Logic Functions in the Philosophy of Al-Farabi

By
Prof. Abdul Jaleel Kadhim Al Wali
Department of Philosophy
CHSS United Arab Emirates University
Al Ain , UAE
jalilwali@hotmail.com
Abduljelil.kazem@uaeu.ac.ae

Abstract

Al-Farabi (870-950 AD), peripatetic philosopher came to be known as the Second Teacher (*al-Mou'allim al-Thani*), Aristotle being the first. His most contributions were clarifying the functions of logic as follows: defined logic and compared it with grammar in a unique and useful manner; made the study of logic easier by dividing it into two categories: idea and proof; believed that the objective of logic is to correct faults we may find in ourselves and in others; and if we do not comprehend logic, we must either have faith in all people, or mistrust all people, or differentiate between them.

In this paper, I will analyse his logical works, *Kitab al-lhsa al 'Ulum* (Enumeration of the Sciences), *Kitab al-qiyas* (Book on the Syllogism), *Kitab al-jadal* (Book on Dialectic), *Kitab al-burhan* (Book on Demonstration), and *Fusus al-Hikam* (The Ring stones of Wisdom), in order to present his contributions in field of logic.

Keywords

Qadi (Judge), Philosophy of Youths, Logic Design, Rules of Logic.

1. Who was Al Farabi?

Al-Fārābī, Muḥammad ibn Muḥammad ibn Tarkhān al-Fārābī, also known as Abū Naṣr al-Fārābī, or Avennasar, was born in Turkistan in 850 AD, and died in Damascus in 950 AD. Although he died a bachelor and in Arabic culture people are known by their son's or daughter's names, there is no clear reason why we call Al-Farabi (Abu nasr).

Al-Farabi completed his early education in Farab and Bukhara, but later went to Baghdad to pursue higher studies, and lived and worked there from 901 to 942 AD.

Al-Farabi lived through the reign of six Abbasid Caliphs, and travelled to many distant lands, studying for a time in Damascus and Egypt, but repeatedly returning to Baghdad, prior to visiting Saif al-Daula's court in Halab, Allepo, where he became one of the king's consultants. It was during his time in Halab that his fame spread far and wide. During his early years, al-Farabi was a *Qadi* (Judge), but later adopted teaching as his profession. During the course of his career, he suffered great hardships, even serving as the caretaker of a garden in order to earn three or four dirhams to pay his living costs. He died at the age of 80 years (Netton 1992; Bakar 1998) .

2. His Contributions

Al-Farabi's major contributions were in the fields of philosophy, logic, and sociology. As a philosopher, he can be classed as a Neoplatonist who attempted to synthesize Platonism and peripatetic philosopher with theology[1]. Zimmerman (1981) wrote that Al-Farabi's programme closely reflected the Alexandrian scheme in the last stage of its development (Zimmerman 1981: xxii) . In sociology, Al-Farabi wrote several books, of which *Ara Ahl al-Madina al-Fadila* (The Model City) became the most famous. This book makes a significant early contribution to sociology and political science.

Al-Farabi's books on psychology and metaphysics were largely based on his own work. He also wrote a book on music, *Kitab al-Musiqa*, as he was a great expert in the art and science of music, and invented several musical instruments, besides contributing to the knowledge of musical notes. It was reported that he could play his instrument so well he could make people laugh or weep at will.

It should be noted that while the book *Theology of Aristotle* was available to Al-Farabi, and was regarded by him as a work by Aristotle, it later transpired that this was the work of the Neoplatonic writer, Plotinus.

[1] From Greek *peripateo*, "I walk about", the philosophical school of Aristotle.
The name arose fromAristotle's habit of walking about with his students in the Lyceum while lect uring.
http://encyclopedia2.thefreedictionary.com/Peripatetic+Philosophy

Although many of Al-Farabi's books have been lost, 117 are still known, of which 43 concern logic, such as *Kitab Ihsa al-Uloom* (Categories of Science), which discusses the classification and fundamental principles of science in a unique and useful manner. *Fusus al-Hikam* (Ring stones of Wisdom) remained a core textbook of philosophy for several centuries at various centers of learning, and is still taught at some institutions in the East. Other significant works by Al-Farabi include *Kitab al-qiyas* (Book on the Syllogism), *Kitab al-jadal* (Book on Dialectic), and *Kitab al-burhan* (Book on Demonstration) (See Rescher 1962 and Arabic scholars).

3. Philosophy of Youths.

Al-Farabi established several rules for the effective teaching of philosophy to youths, including:

- No youth should commence the study of philosophy before he possesses a knowledge of the natural sciences;
- Mathematics is an important subject in training the mind of the young philosopher, because it helps him transition easily from the sensible to the intelligible;
- The study of logic as an instrument to distinguish true from false is of great educational value before commencing the study of philosophy;
- Philosophy is primarily studied to obtain knowledge of God as the Creator and Efficient Cause of all things;
- The student of philosophy must be instructed in the sources from which the different philosophies take their names;
- The teacher should see that his student attends to only one thing at a time, for only one thing can be mastered at a time. The reason for this rule is to have the student concentrate his attention upon the object of study, and make a success of it (Al-Farabi 1987: 224).

