Qualities of an Ideal Scientist : An Islamic Perspective

<"xml encoding="UTF-8?>

Qualities of an Ideal Scientist : An Islamic Perspective

Mohsen Reza Haydari, MD, PhD1

Scientists are individuals with several extraordinary qualities. However, these qualities differ among scientists from various disciplines and depend on the nature and type of research a scientist is engaged in. The impact of scientific research is reflected in a society and the entire humanity at large and scientific research can make human life better or even bring a disaster for human beings.

Thus, it is important to consider various qualities of scientists and their impact on a scientist's research and its consequences. The qualities2 of an ideal scientist can be broadly divided in three main categories: behavioral or spiritual, mental or intellectual and physical qualities. In this article qualities of an ideal scientist will be reviewed from Islamic point of view.

Knowledge and Discovery – An Islamic View

According to the teachings of Islam, knowledge3 doesn't only mean reading, remembering, analyzing or discovering new facts or even making a new invention based on discovered knowledge. Knowledge is based on piety [taqwa]4 and that the seeker of knowledge should have special characteristics reflected in his pure and godly intentions and thinking, wise words and finally virtuous actions.

Knowledge without these characteristics is considered as being of a very low level.5 Whatever a scientist 'observes', 'discovers' or 'creates' is a sign [ayah] of God, a fact already known to God and created by God – being the ultimate source of knowledge6. A scientist is thus blessed with opportunity [toufiq] by God to seek knowledge, do experiments, analyze data and present result or make discovery.

The difficulties that a scientist faces in the path of acquiring knowledge, and the joy and pleasure of making a discovery or creating new knowledge for the sake of God are special and their reward is reserved only for the elected friends of God. All the mental capabilities and ideas leading to discovery, health and physical strength and the brain used by scientist to acquire knowledge are among the greatest blessings of God.

The power of imagination [wahm], intellect ['aql], creativity [khallaqiyyah] and the power of

thinking [fikr] are among the great blessings of God that a scientist uses all the time to do research and without these blessings, research is impossible. A scientist must understand and accept these basic realities. Thus, according to the teachings of Islam, a scientist cannot honestly say ‘my data’, ‘my research paper’, ‘my discovery’ or ‘my invention’.

Whatever good things that come in the way of scientist, in any form, are in fact blessings of God and a scientist must realize that even if he doesn’t remember God in his intellectual pursuits, God remembers him and blesses him abundantly with success and so he must thank God all the time for his favors.

Even difficulties and hardships that a scientist faces during his quest for knowledge, and making a discovery are tests of his patience and hidden blessings of God. Thus in his good times as well as in hardships, a scientist must thank God and seek His help. In the final essence, acquisition of scientific knowledge and making discovery are not the ends, but a means to seek pleasure of God, serve His creatures and are God’s blessings in this world upon a scientist. It is up to him to use these blessings either for the sake of God’s pleasure, thankfulness and worship and reduce suffering of human beings or for worldly, selfish and materialistic gains and bring eternal destruction for himself and humankind.

Qualities of an Ideal Scientist

A scientist should be first a good human being. Motivation for his research should be primarily based on alleviating human pain and suffering and seeking pleasure of God and doing his duty. Scientists have different motivations, including, curiosity, love of discovery, winning awards, becoming famous, better financial life, career promotion and finally competing with a colleague or a group.

All these motivators potentially make a scientist successful in his career; however, these can also lead a scientist to fall in an evil trap, do wrong to himself, his colleagues and society and humanity at large, commit sin and thus, lose divine blessing in his research. A good scientist prioritizes various motives for research and keeps his duty towards God and his creatures as the top motivator.

His heart feels the pain of suffering of creatures and serves as powerful internal force to go forward with scientific research under difficult circumstances and various pressures. In this way, he is never carried away by short-term materialistic or selfish goals and worldly attractions.

In modern times, due to rapid advancement in communications, internet and availability of sophisticated and diverse scientific techniques, a scientist cannot remain isolated and do

research alone. Thus, he should be a good team worker, be humble in attitude and respect his colleagues and their opinions.

Another pivotal characteristic is truthfulness. Scientific research by itself is discovery of a hidden truth which starts from observation and ends with creation of new knowledge or discovery of a fact which may lead to an invention. Thus, until a scientist develops habit of being truthful all the time, he cannot be a good scientist. He can make deliberate or unconscious error of evading or missing truth in his observation, doing experiments, data analysis, inference and writing his results in the form of thesis or research publications. A scientist with habit of being untruthful can easily fall prey to plagiarism and scientific misconduct and exaggerate his findings to make short term worldly gain.

