



Islam and science in contemporary Muslim societies: Interactions between religion, culture, science and education

Anila Asghar
McGill University

Biological Evolution

- **Evolutionary theory unifies biology into a coherent discipline**
- **Biological evolution is accepted as a valid explanatory and predictive framework to elucidate the diversity of life** (Royal Society of Canada, 1985; American Association for the Advancement of Science, 1993; National Science Teachers Association, 2003, InterAcademy Panel, 2006; National Academy of Sciences, 2008)

Context

- Recent studies indicate a widespread rejection of evolution among students and teachers in Muslim communities.
- Muslim science teachers' and scientists' positions on evolution in relation to their religious beliefs determine how they enact the science curriculum in their classrooms

(Asghar, Wiles, BouJaoude & Alters, 2010a,b; Asghar, Wiles, Bean, & Alters, 2009; BouJaoude, Asghar, Wiles, & Alters, 2010).

Context

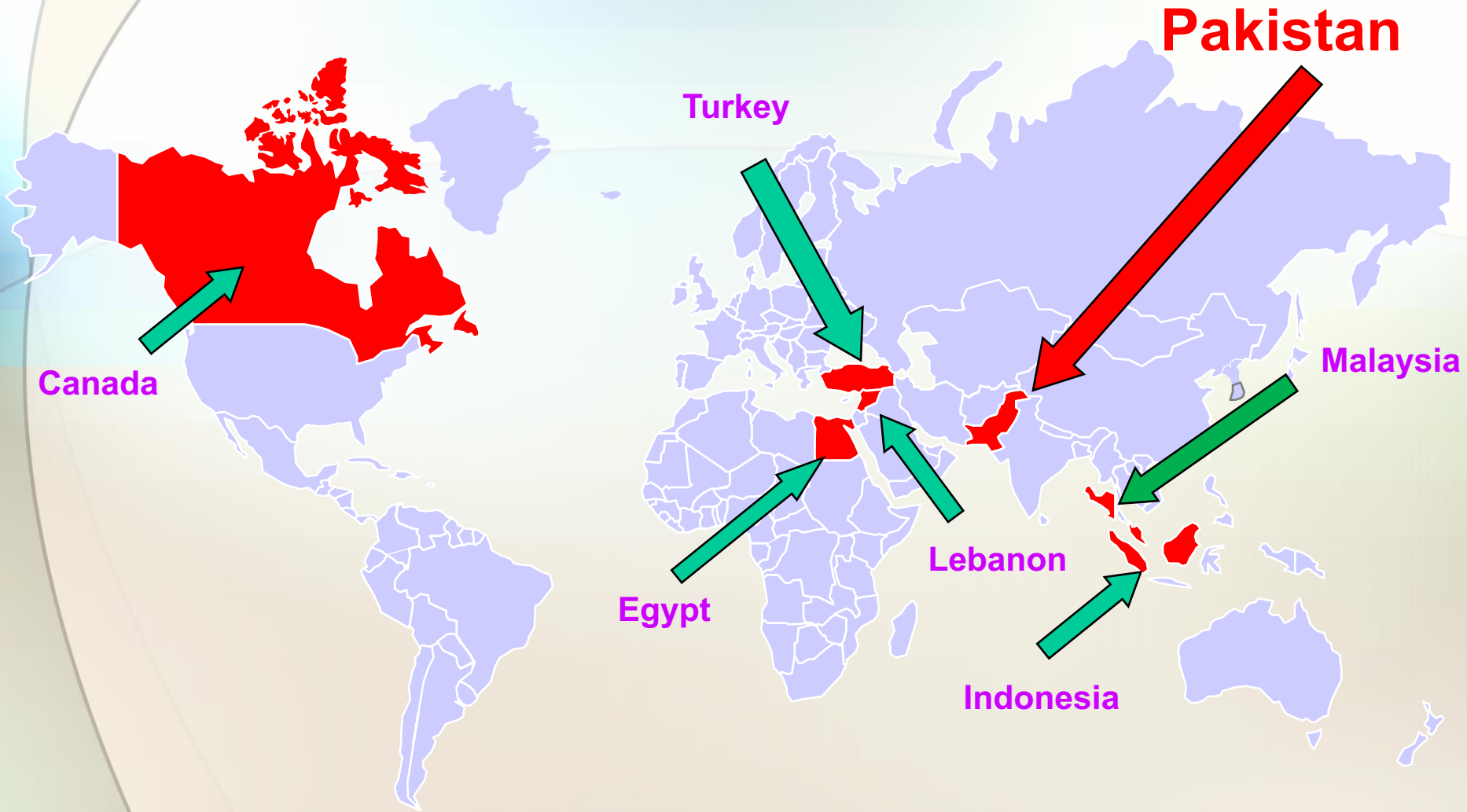
A nation's educational, religious, and political contexts are intimately linked to teachers', physicians' and students' perceptions of evolution (North America, Europe, South Asia, and Middle East)

