

A QURANIC-BASED APTITUDE ASSESSMENT FOR NEW MUSLIM CONVERTS

Ahmed Mabrouk

Abstract

The most important, and perhaps challenging, task that faces new Muslim converts is the acquisition of sufficient Islamic education. Only with such education will their Islamic character develop and would become real contributors to society. The very diverse scientific backgrounds and personal aptitudes of the new converts suggest different methodologies in the way curricula are composed, as well as different approaches for teaching them. In this study, we propose the development of a Quranic-based Aptitude assessment for new Muslim Converts (QAMC-I) as a technique to determine a suitable, semi-customized educational path for each. QAMC-I should indicate whether the concerned candidate has professional, scholarly characteristics that could enable him to specialize in a field of Islamic studies. It should also indicate which field of Islamic studies that a non-specialist would like more and a specialist would excel in. This paper introduces the guiding principles of the proposed QAMC-I. In this work, we introduce a more universal exposition of the underlying principles of cognitive measurement techniques that is more suitable to the universal and analytical nature of the Quran.

Overview

After attracting new members to the Muslim community, a considerable amount of effort, coordinated by many parties, has to be invested in placing, and subsequently integrating, these members as active members in the biggest Muslim family. Since, it is the main shaping factor of identity, education comes at the forefront of these efforts. The design of an educational program for this purpose should consider many factors. In our view, the most important ones are as follows:

1. The topic considered fundamental and indispensable that every Muslim must know. This applies equally to all learners irrespective of their individual needs, competencies or backgrounds. This factor naturally suggests teaching the obligatory part of knowledge needed to develop Islamic views about the Creator and the cosmos and to validate worships, basic monetary transactions and social contracts.
2. The technical aptitude of the student which determines his ability to comprehend the presented material: This factor should determine the level of details, the degree of sophistication and the approach to presenting the material.¹
3. The scientific, cultural and social background of the student: For example, a University student of astronomy and math might be more comfortable with the analytical and quantitative educational approach. On the other hand, a Buddhist convert may need an exposure to the spiritual aspects of Islam. Similarly, a new convert might be curious to know solutions that Islam provides for common social problems in his community.
4. Specific needs of a particular convert: These needs apparently differ from one person to another and have to be explored on a case-by-case basis. For example, it might be useful to know what attracted a particular convert to Islam in order to enhance these aspects further. It is also important to figure out if the convert is still struggling with some doubts or misconceptions about Islam that should be rectified for a healthy growing of his knowledge and Islamic identity.

This paper focuses on the second factor by developing an assessment to gauge the technical aptitude of the student.

Aims of QAMC-I

QAMC-I may vary to a great extent in terms of content and approach. Content wise, education encompasses so many topics with a wide range of perspectives. Teaching this material can also be a broad field for different approaches and methodologies. The recipients of this material, which are the new converts in this case,

¹ A. Woolfolk, *Educational Psychology* (New York: Pearson, 2007), 477-491.

also come with different social and scientific backgrounds and with different degrees of readiness for going through a new educational course. The above factors call for a mechanism that helps discover whether the recipient has professional capabilities with regard to Islamic studies and thus should approach the material using a rigorous and academic approach or he should approach Islamic studies using a less formal and more heuristic approach. If the former case is true, QAMC-I can further help to predict what type of topics the recipient would like to know more about so that greater attention can be given to these topics. In view of the above discussion, QAMC-I is to answer the following questions:

1. Does a particular student have a professional, scholarly aptitude? In other words, could this student specialize in a particular field of Islamic studies or should he just study the minimum needed for an average Muslim? In this sense, QAMC-I can serve as an *early* detector of professional attributes in the students.
2. What style of teaching should be employed on a student based on his aptitude?
3. What branch of Islamic studies is this student more likely to like? This can serve as a future indicator for directing the student to continuing, but not necessarily specializing in an area of study after finishing the orientation program.

Methodology

Due to the very diverse nature of Islamic sciences, it is imperative to specify a particular text as a starting point for measuring a student's aptitude. It is natural to choose the Quran for this purpose. The fundamental concepts of Islamic literature are summed up in the Quran. Also it is the primary source that converts rely on in their early stage of learning Islam. Therefore, this study focuses on the Quranic themes and cognitive abilities required for understanding the Quran. Without doubt, the Sunnah of our Prophet complements and elaborates on Quranic teachings.² However, it is reasonable to assume that those who successfully comprehend the Quran will also

² M. al-Sebaa'I, *al-Sunnah wa makanateha fi al-tashreeḥ al-islami* [The status of Sunnah in Islamic legislation] (Beirut: al-Maktab al-Islami, 1985), 47-74.

be capable of comprehending the prophetic statements. Based on this assumption, we can limit the scope of this study to a realistic domain. We hope that future work, either by the author of this paper or others, will be added to address some relevant themes to the Sunnah.

The next step is to identify the main themes of the Quran. It is understood that the Quran discusses a very large number of topics from different angles and in different degrees of details. Moreover, many of the Quranic themes can be branched into secondary ones in a tree-like hierarchy. Thus the task of identifying the themes of the Quran can be very subjective and may lead to different outcomes by different people. However, taking guidance of the prophetic statements describing the Quran and the illustrations of *tafsir* scholars could constrain the various outcomes of this process to a reasonably acceptable framework.

Once the themes of the Quran are identified, the next logical step would be to determine skills or cognitive abilities needed for comprehending them. These cognitive abilities can be classified into common and specific abilities. Common abilities are needed for understanding all Quranic themes, whereas specific abilities are needed for understanding particular themes. After discussing the common and specific abilities, we have to answer the important question, "How closely the cognitive abilities needed for understanding Quran match those defined in standard literature of cognition?" A separate section was dedicated for discussing those abilities that we consider unique for understanding Quran.

Following this, we need to develop a suitable testing mechanism for quantitative measurement of these abilities. For such a mechanism, we need to answer whether these abilities should be tested as independent faculties or seen as correlated. We thus should search for a single underlying process that taps them. While developing and describing the testing mechanism, we must refer and draw parallels to relevant studies about human intelligence and appropriate techniques for measuring it.

It is expected that there is no single or *best* recipe for formulating QAMC-I. Surely a great deal of subjectivity would be involved in the design of this model. It is quite hard, if not

impossible, to evaluate the success of a formula, compared to another formula, based on theoretical factors. In our view, analysis and periodic measurement are the best tools for figuring out which technique is the best to predict the aptitude of students. We thus dedicate a section for discussing the anticipated evolvement of QAMC-I toward achieving its ultimate goal.

Themes of the Quran

The Quran is the primary source for learning about Islam. The prophetic statements and acts clarify and elaborate on the meanings of the Quran. Analogy and consensus are two secondary instruments of legislation that operate within the domain of the Quran and the Prophetic indications. In this sense, the entire Islamic knowledge is summed up in it. Therefore, understanding the themes of the Quran is the key for understanding Islam. It is thus natural for any aptitude test directed toward understanding Islam to include sections aimed at predicting the ability of the examinees to understand the Quran. In the following the themes of the holy book are briefly described.

1. **The Cosmos** is the platform in which we see the divine attributes. In the second verse of *al-Fatihāh*, the Lordship of Allah over the entire cosmos is affirmed. Quran describes different systems and elements of the cosmos in a way that attracts the attention of the observers to the ultimate power and creativity of Allah. Some of the elements of the cosmos can be grouped as follows:
 - The heavens, earth, stars, the sun, the moon and the planets. *Az-Zumar:5* mention the favor of the cycle of day and night, and how it is connected to human productivity. Predetermined orbits through which stars and planets swim, leading to the consistency and constancy of the movements of celestial bodies are also highlighted (*Ya-sin: 40*). The spaciousness of the universe (*Adh-Dhariyat:47*) its magnificence (*Qaf:7*) and its beautiful lanterns (*Fussilat: 12*) are all mentioned to show how the divine power is displayed through beauty.
 - Oceans, rivers, clouds, mountains and rain especially cloud formation and their direction to specific locations to benefit

particular groups of people are commanded by the Will of Allah (Fatir: 9).

- Plants, trees and fruits of different types with differential qualities in taste and forms are mentioned in the Quran (Ar-Ra'd:4). The interaction between the diversified botanical system and the rain, as an outcome of the water cycle, is yet another evidence of *one* Lord running things according to His will (Abasa:24-32).
- In the case of camels, lions, dogs, donkeys, crawling creatures such as snakes and their diversified shapes and physiology, despite their common origin, is also mentioned in (An-Nur:45). Their different characters and attributes are contrasted in other verses.
- Birds with their vivid colors, sometimes with the nature of predators (Al-Hajj:31), and sometimes with domestic character are cited in the Quran (An-Naml:20).