Patience and persistence are two very important qualities of a good scientist. A scientist has to often deal with failures in his experiments, lack of facilities and funds, uncertainties, unfavorable and hostile environment as many may not believe in his findings. Thus, he should never give up his quest and curiosity and have trust in God [tawakkul] and seek God's help in face of uncertainties, difficulties and adversities. No scientific discovery is possible without firm patience. A scientist must realize that patience bears fruits and he has to wait for the moments of success or discovery; it will surely come sooner or later.

A scientist must have sharp observation and he should be able to see things, phenomena, events and data differently, and with creativity from various aspects and he should also be able to accurately quantify observation.

This is the essence of scientific research as the results that a scientist comes up with form the basis of further inference and application of scientific knowledge. A scientist should also be very responsible in making observations, doing experiments, and publishing his results. He should consider the impact of disclosing his knowledge and discovery to others and before submitting it to a journal or sending it to publisher in any form. Sometimes, a discovery can be harmful to humanity if disclosed or if used by irresponsible individuals and so he must weigh pros and cons.

Listening and accepting points of view that are not in agreement with his own or scientific flexibility is another quality of a good scientist. Often, scientists disagree on a key scientific point, mechanism of action, interpretation of data, have different approaches to scientifically pursue a problem or may have disagreements on other scientific issues.

A good scientist respects and considers opinions of other like him from other disciplines, or with expertise in techniques not known to him as worthy of acceptance and approval. A good scientist realizes beauty of combination of various aspects of observation, diverse opinions,

creative and novel ideas and techniques which often lead to new discoveries, ways to novel solutions and approaches.

Due to rapid expansion of knowledge, creation of new disciplines at a very fast pace, diversity of scientific techniques and communication revolution, often, a scientist is not aware of many new facts and discoveries, and has to be courageous and honest enough to express his ignorance in front of others. Humbleness in thus another characteristic of a good scientist who appreciates efforts and superiority of his colleagues[7] and accepts what is scientifically proven, even though it may be against or better than his own views or current state of his knowledge. This humbleness in fact motivates a scientist to always be a good learner.

Knowledge and skills of a scientist can often lead another scientist or a colleague to become envious towards him, stop his progress and harm him in various ways and deny his due rights. This can also harm a society indirectly because if a talented scientist is not allowed to work and denied facilities and opportunities, society will not able to enjoy fruits of his intellectual endeavors; a disease may remain uncovered, a mechanism leading to better understanding of the cause of an illness or a potential treatment may not be discovered if a scientist is not allowed to pursue research.

Thus, a good scientist has eyes and mind free from envy, that appreciate knowledge and skills of his colleagues, give their due rights and respect, help and promote those who excel him in knowledge, talents and skills, even though it may apparently harm his own career.

According to a tradition[8] reported from Imam Ali (as), a researcher or seeker of knowledge should have several diverse characteristics which are summarized in table 1.

Behavior and Attitude	Spiritual and Mental
Visiting the learned	Good intention
Discussion with the learned	Humbleness
Refined manners	Freedom from envy
Tolerance in behavior	Higher level of understanding
Love of elect	Compassionate by heart
Compassion in behavior	Truthfulness by heart
Truthfulness in words and action	Integrity
Piety in action	Piety

Gentleness	Satisfaction
Research	Gnosis of things and matters
Faithfulness	Salvation
Softness of speech	Well-being
Virtue in action	Divine guidance
Abstinence from sins	Virtue
Research in action	Memory

(Table 1. Characteristics of Researchers in the view of Imam Ali (as

Ontological Aspects of Qualities

All the intellectual and mental qualities described for a good scientist grow as a scientist pursues his career and makes new discoveries or publishes more scientific papers. As a scientist acquires more knowledge, his capacity to acquire more knowledge increases and his 'reservoir' become more spacious, this is opposed to material things where reservoir becomes gradually filled and less spacious as said by Imam Ali (as).9

Accordingly, progress in a scientist's intellectual capabilities is reflected in his ability to go deeper into a topic, know more about less and unknown, comprehend better, make precise and accurate comments, evaluate delicate aspects of knowledge, write more scholarly, do better editing, think laterally, enter into scientific debates with more depth and diversity, develop a general comprehension into broader areas outside his own discipline and guide students more effectively.

From an ethical and spiritual point of view, during stages of acquisition of knowledge, a scientist may be trapped in a stage [known as stage of knowledge by the gnostics] whereby acquiring knowledge becomes his aim and not means to serve God and remove suffering of His creatures. His aim becomes to win intellectual discussions with his like and prove his superiority of knowledge and skills.