(Dagher & BouJaoude, 2012; Burton, 2011; 2012)

Research Goals

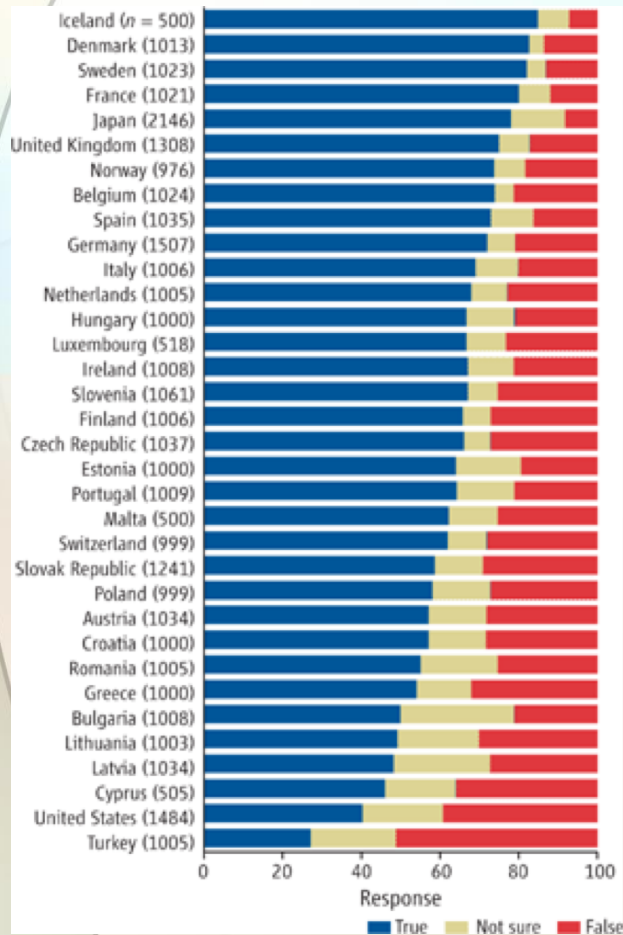
Explore the intersections among religion, science, and education in the Muslim world (i.e., predominantly Islamic countries and countries with large Muslim populations)