2. **Ideology** is the backbone of any religion. Not surprisingly, beliefs thus occupy a substantial portion of the Quran. To ease classification, we dedicate the next subsection to discussing the matters related to the Hereafter. In this subsection, we only discuss the fundamental beliefs mentioned in the famous *hadith* of *Jabril* that indicated, among other things, the pillars of faith.³ Most of these pillars are also mentioned in (Al-Baqarah:285):

- To negate any sort of similarity between Allah (swt), and His creatures (Al-Ikhlās and Ash-Shura:11).
- To acknowledge His beautiful attributes (Al-Hashr:22-24).
- To believe in His power and full control over the kingdom of heavens and earth (Al-Mu'minun:84-92).
- To observe His wonderful creation and to show gratitude to His nurturing of humans (An-Naml:60-64).
- To believe in the attributes of Prophets (Al-Ahzab:39-40) and (An-Nisa':163-165).

³ It is a sound hadith that appears in the collection of Muslim in the chapter of *iman* (faith). It is also the second hadith of *the Forty Hadith* by al-Nawawi.

- To believe in angles (Al-'Imran:18) and (Al-Baqarah:97-98).
 - To believe in divine books (Al-'Imran:3-4) and (Al-A'la:18-19).
 - To believe in destiny, whether favorable or unfavorable (An-Nisa':78-79).
3. **The Hereafter** goes beyond the tangible boundaries we experience in our first life and tells us about that we will face after death until people settle either in Paradise or Hellfire. The Quran describes the following main stages of the Hereafter:⁴
- How people experience death (Al-An'am:93).
 - The signs of the Day of Judgment (At-Takwir:1-14); (Al-Infitar:1-5) ; (Al-Inshiqaq: 1-6).
 - How questioning and evaluation of deeds will occur (Al-Kahf:48-49) ; (Al-Anbiya:47).
 - The division of people into three main groups (Al-Waqi'ah).
 - Guiding believers to Paradise and driving disbelievers into Hell (Az-Zumar:70-75).
 - Description of Paradise and its enjoyment and description of Hell Fire and its torments (Ar-Rahman); (Al-Waqi'ah).
4. **Human Psychology** in the Quran describes human feelings and reactions during different states of emotions. Among those feelings are:
- Sadness as shown by *Jacob* upon losing his son (Yusuf:84).
 - Anger as shown by the threats of the Pharaoh to the sons of *Israel* (Al-A'raf:127).
 - Zeal as shown by Prophet *Suleiman* upon getting the answer of the queen of *Saba* (An-Naml:36-37).
 - Arrogance as shown by the Pharaoh in his request to build a lofty palace (Ghafir:36).
 - Wish as expressed by Prophet *Ayoub* in his prayer to Allah to remove harm from him (Al-Anbiya:83).

⁴ In this context, the Hereafter is defined as the stage that follows death, including the grave period before the commencement of the Last Day.

- Regret as expressed by disbelievers upon seeing the Hell Fire (Saba':33).
- Envy as developed by *Qabeel* towards *Habeel* (Al-Ma'idah:30).
- Jealousy as shown by *Yusuf's* siblings (Yusuf:8).
- Provocation as shown by the *Aziz's* wife toward *Yusuf* (Yusuf:32).

5. **The Story of mankind** is told from creation till the Day of Judgment through the theme of the battle between good and evil. In some instances, the parties of this battle are Adam and Eve on one side and Satan on the other. In other instances, they are the Prophets calling their nations to the way of Allah(swt). The main stations of this story are as follows:

- How creation started and how Allah(swt) ordered heaven and earth to come to existence, and thus they came obediently (Fussilat:11).
- How Satan deceived Adam and Eve and portrayed their way to suffering on earth as an opportunity to eternity (Al-A'raf:19-25).
- How previous nations denied their Prophets and refused to follow upright ethical standards until the divine punishment wiped them out (Al-A'raf:101).
- Snapshots of Prophets' lives and their ranks and virtues (Al-Anbiya'; Ash-Shu'ara).
- The big argument between Prophet Moses and the sons of Israel and how their stubbornness brought the anger of Allah to them (Al-Baqarah:67-74).
- The battles of our Prophet and the psychological conditions of his companions at those times, in particular the battle of *Badr* in 8 and the battle of *Uhud* in Al-'Imran.
- The Walking and Ascending of our Prophet through earth and heavens and his eye-vision of the big signs of his Lord at the ultimate zenith of the universe (Al-Isra' ; An-Najm).
- The closing scene of the believers settling in Paradise and the disbelievers driven into Hellfire, both accompanied with

thanking Allah (swt) for His justice and mercy (Az-Zumar:71-75).

6. **Legal Principles and Rulings:** Quran provides rulings for different aspects of life. By considering these rulings from a holistic view, it is clear that Islam is not confined to the inner consciousness of humans, but extends to the level of society and international affairs. At the outset of Surah Al-Ma'idah, its first verse declares that observing and fulfilling the stipulations of a contract are obligatory on believers. A synopsis of the categories of rulings described in the Quran is briefly described below:
- Establishment of the obligatory worships (Al-Baqarah:43; Al-Baqarah:183; Al-Baqarah:196).
 - Setting up the limits and mutual responsibilities within the social system, such as listing the unmarriageable women (An-Nisa:23), indicating when a difference in religions is a preventive factor in marriage (Al-Baqarah:221) and when it is not (Al-Ma'idah:5), indicating how long the waiting period of divorced women is (Al-Baqarah:228) and the rights of divorced women (Al-Baqarah:241) and (At-Talaq:6).
 - Differentiating permissible from impermissible monetary transactions, such as contrasting permissible selling to impermissible usury (Al-Baqarah:275) and showing the permissibility of hiring and it can be a means for fulfilling social duties (Al-Qasas:27).
 - Establishment of the principles of the penal system such as the vitality of retaliation as a means of life protection (Al-Baqarah:178-179) and the principle of equivalence in punishment (Al-Baqarah:194).
 - Description of lawful sources of food such as cattle (Al-Ma'idah:1) listing different types of inedible animal/birds (Al-Ma'idah:3) and showing the limited domain of impermissible types of food (Al-An'am:145).
7. **Manners** play a complementary role to legal rules. They establish social protocols in human interactions and ensure peaceful encounters in daily life. Some of the important manners established in Quran are as follows:

- Observing privacy of homes and adults (An-Nur:58-61); (An-Nur:27-28).
- Dress code and decent interaction between different genders (An-Nur:30-31).
- Respecting and obeying leaders (Al-Hujurat:1-2).
- Avoiding social vices such as greed and anger (Al-Hujurat:11-12).

Cognitive Abilities Needed for Understanding Quran

Abilities needed for understanding Quran can be classified into two categories: common abilities needed for understanding the Quranic text in general and specific abilities needed for understanding particular Quranic themes. Figure 1 shows the relationship between the Quranic themes and these abilities. Common abilities are depicted horizontally to show their relevance to all the Quranic themes, while specific abilities are depicted vertically to signify their relevance to particular ones.

Common Abilities

Common abilities are identified as verbal reasoning, memorization, numerical reasoning and dual reasoning. In the following, these abilities are discussed.

Verbal reasoning (VR) is needed to understand any text, and the Quran is no exception. Words are the most basic units that convey a meaning. Words are grouped in sentences to compose a relationship. An aspect that is special to the Quran is that it contains a good number of lists. The items of each list are connected with some common features that are not explicitly stated and need to be inferred. These three aspects are discussed below.

1. Words in the Quran, like any text, come with different frequency of usage and each one has a spectrum of different usages and indications. Words with a high frequency of appearance in the Quran constitute its fundamental topics.

- Relations are established by verbs that link a subject to an object in a certain manner. Also, adjectives and adverbs assign description, a time or spatial domain to an object or event.

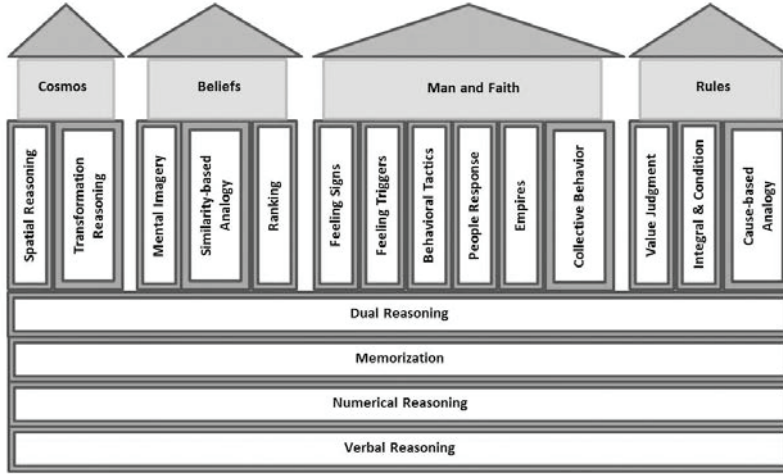


Figure 1: Specific abilities (vertical stripes) are resting on the general abilities (horizontal stripes). Four categories of the Quranic themes (the bevelled-shaped part of the diagram) are on top of the abilities they need. (Shortened names of some abilities are used because of space constraints).

