rule.

A good justification of this comes from John Horgan, who teaches a freshman humanities course at Stevens College in the US, in a blog-post called *Why study humanities? What I tell engineering freshmen*. He begins with the scepticism of virtually all student engineers at having to study philosophy and literature, explaining that

... it is precisely because science is so powerful that we need the humanities now more than ever. In your science, mathematics and engineering classes, you're given facts, answers, knowledge, truth. Your professors say, "This is how things are." They give you certainty. The humanities, at least the way I teach them, give you uncertainty, doubt and scepticism.

The humanities are subversive. They undermine the claims of all authorities, whether political, religious or scientific. This scepticism is especially important when it comes to claims about humanity, about what we are, where we came from, and even what we can be and should be. Science has replaced religion as our main source of answers to these questions. Science has told us a lot about ourselves, and we're learning more every day.

But the humanities remind us that we have an enormous capacity for deluding ourselves. They also tell us that every single human is unique, different than every other human, and each of us keeps changing in unpredictable ways. The societies we live in also keep changing-- in part because of science and technology! So in certain important ways, humans resist the kind of explanations that science gives us.

The humanities are more about questions than answers, and we're going to wrestle with some ridiculously big questions in this class. Like, What is truth anyway? How do we know something is true? Or rather, why do we believe certain things are true and other things aren't? Also, how do we decide whether something is wrong or right to do, for us personally or for society as a whole?⁷⁰

In Britain we are perhaps less advanced in this area, largely because we do not admit the need for 'mixed' education at undergraduate level. Though since the Bodmer report, *Public Understanding of Science*, in 1985, there has been a growing awareness of the lack of

⁷⁰ John Horgan, *Why Study Humanities? What I tell engineering freshmen*, Scientific American blog, 20th June 2013, <http://blogs.scientificamerican.com/cross-check/why-study-humanities-what-i-tell-engineering-freshmen/>

communication between the sciences and the humanities and social sciences, framed not so much as ‘getting the humanities and social sciences into science,’ as ‘getting the science message out.’ However, it has stimulated a remarkable capacity for cross-fertilisation, and one of the more notable fruits of this cross-fertilisation was the decision by Imperial College in the late 1980s to establish a Master’s degree in Science Communication under the then Professor of the Public Understanding of Science (and Director of Communication at the Science Museum) John Durant, and to build around what became two courses, a Department of Humanities. Today those two MSc courses (in Science Communication and Science Media Production) are at the heart of a structure of voluntary undergraduate courses brigaded as ‘Imperial Horizons,’ covering business, development, languages and ‘Science, Culture and Society,’ which many, but not all, students choose to take. Asked his favourite thing about the humanities course, one engineering student volunteered in a filmed interview on the Imperial College website, “There’s a lot of opportunity to debate and discuss,” suggesting that the opposite is more habitually true in the lab.

Dr Stephen Webster, who runs the department, writes on the Imperial website about his MSc courses,

The standard science education, even at undergraduate level – perhaps especially at undergraduate level – does not encourage discussion about science. Yet there is much to talk about. Who should pay for science? Who should decide what science is worth pursuing? Can a scientist ever be sure she has found the truth? What is the relation between science and art? What role do scientists have in science communication? And when there is national debate over a scientific issue, for example climate change, or nuclear power, what can we expect from our media? Our aim is to get you thinking fluently and intelligently about issues like this. We will help you communicate clearly the facts of science. And we will help you interpret the complex nature of science in society.

... you will not find that science communication is one more set of facts to be learnt. In moving from science, to science communication, your way of thinking will change. It is this change that will make you a good communicator (and, if you go back into science itself, a better scientist).⁷¹

Imperial may be at the centre of this enterprise, but it has spread: there are now fourteen universities listed on postgrad.com as having Master’s courses in Scientific Communication, and this is probably not the full tale. Britain has, in other words, experience in addressing the gap that this paper highlights – and Dr Webster’s last paragraph describes with precision the transformation that, in the context discussed in this essay, has profound implications for immunising the mind.

⁷¹ Dr Stephen Webster, Imperial College, London, Centre for Co-curricular Studies
<http://www3.imperial.ac.uk/co-curricular-studies/sciencecommunicationgroup/messagefromstephenwebstergroupdirector>

FUTURE ACTION – THE URGENT NEED FOR DEEPER AND COORDINATED RESEARCH

Education is of course highly political, and nowhere more than in the MENA region. It has, if the research noted in this paper is correct, serious implications not just for the intellectual health of society and for its development, but for security within and beyond the region. Furthermore, it has implications for the education of engineers, doctors and scientists in the West, since here too the research seems to suggest a similar (though less intense) correlation of jihadi radicalism and STEM, particularly engineering, education at tertiary.

As far as MENA is concerned, Britain has the opportunity to make the game in terms of public thinking about this nexus of issues. At the crossroads of public policy, education and security, this is an area of research which must necessarily concern a country with a massively internationalised education system, and a serious problem of radicalisation amongst young citizens and visitors. This agenda, the sensitive exploration of ‘education and radicalisation’ and the development of really constructive responses based on further evidence collection, has great relevance and potency. It faces outward into the educational environment across the region which as a country we know well, through our HEIs and through the British Council; and inward into the security needs of the UK.