Perceptions of Evolution in Muslim Societies



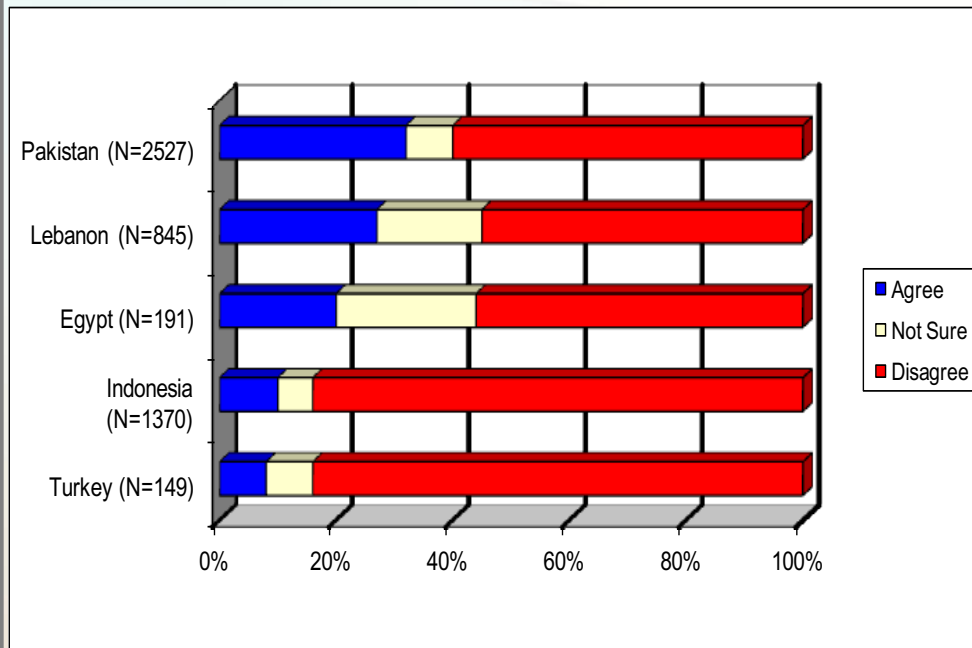
International Comparisons

“Human beings, as we know them, developed from earlier species of animals.”



Miller et al. 2006, Science, 313, 765

“Human beings, as we know them, developed from earlier species of animals.”



Asghar et al., 2012



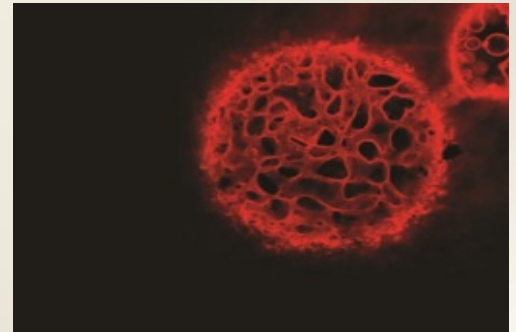
1. Albanian Academy of Sciences
2. National Academy of Exact, Physical and Natural Sciences, Argentina
3. Australian Academy of Science
4. Austrian Academy of Sciences
5. Bangladesh Academy of Sciences
6. The Royal Academies for Science and the Arts of Belgium
7. Academy of Sciences and Arts of Bosnia and Herzegovina
8. Brazilian Academy of Sciences
9. Bulgarian Academy of Sciences
10. RSC: The Academies of Arts, Humanities and Sciences of Canada
11. Academia Chilena de Ciencias
12. Chinese Academy of Sciences
13. Academia Sinica, China, Taiwan
14. Colombian Academy of Exact, Physical and Natural Sciences
15. Croatian Academy of Arts and Sciences
16. Cuban Academy of Sciences
17. Academy of Sciences of the Czech Republic
18. Royal Danish Academy of Sciences and Letters
19. Academy of Scientific Research and Technology, Egypt
20. Académie des Sciences, France
21. Union of German Academies of Sciences and Humanities
22. The Academy of Athens, Greece
23. Hungarian Academy of Sciences
24. Indian National Science Academy
25. Indonesian Academy of Sciences
26. Academy of Sciences of the Islamic Republic of Iran
27. Royal Irish Academy
28. Israel Academy of Sciences and Humanities
29. Accademia Nazionale dei Lincei, Italy
30. Science Council of Japan
31. Kenya National Academy of Sciences
32. National Academy of Sciences of the Kyrgyz Republic
33. Latvian Academy of Sciences
34. Lithuanian Academy of Sciences
35. Macedonian Academy of Sciences and Arts
36. Academia Mexicana de Ciencias
37. Mongolian Academy of Sciences
38. Academy of the Kingdom of Morocco
39. The Royal Netherlands Academy of Arts and Sciences
40. Academy Council of the Royal Society of New Zealand
41. Nigerian Academy of Sciences
42. Pakistan Academy of Sciences
43. Palestine Academy for Science and Technology
44. Academia Nacional de Ciencias del Peru
45. National Academy of Science and Technology, The Philippines
46. Polish Academy of Sciences
47. Académie des Sciences et Techniques du Sénégal
48. Serbian Academy of Sciences and Arts
49. Singapore National Academy of Sciences
50. Slovak Academy of Sciences
51. Slovenian Academy of Sciences and Arts
52. Academy of Science of South Africa
53. Royal Academy of Exact, Physical and Natural Sciences of Spain
54. National Academy of Sciences, Sri Lanka
55. Royal Swedish Academy of Sciences
56. Council of the Swiss Scientific Academies
57. Academy of Sciences, Republic of Tajikistan
58. The Caribbean Academy of Sciences
59. Turkish Academy of Sciences
60. The Uganda National Academy of Sciences
61. The Royal Society, UK
62. US National Academy of Sciences
63. Uzbekistan Academy of Sciences
64. Academia de Ciencias Físicas, Matemáticas y Naturales de Venezuela
65. Zimbabwe Academy of Sciences
66. African Academy of Sciences
67. The Academy of Sciences for the Developing World (TWAS)
68. The Executive Board of the International Council for Science (ICSU)