- Feature inference is needed for understanding the underlying theme behind many lists in the Quran. The Quran does not explicitly indicate the common feature that connects the listed items. This invites specialized scholars to exert their effort in *inferring* this feature. Apparently this process is subject to different scholarly outputs which can all be valid and perhaps approach the truth from different angles. Nonetheless, a general classification of these lists can be made. Some of these lists involve items with complementary roles to each other. Verses 5-17 in Surah Ar-Rahman exemplify such a list. The sun and the moon can be regarded as instances of a central and orbiting

celestial objects. Similarly the stars and the trees can be regarded as instances of celestial versus terrestrial objects. On the other hand, some of the lists involve items belonging to a common class. Verses 24-32 in Surah Abasa list different members of the family of crop-producing plants. The items of these verses portray different parts of an image, that is, in totality, meant to convey some concept.

Numerical Reasoning (NR) is used abundantly in the Quran to add a sense of quantification to concepts and arguments. The following arithmetic operations can be identified as follows:

1. Addition is inferred from Surah Al-Kahf, Verse 25 to show the net period after an increment is added.
2. Multiplication is used in Surah Al-Baqarah, Verse 261 to show how the reward of charity is highly augmented.
3. Division is utilized in the verses of inheritance Surah An-Nisa, Verse 11-12, to indicate the shares deserved by different heirs.
4. Equality and equivalence are used in Surah Ar-Rum, Verse 5 and in Surah Ad-Dukhan, Verse 4 to show the equivalent duration of the Day of Judgment relative to our earthly days.
5. Inequality is used in Surah Al-Mu'minin, Verse 102 to show that prosperous people are those whose good deeds outweigh their bad deeds.
6. Infinity is inferred from Surah An-Nahl, Verse 96 to show that there is no limit to that which is offered by Allah (swt).

Memorization (MM) is the facility on which intelligence works. Our ability to derive *intelligent* conclusions out of the data we *memorize* depends to a good extent on the level of details of this data, the

way it is represented in our memories and how it is connected to relevant aspects.⁵ It is widely believed that memorizing the Quran, especially at a young age, enhances intelligence and develops an organized mind. Even though analyzing this argument is beyond the scope of this paper, exploring the following various memorization aspects displayed in Quran testifies to its validity.

1. **Memory for objects:** The Quran often groups a list of objects based on a linking feature among them as previously discussed. For example, familiar celestial and natural creatures are listed in Surah Al-Hajj, Verse 18.
2. **Memory for events:** Thought-triggering events in our first life and in the hereafter are mentioned in Surah At-Takwir, Verse 1-14 and in Surah 91, Verse 1-8 respectively.
3. **Memory for lists:** For instance, qualities of believers are listed in several verses with slightly different order and with some minor additions, e.g. Surah Al-Ahzab, Verse 35.
4. **Memory for patterns:** Some Quranic chapters start with certain patterns such as ‘Alif Lam Mim’ in the beginnings of Surah Al-Baqarah, Surah Ar-Rum and Surah As-Sajdah.

Dual Reasoning (DR) is perhaps the backbone of Quranic power of conviction. It is used in the Quran for different purposes such as giving a testimony to a fact, conveying an approximate image of a scene from the upper worlds, and encouraging a particular behavior. Dual reasoning encompasses several forms of reasoning in which two aspects are linked, and hence the term ‘*dual*’. What differentiates one form from another is the type of link and the purpose

⁵ R. Sternberg, *Cognitive Psychology* (Belmont: Wadsworth, Cengage Learning, 2009), 218-230.

behind it. Forms of dual reasoning are discussed below.

1. Reasoning by causation is used to reinforce the relationship between a cause and its respective effect. Based on the fact that our success in this life is measured by adopting a life style that leads us to Paradise, the Quran often links between faith and doing good deeds on one hand and granting a seat in Paradise on the other hand. Numerous number of Quranic verses link entering Paradise to the two conditions of having faith and acting positively in accordance to this faith, see for example Surah Al-Kahf, Verse 107 and Surah At-Taghabun, Verse 9.
2. Binary logic capitalizes on the efficient simplicity of binary contrast. Various systems have complementary features. Contrasting these features adds depth, as well as clarity, to the analysis of those systems. In Surah Al-An'am, Verse 1, one pair of cosmological systems and a pair of complementary features are contrasted. Earth, as an inhabitant for humans and animals, is contrasted to heavens as an inhabitant for angels. Similarly, types of darkness, whether physical or symbolic, are contrasted to *the light*. Interestingly the conclusion lies in the introductory clause "Praise to Allah". Other examples for magnifying the difference between opposites are eloquently stated in Surah Ar-Ra'd, Verse16 and in Surah As-Sajdah, Verse 18.
3. Reasoning by analogy is used in the Quran for two main reasons. First, the analogy is meant to facilitate the appreciation of that which is beyond the reach of our senses. In Surah An-Nur, Verse35, the light of Allah (swt) is visualized as a niche and within it a lamp. Second, it is to encourage or discourage the following of a certain

behavior. In Surah At-Tahrim, Verse 11, the wife of the Pharaoh is shown as a good example to the believers, and the wife of Prophet *Nuh* has been given as an example to warn the disbelievers. In Surah Al-Baqarah, Verse 261, the multiplication for reward of the charity is compared to the multiplication of seeds using numerical terms.

4. Observation-based analogy is used to establish a fact on an actual observable phenomenon or event. Resurrection, for example, is proven by using this kind of analogy. The undeniable evidence is that we were created. The fact establishing this is that repeating the act of creation is also possible. Surah Maryam, Verse 66-67 highlight the fact that recreation after death is easier, using pure material framework, than the first creation which took place out of nothing. This kind of analogy is quite similar to reasoning by induction by which an established claim is generalized to another claim.⁶ By observing creatures around us and by reflecting on their behaviors, one can develop firm faith in the power and wisdom nurturing them. Therefore, observation-based analogy is used quite often in the Quran.

Abilities for understanding specific Quranic themes

To enable appropriate identification of abilities needed for particular themes, we group the themes in the bigger categories based on relevance. This results in the four main categories shown in dotted lines in figure 1. *Cosmos* occupies a main category on its own. All nature and practical sciences fall into this category. *Fiqh* and manners, combined together, establish the behavioral norms, and they are gathered in the category of *Rules*. The third main category of *Beliefs* consists of ideology and the hereafter, both addressing aspects

⁶ I. Copi & C. Cohen, *Introduction to Logic* (New Jersey: Pearson, 2009), 482-487.

beyond our direct physical senses.⁷ The fourth main category of *Man and Faith* consists of the Story of mankind and Human Psychology. The common feature between the two parts of this category is how faith disciplines our feelings and shapes our behavior whether at the collective level or at the level of individuals. In the following section, we will discuss abilities needed for understanding each category.

A. Abilities relevant to the *Cosmos* are discussed below.

Spatial reasoning is about the physical integration and placement of different elements of the cosmos. In some cases, the integrated elements are the constituents of a functional system while in others the physical placement triggers the aesthetic sense and moves the soul to a higher level. In Surah Ar-Ra'd, Verse 4, the different pieces of land can be viewed as patches of different colors and textures placed *side-to-side* in an eye-pleasing configuration. Such placement serves a utilitarian purpose for humans as to how crops and trees are diversified and distributed over the earth. In Surah Ar-Rahman, Verse 19-20, the peaceful encounter of the two seas, the salty one and the sweet one, highlights their physical placement into the earth in a harmonious manner. In other instances, as in Surah Fatir, Verse 27, the color contrast between adjacent elements emerging from a single source is pointed out to stimulate the aesthetic sense and eventually the sense of appreciation to the divine Will. It should be noted that spatial reasoning has been used in Quran under different themes, such as in the theme of the *Story of Mankind* for the purpose of describing the battle field. In Surah Al-Anfal, Verse 42, the discrepancy of latitude of the two fighting troops and the timely setting of their meeting are described.

Transformation reasoning elaborates on the cyclic behavior of events. It appears in the Quran in various forms. In one form, a series of events trigger each other sequentially to develop an impactful phenomenon on people and other creatures. In Surah Al-Baqarah, Verse 164, the alteration of day and night results in rain which in turn revives the land and contributes to the growth of crops

⁷ The use of the term 'metaphysics' is avoided here due to the negative connotation associated with this term as a counterpart to science.

and plants that are used as subsistence for people and animals. A similar and related cycle is also mentioned in Surah Fatir, Verse 9. That verse addresses how the patterns of wind guide clouds towards a dead land, rendering it alive once again. Another form of transformation reasoning is to focus on the change of appearance and/or essence of a single element over time. In Surah Yunus, Verse 24, water is first mentioned in a pure form. Afterwards it is mixed with fresh plants that are later harvested.

