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Constructing Islamic Secondary School Curricula and Textbooks for Natural Science: An Integration Framework Based on the *Ūlū Al-Albāb* Model¹

Nur Jannah Hassan,*

Abstract: The annals of the Islamic, modern and post-modern eras are witnesses to how science and technology have impacted humanity. Reacting against the inauspicious effects of modern and post-modern tendencies, is the distinct global phenomenon of Islamic schools offering “integrated education”. But what constitutes as integration? Analyses of various curricula, syllabi and textbooks of natural science used by several Islamic secondary schools in Malaysia, Indonesia, Brunei, Singapore, Southern Thailand, Mindanao and Ontario show very little integration if any. This article puts forward an integration framework towards the construction of Islamic secondary school curricula and textbooks of natural science, based on the Qur’ānic notion of “*ūlū al-albāb*” with Ghazālīan discourse of the *qalb* where certain conventional aspects of natural science undergo holistic reposition, reinterpretation and reorientation from the Qur’ānic worldview. The framework is constructed on the three-level relationships man has – with God, with humanity and with the cosmos.

Keywords: *worldview, integration, natural science, Western modern science, qalb, ūlū al-albāb.*

Abstrak: Rentetan sejarah-sejarah zaman Islam, moden dan pasca-moden adalah saksi terhadap impak sains dan teknologi kepada manusia. Tindak-balas terhadap kesan-kesan buruk aliran moden and pasca-moden, adalah tumbuhnya sekolah-sekolah Islam yang menawarkan “pendidikan bersepadu” – suatu fenomena global yang begitu ketara. Tetapi apakah dia kesepaduan? Analisis terhadap kurikulum, silabus dan buku teks sains tabii yang digunakan oleh sejumlah sekolah menengah Islam di Malaysia, Indonesia, Brunei, Singapura, Selatan Thailand, Mindanao dan Ontario menunjukkan kesepaduan yang begitu sedikit, walaupun ada. Penulisan ini mengutarakan sebuah kerangka bersepadu ke arah pembentukan kurikulum sains tabii sekolah menengah Islam dan buku teks, berlandaskan konsep “*ūlū al-albāb*” berserta wacana al-Ghazālī tentang hati, di mana aspek konvensional sains tabii menjalani penataan, pentakrifan dan pengalihan-arah semula yang menyeluruh dari pandangan alam al-Qur’ān. Kerangka ini dibina berdasarkan hubungan tiga-hala manusia - dengan Tuhan, sesama manusia dan dengan alam semesta.

Kata Kunci: *pandangan alam, kesepaduan, sains tabii, sains moden Barat, qalb, ūlū al-albāb.*

¹ This article is an extension of and should be read with “Integration of the Qur’ānic Worldview with Natural Science: Answering the Long Call for Islamic Secondary Schools” by the same author.

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Introduction

The importance of science and technology in nation building is an undisputable fact. A nation without a sound scientific culture and understanding, proliferation of science, and original and competitive developments in technology will forever remain a consumer, thus jeopardising the sovereignty of her mind, spirit, culture, education, ethics, economy, politics, governance and territory—leaving it at the mercy of manipulations by the world's powers that be. Beyond nationhood and on a 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 *Allāh Subḥānahū wa Ta'ālā* addresses in the Qur'ān as *Ūlū al-Albāb*; without which, the *ummah* may forever subject itself to what M. Bennabi (2003) addresses as “*colonisabilité*”. The annals of Islamic civilisation, and the modern and the post-modern eras have stood witness on 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 savoir-faire have had and still have on the young who forms the fibres, which constitute the fabric of a people and in turn determines its future.

Most notably for Muslims, is developing vigorous scientific young minds and conscience on the foundation of the holistic Qur'ānic worldview—the gist of which is embodied in *Sūrat al-Fātiḥah* (Q. 1:1-7). This in essence, is a factor that is most vital and cannot be dispensed with, if Islamic education were to be taken – which it ought to – as the key to secure a future Muslim *ummah* that is Islamically vibrant. Such an *ummah* is characterised by being knowledgeable; physically, intellectually, emotionally, morally, spiritually and socially wholesome and upright; skilful, excellent, prolific, well balanced and prosperous; conscientious, ethical and just (e.g. Q. 2:143; 3:7, 104, 110, 200; 4:135; 8:60; 14:27; 16:9; 28:77; 96:1-5 & 35:28)—and godly (e.g. Q. 3:191; 23:1-11; 5:7). Such is the *ummah* that is well equipped to not only sustain itself, but also to rise above the vast challenges of contemporary globalisation, with the tumultuously chaotic and systemically collapsing post-modern, pluralistic and liberalistic systems. Such is the *ummah* that is capable to uphold its responsibility as the bearer of a message, which is “*rahmatan li al-‘ālamīn*” (Q. 21:106-107) and in presenting to the world, workable alternatives and solutions based on the *Tawḥīdic* (Al Farūqī, 1982) or Qur'ānic worldview (AbūSulayman, 2002; M.K. Hassan, 2017).

