

INTEGRATING QUR'ĀNIC WORLDVIEW AND NATURAL SCIENCE: A FRAMEWORK FOR ISLAMIC SECONDARY SCHOOLS

Nur Jannah Hassan

Kulliyah of Islamic Revealed Knowledge & Human Sciences, IIUM

Email: njhassan@iium.edu.my

ABSTRACT

Islamic, modern and post-modern eras narrate how science and technology have borne impacts on humanity. Reacting against the challenges imposed by modern and post-modern tendencies, is the distinct global phenomenon of Islamic “integrated education”. But what constitutes as Islamically integrated science education? Analyses of various secondary school curricula, syllabi and textbooks of natural science implemented by a number of Islamic secondary schools that we visited in Malaysia and Indonesia, as well as in Brunei, Singapore, Southern Thailand, Mindanao and Ontario show very little integration if any. This article presents an integration framework for natural science, based on the Qur’ānic notion of “*ūlū al-albāb*” and Ghazālīan discourse, especially on the *qalb*. Certain conventional aspects of natural science undergo holistic reposition, reinterpretation and reorientation from the Qur’ānic worldview, whereby humanity’s relationship with God, with itself and with the cosmos form the main constructs.

Keywords: Worldview, integration, natural science, *ūlū al-albāb*, *qalb*.

INTRODUCTION

The annals of Islamic civilisation, and the modern and the post-modern eras have witnessed the impacts that science and technology have had on humanity – each civilisation with its distinctive and potent worldviews and idiosyncrasies. A careful examination into these civilisations illustrates the magnitude that the philosophical premises on which science and technology are pursued, the impact of the type of science education and the technological competence have on the young who in turn determines the future. A nation that exists without sound scientific culture and understanding, healthy proliferation of science, and original and competitive developments in technology will forever entangle her in the consumer-block. This state jeopardies her sovereignty in mind, spirit, culture, education, ethics, economy, politics, governance and territory, left at the mercy of manipulations by the world’s powers that be. Beyond nationhood is the wider *ummatic* scale. A sound scientific culture must be the ethos of a God conscious and dynamic Muslim *ummah*, vis-à-vis the culture inherent amongst those that the Qur’ān addresses as *Ūlū al-Albāb*. Doing without, the *ummah* may forever subject itself to “*colonisabilité*” (Malik Bennabi, 2003). It is incumbent upon Islamic education to develop vigorous scientific young minds and conscience on the foundation of the holistic Qur’ānic worldview. This is most vital and cannot be dispensed with, in order to secure a future Muslim *ummah* that is Islamically vibrant. Such is the *ummah* that is well equipped beyond sustaining herself, but to rise above the vast challenges of contemporary globalisation, with the tumults, chaos and systemically collapsing post-modern, pluralist and liberalist systems. Such is the *ummah* that is capable of upholding its responsibility as the bearer of a message that is “*rahmatan li al-‘ālamīn*” (Q. 21:106-107), and in presenting to the world workable alternatives and solutions based on the *Tawhīdic* (Al Farūqī, 1982) or Qur’ānic worldview (Abūsulayman, 2002; M. Kamal Hassan, 2017).

Reacting against the challenges imposed by modern and post-modern tendencies, is the distinct global phenomenon of Islamic “integrated education”. But what constitutes as Islamically integrated science education? How far have Muslims advanced towards integrating the Qur’ānic worldview and natural science in secondary Islamic schools, whose students are at critical stages of their cognitive, affective, spiritual, social and ethical developments? The wealth of literature addresses intellectuals at tertiary education levels for the need of integrating *Tawhīdic*/Islamic worldview and the sciences. There are some “integrated” literatures at the pre-school and primary school levels. However, our library and field researches and surveys show a stark dearth of actual works that embody real and satisfactory integration for the secondary (and pre-university) levels—none that we encountered written in the languages used in the numbers of schools that we visited and observed in Malaysia (12), Indonesia (12), Southern Thailand (5), and at least 5 in Brunei, Singapore, Mindanao, and Ontario, between 2010 and 2013. Our open ended interviews and detailed qualitative analyses of their natural science materials – more than 55 curricula and syllabi documents, and some 100 textbooks in Malay, Indonesian, Thai, Tagalog and English, mostly gathered from the schools visited, and published in the said countries and in the U.K. between 2002 and 2015 – may be described briefly as follows:

The lack of comprehensive knowledge on integration (why, what, when and how), time constraints, demands of the formal syllabi and of examinations cause “integration” to be left at the devise of individual teachers or schools, or side-lined altogether. School administrators, teachers and a portion of the public undertake “integration” based on individual awareness and understandings, instead of formal institutionalisation in the curricula. Generally,

“integration” constitutes the study of “Islamic religious knowledge” and natural science in peaceful co-existence, with minimal intersection, if any. An “integrated curriculum” is limited to commendable observances of daily prayers, Qur’ān recitation/memorization, supplications, etiquette, character development and co-curricular activities. With little or no formal training, guidance or supervision, teachers are encouraged to improvise on their own, resulting in superficial patching-on of Qur’ānic verses or *aḥādīth* in the teaching and learning processes. There is a stark lack of secondary school curricula, modules and textbooks of natural science (we found none in English, Malay, Indonesian, Thai or Tagalog used in the secondary schools visited) *fully written* from the Qur’ānic worldview. Hence the dire need for such materials voiced almost unanimously by teachers, administrators and members of the schools’ boards. We found that the secondary school natural science curricula, syllabi and textbooks available and used, are essentially based on the conventional Western modern naturalistic-mechanistic-positivistic model. God and His attributes are left totally out from the study of nature, man and the universe. These contravene the *Tawḥīdic* worldview, and are grave injustices to the holistic nature of humanity and the Cosmos—and to Allah as The Owner, The Creator, The Lord and The Master of the Cosmos. Some of the “integrated materials” found include some Qur’ānic verses and supplications in the opening to thank God for the completion of the book, or at best, oddly and sparsely placed in the text in “piece-meal” fashion with little guidance or relevance.

The above findings have been ongoing as long the present researcher, as a student and a teacher of science, can remember. The secondary school age group is the crucial period whereby the cognitive, affective, spiritual, moral and ethical developments form a lasting worldview, which in-turn fashions their future endeavours. As it is in their hands that the immediate future of the *ummah* lies, we consider the responsibility to address the issues above as ours. Since the study is limited to the number of schools of the countries visited, and the data collection from the number of print materials mentioned, the results do not portray the exact situations in all Islamic secondary schools in the Muslim world. The integration framework presented here is that which is used to construct the most important product of Mohd. Kamal Hassan’s *Profesor Ulung* project, namely a model three-volume supplementary reference textbook, *Natural Science from the Worldview of the Qur’an: An Introduction* (M.K. Hassan, 2017), for Islamic secondary schools in Malaysia and elsewhere, where English is a medium of instruction.

THE REALITY

It is quite common to come across Muslims who are confounded when the question of integration of natural science with the Qur’ān, is brought about. Questions like “What is the problem with [modern] science?”, “What is so ‘un-Islamic’ about [modern] science?”, “There is not such a thing as Islamic science or un-Islamic science!” or; “Science is science, it is objective and it is already ‘Islamic’?”, “Don’t tell me that what we are doing in science is not Islamic!” are usually thrown out in response. These comments summarise astutely the mind-set of an observable many, regardless of their socio-educational backgrounds. This observation was made throughout the researcher’s interactions with science students, researchers, academics, educators, professionals and the public in the period between 2009 and 2014. The mind-set results from formal education and training that ‘indoctrinate’ the objectivity of science and the lack of exposure to, and a good grasp of the history and philosophy of science – a phenomenon that is observed globally.