The scientist also feels pleasure to be called as a 'scholar', 'intellectual' or a person with knowledge and loves to acquire more knowledge for the sake of worldly gains, praises, awards, be ahead of others, promotion, and only for pleasure that he feels in acquiring knowledge and to become famous as a scientist or scholar.10

It is important that at this stage, the scientist should get out of this state of mind with spiritual exercises and concentrate at his duty towards God and His creatures. Until he comes out of

this stage, and enters into stage of acquiring knowledge as a duty towards God again, all his efforts in acquiring scientific knowledge, making discoveries, publications, everything will be for the sake of personal motives, worldly gains and devoid of divinely blessings and the rewards in the Hereafter.

Such a scientist will only progress intellectually and get fame, promotion in academia and acquire high worldly status; however, his spiritual and ethical qualities will be lost and replaced by selfish intentions. He may acquire great successes in his scientific career, however, it will be devoid of divine blessing and pleasure reserved for those who acquire scientific knowledge and make scientific discovery for the sake of God and serving His creatures.

Additionally, when a scientist is in the beginning stages of acquiring knowledge, he may feel to know a lot about a specific topic or area of research, admire himself and behave proudly. However, as he grows and makes progress, his horizon become more wide and high, and gradually finds that he knows very little and there is a lot more to learn in the never ending journey to acquire knowledge.

Thus, a good scientist never falls into the trap of self-admiration ['ujb] and is never proud [mutakabbir] in his behavior towards others. As he gradually, he develops a sense of ignorance inside himself and becomes more humble in his attitude as he acquires more knowledge. Towards his colleagues and likes, the people of knowledge and scholars, he develops a special love and respect and socializes with them.

In order for a scientist to be 'complete' and 'perfect' in all spheres, in addition to his intellectual, mental attainments and social life, he must pay equal attention to ethical and spiritual qualities and self-purification throughout his career. Accordingly, for a good scientist, it is necessary to have spiritual qualities, pure godly intentions, and special behavioral characteristics mentioned above [table 1].

He should also make further progress in sincerity, become more refined, acquire higher levels of piety and divine characteristics with his career progression from a junior researcher or student until becoming an established senior scientist, professor or still higher.

Good Scientist in the Modern Age

In the modern age, a scientist has a more challenging task. As opposed to past when a scientist usually had to travel long distances to find a teacher, do research in isolation and often with few simple techniques, a scientist in today's world has easy access to scientific knowledge, has to work with networks where many scientists are connected together and he is faced with information overflow and has to read a lot of literature before coming up with new

ideas and adopt an innovative approach for his research.

Thus, a good scientist should be a good reader, able to differentiate between various levels and categories of knowledge reported in scientific literature, should be able to work with modern technology, internet, necessary softwares, and should never be tired to learn new scientific techniques and acquire new expertise, whenever required to learn in order to pursue his research goals and to make a discovery.

Additionally, since modern science is essentially multidisciplinary and entails diverse approaches, a good scientist should be a good team worker and collaborate with scientists from various disciplines and never hesitate sharing his ideas with them or be shy of learning from them. He should never hide his knowledge and love teaching his students and colleagues and make use of all the tools available to come up with authentic data and make a discovery necessary for solving a problem –all these in order to ease pain of the creatures of God.

This process is hard test for a scientist as he has to take care of rights of other scientists working with him as well as the fact that he has to fulfill the right of knowledge and skills he has been blessed by God.

Faithfulness and loyalty are two essential qualities of a scientist when working in a team with others. A scientist should never claim knowledge and ideas [either in written or spoken form] or discovery which belongs to others as his own. He shouldn't disclose data that his colleagues have acquired and shared with him and do not want to publish or discuss with others. Additionally, he shouldn't disclose intellectual or other weaknesses of his colleagues that he personally comes to know while working with them.

According to the Prophet Muhammad (swas), this is regarded as the worst treachery [khayanat].11 Removing the name of a colleagues or student from publication or not mentioning verbally their contribution is an act of scientific misconduct. He must always give credit to others, in written and verbally for their intellectual contributions and thank them.

Conclusion

According to the teachings of Islam, knowledge is a divine light [noor] instilled in the heart of a person by God.12 It illuminates the heart of a scientist and guides him. If combined with faith in God, this light leads a scientist to become successful not only in this world, but hereafter also. A scientist's words and actions reflect this divine light, if his aims are godly.