There is a wealth of literature addressing intellectuals at tertiary education levels for the need of integrating *Tawḥīdic* / Islamic worldview and the sciences, as well as some “integrated” literature at the pre-school and primary school levels. However, our library and field researches and surveys show a stark dearth of actual integrated works for the secondary (and pre-university) levels – none that we encountered written in the languages used in the schools that we visited². Our findings may be described briefly as follows:

² Based on a number of material (curricula, syllabi and textbooks in *Bahasa Melayu*, *Bahasa Indonesia*, Thai and English) gathered from the schools visited in Malaysia, Indonesia, Brunei, Singapore, Mindanao,

1. The lack of comprehensive knowledge on integration (why, what, when and how), time constraints, demands of the formal syllabi and examinations cause “integration” to be left at the device of individual teachers or schools, or sidelined altogether.
2. School administrators, teachers and a portion of the public undertake “integration” based on respective awareness and understandings, instead of formal institutionalisation in the curricula.
3. “Integration” constitutes the study of “Islamic religious knowledge” and natural science in parallel, with minimal intersection, if any.
4. An “integrated curriculum” is limited to commendable observances of daily prayers, Qur’ān recitation/memorization, supplications, etiquette, character development and co-curricular activities.
5. Lack of training for teachers. With little or no formal guidance or supervision, they are encouraged to improvise on their own, resulting in superficial patching-on of Qur’ānic verses/ *aḥadīth* in the teaching and learning processes.
6. The stark lack of secondary school curricula, modules and textbooks of natural science (we found none in English/ Malay/ Indonesian/ Thai/ Tagalog used in the secondary schools visited) *fully written* from the Qur’ānic worldview.
7. There is a dire need for such materials voiced by all teachers, administrators and members of the schools’ boards.

We found the secondary school natural science curricula and textbooks available and used, by and large, are based on the conventional Western modern naturalistic-mechanistic-positivistic model, in which God and His attributes are left out from the study of nature, man and the universe. Some of the “integrated materials” found include some Qur’ānic verses and supplications in the opening, or at best, sparsely interspersed in the text, with little guidance or explained relevance. We consider as ours, the responsibility to address the secondary school age group. This is the crucial period whereby the cognitive, affective, spiritual, moral and ethical developments form a lasting worldview, which will in-turn fashion one’s future endeavours. It is, in their hands, after-all, where the immediate future of the *ummah* lies.

A Qur’ānic Integration Framework

Over the ages, science has undergone several major interconnected historical processes namely, “naturalisation”, “secularisation”, and “Islamisation” (M. 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 and civilisation (Kartanegara, 2008, pp. 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 civilization. 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, p. 127).

S. A. Ashraf 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*? (Ashraf, 1990, p. 2).

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 (Osman Bakar, 2008). 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 and in the hereafter. The cosmos is to be studied, observed and contemplated upon, so as to know God and get closer to the Creator – in so doing, pursuing science is an *'ubūdiyyah* to Him, as part of *khilāfah* (M. Golshani, 1989; Osman Bakar, 2008) and promotes prosperity of the environment (*'immārat al-kawn*). 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 the early believers to a myriad of scientific activities, meant to facilitate the 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 (al-Hassani, 2012). Science as seen from the Qur'ān is to be understood in the all-encompassing Islamic spirit with its comprehensive perspective of reality (Osman 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" (M. Kartanegara, 2008, pp. 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:

1. The approach deconsecrates the veracity and authenticity of the Qur’ān by taking empirical data of modern science as to be “the” criteria, and reducing Revelation to an inferior position to Western science.
2. 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.
3. Attaching the verses of the Qur’ān or *aḥadīth* to current scientific findings in the “piece-meal validation” places the sacred truth of Revelation at the scrutiny of shifting contingencies of science.
4. It should be pointed out that the Catholic Church’s dogmatic subscription to geocentrism and supporting it with biblical references, caused a row with Nicholai Copernicus’s (1473-1543) *On the Revolutions of the Heavenly Bodies*, 1543 (N.P. Leveillee, 2011). The Church’s dogmatic position decreed the Inquisition against Galileo Galilei (1564-1642), which incriminated him for his position in *Dialogue on the Two Chief Systems of the World, Ptolemaic and Copernican* (published in 1632) (ibid.) that was in favour of heliocentrism.
5. The Church’s hold on geocentrism, which was 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 hand with mechanistic, secularistic, reductionistic and capitalistic ideologies (M. Kamal Hassan, 1980 & 1981; S.H. Nasr, 2003; Osman Bakar, 2008). The rather apologetic approach of reconciling truncated scientific concepts to Islamic creed, tenets and norms 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 I.R. Al Faruqi, 1982; I.R. Al Faruqi & L.L. Al Faruqi, 1986; S.M.N. al-Attas, 1989; O. Bakar, 2008; M. Iqbal, 2009, M.K. Hassan, 2017).

Al-Ghazālī and the Importance of the Qalb

The place of the spiritual heart (*qalb*) is central in al-Ghazālī’s discourse where he stresses on its purification (*tazkiyah*) and exercising discipline (*riyāḍiyyah*) (see Q. 91:7-

10). He uses the terms *qalb* (heart), *rūḥ* (spirit), *nafs* (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)³. Al-Ghazālī does not include the brain in his discourse of the *‘aql*. That the cognitive intelligences (i.e. the *‘aql*, “mind”, or “reason”) as being more of the functions of the heart is evident through numerous verses of the Qur’ān, rather than the sole domain of the brain as what is commonly understood by the conventional disciplines of psychology and neuroscience. 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)

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, p. 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 fall into 5 general conditions (al-Ghazālī, 2009, p. 39-58):

1. “imperfection” due to immaturity;
2. “dullness due to disobedience” and “lust”;
3. miss-direction due to distractions of worldly matters;
4. veiling due to pre-conceptions and blind imitations; and
5. “ignorance of the direction from which the knowledge sought must be obtained”.

³ Multiple intelligence include the following:

- (i) Mental intelligence: e.g. sense perception (Q. *al-Sajdah*: 27), knowing information (Q. *al-Baqarah*: 42) and storing and retrieving of perceptive data (Q. *Hūd*: 24).
- (ii) Affective intelligence: e.g. *khushū‘* (Malik Badri, *Contemplation: An Islamic Psychospiritual Study*, (Cambridge, London: IIIT, 2000), xiii) and *khashyah Allāh* (Q. *al-Aḥzāb*: 37).
- (iii) Social intelligence: e.g. empathy and kindness (Q. *al-Ṭalāq*: 2, 6-7).
- (iv) Communicative intelligence: e.g. *al-bayān* or speech (Q. *al-Naḥl*: 125; *Ṭā Ha*: 25-35; *Al-Raḥmān*: 4). Q. *Ṭā Ha*: 25-35 is the account of Prophet Musa’s ‘a.s. invocation to Allāh S.W.T. for his brother Prophet Hārūn ‘a.s. to assist him in his Divinely ordained mission to Fir‘aūn:
- (v) *“O my Lord, open for me my chest, and ease my task for me; and loosen the knot from my tongue that they may understand my speech; and appoint for me a helper from my family, Hārūn my brother, increase my strength with him and let him share my task [...]”* (Q. *Ṭā Ha*: 25-32)
- (vi) Contemplative intelligence: e.g. *tafakkur* (Malik Badri, xiv) and *tadabbur* (Q. *al-Nisā’*: 82, *Muḥammad*: 24); and
- (vii) Spiritual intelligence: e.g. *iḥsān* (Q. *Āl ‘Imrān*: 148; “*ḥadīth Jibrīl*”, number 300, *Ṣaḥīḥ Bukhārī*, Vol. 6, Book 60), which is the highest.

Accordingly, the purity and clarity of the heart are imperatives for arriving at the various levels of unveiling of true knowledge (al-Ghazālī, 2009).