Inter-academy panel (IAP) statement on the teaching of evolution

These scientists agree that *the theory of the evolution of galaxies, stars, planets and of life on Earth over billions of years is supported by observations and experiments from all branches of the natural sciences; and represents an extraordinarily interdisciplinary understanding of the history and workings of our planet and its inhabitants* (Inter-Academy Panel, 2006).

<https://www.interacademies.org/13901/IAP-Statement-on-the-Teaching-of-Evolution>



What do Islamic scholars say about biological evolution?

- Since 1859, Muslim intellectuals have responded to evolution in various ways including: **rejection, acceptance, and adaptation**
- Islamic scholars offer **multiple, and conflicting**, interpretations of the Quranic view of creation

(Mohammad, 2000; Cole, 1993; Sayin & Kence, 1999; Remtulla, 1993; Ziadet, 1986)

Evolution Debate Among Muslim Scholars

- Islamic creationists argue that evolution contradicts the religious view of creation
- Secularists endorse the **integration** of biological evolution with modern science (Bucaille, 1982; Khan, 1979; Quddus, 1971; Remutalla, 1993; Zaman, 2003).

Islamic Narrative: Young-Earth Vs. Old Earth?

- The Quranic account of creation includes a 6-day period of creation.
- One day has been defined as “a thousand years of what you count” (32:5) or as “a day the measure of which is fifty thousand years” (70:4).
- “Indeed, **young-Earth creationism is wholly absent in the Muslim world,**” and a universe billions of years old is commonly accepted (Hameed, 2008)

Engaging with Evolution

A complex interplay of cognitive and affective factors:

one's prior knowledge

religious beliefs,

goals and motivation

openness to new ideas

may influence one's engagement with potentially controversial topics, such as evolutionary science and may interfere strongly with his/her perceptions, understanding, and acceptance of evolution

(Alters & Nelson, 2002; Cobern, 2000).



Study Purpose

To:

- explore how Muslim scientists, teachers and secondary students construe biological evolution in relation to their Islamic beliefs about the origin of life
- examine the treatment of evolution – content and coverage - in secondary biology curriculum and textbooks

Science Curricula in Muslim Societies

Islamic Republic of Pakistan

- Science learning goals advocate the study of **nature as an act of religious devotion**

(Asghar, Wiles, and Alters 2010)

Oman and Saudi Arabia

- Strengthen **students' Islamic beliefs** through **scientific observation** of Allah's [God's] creation (Oman)
- **Know God the great creator, for the existence of the created is evidence that the Great Creator exists**

(Omani Ministry of Education (2000) *Curriculum Framework for all School Subjects* and (2008) *Secondary Education Science Curriculum*; Saudi Ministry of Education (2010) *Secondary Education Development Project: Secondary education curricula*)

Science Curricula in Muslim Societies

Pakistan's national biology curriculum for grades 9-12 explicitly declares that the primary goal of biology education is to “enable the students to appreciate that Allah (SWT) is [the] Creator and Sustainer of the universe.”

Biology Textbook – Grade 9, Balochistan

Typical Pakistani Biology Textbook

been maintaining the balance in our environment for million of years are now at the verge of extinction due to pollution. Many biologists are engaged in research to find out causes and ways to control the pollution. The biology thus, has great impact on us and it has helped in improving the quality of our life.

5. Space biology

During the exploration of space, presence of life on other planets has also been probed into. On Mars some evidence of life has been found which is still under further investigation.

