

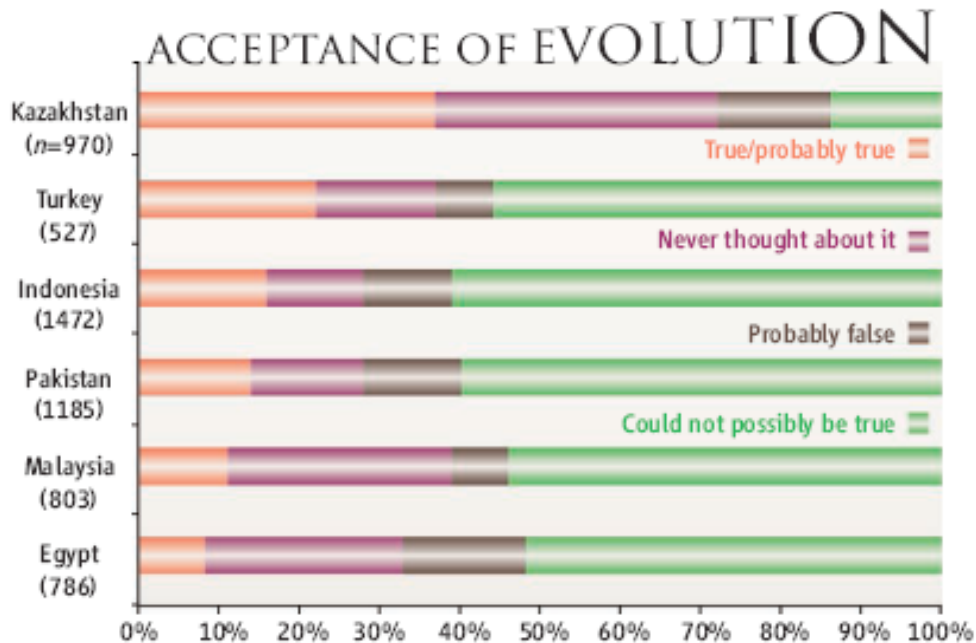
The Challenges of Science Education Today

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1. Knowledge and Acceptance of Evolution in the Muslim World

When Miller et al. (2006)¹ published surveys of public acceptance of evolution in 34 countries, observers were stunned to note that the United States was ranked 33rd, with only 40 % of respondents stating that they regarded evolution as “true”, 40 % considering it “false”, and about 20 % declaring themselves “not sure”. Observers also noticed that the only country in the list with a Muslim majority population (Turkey) showed even more negative views with regard to population, with less than 30 % of respondents accepting evolution as “true”.

More recent surveys, however, have shown that people of other Muslim countries reject evolution even more strongly. In December 2008, Salman Hameed published² results of surveys on the acceptance of evolution in 6 Muslim countries (see graphic below from that paper). Results showed that, except for Kazakhstan, the fraction of those who considered evolution to be “True” or “Probably True” averaged about 15 %.



Other recent surveys, particularly those focusing on students (from high schools and universities) have shown that this widespread rejection of evolution reaches to the highest levels of education, including university professors. Indeed a survey by the present author among students and professors at the American University of Sharjah in 2007 showed that results among students and professors were virtually identical: less than 15 % considered evolution “a theory that is strongly confirmed by evidence”, while more than 60 % viewed

it as “just an unproven theory” that they “don’t believe in”. Furthermore, a large majority of students and professors recommended that the theory either not be taught at all (“against my religion”) or be presented as “just a theory”.

Most recently (March 2009), results of a large international study (*Theistic, Agnostic, and Atheistic Notions of Evolution in Islamic Societies: Exploring Muslim scientists’, teachers’, and student understanding of evolution*) conducted by the Education, Evolution, and Creation Center at McGill University were presented in a symposium on Islam & Evolution. The study consisted of:

- A survey of 5500 Muslim high school students in Canada, Egypt, Lebanon, Indonesia, Pakistan, and Turkey;
- 150 interviews of scientists, teachers and community members;
- Teacher focus group discussions.