Contrary to the common misunderstanding, an examination of the history and philosophy of Western modern science clearly shows that science is *far* from being objective. It is *laden* with the fundamental pre-suppositions and premises of the worldview that constructs the discipline. Fundamental questions such as “Who am I?”; “Where do I come from?”; “Why am I here?”; “What is the meaning of life?” all bear their weight in the foundation and trajectory of any system or discipline, inclusive that of science. Many arguments have been put forth against science as conventionally defined, such as follows.

THE NATURE OF WESTERN MODERN (NATURALISTIC, MECHANISTIC AND POSITIVISTIC) SCIENCE

The naturalistic premise of Western science may be understood as such:

The history of science, even of modern science since the Renaissance, and especially since Francis Bacon, may be taken as an illustration.... Bacon was the prophet of the secularized religion of science. He replaced ‘God’ by the name ‘Nature’... Theology, the science of God, was replaced by the science of Nature. The laws of God were replaced by the laws of Nature. God’s power was replaced by the forces of Nature. And at a later date, God’s design and God’s judgements were replaced by natural selection. Theological determinism was replaced by scientific determinism, and the book of fate by the predictability of Nature. In short, God’s omnipotence and omniscience were replaced by the omnipotence and omniscience of nature and by the virtual omniscience of natural science (Karl R. Popper, 1996:82-83).

Mechanistic philosophy is attributable to materialism. It holds that the universe “is best understood as a completely mechanical system”, i.e. “a system composed entirely of matter in motion under a complete and regular system of laws of nature”. Mechanists strive to explain “every phenomenon in the universe [...] in terms of mechanical

laws". It is "often criticised for overlooking the organic interdependent relationships", "its incompatibility with free will, and oversimplification of complex phenomena" (*The New World Encyclopedia*, n.d.).

Positivism describes a system as a set of experiential data, with the repudiation and exclusion of any metaphysical presupposition. It refutes transcendence and is "antitheological". "Most positivists have been utilitarians" with the "object of worship not the deity of the monotheistic faiths but humanity" rendering it "anthropomorphic" (*The Academic Edition of Encyclopaedia Britannica*, n.d.).

All three philosophies stand on the premise of secularism, and have been the conspicuous characteristics of Western modern science. Richard Tarnas (1991:282-283) accounts,

This emergence of the modern mind, rooted in the rebellion against the medieval Church and the ancient authorities, and yet dependent upon and developing from both these matrices, took the three distinct and dialectically related forms of the Renaissance, the Reformation, and the Scientific Revolution. These collectively ended the cultural hegemony of the Catholic Church in Europe and established the more individualistic, sceptical, and secular spirit of the modern age. Out of that profound cultural transformation, [modern] science emerged as the West's new faith... Science ennobled that [modern] mind, showing it to be capable of directly comprehending the rational order of nature [...] No [...] such authority needed, for every individual possessed within himself the means for attaining certain knowledge—his own reason and his observation of the empirical world.

Tarnas (1991:320-323) expresses the rootedness, rebellion and dependence upon medieval Church and ancient Hellenistic authorities as the "hidden continuities" of the Western mind.

Thomas S. Kuhn [1922-1996] writes.

If science is the constellation of facts, theories, and methods collected [...], then scientists are men who, successfully or not, have striven to contribute one or another element to that particular constellation [...]. An apparently arbitrary element, compounded of personal and historical accident, is always a formative ingredient of the beliefs espoused by a given scientific community at a given time. That element of arbitrariness does not, however, indicate that any scientific group could practice its trade without some set of received beliefs (Kuhn, 1996:1-4).

Tarnas (1991:359) notes,

because scientific knowledge is a product of human interpretive structures that are themselves relative, variable, and creatively employed [...], the truths of science are neither absolute nor unequivocally objective. [...] the modern mind was left free of absolutes, but also disconcertingly free of any solid ground.

Compounding to the above is the declaration of the death of philosophy by Stephen Hawking (2010:5), who affirms that,

God [...] is not the answer of modern science [...] just as Darwin and Wallace explained how the apparently miraculous design of living forms could appear without intervention by a supreme being, the multiverse concept can explain the fine-tuning of physical law without the need of a benevolent creator [...] (Hawking, 2010:164-165).

Adding on to these is the post-modernists' annihilation of truth, leaving humanity in a free fall to the bottomless pit of valuelessness.

THE STATE OF ENVIRONMENTAL AND HUMANITARIAN AFFAIRS IN THE HANDS OF MODERN SCIENCE

Scientists, philosophers and scholars agree that since the modern period, science has progressed on a course that, whether directly or indirectly, places humanity and the environment in an unprecedented glut of crises. In the name of development, human beings manipulate and devastate the earth, whilst amassing pollution and garbage on its surface. For utility and status, for showing up political muscles, for comfort and mobility, for advancing the economy, and in the name of progress, humans rape the earth and violate its inhabitants without concern. On top of the widening ozone hole, global warming and extreme weather conditions as part of the human induced climate change, is the discovery of a plastic garbage patch in the Pacific Ocean (see S. Kaplan, 2016 and Ocean Portal, 2015) twice the size of France (Richard Grant, 2009), endangering and killing marine life and polluting the food chain. Out of the rapid spur of all these, humankind has subjected himself and each other to unprecedented dependencies due to pollutions of the environment, the body, the mind and the soul, and the loss of its spirit. Facing the global systemic crises, Hans Küng (2007:649-650) challenges,

[t]he price that the West had to pay for the [...] epoch-making change in values and norms [...] of late-modernity [...] was a high one: the other spheres of life were left with no religions and indeed largely also with no moral basis and ultimate horizon of meaning... From this follows a deep crisis of orientation and [...] a desperate search for meaning, criteria and a shared basis for values. Like absolutized faith, so too absolutized reason can set free destructive energies, with devastating effects... Here is a new task for Muslims and Christians together.

A QUR'ĀNIC INTEGRATION FRAMEWORK

Natural science is a study of the physical universe (*'ālam al-shahādah*) that Allāh created, as part of His bounties (*fadā'il*) and blessings (*ni'ām*) to humanity. It is only inherently justified that this is conducted in tandem with The Creator's Words (e.g. Q. 3:190-191; 45:2-6). Such epistemological unity is inherent in the Qur'ān, which is replete with mentions that Allāh is The Ever-Aware Owner, The Creator that originates creation and then repeats it, The Sustainer, The Mighty, The Wise; followed by verses pointing to the wonders of His creations in the Cosmos. These are signs (*Āyāt*) for those who use their faculties to reflect and understand. The Qur'ān draws attention to "read" *Āyāt Allāh* in His two Books – *al-Qur'ān* and *al-kawn* (the Open Book of Nature). The latter is Allāh's revelations devoid of human language, yet teeming with His signs (Q. 41:53)—to be "read", studied, pondered, contemplated, understood and reflected upon in the light of the Qur'ān. This signifies the rightful position of reason (*'aql*), which is subservient to Revelation (*al-wahy*). Human reason must submit to the Divine Intellect—The Author of both *Āyāt*.