B. Abilities relevant to the *Beliefs* are described below.

Mental imagery is tapped on to visualize the scenes of future events such as those of the Day of Judgment and enjoyment or punishment in Paradise and Hell respectively. As our Prophet (pbuh) indicated: “Whoever is interested in visualizing the scenes of the Day of Judgment, he should read *at-Takwīr*, *al-Infitār* and *al-Inshiqāq* (At-Takwīr, Al-Infitār and Al-Inshiqāq).”⁸ This prophetic statement is a clear reference to the ability of mental imagery needed to perceive, and hence internalize and act upon, these fundamental scenes of the hereafter. Surah At-Takwīr shows how the figures of stability and signs of persistent periodicity in the universe will experience major transitions. On this Day, the sun will no longer emit light; stars will be scattered and no longer follow their orbits; mountains will be moved; the best cattle will be neglected; beasts will be gathered in one field; oceans and seas will be set on fire. Apparently such a phenomena on this massive scale, all taking place concurrently via events that were previously regarded as stable and regular, require a mental imaging at a different level since no sensual experience that we have had thus far has been developed about them in the human mind. In other words, mental imagery comes to fill the gaps in our sensual experience that relates only to a limited domain of knowledge, which is basically the domain of the events of this life. Images painted by these verses in people’s minds may vary significantly from a person to another since a great deal of fine details can be added arbitrarily to these images. Such a high variability distinguishes mental images from sensual ones.

⁸ It is a reasonably sound hadith narrated in *al-Musnad* by Ahmad ibn Hanbal.

Similarity-based analogy is used in the Quran to express the arguments of the disbelievers in their attempts to equate two distinctive cases based on an aspect of similarity they share.⁹ Surah Al-Furqan, Verse 7 narrates the denial of the disbelievers on the prophethood of our Prophet based on the standpoint that he had the same human characteristics they had. Allah(swt) discredited this unfounded *analogy* by declaring that prophethood is a gift that can be given, according to His Will, to selected humans.

Ranking is the process of assigning a degree in Paradise or a level in Hellfire to a human based on his beliefs and deeds. Even though this process is entirely governed by the divine Will, its general principles are known to us. We know that good intention can multiply the reward of a deed. We also know, from a Prophetic statement, that believers move up to a higher degree based on the amount of their good deeds. Surah Al-Waqi'ah distinguishes elite believers from ordinary ones and describes their distinctive reward. Similarly Surah Ar-Rahman describes four Paradises out of which two are higher than the others. The Quran also indicates that hypocrisy is the worst type of disbelief and shows that hypocrites will be in the *lowest* level of Hellfire (An-Nisa:145).

C. Abilities relevant to the *Human Psychology* are described below.

To identify physical signs of different feelings is perhaps the most basic ability related to human psychology. For example, to turn red can be a sign of shyness.

To identify causes that trigger different feelings; for example, hearing about the death of a family member causes sadness.

To learn tactics for controlling undesirable qualities and for enhancing the desirable ones; the Quran has established the fundamental concept that true faith should lead to a good behavior and good manners(Al-Baqarah: 93). Social experience indicates that academic teaching alone is insufficient to bring Islamic manners into reality. Family members, teachers, friends, and community figures

⁹ Ibn-Qayyem al-Jawzeyyah, *E'laām al-mūq'en a'n rābb al-'alāmīn* [Notification to those who sign on behalf of the Lord of the universe], 3 vols. (Beirut, Dar al-Fikr, 1977), i. 148-150.

should continuously monitor and guide their respective mentees toward developing the quality of self-restraint. As discussed under the theme of *manners*, the Quran has laid down the tenets of good personal traits. For instance, the Quran tells us that kind words are better than a charity associated with harm (Al-Baqarah:263) and forgiving is more rewarding than punishment (Ash-Shura:40). The *Sunnah* has elaborated on these traits and provided practical tactics for implementing them.¹⁰ The entire practice of Sufism aims at strengthening the bond with the hereafter and the desire for getting the reward of Allah and to use those qualities to fight the evils of the soul. *Sufi*' literatures are full of analysis, techniques and stories to purify the soul.¹¹

D. Abilities relevant to the *Story of Mankind* are described below:

To understand the response of people to their Prophets in the context of the typical battles between reformers and tyrants or in more general terms between good and evil. The Quran has indicated in Surah Ash-Shu'ara:Verse136-137 the response of early generations to Prophets was in general negative.

To identify the critical factors on the rise and fall of empires, a society in the rising stage would consistently apply justice, avoid unethical practices like oppressing the poor and the weak ones, distribute wealth equally among social classes and encourage living a simple life. The Quran already provides reasons for which some nations received the wrath of Allah which were often repeated on the tongues of Prophets upon chastising their people (Al-A'raf:71).

To identify the human desire that motivates a collective behavior in society, for example, breaking the order of the Prophet in the battle of *Uhud* was a collective behavior that was motivated through a common desire from the violating individuals.

¹⁰ See hadith number 16 from the *Forty Hadith* by al-Nawawī. This hadith is also included in the collection by al-Bukharī. It is a brief advice from the Prophet about avoiding getting angry.

¹¹ Al-Harīth al-Muhāsebī, *risālat al-mustarshidēn* [A Message to the Seekers], (Halab: Dār al-Salām, 1988), 115-128.

E. Abilities relevant to the *Fiqh* are described below.

To assign a value judgment to an act in a prescriptive statement, the term '*prescriptive*' is important because it shows that this value judgment has to be aligned with Islamic teaching. Since *fiqh*, in general, is meant to indicate how obligatory or incumbent it was to perform or avoid an act, this ability is perhaps the most basic *fiqh* ability. The Quran assigned different levels of obligation to or against some acts in a variety of ways. Sometimes Quran makes it obligatory or unlawful to do a particular act as discussed previously. Sometimes, Quran contrasts a permissible act to an unlawful one in the same verse as in Surah Al-Baqarah, Verse 276. Other times, Quran shows that it is permissible to do an act, but it is better to leave it (Ash-Shura: 43).

To differentiate between an integral, a condition and recommended acts, even though both an integral and a condition are required for the validity of a task, the condition should not be seen as part of the task, but rather a separate requirement for this task.¹² Also, some of the complementary acts might not be required for a task, but only recommended or even irrelevant. For example, prostration is an integral part of prayer, purity is a condition, dressing up neatly is recommended and the weather condition is irrelevant.

Cause-based analogy is used to extend the ruling from one case to another case as a result of sharing a common cause. That cause exists in an agreed-upon case and in the case under discussion as well. Since sharing the same cause, the case under discussion should have the same ruling or result of the original case. In Surah Al-'Imran, Verse 59, any reasonable mind should admit that Jesus is a human being created according to the divine Will exactly as was Adam. Similarly, Surah Al-'Imran, Verse 137 puts the mind in a state of anticipation of punishment like that inflicted on previous nations for denying the signs of Allah(swt).

Classification of Mental Abilities

In the previous section, we classified abilities needed for

¹² Saif al-Deen al-'A'medī, *al-Ehkām fī Usūl al-Ahkām* [The Perfection in the Fundamentals of Rulings] (Beirut: Dār al-Küttub al-E'lmeyyah, 1985), i. 112.

understanding the Quran into general and specific. This classification seems reasonable because general abilities are needed for understanding the entire text of the Quran while specific ones are needed for some topics or parts of the Quran. In addition to that seemingly reasonable motive, it is also important to realize that this classification is aligned to one of the most prominent themes of the science of Cognitive Psychology, in particular the area of human intelligence. To understand the link between the two, we have to briefly discuss the nature of intelligence as viewed by the most influential researchers of this area.

Despite the numerous definitions of intelligence,¹³ the common underlying trend between many of them can be expressed as follows: intelligence is a complex construct from which many mental abilities related to comprehension and reasoning spring. The first direct observation of this definition is that mental abilities are the outcome of intelligence. This means that a more intelligent person should be able to perform more complex mental operations and in a more efficient way. However, what is exactly the nature of this complex construct called intelligence? This question can be paraphrased in a different way as follows: what are the underlying processes being tapped upon conducting mental operations? Generally, there are two major views about this point, the first of which is attributed to Spearman who regarded intelligence as a unitary process.¹⁴ According to Spearman, we are always tapping on a single process, called *g* by him, regardless of how diverse the mental processes we conduct might appear. Following that view of a single process manifested in many mental operations, Spearman thought that human intelligence can be best measured through a variety of tests in order to capture a fair and well-rounded view of *g*. Contrary to Spearman, Thurstone¹⁵ and later Gardner¹⁶ thought that human intelligence should be conceptualized as a set of about

¹³ R. Sternberg and D. Detterman, eds. *What is Intelligence?* (New Jersey: Ablex Publishing Corporation, 1986), 51-54.

¹⁴ C. Spearman & L. Jones, *Human Ability* (London: Macmillan Co. LTD, 1951), 52-76.

¹⁵ L. Thurstone, *Primary Mental Abilities* (Chicago: The University of Chicago Press, 1938), 79-91.

¹⁶ H. Gardner, *Multiple Intelligences* (New York: Basic Books, 1993), 5-12.

half-a-dozen more relatively independent faculties. Accordingly IQ tests should consist of a set of tests each of which is designed to measure one of these faculties.