Al-Ghazālī describes that human beings are equipped to derive awareness and knowledge from two sources: (i) the faculties of senses and reason (*'aql*), which are deficient, allowing humankind to know the apparent material universe in which he lives; and (ii) the Divine Revelation and inspiration (*naql*) which enable him to discover what may be hidden from plain sight. These are not equal – as per their sources, methods or reliability. The human heart (*qalb*) has the “special properties of knowledge and will, which separates it from animals”, and through the process of maturity, distinguishes it from that of the youth’s (al-Ghazālī, 2009, pp. 23-24). True knowledge can only be unveiled once the heart (*qalb*) has been cleansed and the veils removed (through *tazkiyat al-nafs*), and the self-cultivated through Qur’ānic and *Sunnatic* learning and exercising (*riyāḍiyyah*). 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, p. 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, pp. 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 *nafs* (*al-ammārah bi al-sū'*) for the higher (*lawwāmah*, *al-muṭmainnah*). Thus, the training of *al-'aql* – the cognitive faculty of the heart, comprises the disciplining of the extrinsic and the intrinsic faculties of senses which are considered as 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 is clear when he criticises against blind faith, or “*taqlīd* rather than to investigation and personal observation” (quoted in N. Nofal, 1993, p. 228-231).

Allāh declares in the Qur’ān that He accepts deeds or acts of worship (*'ibādah* both as the prescribed and in the broader general sense) only if they are characterised by purity of the self (Q. 91:9), soundness of the heart (Q. 26:89) and humility of the spirit (Q. 2:45). 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 the truth without attending to his 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 very well be physically and mentally skilled in empirical knowledge or the empirical aspects of the sciences; but with a heart that is fully veiled and a soul that is utterly lost, one is not able 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 (both the extrinsic and the 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 *ūlū al-albāb* shows the following. *Ūlū al-Albāb* are those with profound sensory and intellective faculties, refined through what al-Ghazzālī terms as *riyādiyyah* and *tazkiyat al-nafs* so much so that their heart, having been purified from the inclinations of the lower *nafs* or *hawa*, receives impressions and colouration by Allāh (“*sibghat Allāh*”, Q. 2:138), to the point that, as explained in a *ḥadīth qudsy*, God 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 [...]” (Related by Bukhārī, on the authority of Abū Hurayrah *r. 'a.*, *Ḥadīth* 38, *An-Nawawī's Forty Ḥadīth*, (1976), p. 118). Their heart permeates with the quintessence of illuminated reason and understanding, intelligent and discerning wisdom, and with insights that are able to draw conclusions on the unearthing of the truth and correct guidance. These are people characterised by the Qur'ān as those:

1. whose life is devoted in sincere and humble ‘*ubūdiyyah* towards Allāh in all its spheres;
2. who observe lofty and refined Qur'ānic spiritual ethics as exemplified by the Prophets ‘*a.s.*, the seal of whom is Muḥammad ṣ. ‘*a.w.*;
3. who, on observance of Qur'ānic injunctions exert themselves, their sensory and intellective faculties in listening to, seeing, observing, thinking, pondering and contemplating upon the Signs of *Allāh* in the Qur'ān and in the Open Book of the Cosmos to arrive at deep understanding of them inductively and deductively; steadfastly verifying their understanding through further empirical proofs and observations without superstition, unfounded assumption and speculation or blind imitation;
4. who, with a deep sense of awareness of God (*taqwā*); gratitude (*shukr*), humility (*tawāḍu'*) and execution of the highest form of ‘*ubūdiyyah* to Allāh; are ceaseless in their strive (*jihād*) in bringing themselves and others nearer to understanding His Signs, in knowing the Lord of the Universe and in getting closer (*taqarrub*) to Him; exerting themselves in selfless service to humanity through their responsibilities, profession, trade and craft to the best level of their ability (*itqān* and *iḥsān*);

In so doing, they

5. can emerge as scholars who, through a life of vicegerency (*khilāfah*), safeguard the sanctity of the balance in creation and spread mercy and goodness to all (*rahmatan lī al-‘ālamīn*). They are as what the Qur’ān addresses, “*Innamā yakhsha Allāha min ‘ibādihi al-‘ulamā’* – 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*.

“Seest thou not that Allah sends down rain from the sky, and leads it through springs in the earth? Then He causes to grow, therewith, produce of various colours: then it withers; thou wilt see it grow yellow; then He makes it dry up and crumble away. Truly, in this, is a Message of remembrance to men of understanding” (Q. 39:21).