The Qur'ān insists one to apply and bring to bear all the sensory and intellectual faculties in comprehending both categories of *Āyāt*. A compelling example is Q. *Al-Rūm*:11-27. The repetitious mentions of "*and among His Signs is*" decree upon humanity to awaken the senses and engage in a rational understanding of God's *Āyāt* as do the "*Ūlū al-Albāb*". Another gripping Qur'ānic injunction is the notion of "*taskhīr*", which is the subjection of "*all that is in the heavens and all that is in the earth*" (Q. 45:12-13) for humanity to harness, manage, safeguard and benefit from in their servitude (*'ubūdiyyah*) and vicegerency (*khilāfah*) to Allāh on earth (Q. 2:30-34)—a "cosmic" vocation (Al Fārūqī, 1986: 317) despite human's infinitesimal physical size. Allāh's administration of the cosmos (*Tadbīr al-kawn*, from "*yudabbiru*", Q. 10:3, 31; 13:2; 32:5) and His pre-measurement, predetermination and decree ("*Taqdīr*" from "*qaddara*", Q. 10:2, 5; 25:2; 41:10; 73:20; 80:19 & 87:3) set the regularities, constancies and predictability of the properties of nature. In this regard, scientific laws are scientific statements that attempt to describe, insofar as science has reached, particular fixed patterns in nature in accordance to Allāh's Regulation (*Tadbīr*) and His Laws (*Taqdīr*) as He has decreed to operate in the physical universe. However, due to the contingency of science, certain established scientific theories (or perhaps even scientific laws) may be proven null in the future. It must be noted as well, that Allāh by His Absolute Power and Dominion is capable to decree upon miracles (mostly in the form of *mu'jizāt al-rusul*) that is totally out of the norm or the expected regularity in nature, and is thus scientifically inexplicable. Outside the domain of science also is the unseen realm (*'ālam al-ghayb*) of the cosmos, such as the nature of spirit (*rūh*), self (*nafs*) and intelligence (*'aql*).

The cosmos thus should be studied in the Light of the Qur'ān, which is The Guidance (*al-Hudā*) and The Criterion (*al-Furqān*); with humility, gratitude, acknowledgement, awe and utmost reverence, obedience and servitude towards Allāh, The God, The Creator, The Owner and The Lord of everything that exists. Placing Him outside of the disciplines of natural science, and pursuing them with attitudes contrary to the above constitutes as grave injustices (*ẓulm*) and tyranny (*taghūt*) of the highest order to the innate nature of the human self, to the cosmos – the environment, floras and faunas, the atmosphere, and the outer space – and especially to God.

QUR'ĀNIC SCIENTIFIC ACTIVISM AS 'UBŪDIYYAH AND KHILĀFAH

Whilst modern Western science serves the utilitarian, medical, economic and technological needs of human life, the role of science in Islam transcends beyond pragmatic utility. It is to discover the Signs of Allāh in nature and to utilise all the resultant knowledge in serving His cause with gratitude, for the benefit of humanity's wellbeing in this world. It is to realise the grand purpose of creation, to facilitate humans in their vocation on earth, towards sustaining their felicity in the hereafter. The cosmos is to be studied, observed and contemplated upon, so as to know God and get closer to the Creator. Pursuing science is an *'ubūdiyyah* (servitude) and constitutes as *khilāfah* (vicegerency) to Allāh (M. Golshani, 1989; Osman Bakar, 2008, MK. Hassan, 2017) and in so doing, promotes prosperity of nature (*'imārat al-kawn*, see Q. 11:61). As the Book of Guidance, the Qur'ān does not neglect anything relevant to the conduct of human's life, from which humanity should be able to deduce the tools necessary for the cognition of nature. These are the hearing, the sight and the heart; perception of Divine Signs in nature through intellections and reflections, and prescriptions for studying nature through a careful study of the Book (M. Golshani, 1989). Science as a study of God's Signs had moved early believers to a myriad of scientific activities, meant to facilitate people in their servitude towards God and study of His creations, which in turn led Muslims to the pinnacles of scientific advancements during the golden period of Islamic civilisation.

"ISLAMISING" SCIENCE AS PART OF ISLAMIC INTELLECTUAL LEGACY

Over the ages, science has undergone several major interconnected historical processes namely, "naturalisation", "secularisation", and "Islamisation" (Mulyadhi Kartanegara, 2008). Naturalisation of science is the "adaptation or acculturation" of science coming from outside to a certain new culture, that results in the foreign science being fully assimilated into the new society as its indigenous culture and philosophical system, hence the nature of science which is not value-free or neutral but always "culturally and ideologically laden". Secularization of science took place when all the spiritual-metaphysical dimensions were divorced from scientific view, activities, theories

and methods by post-Renaissance, modern Western world. Hence, Islamisation of science is a naturalisation of the Western modern science into Islamic value system and foundation of civilisation (Kartanegara, 2008: 149-163). It is the contemporary effort at reconstructing and reviving science in accordance to the Qur'ānic worldview, as was also the case on the onset of Islamic civilisation. To illustrate, the stance of the 9th century Muslim philosopher-scientist, Ya'qūb ibn Ishāq al-Kindī, is explained as follows.

Although Al-Kindi was influenced by the work of Aristotle [...], he put the Greek's ideas in a new context and laid the foundations of a new philosophy. He first elaborated a system of thought based on the logic of Greek philosophy, hence developed logic and systematic explanations for some of the debated theological issues of his time, such as creation, immortality, God's knowledge, and prophecy (G.N. Atiyeh, 1966:127).

Syed Ali Ashraf (1990:2) asserts,

The philosophy of the Islamic past must be studied in order to see how Muslim philosophers tried to Islamise Greek philosophy, how far they succeeded and how far they failed and why. What was the problem which compelled Ghazali to write [...] *Tahafut al Falasifa*?

Science as seen from the Qur'ān is to be understood in the all-encompassing Islamic spirit with its comprehensive perspective of reality (O. Bakar, 2008). It is not mere labelling of the discipline with Qur'ānic verses or *aḥādīth*. Despite its popularity, not only is this "piece-meal validation" (Kartanegara, 2008:149-163) not accurate, it poses certain risks, with the potential of contravening the very objectives of integration and thus must be avoided. We consider the "piece-meal" approach as faulty for the following reasons. The approach deconsecrates the Qur'ān by taking empirical data of modern science as "the" criteria, and reducing Revelation to an inferior position to science. Whence science, as a product of human effort is contingent and not infallible, the Qur'ān as the Final Revelation from Allāh is objective, with no faults and contains the absolute Truth at all times. Attaching the verses of the Qur'ān or *aḥādīth* to current scientific findings in the "piece-meal validation" places the sacred truth of Revelation at the scrutiny of shifting contingencies of science. It should be pointed out that the Catholic Church's dogmatic subscription to geocentricism and supporting it with biblical references, caused a row with Nicholai Copernicus's (1473-1543) *On the Revolutions of the Heavenly Bodies*, 1543. The Church's dogmatic position decreed the Inquisition against Galileo Galilei (1564-1642), which incriminated him for his heliocentric position in *Dialogue on the Two Chief Systems of the World, Ptolemaic and Copernican*, 1632 (N.P. Leveillee, 2011). The Church's hold on geocentricism, a valid scientific understanding at the time and prior to the discoveries that pointed to the heliocentric nature of the solar system, resulted in the schism of science from religion, which has remained for close to four hundred years. Muslim educators must be informed and be cautious of the above danger, and exercise acute discernment and probity in their efforts at integration.