The two above views can be reconciled using the hierarchical model of Cattell-Horn-Carroll (CHC).¹⁷ This model provides a structure for understanding human intelligence and the cognitive abilities related to it. In this model, cognitive abilities are classified in a hierarchical manner into three levels or strata.¹⁸ The highest level represents the general intelligence or *g*. Stratum II includes ten broad abilities representing the basic constitutional and longstanding characteristics of individuals.¹⁹ Stratum I includes more than 70 narrow abilities usually developed based on experience and learning. These narrow abilities are subsumed by the broad abilities in Stratum II.

Our classification of abilities needed for understanding the Quran also adopts a hierarchical view similar to that of the CHC theory. The general abilities of our classification correspond to the broad abilities of the CHC theory, while the specific abilities correspond to the narrow abilities of the CHC theory. However, broad and general abilities defined in the two classifications do not fully match. Moreover, mismatch between our specific abilities and the CHC narrow abilities increases, as expected, between the two classifications. This issue will be revisited upon comparing our technique to the Wechsler's scale later.

Different Approaches for Measuring Cognitive Abilities: A Historical Overview

The first attempt to formally measure intelligence can be attributed to Binet who was assigned by the French Ministry of Public Instruction to identify children who can benefit from instruction in public

¹⁷ W. Johnson & T. Bouchard, "The Structure of Human Intelligence: It is Verbal, Perceptual, and Image Rotation (VPR), not Fluid and Crystallized," *Intelligence* (2005), 33:393-416.

¹⁸ R. Cattell, *Abilities: Their Structure, Growth, and Action* (Illinois: Houghton Mifflin Company, 1971), 103-106.

¹⁹ J. Carroll, *Human Cognitive Abilities* (New York: Cambridge University Press, 1993), 631-636.

schools.²⁰ Binet's approach was more inclined to experimentation and periodical adjustment rather than to theorization. Binet and Simon (B-S) measured kids' intelligence based on their abilities to perform common tasks faced in daily life such as naming objects seen in a picture, completing a series of digits, copying a diamond, and telling the difference between a fly and a butterfly. Since B-S targeted kids undergoing significant changes in their mental abilities as they grow, they introduced the notion of mental age. A kid at the age of 8 should be able to perform all the tasks performed by kids at the age of 6, to perform a good number of the tasks performed by kids at his age and to perform some of the tasks performed by kids at the age of 10. Contrarily to B-S who followed a very practical approach in developing their IQ tests, Spearman was mainly concerned with the theory. Thus, it is not straightforward to figure out Spearman's approach for measuring intelligence simply because he did not forward any test for this purpose.

A few years after the appearance of the 1911 B-S test, Terman transferred this test to the US and produced the revised Stanford version of it. While following the same approach of B-S, Terman significantly expanded the original test and tried it on a much bigger sample than had Binet (1000 kids compared to 50 by Binet). In its fifth edition, the Stanford-Binet (S-B) test is one of the standard tests for intelligence measurement.

In 1939, Wechsler published an IQ test for adults. The test was basically extracted from the military testing program during World War I. The test consisted of two scales, one was language-based whose score reflected verbal intelligence and the second was language-free whose score reflected performance intelligence.²¹ Wechsler's theory was driven by clinical practice where some patterns in the scores could be used to trace some forms of mental disorders, perhaps influenced by his career then as a psychologist in Bellevue hospital. It is important to realize that Wechsler's test measured the aggregate aspects of intelligence rather

²⁰ N. Mackintosh, *IQ and Human Intelligence* (New York: Oxford University Press, 2011), 11-12.

²¹ D. Wechsler, *The Measurement and Appraisal of Adult Intelligence* (Baltimore: Waverly Press Inc., 1968), 61-85.

than the general intelligence defined by Spearman. The latter can be obtained by extracting the common factor to all tests and discarding the specifics, whereas Wechsler's test included the specifics. Wechsler's test composition strategy differed from that of S-B. The early version of S-B tests consisted of a number of different tests grouped by age. Conversely, Wechsler developed a single set of tests suitable for all ages, but ranging from easy to difficult items. Additionally, Wechsler had to abandon the notion of mental age used in S-B tests for children because mental abilities relatively saturate in adults or at least they do not increase with the same high rate they increase with during childhood. Instead, Wechsler used the following formula:²²

$$(\text{Actual test score}) / (\text{Expected score test}) \times 100,$$

where the expected score is the average score of the sample of people in the same age.

The early versions of the Wechsler Adult Intelligence Scale (WAIS) did not include significant items for testing fluid reasoning, which may account for its origin from military testing program. This gap was fixed in later versions. Wechsler tests also endured one more significant modification. Test items were grouped in such a way that allowed the calculation of "Index Scores" that correspond to some themes of the CHC theory. With that, the clinical theory of Wechsler was linked to a data-driven theory researching the nature of human intelligence. Over the years, Wechsler tests were revised and expanded periodically and are currently considered the most widely used measurement tool of human intelligence. For this reason, WAIS-IV was chosen to compare with our QAMC-I, as will be discussed later.

QAMC-I Testing Approach

The basic underlying idea of the QAMC-I testing approach is to probe the existence of the ability in question in its *crude and undeveloped* form. It is assumed that examinees might have some undeveloped abilities since they did not go through a structured

²² Mackintosh, *IQ*, 33.

course of Islamic education to enhance them. Thus, the respective skills would be latent, awaiting training and further enhancement. With that approach, the exploratory nature of our aptitude assessment is maintained. The implications of the above approach are as follows:

1. The use of technical terms that can only be known through formal study should be avoided,
2. Addressing sophisticated issues that require thorough analysis should be avoided, and
3. The concerned ability should be tested in the context of daily life experience rather than in the context of scientific cases relevant to a particular science. For example, instead of testing the cause-based reasoning in the context of specific legal cases, it can be tested in the context of familiar regulations such as traffic regulations.

In accordance with our testing approach, QAMC-I is suitable for adults, 16 years old or above, with no major mental deficiency, who completed at least six school years, having basic verbal and numerical skills and have not studied intensively about Islam. Persons who studied seriously about Islam before becoming Muslims, either through structured programs or self-study, should be excluded from this assessment.

As QAMC-I is also meant to spot students with potential scholarly aptitude, it has basic and advanced levels. Compared to the basic level, test items in the advanced level are more difficult with a greater emphasis on the analytical and reasoning side and with an indicator of the processing speed. QAMC-I does not contain specific sections for testing processing speed as it is in the case with some IQ tests such as WAIS-IV (to be discussed later). Processing speed is tested in the advanced level through *limiting* the time given to the respective advanced tests in a way that would presumably differentiate an advanced student from a less gifted one. Indeed a scholar should have the talent of figuring things out quickly.

Evaluation modules follow the same classification of the abilities and are thus identified as common modules that test abilities needed to understand the Quranic text in general and specific modules that target particular abilities needed to understand particular Quranic themes. More details will be given later about the

interpretation criterion of the scores. In the following section, testing the common and specific abilities is described. Few examples are also given for further clarification.

QAMC-I Tests

Testing Verbal Reasoning: Although the Quranic text comes in Arabic, translated versions can convey an approximate meaning of the Arabic text. Therefore, this section should not focus on the intricate details or the eloquent indications of the Quran that can only be conveyed in Arabic. This is meant to provide a universal platform for evaluating non-Arabic speakers, Arabs who are not specialized in linguistics and eloquent Arabs. The three aspects of verbal reasoning can be tested as follows:

1. **Vocabulary:** A computerized approach can be used to classify words in the Quran into three levels of difficulty based on the frequency of use. Examinees can be asked to identify synonyms and opposites either by choosing from a provided list of offerings or by filling a blank entry which is more difficult and more suitable to the professional level.
2. **Relations:** Examinees can be asked to guess a suitable verb that connects a subject to an object, such as ‘*cow ... milk*’, ‘*clouds rain*’ and ‘*angels deeds*’. Apparently the first example is the easiest while the last is more difficult.
3. **Feature inference:** A list of four words, for example, can be given where three of them can be linked through a common feature, while the fourth one may carry no significant relation to the rest. Examinees can be asked to identify the irrelevant word. A simple example is: ‘*sun, water, plants and a computer*’.

Testing memory: The Quran utilizes long-term memory rather than short-term. Techniques of pausing and distracting are not applicable to Quran and thus should not be utilized. The four aspects of memorization can be tested through essays that include the elements to test. These essays can be read by the examiner or shown in a written format to the students for some appropriate time and then removed for the questions to start. Reading the essays is more suitable for the advanced level. Few examples are given below:

1. **Memory for objects:** A simple example can be *'spoon, fork and knife'*. A more difficult example can be *'desk, suit and door'*.
2. **Memory for events:** A simple example can be *'lightening, thunder and rain'*. A more difficult example can be *'accident, victim, ambulance and surgery'*.
3. **Memory for features:** A simple example can be as *'honest, frank and straightforward'*. A more difficult example can be *'perceptive, vigilant and intelligent'*.