1.7 Origin of Life

1. Islamic Concepts

By the origin of life, we mean the formation of first living thing on this earth. What was this thing like and how did it come into existence. In The Holy Quran, there are many verses which tell us about the origin of life. The most important fact in the teachings of Quran is that Allah is the ultimate creator of every thing whether plants, animals or non-living things.

اللَّهُ خَالِقُ كُلِّ شَيْءٍ وَهُوَ عَلَى كُلِّ شَيْءٍ وَكِيلٌ

"Allah is creator of all things, and He is guardian of overall things".

(Surah Zamar-Ayat 62)

Not only plants, animals and non-livings but also the universe has been created by Allah. Another important fact we get from Quran is that every living thing has been created from water.

وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ

"We made every living thing from water"

(Sura Ambia-Ayat 30)

We were never aware of many living things earlier as we know today. The Viruses, bacteria, algae, fungi, different kinds of plants, all animals and human are all living things. According to Quranic verses Allah has created all the diverse living things from water.

This message of Quran hints at common origin of all living things. Or we can at least say that all living things have come out from water.

Allah also says in Quran:

خَلَقَ الْإِنْسَانَ مِنْ صَلْصَالٍ كَالْفَخَّارِ

"He created man from clay like the potter's"

(Sura Rahman, Ayat 14)"

Therefore, it seems that there were two big steps as far as the creation of man was concerned. The first step was the creation from water. The second step was where by the first created thing, on admixing with clay was transformed into more advanced being. The same can also be applied to

other animals, because there are certain similarities between the structure of man and other animals. Digestive system, nervous system, circulatory system, excretory system and reproductive system are similar although dissimilar in other details.

Once the life had been created, Allah implemented the process of reproduction for the continuity of races of animals. The various stages of reproduction have been described in sura in following way.

ثُمَّ خَلَقْنَا النُّطْفَةَ عَلَقَةً فَخَلَقْنَا الْعِظَامَ ثُمَّ نَضَّجْنَاهُ رَجُلًا

"Then fashioned we the drop a clot, then fashioned we the clot a little lump, then fashioned we the little lump bones, then clothed the bones with flesh,

(Sura Al-Humaza, Ayat 14)

وَاللَّهُ خَلَقَ كُلَّ دَابَّةٍ مِنْ مَاءٍ فَمِنْهُمْ مَنْ يَمْشِي عَلَى رِجْلَيْنِ وَمِنْهُمْ مَنْ يَمْشِي عَلَى أَرْبَعٍ وَمِنْهُمْ مَنْ يَمْشِي عَلَى سِتَّةٍ

"Allah hath created every animal from water some of them creep up on their bellies, other walk on two legs, and others on four. Allah creates what He pleases. He has power overall things".

(Sura Nur, Ayat 45)

هَلْ أَتَى عَلَى الْإِنْسَانِ مِنْ شَيْءٍ لَمْ يَكُنْ شَيْئًا مَذْمُورًا

"Hath there come upon man (every) any period of time in which he was a thing unremembered?"

(Sura Dhuha Ayat 1)

A close study of above sermons reveals that all animals had common origin but they gradually underwent changes afterwards and became different from each other i.e. some developed crawling, some started walking on two legs and some other had four. It seemed that animals of today are advanced forms of the past animals who achieved this form after passing through many changes.

2. Scientific Concepts

How did life originate on this earth? This may never be known for certain to science, because neither it is possible today to make observation of the then primitive events when the life actually originated nor there is any fossil record of the first formed soft-bodied organisms. In 1950 some scientist simulated the primitive earth conditions (approximately 4 billion years ago when life originated on earth) in the laboratory and started performing experiments on the basis of which scientists developed a few hypothesis, which seems near to what happened in the origin of life on earth.

Science & Religion in Pakistani Biology Textbooks

Common Ancestral origin of “all living things”

“We made every living thing from water” (The Quran, 21:30)

- Explanation: “According to Quranic verses Allah has created all the diverse living things from water” (9th-grade Punjab textbook, 2005, p. 12).