The defects in Western modern science as they exist today, developed hand in glove with secularistic, mechanistic, reductionistic and capitalistic ideologies (M. Kamal Hassan, 1980 & 1981; S.H. Nasr, 2005; O. Bakar, 2008). The rather apologetic approach of reconciling truncated scientific concepts to Islamic creed, tenets and norms, or that of truncated Qur'ānic verses or concepts to scientific theories will only deepen conflicts, imbalance and disharmony. A critical approach should include the deconstruction of the Western epistemology, and the reconstruction of an Islamic epistemology through a critical re-cultivation of the Islamic scientific tradition. Thus the curricula of natural science should also include the assumption that science is not neutral and value-free, with the ultimate purpose of science in Islam being to contemplate on God's creative work so as to increase one's faith and closeness to Him (see Golshani, 1989; O. Bakar, 2008; M. Kartanegara, 2008; M.K. Hassan, 2017). Science from the worldview of the Qur'ān is therefore in line with the holistic (spiritual, physical, emotional, intellectual and social) reality of the innate, uncorrupted human nature and the fundamental tenets of Islam, and should wholeheartedly reinforce *Tawḥīdic* principles (see Al Faruqi, 1982; Al Faruqi & Al Faruqi, 1986; S.M. Naquib al-Attas, 1989; O. Bakar, 2008; M. Iqbal, 2009, M.K. Hassan, 2017).

SOME GLARING ISSUES REGARDING CONVENTIONAL WESTERN MODERN SCIENCE

Listed below are several glaring issues regarding Western modern science, as conventionally defined, which are injurious to the worldview of Qur'ān. These need to be weeded out, or repositioned, realigned, redefined and corrected.

First, are the detachment from God and the transcendent by Western philosophies, replacing Him with reason, material, mathematical empiricism and "nature" (Karl R. Popper, 1996:82-83). Absolute freedom and the unrestrained human reason assume supremacy as *the* criterion above Revelation. On the premise of secularism, God is deconsecrated and the notion steadily erodes from deism and pantheism to agnosticism and atheism, where God is a mere historical product of the unsophisticated (S. Freud, 1919) and delusional mind (R. Dawkins, 2006). Human reason being the only authority, losing all sensibility of the sacrosanct and custodianship—all else in the universe, inclusive of other human beings can be considered as biddable materials under mechanistic natural law and objects of scientific investigations (R. Alexander and R.L. Numbers, 2010). Charles Darwin's theory of evolution, natural selection and survival of the fittest mark a "pedestal" of the "natural history" of human beings. Instead of the Ādamīc man – slave-servants and vicegerents of Allāh or the "children of God" in Christianity – the Darwinian man is a product of a random, mechanistic, naturalistic and purposeless evolutionary process of nature.

Second, several ideas that are adhered to as the conventional modern scientific paradigm (R. Sheldrake, 2013:6-27) strike several chords too familiar with ancient Hellenistic cosmology, some of which are inherent in the old Christian dogma (c.f. “hidden continuities”, Tarnas,1991:320-323). For example, everything in the universe; inclusive of human beings, their inner workings and the laws of nature are mechanically self-perpetuating and fixed (“Watchmaker analogy”, William Paley, 1802/2009). These trace back to the Aristotelian deistic universe. The law of conservation of mass and the first law of thermodynamics states that matter and energy are neither created nor destroyed, i.e. their total amounts in the universe remain constant. This originates from the Aristotelian-Christianised notion of God Who formed the universe from matter that is already in existence, since nothing can be created *ex-nihilo*. Science acknowledges no transcendental meta-physical value in human earthly life. Humans are only the Aristotelian “rational animals” (Christopher Shields, 2008), and a mere chance-product of natural selection (Charles Darwin, 1859), the purposeless mechanism of evolution; and with respect to the size of the cosmic universe, human beings are diminutively insignificant, c.f. the Aristotelian notion of no value to earthly life (Shield, 2008). Science places no transcendental significance to the earth. Thus with the well-being of the imperilled earth on a rapid and irreversible decline at the hands of the Western modern science and technology; is science’s ongoing obsession to find an alternative planet with signs of biological life as a new planet for humans. These are traceable to the Aristotelian-Christianized geocentricism, whereby the only significance of the earth is that of a place of punishment for sinners, with no moral obligation or custodianship onto it.

Thirdly, is the notion of science as being objective and value-free. Bernard E. Rollin (2006:17) confides,

The slogan that I in fact learned in my science courses in the 1960s, and which has persisted to the present, is that ‘science is value-free’ in general, and ‘ethics-free’ in particular... “science cannot make value judgements [...] cannot make moral judgements”.

Luke Mastin (2008) explains, positivism

campaigns for a systematic reduction of all human knowledge to logical and scientific foundations [...] whereby... a statement is meaningful only if it is either purely formal (essentially, mathematics and logic) or capable of empirical verification. This effectively resulted in an almost complete rejection [...] of Metaphysics (and to a large extent Ethics) on the grounds that it is unverifiable. Its influence in 20th Century Epistemology and Philosophy of Science, however, has been profound.

AL-GHAZĀLĪ AND THE IMPORTANCE OF THE *QALB*

Al-Ghazālī considered knowledge of the many branches of natural science as an essential prerequisite for understanding the Qur’ān. Al-Ghazālī re-emphasized theo-centricity, which integrates all matters of human existence and life. He managed to reconcile and re-integrate the three disparate post-Qur’ānic thoughts of *fiqh*, *kalām* and *taṣawwuf* into one cohesive and organic whole. His mastery of Hellenistic philosophy, which was prevalent and had greatly influenced several important and prominent Muslim scholars at the time, notably al-Farābī and Ibn Sinā, enabled him to sift through and discard the un-Islamic elements of Greek thought. His *Tahāfut al-Falāsifah* (al-Ghazālī, 1963:3) thus cleansed *kalām* from “heresy”. Among the twenty philosophical problems he identified and refuted were the belief in the “everlasting nature of the world, time and motion”; that God “does not know the non-particulars”; the “impossibility of a departure from the natural cause of events”; and the “denial of the resurrection of bodies” (al-Ghazālī, 1963:11-12). These arguments are relevant in that they fundamentally disprove some of the dogmas of conventional modern science (c.f. “The Ten Dogmas of Modern Science”, R. Sheldrake, 2013:6-27). Al-Ghazālī redefined the integrative nature of human beings and reinstalled the importance of the state of the heart (*qalb*) as the determiner of the value of any action, thus realigned the spirit of ethics to be in congruence with the purpose of human creation and vocation on earth. By classifying knowledge and its acquisition, he reallocated the rightful and very important position of human intellect, in subservience to the objective Divine Revelation. He brought to conscious awareness the truth of the finite earthly life and the eternal destiny human is heading; thus giving an overview and spiritual insights into the transcendental nature of the life to come, thus placing human life into the larger cosmological perspective.