Testing Numerical Reasoning: Arithmetic operations are highly correlated and they can be tested collectively. At the basic level, mathematical abstraction should be avoided. This can be achieved by connecting arithmetic operations to the physical qualities of familiar objects and creatures around us. To test inequalities for example, photos of different animals can be given whereby examinees are asked to arrange them in ascending order based on weight and/or size. Also examinees can be asked to identify the arithmetic operation that needs to be performed in order to get the required result. For example, to test multiplication, a question can be *'Each guest will eat two eggs, how many eggs do we need to have in order to feed ten guests?'* For the advanced level, questions should be more sophisticated but not something that would require specialty in mathematics. For example, two or more operations need to be performed to reach the required result. Also, time should be limited to gauge processing speed.

Testing Dual Reasoning: In all types of dual reasoning, there are two aspects or parties to compare, but with different purposes. In reasoning by causation, the purpose is to reinforce and highlight the relationship between the cause and the effect, either for the sake of encouraging or discouraging. In binary logic, the purpose is to contrast the complementary roles or natures of the two elements. In reasoning by analogy, the purpose is to bring a situation or an element closer to mind by linking it to a more familiar one. In cause-based analogy, the purpose is to extend a ruling to the second case. In reasoning by observation, the purpose is to affirm a fact based on another undeniable fact. Accordingly, the most straightforward way to test the different forms of dual reasoning in a collective manner is to test the purpose of the respective dual

reasoning. For example, a question may ask about the purpose of portraying the charity given to the poor as a loan to Allah(swt).

On the other hand, each of the dual reasoning forms can be tested individually as follows. Reasoning by analogy can be tested through identifying the common features between the two parties. For example, *the man who saved our lives is like a lion* (for bravery) and *the wrestler is like a lion* (for strength).

Reasoning by causation can be tested through guessing the cause or the effect. An easy and direct example is '*if fire touches the skin of a person it will ?*'. A more difficult one would be when multiple causes are needed to lead to the effect such as '*? + ? + ? are needed to build a strong body*'.

Testing Spatial Reasoning: Spatial reasoning is one way for implementing the concept of *facilitation*, highlighted in Surah Al-Baqarah, Verse 29. In the Quranic context, it is meant to achieve functional and aesthetic purposes. The most basic task is to distinguish between the two purposes. Respective questions would request to classify patterns of physical integration into either category. For example, a lake flanked by grass and trees serves a functional ecological cause, whereas the arrangement of flowers in a bouquet serves an aesthetic purpose. A slightly more advanced task is to identify the specific functional purpose meant by the physical placement. For example, dedicating part of the space of a shopping complex for restaurants is meant for the convenience of shoppers and maximizing profitability. Also keeping bus stops close to train stations is meant for smooth, uninterrupted transportation.

Testing Transformation Reasoning: Transformation deals with different states of a cycle meant for a sensible purpose. Aspects to test can be the purpose behind the whole cycle, the driving force that triggers the change from one state to the next, the characteristics of each state and the order of the states. Quran presents these aspects to show the divine power driving the cycle and the beneficial outcome of the transformation. Examples previously given for transformation reasoning are actually daily life examples and therefore can be tested directly without relying on a religious background. The stages of man's life (Ar-Rum:54) can be addressed to examine the characteristics of each life stage and the outcome of

the cycle in terms of physical and mental growth. The cycle of water, (Ar-Rum:48) can be addressed to test the driving forces behind each stage, such as sun heat and wind, and the coordination between different components of the cosmos to implement their respective subtasks of the grand task.

Testing Mental Imagery: It can be tested through altering an event/scene that people experience in their real life to another one that does not belong to this experience. Tornados and hurricanes can be used as test cases for mental imagery since they represent the extreme unusual part of our experience. Examinees may be asked to visualize an extraordinary phenomenon and describe it either in words or drawings. They can also be asked to describe remote areas they have not visited before such as the North Pole and complete the details of life style there based on guess and imagination. The examinees' level of imagination can be divided into three categories: low, medium and high based on their abilities to describe the impact and the details of the scene. Mental imagery – as established by the Quran - should not be confused with that needed to produce a Star Wars type movie. In these movies, creatures are distorted of their original form. On the other hand, mental imagery does not call for shape/configuration distortion. It requires ordinary creatures to be placed in an unfamiliar environment under unusual circumstances. Testing should probe the appropriate aspects of mental imagery, rather than distortion and hallucination.

Testing Human Psychology: It can be tested through linking particular events to the feeling they trigger and subsequently to the behavior they produce. For example, long waiting in doctor offices triggers frustration which can lead to losing temper. Various events, feelings and behavioral patterns can be shuffled up and examinees are requested to link them properly. Also, the abilities of examinees to predict the outcome of a particular personal virtue or vice can be tested through the asking of examinees to suggest or choose among several options the expected outcome of having some personal traits. For example, being greedy might lead to committing theft. Also being calm could reduce violence-based accidents.

Testing Story of Mankind: Our early discussion showed that the Quran discussed three themes under this category, namely the

battle between good and evil, how and why nations progress or digress and the motive behind a collective behavior on the society level. These themes can be tested through the following techniques:

- Select a negative phenomenon in the society, such as the presence of drugs in school, abuse of employees' rights or increasing violence against women and address this phenomenon in the context of the ongoing battle between good and evil. Questions can target the root of the problem, the progression in tackling the problem and the adoption of a proper strategy to combat it.
- Consider the instruments of social justice in the society, such as welfare programs and charity organizations, and ask examinees to evaluate their performance and the impact of these instruments on the entire society.
- Identify some common social patterns in society, such as extravagance in wedding celebrations, medical doctors offering their services in rural areas, and youth spending enormous amount of time watching TV, movies, and ask examinees to investigate whether it leads to the advancement or decline of nations. Present two families with different life styles and ask examinees to conclude which is more aligned to Islamic teaching.

Testing *Fiqh*: This section should test the elementary *fiqh* knowledge of the converts at that early stage of their learning. Moreover, questions should evaluate their ability to comprehend rules and apply them to particular incidents. The most basic exercise is to ask examinees to assign some acts to one of the five categories of permissibility.²³ For example, examinees can be asked to assign the five prayers, paying charity and forgiving those who harmed them to one of the five categories. Also the relationship between some acts in terms of being a condition to another act, a sub-integral or irrelevant to it can be tested. For example, examinees can be asked to connect a statement from the left column to the right which carries the same relationship as follows:

²³ These categories are *Obligatory*, *Recommended*, *Permissible*, *Discouraged*, and *Unlawful*. See Ibn al-Ferkāh, *Sharh al-waraqāt li imam al-haramainn al-Jūwainī* [Commentary on Short Notes of the Imam of the Two Sacred Mosques], (Beirut: Dār al-Bashāʾr al-Islameyyah, 2001), 89-101.

- Prostration and prayer ---- Score and school admission
- Color of clothes and prayer ---- Studying anatomy in medical schools
- Purity and prayer ---- Gender and school admission

Scores Profile and Interpretation

At this point, it is instructive to recall the objectives of our proposed assessment since this will guide the approach of interpreting the scores. First, the assessment is meant to detect candidates with scholarly potential early. Such candidates should be given special attention to their anticipated future leadership role and significant contribution to their society. Their exposure to the educational material should be more structured, with focus on concepts and with higher dosage of analytical and deductive exercises. On the other hand, those who do not show scholarly potential should be taught basic and fundamental aspects of Islamic teaching. Material should be presented in a more casual style, with a higher dosage of multimedia presentation (videos/conversations) and through an exemplary approach. Second, the assessment should indicate the field(s), as represented by the four main categories that candidates would be interested the most to study. This is applicable to all candidates since learning would be an ongoing process to all of them, but with different dosages and approaches.

To distinguish between students with scholarly potential and others, scores of basic units and advanced units should maintain some relative weight. The advanced candidates should score high (more than 80%) in the basic units and at least pass the advanced units (more than 50%). On the other hand, average students may or may not pass the basic units and may not score high in the advanced units. For a big sample of students (500 students or more), the average score in the basic units should be higher than the average score of the advanced units by about 50%. If the average scores difference is small (less than 30%), it would mean that the questions were not set up properly to distinguish advanced students from average and less gifted ones. If the average scores difference is high (more than 70%), it would mean that the gap between the basic and advanced units is too high and only highly talented students would be

identified. In either case of big or small difference of the two average scores, the units lose power to classify students into advanced and average students.

Most students would have more inclination to one of the four categories over the other three ones. The specific nature of questions in the different categories should aid in reflecting this inclination. It should be reflected in a higher score of the respective category than the other three by at least 20%. If the student is an average student, this score increment should show in the basic units. If the student is an advanced student, it should show in both basic and advanced units. A small percentage of students would be inclined to more than one category.

It is also recommended that the scores *profile* rather than the individual scores be evaluated in order to figure out the hierarchical structure of the cognitive abilities of each particular student. This is consistent with our belief in a hierarchical structure with interrelated abilities as discussed earlier. Accordingly, a typically acceptable profile would be similar to the one shown in Figure 2A. Taking visual inspiration of the dependence of the specific abilities scores (shown in vertical stripes) on those of the common abilities (shown in horizontal stripes), horizontal stripes can be regarded as foundation layers for buildings resting on them. High-rise towers cannot stand on weak foundations, and solid foundations give rise to tall buildings. For this reason, we think that the *Towers-on-Sand* profile, Figure 2B, does not represent a realistic case because it means that strong mental faculties can be based on a weak common process. Likewise, we reject the *Towers-and-Huts* profile, Figure 2C, because a sound underlying process would naturally result in the development of firm and tall structures, on the average, rather than the flimsy huts beside the tower. The appearance of these unrealistic profiles in more than 5% of the scores means that test items need further refinement toward the acceptable profile.