4. Division of Philosophy

Al-Farabi divided philosophy into two categories: theoretical philosophy, and practical philosophy. Theoretical philosophy is concerned with principals of human knowledge, and can be subdivided into three categories: mathematics, metaphysics, and psychology.

The practical philosophy is concerned with the use of philosophy in everyday life, and its power to achieve good. It is subdivided into ethics and politics.

The goal of philosophy is to achieve happiness (Al-Farabi 1987: 224-226).

5. Logic Design

5.1. Most Islamic philosophers were drawn to work in the field of logic for several reasons, the first of which was related to their belief that logic is a tool of philosophy. It "was to be studied before philosophy proper: it was to be studied from texts: and the texts to be studied were Aristotle's" (Zimmermann 1981: xxi). This means that logic is the key to philosophy, and Islamic philosophers recommended Aristotle's books as a key original text to accompany the study of logic.

The second reason arose when the Islamic religion expanded to cover a large number of countries. People in these new countries required rational arguments, rather than religious belief, for adopting the Islamic religion. Islamic Philosophers sought appropriate sources to help them in this situation, and embraced Aristotle's logic. However, Al-Ghazali (d.1111) criticized Islamic scholarship for adopting Greek philosophy; he believed that physics and metaphysics were largely unacceptable, but approved of the use of logic in assisting in arguments to convince others about the Islamic religion. Thereafter, some aspects of the philosophy of the Organon were gradually assimilated by kalam, and have been used by theologians to support the Islamic religion against unbelievers. Al-Farabi claimed that kalam defends the religion it serves, and that theology is by definition nothing more than the logical demonstration of believed truth (Van 1970: 21). Thinking is discussion in kalam, and the word kalam itself means 'speech', or 'conversation'. Truth is found in answer and query, or jawab wa-su'al. In this, there is a mas'ul, one who is asked because he has promoted a thesis for which he is responsible, and there is a sa'il, an interrogator, who attempts to question this thesis (Van 1970: 22-25).

Islamic philosophers developed the theologians' purpose of using logic, and expanded Aristotle's logic, translated it, understood, explained, and used it as a tool in defending against non-Muslims.

Al-Farabi, and other Islamic philosophers, were familiar with Aristotle and with Stoic logic. Moreover, the sources of Islamic logic included not only Aristotle and Stoic

philosophers, but also late Greek Aristotelian commentators, such as Isagogic of Porphyry, and Galen.

> "Commentaries and introductions served to fill in gaps, to put subject-matters in logical order, to explicate the imputed system, and to define the place of each of Aristotle's logical books within it. Porphyry (d. c. 305) wrote his Isagogic as an introduction to the Categories, the first book of the logical Organon. The last generations of commentaries surviving from late six-century Alexandria give the impression that introductory lectures up to, or including, the Categories, had come to form the better part of philosophical instruction" (Zimmerman 1981: xxii).

This explains why Islamic philosophers were not solely concerned with Aristotle's logic, but also employed the commentaries and the introductions of Aristotle's followers.

It can be stated that Al-Farabi and his contemporaries at the Baghdad school created the conditions of philosophical scholarship. They considered logic first, then studied the books of Aristotle's Organon in the traditional order, which resulted in the revival of a scholarly generation of the Aristotelian commentary.

5.2. Al-Farabi's design of logic began to make the study of logic easier by dividing it into two categories, *Takhayyul* (idea), and *Thubut* (proof).

Al-Farabi defined logic in his book *Ihsaal-ulum* (Enumeration of the Sciences) as an instrumental or rules-based science, aimed at directing the intellect toward the truth and safeguarding it from error through its act of reasoning (Al-Farabi 1968: 67).

Some scholars believe that Al-Farabi was influenced by late Greek philosophy in this definition, and in the division of logic, and "at almost every step from book to book, from section to section, Al-Farabi follows traditional patterns of exposition" (Zimmermann 1981: xxiii). However, it can be argued that it is unfair to claim that Al-Farabi followed them step-by-step, since he analyzed logic according to the Arabic language, rather than Greek language, and said that logic, in its Arabic form of '*Mantik'*, demonstrates that it is a derivative of the utterance, 'Nuttok'. Historically, this form of speech indicates three meanings: firstly, that speech is accompanied by voice. This is what is meant by (*tongue expresses conscience*), secondly, that speech is located in the soul (*the intelligible indicated by speech*), and thirdly, that psychological power originates in human beings, which always differentiates man from other living beings (Al-Farabi 1968: 78).

5.3. Al-Farabi believed that intelligibility implies never containing errors. For him, man finds himself predisposed to recognize and believe in intelligibility, for example, the whole is greater than part. Other things that may contain errors are those things that can be realized through thought, contemplation, measurement, and inference. In such things, man requires the rules of logic.

The creation of logic is similar to the creation of grammar, because the percentage involved in translating logic into reason and rendering it intelligible is the same as that involved in applying grammar to language and speech, by utilizing the counterparts of the rules of speech.

Rules of logic are techniques that examine errors that cannot be attributed to reason. They can be compared to the measures through which shape and form are studied. When doubt exists regarding the straightness of a line, a ruler is applied, and when there is doubt concerning a circle, a pair of compasses can be employed.