The place of the spiritual heart (*qalb*) is central in al-Ghazālī’s discourse where he stresses on its purification (*tazkiyat al-naḥs*) and exercising discipline (*riyāḍiyyah*) (see Q. 91:7-10). He uses the terms *qalb* (heart), *rūḥ* (spirit), *naḥs* (soul) and *‘aql* (intelligence) to represent the four intrinsic faculties of the spiritual heart, each stands on its own meaning, yet all are intimately interrelated, constituting an organic whole. On its own, each is capable of bearing apparent and outward expressions, as well as with the interplay of any or all of the rest (al-Ghazālī, 2009). Classical Islamic scholars use the plural *‘uqūl* in addressing the faculties of intelligence (vis-à-vis multiple intelligences in contemporary jargon). As evident through numerous verses of the Qur’ān, the cognitive intelligences (i.e. the *‘uqūl*, sing. *‘aql*, mind, or reason) are more of the functions of the spiritual heart rather than the sole domain of the brain as what is conventionally understood. The Qur’ān challenges:

“Do they not think deeply (earnestly seek to understand) the Qur’ān, or are their hearts locked up by them?” (Q. 47:24)

“Or do those in whose hearts is a disease, think that Allāh will not bring to light all their rancour?” (Q. 47:29)

Accordingly, al-Ghazālī explains that the heart is the seat of knowledge (“*al-maḥall al-‘ilm*”) and he aptly uses the “mirror” analogy in reference to it (al-Ghazālī, 2009:39-40). So central is the function of the heart that even in the

pursuit of something that is intrinsically noble (“*maḥmūdah*”) may in fact be despicable (“*mazmūmah*”) if the deed springs forth from a heart that is “defective” or tainted with “diseases”. These may come as “imperfection” due to immaturity, “dullness due to disobedience” and “lust”, miss-direction due to distractions of worldly matters, veiling due to pre-conceptions and blind imitations, and “ignorance of the direction from which the knowledge sought must be obtained”. Accordingly, the purity and clarity of the heart are imperatives for arriving at the various levels of unveiling of true knowledge (al-Ghazālī, 2009:39-58).

Al-Ghazālī describes that human beings are equipped to derive awareness and knowledge from two sources: The faculties of senses and reason (*‘aql*), allow humans to know the apparent material universe where he resides. The Divine Revelation and inspiration (*naql*) enable him to discover what may be hidden from plain sight. The former is deficient and thus subservient to the latter. The *qalb* has the “special properties of knowledge and will, which separates it from animals”. The processes of spiritual maturity distinguish the *qalb* from immature tendencies (al-Ghazālī, 2009:23-24). True knowledge can only be unveiled once the *qalb* has been cleansed and the veils removed (through *tazkiyat al-nafs*), and the self-cultivated through Qur’ānic and *Sunnatic* learning and exercising (*riyādiyyah*). Since the highest purpose of knowledge is to enable one to get closer to Allāh and eventually to the ultimate bliss of being in His presence (“*Wajh Allāh*”, Q. 2:115, 272; 30:38-39; 76:9), the more the self comprehends knowledge, the better it knows God. With better knowledge and awareness of God, the closer one comes to Him, thus earning greater happiness (al-Ghazālī, 2013). Al-Ghazālī says,

Clear understanding and clear intellect are the highest attributes of man, because through the intellect, the responsibility of Allah’s trust is accepted, and through it man can enjoy the closeness to Allah (al-Ghazālī, 2013:49).

To al-Ghazālī intelligence (*‘aql*) is “the certain sight and the light of belief, the inner characteristics” and “the source and fountain head of knowledge” through which humanity “comprehends reality”. He relates the former to the primordial covenant with Allāh S.W.T. (*‘ahd Allāh*) and the latter to human innate nature (*fiṭrah*) (N. Nofal, 1993:222-236). Hence, part of the task of education is to develop the intellect to acquire the capacity to accumulate knowledge through experiences and ultimately to enable one to conquer and subdue the lower self (*nafs al-ammārah bi al-sū’*) for the higher (*lawwāmah, al-muṭmainnah*). Thus, the training of *al-‘aql* – the cognitive faculty of the spiritual heart, comprises the disciplining of the extrinsic and intrinsic faculties of senses which are apertures to the spiritual heart and the rest of its faculties (*qalb, rūh* and *nafs*). Al-Ghazālī’s emphasis on exercising the senses and intellect in investigations and observations is clear when he criticises against blind faith, or “*taqlīd*” (quoted in N. Nofal, 1993:228-231).

Allāh declares that He accepts deeds (*‘ibādah*) only if they are characterised by purity of *nafs* (Q. 91:9), soundness of *qalb* (Q. 26:89) and humility of *rūh*, bearing in mind the certainty of meeting and returning to their Lord (Q. 2:45-46). These are attained through cleansing the physical body from any physical impurities and the purification of the *nafs, rūh, qalb* and *‘aql* from any diseases that cast veils rendering them dull and impenetrable. Likewise, a human being will not be able to attain the unveiling of truth without attending to his spiritual heart, purifying it and exercising his faculties in accordance to Qur’ānic and *Sunnatic* injunctions. A person in the possession of *al-nafs al-ammārah* may be physically and mentally skilled in the empirical aspects of science; but with a heart that is tainted, is unable to penetrate into the deeper meanings of things, lacking insights to arrive at true knowledge. At best, the information, data and skills gathered are good only for pragmatic and utilitarian disposes. Thus the equilibrium between purifying the self and exercising one’s faculties (extrinsic and intrinsic), and in engaging both the spiritual and the physical aspects of the self, in *dhikr* and *fikr* (M.K. Hassan, 2017), is the stance of those coloured with the Worldview of the Qur’ān in the pursuit of true knowledge.

ŪLŪ AL-ALBĀB

A contextual study on all the sixteen verses of the Qur’ān referring to the term shows that *ūlū al-albāb* are honoured by Allah, for their profound spiritual ethics and (sensory and intellective) faculties. Their *qalb*, having undergone *riyādiyyah* and *tazkiyat al-nafs* is free from inclinations of the lower *nafs* or *hawa*, receives “colouration” by Allāh (“*sibghat Allāh*”, Q. 2:138), to the point that He is “his hearing with which he hears, his seeing with which he sees, his hands with which he strikes, and his foot with which he walks [...]” (*ḥadīth qudsy* in *An-Nawawī*, 1976:118).

Their *qalb* is the quintessence of illuminated reason and understanding, intelligent and discerning wisdom, and with insights that are able to unearth truth and correct guidance. These are people characterised by the Qur’ān as those whose life is devoted in sincere and humble servitude (*‘ubūdiyyah*) towards Allāh in all its spheres. They observe lofty and refined Qur’ānic spiritual ethics as exemplified by the Prophets ‘*a.s.*, the seal of whom is Muḥammad ṣ. ‘*a.w.* On observance of Qur’ānic injunctions they exert themselves, their senses and intelligences in listening to, seeing, observing, thinking, pondering and contemplating upon *Āyāt Allāh* in the Qur’ān and in the Cosmos to arrive at deep understanding of them; steadfastly verifying through further empirical proofs and observations without superstition, unfounded assumption, speculation or blind imitation. With deep sense of awareness of God (*taqwā*), gratitude (*shukr*), humility (*tawāḍu’*) and execution of the highest form of *‘ubūdiyyah* to Allāh, they strive (*jihād*) ceaselessly in bringing humanity nearer to understanding *Āyāt Allāh*, in knowing and in

getting closer (*taqarrub*) to God. They exert selflessly in service to humanity through their responsibilities, professions, trades and crafts to their best (*itqān* and *ihsān*).

In so doing, they may emerge as scholars (*‘ulamā’*) who, through a life of vicegerency, promote prosperity while safeguarding the sanctity of balance in nature (*‘imārat al-kawn*) and spread mercy and goodness to all (*raḥmatan li al-‘ālamīn*). They are as what the Qur’ān addresses, “Those truly fear Allāh among His servants who have knowledge” (Q. 35:28). In a very tight nutshell, constant awareness and remembrance (*dhikr*) of Allāh and unfailing engagement of the mind (*fikr*) in intellection and contemplation of God’s creations – in the Cosmos, in human history and in the body – are the traits of the integrated personalities that the Qur’ān addresses favourably as *ūlū al-albāb*.