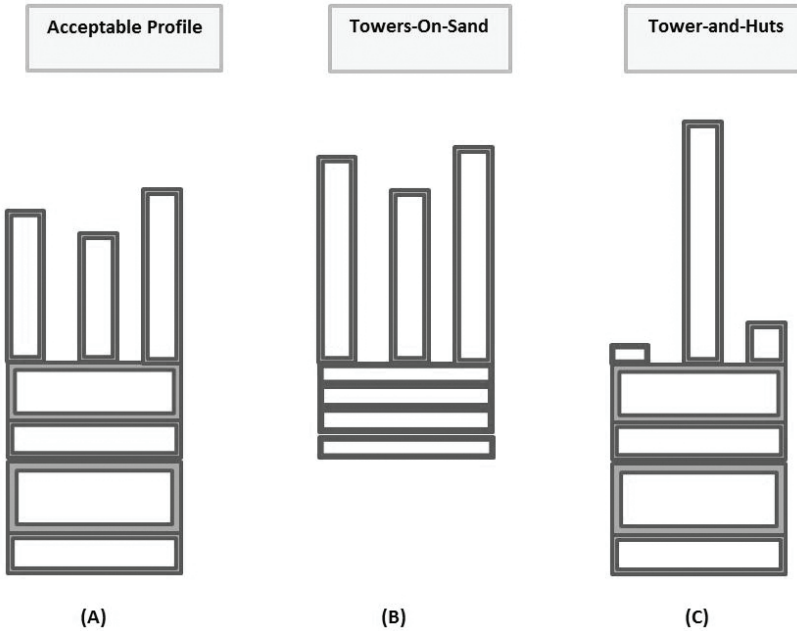


Figure 2: (A) A typical scores profile. (B) and (C) Unrealistic scores profiles. Few vertical stripes are shown for illustration.

Aptitude versus Interest

The role of interest in shaping the student scores profile cannot be ignored. Aptitude measurement of new converts should not be regarded as an examination given to job applicants in order to choose the best candidates. There is a fundamental difference between the two situations. Efforts made in a job are translated directly into monetary value. Therefore, people are in the ‘best effort mode’ during work. In other words, they exert and consciously show their best qualities to complete tasks assigned to them and to produce the best possible output. This is not always the case with new converts studying Islamic sciences on a voluntary basis. They may be able to succeed in their Islamic studies if they have to, but they may not necessarily have high interest in it if they are busy with other career and/or social issues. For this reason, aptitude tests for new converts should be complemented in other ways to identify their interest

profiles. While interest can motivate someone to start a study course and dedicate some time to it, competency will primarily determine the success factor. Both interest and competency are important for successful completion of the desired study. Practically speaking, many of the new converts may be studying about Islam during their free time or alternatively during the times of their hobbies. This approach motivates the need for packaging the technical material of this program in a way that arouses their interests.

Quantitatively, interest can act as a *modulating* gate for the competency assessment. In a simple formula,

$$\text{Success level} = \text{Competency level} \times \text{Interest level.}$$

The above formula suggests that high interest, represented by 1, will unleash the full mental energy of the student toward his study. Conversely, low interest, represented by 0.5, for example, will only produce half the potential outcome of the study. Interest level should be quantified based on an interview and/or a survey and added to the competency scores profile for joint consideration of both indicators.

Comparison of QAMC-I and WAIS-IV

The reason for choosing WAIS-IV to compare with our QAMC-I assessment was previously discussed. Despite the clinical origin of the test, it has been amended over years, as is the case with many other IQ tests, to become the most standard and the most complete IQ test. The content of WAIS-IV is summarized in Table 1. As shown in the table, WAIS-IV consists of 16 tests divided into four groups: verbal comprehension, perceptual reasoning, working memory and processing speed. This is consistent with Wechsler's view that human intelligence can be best measured using diverse tests. Two remarks are to be made about the test before proceeding with the comparison. First, the first 3 tests of *Verbal Comprehension* seem to be tests of knowledge rather than problem-solving ability. Second, the last category of *Processing Speed* places a premium on rapid execution of simple tasks that could be easily solved had enough time been given. A question may arise about the feasibility of encountering this type of tasks in real life, though.

Table 1: A summary of the WAIS-IV content, (Extracted from Mackintosh, IQ and Human Intelligence).

Category	Test Description
Verbal Comprehension	1. Information: General Knowledge questions covering different fields
	2. Vocabulary: Definitions of the meanings of words
	3. Comprehension: Meanings of various sayings and proverbs
	4. Similarities: Aspects of similarity between two things
Perceptual Reasoning	5. Picture Completion: To complete missing parts of familiar objects
	6. Block Design: To arrange colored cubes to form certain patterns
	7. Picture Arrangements: To arrange pictures to form a story
	8. Matrix Reasoning: To select from a number of alternatives on offer a pattern that completes a 3x3 matrix of patterns
	9. Visual Puzzles: To choose the response options that can be combined to form the shown puzzle
	10. Figure Weights: To select the missing weights required to balance a scale
Working Memory	11. Arithmetic: To solve simple arithmetic operations in the mind: no pen or paper allowed
	12. Digit Span: To repeat a series of digit in the same order or in a reverse order
	13. Letter-number sequencing: To repeat an alternating sequence of numbers and letters, putting numbers first in ascending order and letters next in alphabetical order
Processing Speed	14. Digit Symbol: After displaying the 1-9 digits in order, with a symbol underneath each of them, the examinee should fill the digit that goes with the shown symbol in a certain way.
	15. Symbol Search: After showing a list of symbols followed by a series of test items, the examinee should identify the test items that appear in the list of symbols
	16. Cancellation: To identify target shapes within a structure of shapes

Table 2 shows the comparison between QAMC-I and WAIS-IV. Before analyzing the table, few remarks about the way it is composed are in order. When a test in WAIS-IV is similar to the QAMC-I test in the first column, we will list the name of that test in the second column and indicate differences in the third column. Similarity is gauged based on the degree of the overlapping between the two abilities and the approach of testing. When no such test exists, but we think that the results of the QAMC-I test would correlate with those of a WAIS-IV test, we indicate the degree of correlation in the third column. We also use the third column to show that no similar test or a correlating one exists, with a brief comment on the reason.

Table 2: A comparison between the QAMC-I and the WAIS-IV assessments. Abilities and tests are italicized.

QAMC-I	WAIS_IV	Comments
Not Applicable	<i>Information</i>	The Quran does not address aspects that are particular to a region, culture or era. Some cosmic and nature related items are covered in respective Quranic themes
(VR) <i>Vocabulary</i>	<i>Vocabulary</i>	Quite similar, except that man-made tools constitute a low percentage of words in the Quran
(VR) <i>Relations</i>	Not Covered	Correlates with the <i>Comprehension</i> test in WAIS-IV
(VR) <i>Feature inference</i>	<i>Similarities</i>	Same purpose, but different testing approach
NA	<i>Comprehension</i>	Language-dependent test and Culture-dependent test; beyond the Quranic scope
(NR)	<i>Arithmetic set</i>	Quite similar, but WAIS-IV administration does not allow pen and paper
(MM) <i>Memory for objects</i> and	Not Covered	Correlates with the <i>Digit Span</i> and the <i>Letter-Number</i>

<i>Memory for lists</i>		<i>Sequencing tests</i>
(MM) <i>Memory for events</i>	Not Covered	Correlates with the <i>Picture Arrangement</i> test
(MM) <i>Memory for patterns</i>	Not Covered	Correlates with the <i>Symbol Search</i> test; Cues in QAMC-I test are letters while cues in WAIS-IV test are visual
(DR)	Not Covered	Limited correlation with the <i>Block Design</i> and the <i>Matrix Reasoning</i> tests; Both WAIS-IV tests rely on geometrical shapes, whereas DR in the Quran is a sophisticated version of induction and deduction logic
<i>Spatial reasoning</i>	Not Covered	Limited correlation with <i>Visual Puzzles</i> and <i>Block Design</i> tests; Later WAIS-IV test uses geometrical shapes, whereas QAMC-I test uses natural elements
<i>Transformation reasoning</i>	Not Covered	No apparent correlation with any WAIS-IV test
<i>Mental imagery</i>	Not Covered	Primarily deals with Day of Judgment events which are beyond the scope of WAIS-IV
<i>Similarity-based analogies</i>	Not Covered	Mainly for discrediting false arguments; beyond the scope of WAIS-IV
<i>Ranking</i>	Not Covered	For classification and appraisal; beyond the scope of WAIS-IV
<i>Human Psychology</i>	Not Covered	Beyond the scope of WAIS-IV
<i>Story of Mankind</i>	Not Covered	Beyond the scope of WAIS-IV
<i>Fiqh</i>	Not Covered	Beyond the scope of WAIS-IV
Not Applicable	<i>Processing Speed</i>	Tested in the advanced units of QAMC-I indirectly by limiting the test time. No specific tests in QAMC-I are dedicated for this purpose

The comparison in Table 2 shows the following fundamental differences between the two assessments:

1. QAMC-I is data-driven and exploratory in nature. It is more oriented to discovering innate abilities, rather than those developed through experience and structured education, keeping in mind that the impact of life experience and educational background cannot be eliminated completely. On the other hand, WAIS-IV probes skills acquired through the use of man-made machines in a technically developed environment.
2. Reasoning-related abilities occupy a major and wider portion of QAMC-I than that of WAIS-IV.
3. Geometrical shapes are used intensively and in several tests of WAIS-IV, whereas QAMC-I refers to cosmic systems of different scales and accessibility.
4. History of mankind and their future in the hereafter are addressed in QAMC-I, but hardly touched upon in WAIS-IV.