An Integration Framework towards the Construction of Natural Science Curricula for Islamic Secondary School based on 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:

1) *Al-Taṣawwur al-Qur’ānī* (see S. Qutb, 1995)

The Qur’ānic worldview form the fundamental premise and fashions the underlying spirit, through which the curricula

1. View Allāh’s Cosmos with the servitude, humility, acknowledgement, appreciation, gratitude, literacy, awareness, responsibility, activism, ethicality and accountability of *ūlū al-albāb*.
2. Endeavour to “read” cosmic phenomena, which are *Āyāt Allāh* in His Open Book of nature, and to engage actively towards a deeper and holistic understanding of the Cosmos, guided by the study of *Āyāt Allāh* in the Qur’ān.
3. 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.
4. Focus on the threefold relationship, whilst placing realities in the balance of criterion of the ideals:
 - a) humanity with Allāh (*ḥabl min Allāh*, i.e. *‘ubūdiyyah* and *khilāfah*),
 - b) humanity with itself (*ḥabl min al-nās*, i.e. *muḥāsabah*, *tazkiyah*, *al-amr bi al-ma’rūf wa al-naḥy ‘an al-munkar*, *ummah wasaṭ*), and
 - c) humanity with the Cosmos (*ḥabl min al-kawn*, *rahmatan li al-‘ālamīn*).

5. Enrich the subject matter of natural science with relevant Qur’ānic verses and concepts, which pertain to the theology, ontology, cosmology, epistemology, anthropology, axiology and eschatology of the Qur’ān, and supplementing them with relevant *ahadīth*, in line with the above spirit.

2) *Al-Turāth al-‘Ilm fī al-Islām*

The curricula serve to revive and resume the civilizational legacy and knowledge tradition in Islam:

1. The study and pursuit of natural science as a revival and continuation of Islamic knowledge tradition.
2. An obligatory endeavour, which helps humanity in getting closer to Allāh and earning His pleasure.
3. Identify errors in historical facts associated with certain scientific theories, laws and notable scientific figures.
4. Correct the above with proven data and relevant Islamic civilizational legacy (*turāth al-ḥaḍarah al-Islāmiyyah*).
5. Enrich the body of knowledge with contributions and legacies of the great Muslim scientists of the past.
6. Create awareness of the place of natural science in the greater civilizational scheme of things.

3) *Al-Mulā’imah*

The curricula aims to:

1. Provide relevance of natural science to students’ daily life as Muslims.
2. Spark interest and better appreciation of natural science, so students become self-initiated learners.
3. Bring contemporaneous relevance (*mu’āṣarah*) of the Qur’ān to students of science.
4. Make the verses of the Qur’ān to ‘come alive’ in the hearts of students, with constant reflections on the cosmos and remembrance of *Allāh*.
5. Motivate Muslim students to build affinity with the subjects of natural science and become future scientists to develop the Muslim *ummah*.
6. Create awareness for learning science as a personal religious obligation (*fard*) and its endeavour in society as a communal religious obligation (*fard kifāyah*).
7. Facilitate teaching and learning in particular, and education in general towards producing *Tawḥīdic* inspired scientists and scientific minds who with reference to the Qur’ān, study Signs of Allāh in “the open book of Nature” (*Āyāt Allāh al-Kawniyyah*).
8. To empower Islamic religious schools in producing Muslim students with *Tawḥīdic* inspired scientific minds, and Qur’ānic attitude and activism.

Figure 1.1 represents, in a very simplified fashion, the framework described.