AN INTEGRATION FRAMEWORK FOR CONSTRUCTING NATURAL SCIENCE CURRICULA FOR ISLAMIC SECONDARY SCHOOLS: THE *ŪLŪ AL-ALBĀB* MODEL

With a three-step methodology of (i) Identify, (ii) Purify, and (iii) Beautify and Enrich, this framework comprises a three-dimensional construction:

- I. *Al-Taṣawwur al-Qur’ānī* (the Worldview of the Qur’an),
- II. *Al-Turāth al-‘Ilm fī al-Islām* (Islamic Civilisational Legacy and Knowledge Tradition) and
- III. *Al-Mulā‘imah* (Relevance).

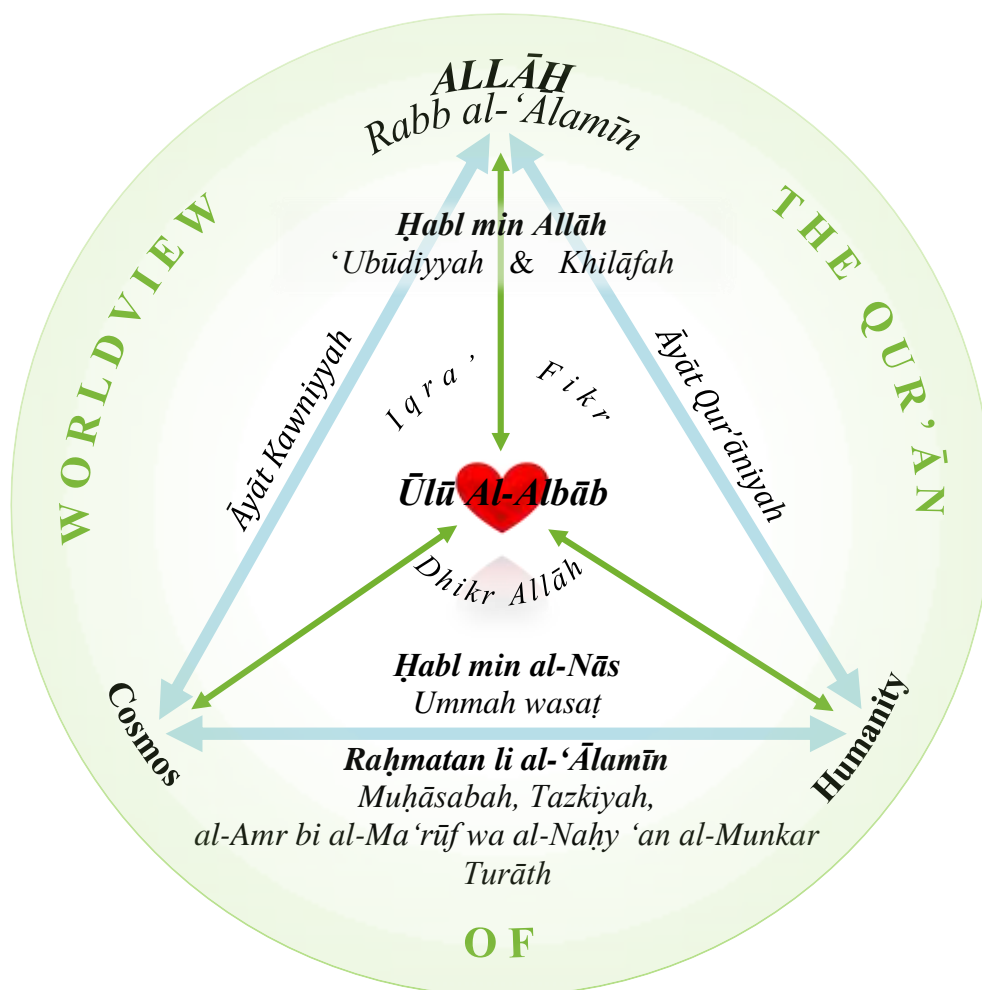
Figure 1 describes the details of the three-dimensional construction. Figure 2 represents, in a very simplified fashion, the framework described.

Figure 1 The *Ūlū Al-Albāb* three-dimensional integration framework towards constructing natural science curricula for Islamic secondary schools.

<p>(1) AL-TAṢAWWUR AL-QUR’ĀNĪ The Qur’ānic worldview forms the fundamental premise and fashions the underlying spirit, through which the curricula:</p>
<ol style="list-style-type: none"> i. View Allāh’s Cosmos with the servitude, humility, acknowledgement, appreciation, gratitude, literacy, awareness, responsibility, activism, ethicality, accountability and the <i>qalb</i> of <i>ūlū al-albāb</i>. ii. Endeavour to “read” cosmic phenomena, which are <i>Āyāt Allāh</i> in nature, and to engage actively towards a deeper and holistic understanding of the Cosmos, guided by the study of <i>Āyāt Allāh</i> in the Qur’ān. iii. Identify, then weed out or reposition, realign, redefine and correct any concept conventional in Western modern science that are injurious or detrimental to the Qur’ānic theology, ontology, cosmology, epistemology, anthropology, axiology and eschatology. iv. Focus on the threefold relationship, whilst placing realities in the balance of criterion of the ideals: <ul style="list-style-type: none"> • humanity with Allāh (<i>ḥabl min Allāh</i>, i.e. ‘<i>ubūdiyyah</i> and <i>khilāfah</i>), • humanity with itself (<i>ḥabl min al-nās</i>, i.e. <i>muḥāsabah</i>, <i>tazkiyah</i>, <i>al-amr bi al-ma’rūf wa al-naḥy ‘an al-munkar</i>, <i>ummah wasaṭ</i>), and • humanity with the Cosmos (<i>ḥabl min al-kawn</i>, <i>raḥmatan li al-‘ālamīn</i>). v. Enrich the subject matter of natural science with relevant Qur’ānic verses and concepts, which pertain to Qur’ānic theology, ontology, cosmology, epistemology, anthropology, axiology and eschatology of the, and supplementing them with relevant <i>ahadīth</i>, in line with the above spirit.

<p>(2) AL-TURĀTH AL-‘ILM FĪ AL-ISLĀM The curricula serve to revive and resume the civilisational legacy and knowledge tradition in Islam:</p>
<ol style="list-style-type: none">i. The study and pursuit of natural science as a revival and continuation of Islamic knowledge tradition.ii. An obligatory endeavour, which helps humanity in getting closer to Allāh and earning His pleasure.iii. Identify errors in historical facts associated with certain scientific theories, laws and notable scientific figures.iv. Correct the above with proven data and relevant Islamic civilisational legacy (<i>turāth al-ḥaḍarah al-Islāmiyyah</i>).v. Enrich the body of knowledge with contributions and legacies of the great Muslim scientists of the past.vi. Create awareness of the place of natural science in the greater civilisational scheme of things.
<p>(3) AL-MULĀ‘IMAH The curricula aims to:</p>
<ol style="list-style-type: none">i. Provide relevance of natural science to students’ daily life as Muslims.ii. Spark interest and better appreciation of natural science, so students become self-initiated learners.iii. Bring contemporaneous relevance (<i>mu‘āṣarah</i>) of the Qur’ān to students of science.iv. Make the verses of the Qur’ān to ‘come alive’ in the hearts of students, with constant reflections on the cosmos and remembrance of <i>Allāh</i>.v. Motivate Muslim students to build affinity with the subjects of natural science and become future scientists to develop the Muslim <i>ummah</i>.vi. Create awareness for learning science as a personal religious obligation (<i>farḍ</i>) and its endeavour in society as a communal religious obligation (<i>farḍ kifāyah</i>).vii. Facilitate teaching and learning in particular, and education in general towards producing <i>Tawhīdic</i> inspired scientists and scientific minds who with reference to the Qur’ān, study Signs of Allāh in “the open book of Nature” (<i>Āyāt Allāh al-Kawniyyah</i>). <p>To empower Islamic schools in producing students with <i>Tawhīdic</i> inspired scientific minds, and Qur’ānic scientific attitude and activism.</p>

Figure 2: A simplified schematic representation of an integrated framework and approach, based on the *Ūlū al-Albāb* model towards the construction of Islamic secondary school curricula for natural science.