Examples of verses from the Quran

- presented in Pakistani biology textbooks and their interpretations include:

(a) **The universe and all living beings are created by Allah:**

- "That is Allah your Lord. There is no god but Him, the Creator of all things. Therefore, serve Him. He is the Guardian of all things." (The Quran, 'Surah Al-Ana'm, Ayah 103')

(b) **All living things have been created from water:**

- "We made every living thing from water." (The Quran, 'Sura Ambia-Ayat 30')

(c) **Humans were created from clay:**

- "He created man from clay like the potter's." (The Quran, 'Sura Rahman, Ayat 14').

Science & Religion in Pakistani Biology Textbooks

Common Ancestral origin of “all living things”

A close study of above sermons reveals that all animals had common origin, but they gradually underwent changes afterwards and became different from each other. . . . It seemed that animals of today are advanced forms of the past animals who achieved this form after passing through many changes ((9th-grade Punjab textbook, 2005, p. 12).

Muslim Scientists' Perspectives

A Pakistani Muslim Scientist/Biologist

- “Allah says *kun fayaku'n* [be and it happens]. The Quran says that Allah created everything in six days, but the ‘length and duration’ of these days is not defined.
- “Radio-carbon dating provides physical evidence in favor of Darwin’s concept.”

Muslim Scientists' Perspectives

Incompatibility of Science and Religion (A Pakistani Marine Biologist)

- **“Scientists take [Darwinism] as an opinion. It is not a fact. . . . People, scientists, with an Islamic point of view disagree with this theory. Quran is the word of God. There is no compatibility between the religious and scientific view” of creation. God created Adam first, not as a Neanderthal.”**
- **“There was no evolution of human beings. Adam was created as a complete [individual], he didn't evolve.”**

Muslim Teachers' Perspectives

“[The] Islamic view of human creation is that. . . . humans were created by Allah with water and clay as it is, in their present form, physical structure and form.”

(A female secondary biology teacher, Pakistan)

Canadian Muslim Teachers' Perspectives

“[Evolution means] the survival of the fittest; [I have] no problem with it. . . . [I] cannot believe that man came from ape. . . . All the creation is from Allah. . . . [Allah created] Adam with clay.”

**(A male high school science teacher,
Canada)**

Canadian Muslim Teachers' Perspectives

- **“In public schools, religion is not allowed in [science]. . . . In a religious school, it is different. Islam would be in science classes. There is freedom to include Islam in every subject. . . Look at things from the religious perspective.”**

(A female anthropology teacher, Canada).

Muslim Teachers' Perspectives

Islam and Science

- Nevertheless, all agreed that there is “*no contradiction between science and Islam*” in general.
- Muslims need to “*explore the world to understand it scientifically.*”
- “**God gave us *aqal* [reason]** to think and understand the world.”

Muslim Scientists

Muslim scientists generally did not see any major conflict between Islam and science.

Some scientists (**biologists**) tried to reconcile evolution with religion. The scientists' epistemology drew on coordinating physical evidence and evolution theory.

Scientists from other disciplines (chemistry, atmospheric science, chemical engineering, etc.) tended to accept evolution of living beings excluding human beings

Some scientists accepted human evolution also, but many had issues with this idea

Muslim Teachers

Majority of the science teachers did not exhibit a clear and in-depth understanding of evolutionary science or the nature of science.

Some science teachers completely rejected evolution because they believed in the special sudden creation of *all* living beings.

Most participants either accepted or considered the possibility of evolution of living organisms except human beings.

Conclusions

- Students exhibited a weak and inconsistent understanding of evolution and many did not accept it
- Religions beliefs considerably influence students' perceptions of evolution

Conclusions

- School curricula – including science education curricula – used as vehicles for nation-building
- Some science curriculum focus on developing a religious identity
- How and what teachers teach about evolution is more important than what is in the curriculum
- The concepts and processes related to the nature of science are not discussed explicitly
- The need for explicit connections between scientific epistemology and biological evolution