In light of the above differentiating points, it can be said that the Quran, as the material source of QAMC-I, contains a full-range spatial dimension, starting from accessible cosmic elements, such as rivers and trees, and minute creatures, such as ants and seeds, all the way up to gigantic systems, such as galaxies. The Quran also contains a full-range of temporal dimensions that go all the way back to the beginning of creation and all the way forward to the hereafter. Figure 3 depicts these two dimensions. Reasoning is the faculty critically needed to appreciate the completeness of the spatial and temporal dimensions addressed in the Quran and thus heavily tested in QAMC-I in relation to these two dimensions. With reasoning, man stands as an intellectual element in the cosmos to watch that which is near and far, analyze configurations and mechanisms therein, and register patterns in mind for subsequent submission with love to the Creator.²⁴ The Quran usually presents a whole cosmic system with various interrelated elements involved. Consequently, while WAIS-IV tests narrow down the list of items to test and attempt to isolate them for individual assessment, the Quran usually comes from

²⁴ The story of *Hayy Ibn Yaqzān* by *Ibn Tūfayl* displays this sequence. *Hayy* started by observing his surrounding and ended up recognizing his Creator and submitting to Him.

a higher dimension and addresses a meaningful scene with clear significance to our life. With that, ambiguity about which ability is being tested with some IQ testing approaches, such as Raven progressive matrices,²⁵ is cleared. Moreover definitions of abilities needed for understanding the Quran are properly aligned with fundamental indicators of intelligence.

Evolution of QAMC-I

Our hypothesis of QAMC-I should be considered as an *initial* proposal of that assessment. In reality, the last letter in the abbreviation, ‘I’, stands for *Initial* to signify this fact. QAMC-I should be adjusted and refined based on theoretical analysis and data-driven statistical techniques such as Factor Analysis (FA). Theoretical analysis might lead to identifying more Quranic themes not mentioned in our proposal. Also, QAMC-I can be enriched by expanding the analysis to the teaching of our Prophet. Identifying new themes in the Quran or in other sources of Islamic teaching sounds as the natural direction for expanding QAMC-I.

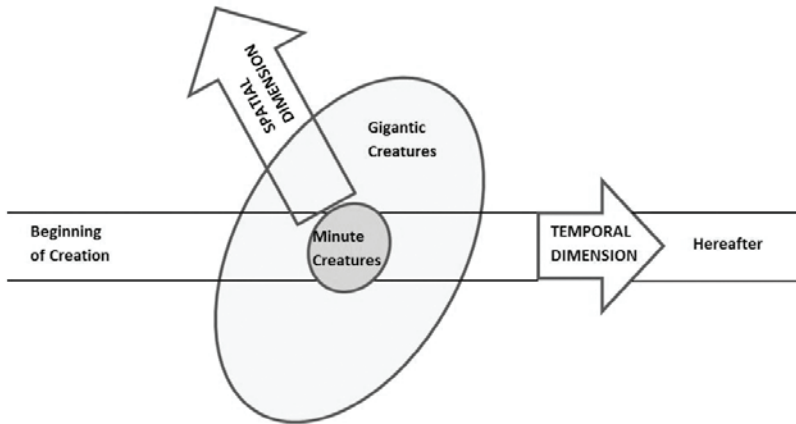


Figure 3: Spatial and temporal dimensions covered in Quran.

²⁵ P. Carpenter, M. Just and P. Schell, “What One Intelligence Test Measures: A Theoretical Account of the Processing in the Raven Progressive Matrices Test,” *Psychological Review* (1990), 97, 404-431.

FA is a statistical tool that is widely used to simplify the correlation matrix of many variables (like the subject scores of an undergraduate program) into a few factors. The basic idea behind FA is that when the results of two tests given to a wide enough sample of students correlate, the aspects tested by these two tests overlap at least partially. FA can show in quantitative terms the degree of dependence, called factor loadings, of each variable on these few factors. With this simplification, the relationship between the variables can be better understood. More importantly, the underlying few factors or processes behind many observable processes can be identified and quantified, notwithstanding the limitations of FA in the identification process.²⁶ The procedural steps of FA are briefly described in the Appendix.

There is an important point to observe in the above FA procedure. FA calculates the values of the common factors, but is silent, as it is expected to be, about naming, i.e., identifying, these common factors. An external criterion has to be used for this purpose. Therefore, FA can yield different interpretations with limited assurance over which one is more correct. Nonetheless FA proved useful in revealing a more compact correlation formula between a large set of variables. However, insight about the meaning of the numbers must be always present in the mind of the analyst.

Spearman developed Principle FA (PFA) and believed that its results serve as a strong testimony for his single construct of general intelligence, *g*. Thurstone used a different type of FA, which is Multiple FA (MFA), and also interpreted the results to signify multiple and relatively independent mental abilities. Spearman extracted the *g* factor first and consequently assumed that *g* is sufficient to account for the correlation between all the variables. On the other hand, Thurstone extracted a group of factors first and assumed that there was no need to identify a common factor for all of them.²⁷

Applying FA on actual scores of QAMC-I might suggest that two abilities should be jointly assessed using one test if their test scores highly correlate. The desired outcome of analyzing the

²⁶ P. Kline, *An Easy Guide to Factor Analysis* (London: Routledge, 1994), 28-41.

²⁷ Mackintosh, *IQ*, 51.

QAMC-I tests using FA is that each test should strongly load to a few, and preferably one, factors while simultaneously loading insignificantly to many other factors. This is basically Thurstone's principle of "*Rotation to a Simple Structure*". Although this principle is usually explained using geometrical terms, the practical meaning might be lost in the geometrical context. For this reason, we will instead comment on the practical implication and relate it to the geometrical representation. When some tests (represented as vectors) correlate significantly with each other, this means they are testing a common factor. Items of these tests should be adjusted (vectors rotation) such that the sum of correlations between each test and the common factor is maximized. This is the situation where the common factor stands geometrically in their midst.

Finally, it should be mentioned that the actual credibility of QAMC-I should be examined against the scores of the future achievement tests of the assessed students to determine the success rate of QAMC-I in detecting future scholars and in predicting their preferred areas. Even though such an examination might reveal the need for modifying the assessment strategy, it does not tell what should be modified and in what way. Further theoretical analysis and standardization through ongoing application of the FA seem to be the way for further improvement.

Conclusion

This study shows that due to the universal nature of Quranic beliefs, the Quran presents full-range spatial and temporal dimensions of the cosmos. As a result, understanding the Quran requires a good number of distinctive mental abilities beyond that required for ordinary IQ tests, such as mental imagery, transformation reasoning, story of mankind and human psychology. In particular, dual reasoning, with its variant forms, provides the analytical instrument for supporting the Quranic views. General abilities for understanding the Quranic text in general and specific abilities for understanding its distinctive themes were analyzed in depth throughout this study. A quantitative testing approach was introduced for each of these abilities and showed how the scientific inclinations of new Muslim converts toward a specific Quranic field can be detected early and how

advanced students can be identified. Finally, we pointed out possible theoretical and statistical techniques for future evolvement of QAMC-I.

Appendix

Using very general terms and without delving into the intricate details of the various FA processes and the algebra that supports them, FA can be described in the following ways:

- First, calculate the first characteristic vector of the correlation matrix. This vector consists of weights, each is a normalized value of the sum of correlations each variable has with all the variables of the correlation matrix.
- Second, calculate the factor loadings by multiplying the first characteristic vector by the eigen value of this factor which is the total amount of variance attributed to this factor.
- Third, calculate the residual matrix by partialing out the first factor of the correlation matrix.
- Fourth, extract the second factor and its loadings by repeating the first two steps on the first residual matrix.
- Fifth, obtain the second residual matrix by partialing out the second factor of the first residual matrix.
- Sixth, repeat the procedure of extracting factors and generating new residual matrices until the numbers in the residual correlation matrix are too small to account for a realistic factor.