The central insights on which such work would need to be based, and the exploration of which would be an important part of it, are that:

- poor teaching of the social sciences is an inadequate use of a potentially powerful intellectual defence against extremist ideas;
- the way in which STEM subjects are taught reinforces rather than challenges the development of a mindset receptive to extremist ideas;
- the entire structure of education, from primary onwards, across much of the MENA region supports a receptivity and intellectual passivity that provides the infrastructure for both failures.

In taking forward the agenda of dispassionate, evidence-based research on radicalisation, there are a number of obvious and pressing opportunities. They are all predicated on the urgent need to understand, in all its protean subtlety, the process by which young people become convinced to give their lives to a cause that seems to others destructive and even nihilistic, but which acquires a very different driving significance for them. Much excellent work is done by academic and policy specialists, but there is little sense of its being ‘joined-up,’ or of its yielding the comprehensive account of radicalisation which at present we signally lack.

Education is a crucial crossroad of policy and understanding. I recommend that a suitable institution (perhaps the British Council) take the lead in initiating research and discussion, with a view to publishing substantive findings on the whole question of ‘education and radicalisation’ with as much precision and certainty as is available to us. Such a process of research needs to reflect first on whether more data can be adduced to make the conclusions reached here more substantial and more subtle; secondly on refining interpretations; and then on proposing possible ways forward in STEM, H&SS and schools education, both in the MENA region (and wider Islamic world) and in the UK.

I also recommend that a suitable institution (again perhaps the British Council) undertake a larger and much more ambitious project. This would be to assemble a core group of institutions sponsoring an academic panel called, for argument’s sake, *Cultures of Radicalisation*. It would review existing and emerging research on the entire process of radicalisation, of which former Assistant Commissioner of the Metropolitan Police, Robert Quick, said rather disarmingly

recently, “Our understanding of radicalisation, what is at the heart of dissatisfaction with UK society, is very little understood [sic].”⁷² It would treat radicalisation as a cross-disciplinary cultural problem, drawing on psychology and anthropology as well as political science, education, communication and history; and it would, if properly imagined and constituted, have the potential to become the ‘IPCC’ (International Panel on Climate Change) of radicalisation, eliciting and synthesizing new insights and understandings in a cultural and academic framework of high-tension consensus, with strong policy implications.

Beyond these – and building on it – there are obvious implications for education work in MENA by a wide range of organisations which might be guided by this research. There is a clear suggestion that more attention should be paid to teaching and research in the humanities and social sciences – both as immunisation against radicalisation and as motors of progressive change in static societies. There is also a strong pointer to looking at STEM education and seeking politically feasible ways in which the intellectual horizons of STEM students across the region can be broadened. The latter, in particular, may offer some pointers for students from the region coming to study in the UK – a large capture of elites and future leaders whose mindset is, and will be, of great importance to the UK.

Finally, attention to schools education should energetically expand its focus to the pædagogy of closed minds – or rather to the counter-pædagogy of opening them. There is an enormous and very important issue at stake here, and it requires that those with the potential to stimulate and leverage reform think hard about how to build a strong culture of critical thinking and free enquiry amongst school children across the region. This includes a frank admission that in several countries literacy remains (despite the headline figures, the MDGs and the assertions of ministries of education) an enormous problem which, unsolved, will stand squarely in the way of developing the mindset needed both to resist the blandishments of the radicalizers, and to develop a healthy society, able to manage its own development. The focus that many organisations both, national and international, place upon tertiary education, as opposed to primary and secondary, is oddly counter-intuitive, and reflects perhaps the sheer, intimidating size of the larger problem of schools reform. Egypt’s *education* system, for example, has a population larger than the *state* of Tunisia. Where to begin? But unless real attention and resource can be brought to bear on building a genuinely child-centred schools system in every country of the region, Higher Education reform will always be remedial – an often noble, but hobbled, attempt to rectify the mindset created by rote-learning, regurgitating exams, conformity and partial literacy, long before the student ever reached university.

As I have argued here, this is a matter as much of security as it is of development. The Seifeddine Rezguis of this world, educated in barely fit-for-purpose schools that inculcate “submission, obedience, subordination and compliance, rather than free critical thought,” and send their graduates on to universities where engineering is taught unadulterated with the ambiguities of sociology or history, are all too open to the black-and-white, binary ideologies of jihad.

⁷² Vikram Dodd and Ewan MacAskill, *UK ‘should let extremists join Isis in Syria,’* The Guardian, 7th July 2015

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Martin was educated at Magdalen College, Oxford, in Modern History and at St Antony's in Modern Middle Eastern Studies (M Phil). He was the 2009 Sheikh Zaki Badawi Memorial Lecturer, and is a Fellow of the Royal Canadian Geographical Society and a Visiting Fellow at the Prince Alwaleed bin Talal Centre of Islamic Studies at Cambridge. He is a member of the Advisory Board of London University's Centre for Post-Colonial Studies, and is the Chair of Trustees at BAX (British-Arab Exchanges). He has co-edited with Andrew Hussey the collection *The Challenge of North Africa*, in which his essay *Bavures and Shibboleths: The Changing Ecology of Culture and Language in Morocco*, appears.

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