Highlights from that study included:

- Widespread conceptual (theory, fact, law, etc.) and scientific misunderstandings (human evolution, descent from monkeys, etc.) regarding Evolution exist among Egyptian and Lebanese students, despite large differences in religiosity and affiliation.
- Analysis of the surveys of teachers’ views showed results similar to those for students in Lebanon; teachers present the material while not believing it. 30+ teachers in Egypt all rejected Evolution!
- In Pakistan, teachers, though not seeing any contradiction between Islam and Science, had wrong understandings of Evolution, in particular rejecting human evolution.
- Textbooks and teachings often include Qur’anic references to creation. Textbooks often present two viewpoints separately: the Islamic concept of creation, and the scientific concept of how life/humans appeared.
- Some teachers in Indonesia used material produced by Harun Yahya.
- 80% of Pakistani students believe humans were created separately in their current form.

Finally, a survey undertaken in 2001 among high-school students in Tunisia, which is widely considered as the most liberal, secular country in the Arab-Muslim world, showed a variety of attitudes with regard to evolution, with roughly just over half of the students accepting evolution or assimilating it into their theistic worldview.

2. Challenges of Science Education (more generally) in the Muslim world

The results of the 2007 Trends in International Mathematics and Science Study (TIMSS) were published in December 2008. These tests, in which countries participate on a voluntary basis, cover Math and Science at Grades 4 and 8. The most recent results show Arab/Muslim pupils performing at the very lowest levels compared to international standards (see the table below for Science results of Grade 8, where 500 is the “normal”, acceptable level at which pupils are expected to perform).

Country	Average score		
Singapore	567	Israel	468
Taiwan	561	Bahrain	467
Japan	554	Iran, Islamic Rep. of	459
Korea, Rep. of	553	Turkey	454
England	542	Syrian Arab Republic	452
Hungary	539	Tunisia	445
Czech Republic	539	Oman	423
Slovenia	538	Kuwait	418
Hong Kong	530	Colombia	417
Russian Federation	530	Lebanon	414
United States	520	Egypt	408
		Algeria	408
		Palestinian Nat'l Auth.	404
		Saudi Arabia	403
		El Salvador	387
		Botswana	355
		Qatar	319
		Ghana	303

There are other alarming trends highlighting serious deficiencies in how science is presented and (mis)understood in countries in which Muslims are a majority, including, in particular, the extraordinary popularity of the theory of “miraculous scientific content of the Qur’an”. Furthermore, some studies have shown that teachers widely suffer from conceptual misunderstandings of the nature of science itself (its methodology, its principles, and its mechanisms for discovering, checking, and ascertaining the uncovered truths).

My many years of experience in Science Education (teaching, writing and revising textbooks, conducting teacher training, and discussing curricular issues with education officials) have led me to conclude that these problems stem from the following causes:

- the absence of the philosophy of science from curricula;
- the heavy burdens of teachers;
- the denseness of the content of almost all science curricula currently taught;
- the lack of resources;
- the sometimes inadequate teaching methodology.

Science Education policymakers are clearly faced with major challenges.

3. Conclusions and Recommendations:

- ❖ Evolution is largely misunderstood and culturally rejected among the overwhelming majority of students and teachers as well in most of the Muslim world.
- ❖ The state of science education in the Arab-Muslim world is very worrisome. The famous UNDP report of 2002 on the level of “human development” in the Arab world described pupils as having “passive attitudes”, “hesitant decision making skills”, and “suppressing questioning, exploration and initiative”...
- ❖ Science is low on the political agenda, at best it is embedded in “technology development” policies.
- ❖ Teachers, especially in Biology, need training/ workshops!
- ❖ The nature of science is largely misunderstood; there is a serious need to teach the philosophy of science widely.
- ❖ Also, it is important to set up forums (academies, conferences, etc.) to discuss and publicize science, its paradigms, its social implications, etc.
- ❖ States should encourage the old Islamic tradition of endowments and patronage of Science.

Notes/References:

¹ J. Miller et al., *Science*, 11 August 2006, Vol. 313, no. 5788, pp. 765 – 766.

² S. Hameed, *Science*, 12 Dec. 2008, Vol. 322, no. 5908, pp. 1637-1638.