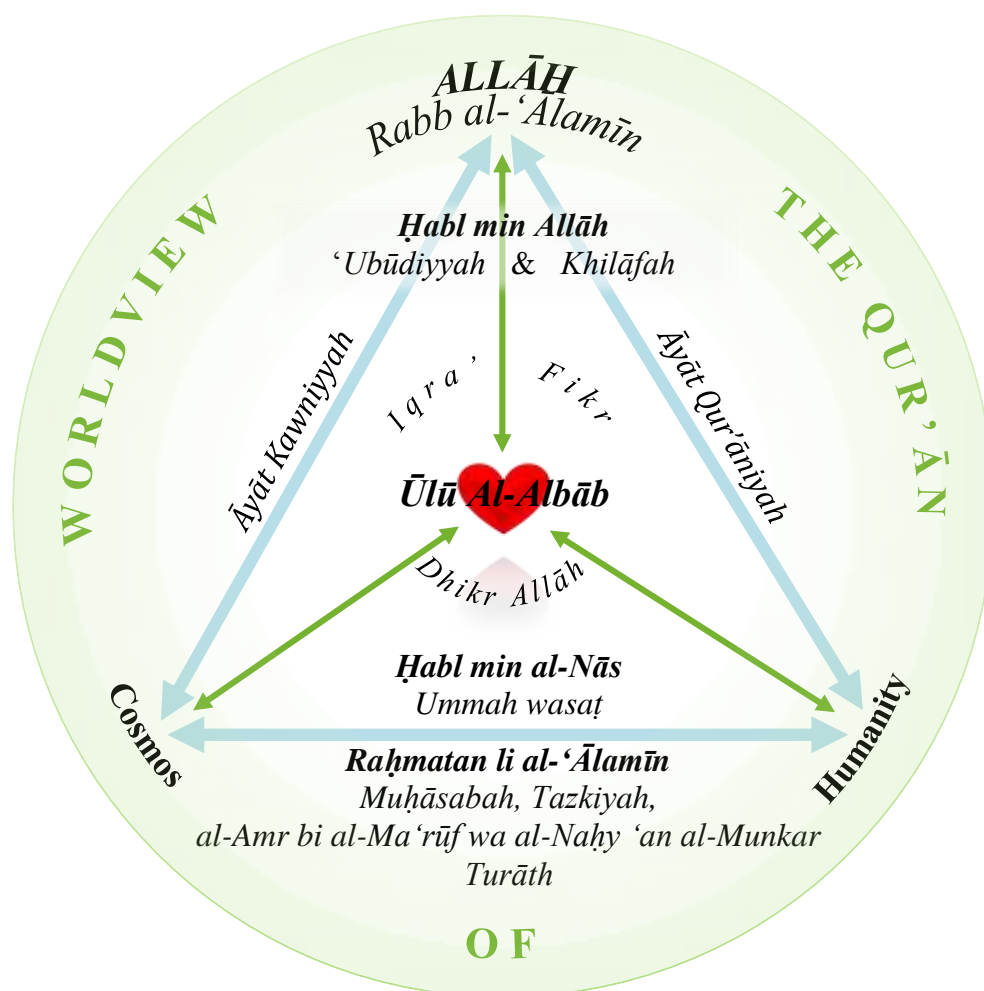


Fig. 1.1 A simplified schematic representation of an integrated framework and approach, based on the Ūlū al-Albāb model towards the construction of Islamic secondary school curricula for natural science.

Project N.S.W.V.Q. (Natural Science from the Worldview of the Qur'ān)⁴

Natural Science from The Worldview of The Qur'an: An Introduction, a 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

⁴ This project, entitled “Towards a Malaysian Model of Reformed Islamic Religious Education Based on the Integration of Science and the Worldview of the Qur'ān: Production of a Secondary School Textbook on Science from the Worldview of the Qur'ān”. Chaired by the Distinguished Professor Dr. Mohd. Kamal Hassan, the project commenced from October 2011 to March 2015, bearing its first fruit, the three-volume book (forthcoming at the end of 2017). The present author is the Project Coordinator, administrator, planner and an active member of the research group, from the project's initiation to its completion. She is also the general editor and chemistry author.

public. The science subject matter is based on the commonality of the 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 comprising of (i) Introduction and Philosophical Premises; (ii) Man, Matter and Living Things; (iii) Interactions and Interdependence; (iv) Energy; (v) Motion and Dynamics; (vi) Management of the Environment, Balance, Sustainability and Continuity of Life; (vii) Technology and Development; and (viii) Astronomy and Space Exploration. The subject matter of science is discreetly presented from the Worldview of the Qur'ān with theology, epistemology, cosmology, ontology, anthropology, axiology and eschatology; and select aspects of *turāth* interwoven into the text. Two small examples are as follows (all diagrams, embellishments, references and footnotes have been removed):

Models of an atom

There have been many ideas and models of the atom postulated by philosophers and scientists throughout human civilisations, from Democritus (460 - 370 B.C.) to Al-Baqillani (950 - 1053 C.E.), al-Ghazali (1056 - 1111 C.E.), Fakhr al-Din Razi (1149 - 1209 C.E.), and J. Chadwick (1891 - 1974 C.E.); to name just a few.