CONCLUSION

Project *N.S.W.V.Q.* (Natural Science from the Worldview of the Qur’ān, chaired by M. Kamal Hassan) works towards the production of *Natural Science from The Worldview of The Qur’an: An Introduction*. The three-volume work is a reference or supplementary textbook for biology, chemistry and physics, intended for use in Islamic secondary schools, as well as by science educators and the public. The science subject matter is based on the commonality of Malaysian, Indonesian, Cambridge, Bruneian, Singaporean, Filipino, Canadian and American middle and high-school curricula and syllabi. *N.S.W.V.Q.* is written in a fashion that veers away from the conventional. It presents the subject matter of biology, chemistry and physics in integrated themes. Throughout the book, the subject matter of science is discreetly presented from Qur’ānic theology, epistemology, cosmology, ontology, anthropology, axiology and eschatology. This involves holistic repositioning, reinterpreting and reorienting certain conventional aspects of Western modern science, whereby humanity’s relationship with God, with itself and with the cosmos form the main constructs. Interwoven into the text are corrections of historical facts on scientific and technological developments, based on verified findings on the legacies of Muslim scholars, thinkers and scientists of the golden Islamic age. There are many instances whereby pressing issues of cosmological, ontological and axiological significance are juxtaposed with the current state of the environment, to prompt readers into tracing the sources of the problems and to find sustainable solutions based on Qur’ānic premise.

As such, despite the limitations of our study, the model supplementary reference textbook, which is written based on the *Ulū Al-Albāb* three-dimensional integration framework for constructing natural science curricula for Islamic secondary schools, is suitable for use not only in Malaysia, but also for Islamic secondary education in other countries as well, as long as English is a medium of instruction. The *Ulū Al-Albāb* three-dimensional integration framework itself is designed from an *ummatic* and Islamic civilisational stance. As it is based on the Qur’ānic knowledge and scientific culture, the framework is deemed suitable and useful for any Islamic secondary schools in the Muslim world, transcending language barriers, provided that the framework is accurately translated into the

respective languages. It is our vision and hope that the framework and its Islamically integrated model reference textbook for natural science shall not only fill the void that is so distinctly felt and witnessed in Islamic secondary education of the countries that we visited, but shall be an impetus for further research and works that address the need for real, correct, accurate and substantive integration of Qur'ānic worldview and natural science for use at all education levels throughout the Muslim world. This is a small step towards re-establishing natural science as a field of study that is truly based on the *Tawhīdic* worldview of the Qur'ān as was the case during the Golden Age of Islam.

In truth, the Qur'ān prescribes the very scientific attitude and worldview that the world of today needs, in the face of the global crumbling of human dignity, decaying of environmental sustainability and collapsing of civilisational integrity due to the fundamental systemic failures of modern and contemporary post-modern premises and structures. The *ummah* must veer away from her current trajectory of mimicking worldviews that are alien to the holistic and integrative nature of the Qur'ān, of the humankind and of all creations. Worldviews such as naturalism, mechanism and positivism that conventionally define disciplines of natural science, all stem forth from agnosticism, secularism and atheism that are alien to the *Tawhīdic* worldview of the Qur'ān. They have long seeped into the hearts of Muslims, tearing the *ummah* apart into shards that cannot, even at the very least, manage to sustain its survival, let alone to stand up as the most justly balanced (*ummatan wasaʿta*) and as the best (*khaira ummah*), offering the world solutions that are mercy to the Universe (*rahmatan li al-'ālamīn*). It is indeed a religious obligation and responsibility of Muslims, as the people with direct faithful and intimate access to the Qur'ānic criterion and guidance, to provide an answer. The *Ūlū al-Albāb* integration framework towards constructing curricula of natural science for Islamic secondary school is our humble attempt at addressing the long call for fully integrated science curricula and literature for use in formal instructions. This is a small step towards the Qur'ānic and *Sunnatic* ideals. Our future plans include the production of *N.S.W.V.Q.* teachers' guide, teachers' trainings, workshops and talks to secondary school students, as well as the production of subject and grade-level specific *N.S.W.V.Q.*; *in shā' Allāh*.

REFERENCES

- Abūsulaymān, 'A. H. (2002). "Man Between the Two Laws; A Qur'ānic Perspective in Understanding Self and Understanding the Other". Retrieved 1 August 2013. <http://i-epistemology.net/abdul-hamid-a-abu-sulayman/1143-man-between-two-laws-a-quranic-perspective-in-understanding-self-and-understanding-the-other.html>
- Akdoğan, C. (2008). *Science in Islam and the West*. Kuala Lumpur: ISTAC, IIUM.
- Al Fārūqī, I. R. (1982). *Al Tawhīd: Its Implications for Thought and Life*. Herndon, Virginia: IIIT.
- Al Fārūqī, I. R. & Al Fārūqī, L. L. (1986). *The Cultural Atlas of Islam*, New York & London: Macmillan.
- Al-Attas, S.M.N. (1989). *Islam and Philosophy of Science*. Kuala Lumpur: ISTAC IIUM.
- Alexander, R. and Numbers, R.L. (2010). *Biology and Ideology from Descartes to Dawkins*. Chicago & London: University of Chicago Press Ltd.
- Al-Ghazālī. (1963). *Tahāfut al-Falāsifah*. Sabih Ahmad Kamali. (Trans.). Lahore: Pakistan Philosophical Congress.
- Al-Ghazali. (2009). *The Book of Knowledge*. (Nabih Amin Faris. Trans.). Petaling Jaya: Islamic Book Trust.
- Al-Ghazali. (2013). *Wonders of the Heart*. W. J. Skellie. (Trans.). Petaling Jaya: Islamic Book Trust.
- Al-Ghazzālī. (2013). *The Book of Knowledge. Kitāb al-'Ilm of Al-Ghazzālī's Iḥyā' 'Ulūm al-Dīn*. (Faris, N. A. Trans.). Kuala Lumpur: Dar al-Wahy Publications.
- Al-Hilālī, M. T. & Khan, M. (1427H.). *The Noble Qur'an: English Translation of the Meanings and Commentary*. Madinah: King Fahd Complex for the Printing of the Holy Qur'an.
- Ali, A. Yusuf. (1992). *The Holy Qur'an: Translation and Commentary*. Brentwood, Maryland, USA: Amana Corp.
- Al-Nawawī. (1976). *An-Nawawī's Forty Hadith*. (Ibrahim, E. & Johnson-Davies, D. Trans.). Damascus: The Koran Publishing House.
- Asad, M. (1980). *The Message of The Qur'an*. Gibraltar: Dar Al-Andalus.
- Ashraf, S. A. (Ed.). (1990). "Editorial". In *Muslim Education Quarterly*. 7(2): 2. Cambridge: Islamic Academy.
- Basmeih, S. 'A. (2007). *Tafsir Pimpinan Ar-Rahman: Interpretation of the Meaning of the Qur'an*. (English Translation evaluated and consulted upon by 'Uthmān El-Muḥammady). Malaysia: JAKIM.
- Bennabi, M. (2003). *Abderrahman Benamara, Colonisabilité*. Alger: Dar el-Hadhara.
- Darwin, C. (1859). *The Origin of Species: By Means of Natural Selection or The Preservation of Favoured Races in the Struggle for Life*. London: John Murray.
- Dawkins, R. (2006). *The God Delusion*. Boston New York: Mariner, Houghton Mifflin Company.
- Freud, S. (1919). *Totem and Taboo: Resemblances between the Psychic Lives of Savages and Neurotics*. (Trans. A. Brill). London: George Routledge & Sons. Ltd.
- Golshani, M. (1989). "Philosophy of Science from the Qur'ānic Perspective". In *Toward Islamization of Disciplines*. Herndon, Virginia: IIIT.
- Hawking, S. & Mlodinow, L. (2010). *The Grand Design: New Answers to the Ultimate Questions of Life*. London: Bantam Press.
- Ibn 'Abbās, 'A. (2007). *Tanwīr al-Miqbās min Tafsīr Ibn 'Abbās*. (English Trans. Guezzou, M.). Amman: Royal Aal al-Bayt Institute for Islamic Thought.