A scientist remains alive after his physical death because of his written words left as a legacy for mankind or his invention which serves humanity to remove their suffering and make their life better. A scientist is constantly in a state of evolution towards more knowledge and higher

qualities in all spheres and his quest to see realities of creation, created by God. Every time he makes a new discovery, he, in fact discovers a new name [ism] of God, and His new attribute [sifat] which increase his gnosis [marifat] of God. He becomes more responsible in his duties towards himself, knowledge he has acquired, his colleagues, students, society and finally God. At every higher level of knowledge and discovery, there are new challenges, more complex uncertainties and more severe difficulties waiting for him.

A scientist should never be tired and remember God, thank Him for his favors and His tests, and seek His help and never forget his duties towards Him. Finally, a prayer attributed to the Prophet Muhammad (swas) can be a good tool which a scientist can often use to seek divine help: 'O Allah, show me the things (or facts) as they (really) are.'13

Notes

1. Baqiyatallah University of Medical Sciences.

2. In this article, qualities of a good scientist are mentioned in italics throughout the text. The Arabic words are in brackets [], written in italics.

3. In Islamic traditions reported by Prophet (swas) and His Ahlul Bayt (as), over 700 traditions have been reported on various aspects of knowledge, seekers of knowledge and benefits of seeking of knowledge.

4. Surah al-Baqarah, ayah 282: '…and be careful of (your duty) to Allah, Allah teaches you, and Allah knows all things.' The basic fact is that human should be careful of his duty towards God, know that it is God in the end who teaches, either directly or indirectly and finally God emphasizes that whatever knowledge a human being acquires is in fact known to God. Please see Tafsir al-Mizan (WOFIS Publishers, 1973) for detailed commentary. Additionally refer to reference no. 5 for detailed explanation as to how piety [taqwa] purifies human soul and makes it receptacle of knowledge.

5. Imam Ali Ibn Abi Talib (as): 'That knowledge which remains only on your tongue is very superficial. The intrinsic value of knowledge is that you act upon it.' [Nahjul Balagha, saying no. 92] Available online: Al-Islam.org, Ahlul Bayt Digital Islamic Library Project http://www.al-islam.org/nahjul-balaghah-letters-and-sermons-of-imam-ali].

6. Imam Khomeini (ra), Forty Hadith chapter 24, The Classification of Sciences, pp. 421-434 (Ansariyan Publications, 1999) [available online: Al-Islam.org, Ahlul Bayt Digital Islamic Library Project http://www.al-islam.org/forty-hadith-an-exposition-second-edition-imam-k...].

7. Surah Yousuf, ayah 76: ' …and above every one possessed of knowledge is the All-knowing one.' This is a fact that human beings excel each other in knowledge, in different places and in

different times and no one can know everything except God. Thus being humble with others is the best manner a scientist or seeker of knowledge should adopt. Please see Tafsir al-Mizan for details.

8. Al-Kulayni (d. 941 A.D.), al-Kafi, vol. 1, kitab fadl al-'ilm, bab al-nawadir, hadith no. 3. For detailed explanation of the qualities of seekers of knowledge, please refer to Forty Hadith by Imam Khomeini (ra), chapter 23, The seekers of knowledge, pp. 405-420.

9. Imam Ali Ibn Abi Talib (as): 'Every container gets narrows with what is kept in it, except for the container of knowledge which becomes more spacious.' [Nahjul Balagha, saying no. 205]

10. Imam Khomeini (ra), Adabus Salat [The Disciplines of Prayer] discourse 1, chapter 2, The stages of the stations of the people of suluk, pp. 13-16 (The Institute for Compilation and Publication of Imām Khomeini's Works (International Affairs Department), 2002) [available online: Al-Islam.org, Ahlul Bayt Digital Islamic Library Project http://www.al-islam.org/adabus-salat-second-edition-imam-khomeini].

11. Al-Majlisi (d. 1698 A.D.), Bihar ul-Anwar, vol. 17, p. 67, hadith no. 2. Prophet Muhammad (swas) said: 'Be truthful to each other in the matters of knowledge, because treachery in the matters of knowledge is worst than treachery in the matters of material things.'

12. Ibid., vol. 17, p. 225, hadith no. 17. Imam Ja'far al-Sadiq (as) said: 'Knowledge is not extensive learning. Rather, it is a light that God casts in the heart of whomever He wills. Knowledge is not extensive learning. Rather it is a light that God instills in the heart of anyone He wishes to guide. Therefore, if you wish to acquire knowledge, first seek the reality of servitude inside yourself, and seek knowledge by the way of adhering to it and then ask God to bless you with it so that He blesses you with its understanding.' For explanation of this hadith, please see reference no. 9.

.13. Vide reference no. 9 for explanation and slight variations in the text of prayer