As scientists study deeper into the observations of scientific experimentations, our understanding of the atom develops a little further. The following is currently the most established model of the atom that science posits. No one will be absolutely sure of the nature of the atom; the knowledge of which is *only* known to Allah The Most Gracious, the All-Wise Creator.

To begin with, the atom is so minuscule that it is invisible, even to the most powerful of microscopes. It can only be 'seen' (or more accurately represented) by a special instrument called the *electron microscope* [....the text continues...].

There are many instances in *N.S.W.V.Q.* whereby pressing issues of cosmological, ontological and axiological significance are juxtaposed with the current state of the environment. One example is a passage towards the end of the very technical section on chemical equilibria:

The Earth: Equilibrium Tipped?

You have seen earlier that the earth is a huge closed system and how dynamic the equilibrium which Allah The Most Gracious, the Magnificent Creator and Sustainer has established. Out of His Utmost Grace and Wisdom, millions upon millions of interactions and interdependences, creations and re-creations are happening simultaneously, all the while maintaining the delicate balance and equilibrium in nature.

You have learnt that any system at equilibrium may be interrupted with either the addition of external factors; or the

removal of some internal factors. The amazing character of a system in a state of equilibrium is its intelligent inherent ability to compensate the interruptions dynamically in order that the equilibrium is re-established.

One may ponder how delicate an act of balancing this is! How well equipped and perfectly orchestrated all of these systems are!

Look within our bodies. A healthy person is in full equilibrium. Once a pathogen invades and causes us to fall sick, the equilibrium in our body is disturbed. We feel tired, feverish and our temperature shoots up. Allah The Most Gracious has designed us in such a way that forces us to take rest so that our internal defence mechanism can work efficiently in removing the interruption to our health. The high temperature of the fever fights the pathogen, until the internal equilibrium is re-established, and we feel better.

Looking at the whole universe of creations, one must realise how elegant this balancing act is in maintaining the equilibrium in nature. The birth and death of stars, and the moon, the weather patterns, the rainfalls, the sun, the flora, the fauna, the polar icecaps, the mountains and valleys, all built into the dynamics of the equilibrium on earth. The earth itself – a tiny part of the bigger equilibrium in the Universe: how it revolves, the degree of the tilt of its axis, its orbit around the sun, its distance from the sun... all of which is intelligently engineered to perfection!

*“On the earth are **signs** for those of assured Faith.” (Q. al-Dharyat, 51:20)*

*“And the earth We have spread out; set thereon Mountains firm and immovable; and produced therein all kinds of things in due balance. And We have provided therein means of subsistence, **for you** and for those for whose sustenance you are not responsible.*

*And there is not a thing but its treasures are with Us; but We only send down thereof in due and ascertainable measures. And We send the fecundating winds, then cause the rain to descend from the sky, therewith **providing you** with water, though you are not the guardians of its stores....*

Surely it is your Lord Who will gather them (those before you and those after you) together: for He is perfect in Wisdom and Knowledge.” (Q. al-Hijr, 15:19-25

It is onto earth that human beings are assigned as Allah’s vicegerents. It is the earth and all that it contains that Allah The Most Gracious has blessed us with, for which we are immediately responsible and accountable for.

Alas, look at the earth today... The environment is in a glut of crises never experienced before. Human beings manipulate and devastate nature and in return amass garbage on its surface. We reap diamonds, gold, and rare earth metals for riches, advanced

electronic smart-pads, smart-pods and smart phones; and leave the earth permanently scarred. We burn fossil fuels to keep us mobile and comfortable, but leaving the earth hot and smouldering. We raze green forests to barren lands, cut hills and mountains flat, bore holes in the protective stratospheric ozone and through the earth's crust, spew noxious toxins in the atmosphere, rivers, lakes and oceans.... Must we tip the natural equilibrium of the earth to the extent that it collapses?

"Mischief has appeared on land and sea because of (which) the hands of men have wrought, that (Allah) may give them a taste of some of their deeds: in order that they may return (to the right path)." (Q. *al-Rum*, 30:41)

Do something, before it is too late!!!

Conclusion

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 – 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 (*ummataṭan wasaṭa*) and as the best (*khaira ummah*), offering the world solutions that are mercy to the Universe (*raḥmatan 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*.

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