- IbnKathīr. (2000). *TafsirIbnKathir*. (Abridged under supervision of Al-Mubarakpuri, S. R.). Riyadh: Darussalam.
- Iqbal, M. (2009). *The Making of Islamic Science*. Petaling Jaya: Islamic Book Trust.
- Kartanegara, M. (2008). "Secularization of Science and Its Islamic Answer". In Baharudin Ahmad. (Ed.). *Islamic Science and the Contemporary World: Islamic Science in Contemporary Education*. Kuala Lumpur: ISTAC.
- Kuhn, T. S. (1996). *The Structure of Scientific Revolutions*. (3rd Edn.). Chicago and London: The University of Chicago Press.
- Küing, H. (2007). *Islam: Past, Present and Future*. Oxford: Oneworld.
- M. Kamal Hassan. (1980). "Integration of Islamic Values in Science and Technology Education in the Context of National Development: A Challenge to Muslim Decision-Makers and Educators in Malaysia". In UKM. (1980). Paper presented at the International Conference on The Role of Universities in Developing Nations.
- M. Kamal Hassan. (1981). "The Implications of Science and Technology Education and Development on Islamic Values". In *Environmental Education and Research in Indonesian Universities*. Maruzen Asia.
- M. Kamal Hassan. (2017). *Natural Science from the Worldview of the Qur'an: An Introduction*. Kuala Lumpur: ITBM.
- Mastin, L. (2008) "Logical Positivism". In *The Basics of Philosophy: A Huge Subject Broken Down into Manageable Chunk*. Retrieved 23 June, 2015 from http://www.philosophybasics.com/branch_logical_positivism.html.
- Maududi, S. A. A. (2006). *Towards Understanding the Quran: Abridged version of Tafhīm al-Qur'ān*. (Ansari, Z.I. Trans. and Ed.). United Kingdom: The Islamic Foundation.
- Nabil Nofal, N. "Al-Ghazali (A.D. 1058-1111; A.H. 450-505)". In *Thinkers on Education. In Prospects: The Quarterly Review of Comparative Educatio*. Vol. 23. No. ¾. Paris: UNESCO, International Bureau of Education, 1993. P. 222-236.
- Nasr, S. H. (2005, Winter.). "Islam, Muslims and Modern Technology". In *Islam & Science*. Vol. 3. Issue 2: 109-126. Alberta: The Center for Islam and Science.
- Nicholas P. Leveillee. (2011). "Copernicus, Galileo, and the Church: Science in a Religious World". In *Student Pulse*. 3(05). Retrieved October 2nd 2015. Retrieved October 2nd 2015 from <http://www.studentpulse.com/a?id=533>.
- Nor Jannah Hassan. (2017). "Integration of Qur'anic Perspectives in the Curricula of of Natural Science in Selected Islamic Secondary Schools of Malaysia and Indonesia: A comparative Study". Ph.D. Thesis. Gombak: IIUM.
- Osman Bakar. (2008). *Tawhid and science: Islamic Perspectives on Religion and Science*. Shah Alam: Arah Publications.
- Paley, W. (1802 /2009). *Natural Theology or Evidence of the Existence and Attributes of the Deity, Collected from the Appearance of Nature*. Bridgewater Treatises, Faulder.Reissued by University of Cambridge Press.
- Popper, K. R. (1996). *The Myth of the Framework: In Defence of Science and Rationality*. New York & London: Routledge.
- Rasā'il al-Kindī al-Falsafiyah*. In Atiyeh, G.N. (1966). *Al-Kindi*. Rawalpindi: Islamic Research Institute. Cited in "Al-Kindi". In *Muslim Heritage*. Retrieved January 11th 2017 from <http://www.muslimheritage.com/article/al-kindi#ftnref3>.
- Rollin, B. E. (2006). *Science and Ethics*. Cambridge: Cambridge University Press.
- Sheldrake, R. (2013). *The Science Delusion: Freeing the Spirit of Enquiry*. London: Coronet.
- Shields, C. (2008). "Aristotle", in *Stanford Encyclopedia of Philosophy*. Retrieved 1 June 2014 from <http://plato.stanford.edu/entries/aristotle/>.
- Tarnas, R. (1991). *The Passion of the Western Mind: Understanding the Ideas That Have Shaped Our Worldview*. New York: Harmony Books.
- Kaplan, S. (2016, 20 January). "By 2050, there will be more plastic than fish in the world's oceans, study says". *The Washington Post*. Retrieved 9 March 2016 from <https://www.washingtonpost.com/news/morning-mix/wp/2016/01/20/by-2050-there-will-be-more-plastic-than-fish-in-the-worlds-oceans-study-says/>.
- Grant, R. (2009, 24 April). "Drowning in plastic: The Great Pacific Garbage Patch is twice the size of France". *The Telegraph*. Retrieved 8 March 2016. <http://www.telegraph.co.uk/news/earth/environment/5208645/Drowning-in-plastic-The-Great-Pacific-Garbage-Patch-is-twice-the-size-of-France.html>.
- No Author. (2015, 31 May). "Ocean Trash Plaguering Our Sea". In *Ocean Portal, Smithsonian National Museum of Natural History*. Retrieved 8 March 2015. <http://ocean.si.edu/ocean-news/ocean-trash-plaguering-our-sea>.
- No Author. (n.d.). "Mechanism". Retrieved October 8th 2014 from [http://www.newworldencyclopedia.org/entry/Mechanism_\(philosophy\)](http://www.newworldencyclopedia.org/entry/Mechanism_(philosophy)).
- No Author. (n.d.). "Positivism". (n.d.). Retrieved October 8th 2010 from <http://www.britannica.com/EBchecked/topic/471865/positivism>.