Implications

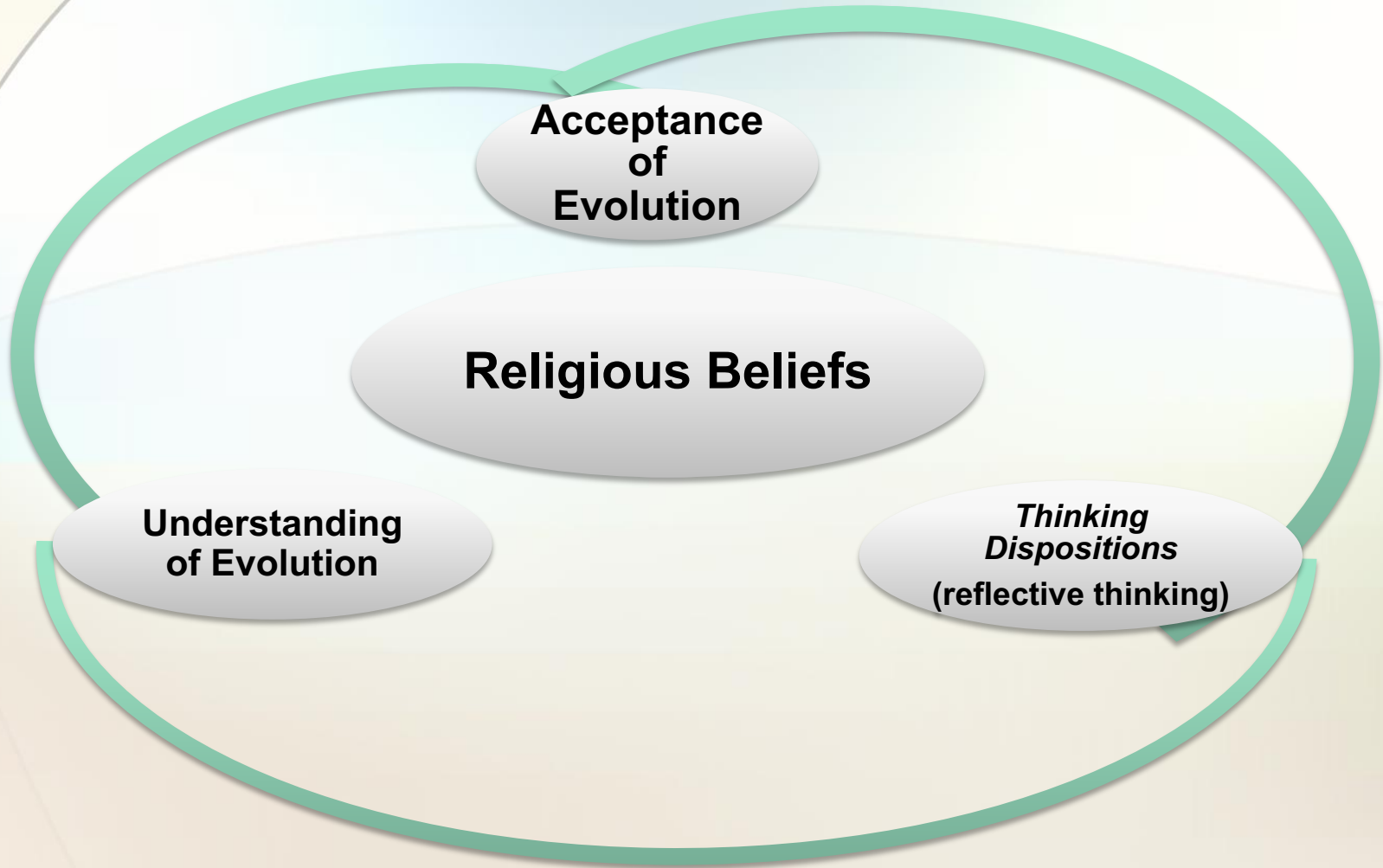
- Effective evolution education programs for teachers
- Expand teachers' understanding of various theological positions and perspectives on evolutionary science
- inform teachers of the ways in which their muslim students perceive evolution
- foster a dialogue among civilizations
- Inclusion of the nature of science related concepts, would potentially enhance teachers' and students' understanding of evolutionary science

Thank You



***Questions
????***

Religion and Evolutionary Science



(Alters & Nelson, 2002; Asghar , 2012; Cobern, 2000; Fysh & Lucas, 1998; Hokayem & BouJaoude, 2007; Fysh & Lucas, 1998; Hokayem & BouJaoude, 2007)