The objective of logic is to correct errors we may find in ourselves and in others, and errors that others find in us.

Al-Farabi believed that, once in possession of the rules of logic, and a desire to correct our errors, such rules will not permit a person to stray into indefinite matters, or delusion as to what is right. If the rules of logic are adopted, they will lead a person onto the correct path.

Another person's errors can be corrected in the same manner that one corrects one's own. However, if we wish other people to correct our own errors, we must be prepared to accept their intervention.

Al-Farabi rejects the idea that those who comprehend geometry and numbers can abandon logic, or replace it, or conduct it. This opinion is similar to the option that those who memorize poems and prose do not require grammar rules.

Logic infers that the grammar involved in speech constitutes rules, but these rules differ as the grammar rules of a given nation are not the same as those of another, while logic offers rules that are applicable to all nations. All nations are involved in speech, which can be individual or compound. An article of speech can be a noun, a word, or an article. Speech can be balanced, imbalanced, or otherwise (Al-Farabi 1968: 73-74).

The noun is a word that possesses a single meaning. The meaning can be understood by itself alone, regardless the context of the noun.

The word is a single word that relates to a meaning. The meaning should be understood by itself in the context of its meaning.

The article is a word that possesses a single meaning. The meaning could not be understood by itself without being connected with a noun or word. Examples include: from, on, and to (Al-Farabi 1976: 7).

The difference between the rules used by logic, and those used by grammar, are that grammar provides rules for use in a given language, but the rules of logic can be applied to language in general, as they are universal.

Al-Farabi defined logic as a grammar of thought. This was one of two major simplifications fundamental to the propaganda of his school. The second, as inhibiting as the first was stimulating, was the assertion that such a grammar of thought was embodied in Aristotle's Organon (Zimmerman 1981: cxxxix)[2].

However, it is not easy to determine exactly how grammatical form and logical form correspond. Some theories exist that discuss the relationship between the two, and they suggest that the logical form could be found "within the various versions of transformational grammar like (deep structure) (conceptual structure) or (semantic representation)" (Allwood 1979: 19).

5.4. Al-Faribi's Logic Forms

Aristotle used letters as a term-variables, and thereafter ancient and medieval schools of philosophy made little progress in the use of symbols. Al-Farabi's practice, while not exceptional, certainly constitutes a special case. By making general use of the Aristotelian formulae and paradigms in their unidiomatic, or even ungrammatical translated forms, Al-Farabi invested his logical language with unusually high degree of artificiality. For example, Aristotle used the formula (not + noun) to represent a negative noun, but Al-Farabi used (La + noun) because Arabic possesses no synthetically negated nouns (Zimmermann 1981: xliv).

[2] This definition of logic was refuted by some scholars. See; Zimmerman, F.W. (1981) Al-Farabi's Commentary and Short Treatise on Aristotle's De Interpretation, p. cxxxix.

5.5. Parts of Logic

Al-Farabi divides logic into eight parts, corresponding to the eight books of the Aristotelian Organon. His division of logic is coordinated with the aim of logic. The aims of the logic are:

- First, to regulate (tuqawim) and guide reason toward right thinking with regard to all intelligible admittances of error.
- Second, to provide safeguards against error with regard to those intelligible aspects.
- Third, to provide meaning to the intelligible admittances of error (Al-Farabi 1968: 75).

According to these aims of logic, the eight parts of logic consist of the following:

1. Standard speech, which includes three forms: ineligible, simple, and compound words. The intelligible is located in the psyche. These are forms that consist of a single word without a specific context, and can be understood by themselves, without any reference to a specific context such as ground, gold, animal, human, zead, and amro, in the category of substance, or line, number, and time in the category of quantity. Further examples are: white and black in the category of quality, son and father in the category of adding, standing in the category of place, zead and amor in the category of time, sitting and standing in the category of position, clothing in the category of for him, and whiting and hutting in the acting and reacting categories (Ibn Baga (Avenpace) 1976: 13-14).

2. The other two forms of speech are utterances that consist of simple and compound words. Simple words are composed of up to two intelligible words, while compound words are composed of more than two words in simple, intelligible speech. Al-Farabi, like Aristotle discussed these two kinds of speech in two books, Al-Burhan *and* Al-Qiyas (Al-Farabi 1986; Al-Farabi 1986) [3].

3. The five artefacts used in discourse consist of the following: demonstrative, controversial, sophisticated, discourse, and poetry.

[3] The Arabic text for these books are “Al-Burhan" and "*Al-Qiyas*", both of them and Ihsa' al-'ulum published at the same year 1986.
Al-Farabi, A. (1986) Al-Burhan, investigated by Majed Faghry , Dar Al-Mashrq, Beirut.
Al-Farabi, A. (1986) Al-Qiyas , investigated by Rafiq Al-Agam, Dar Al-Shroq, Beirut.

Demonstratives are the words that benefit the true Science we seek to learn, whether they are used by man himself in inferring what is in question, or are raised by other people, or vice versa in order to correct what is in question.

Controversial speech is used in two situations, where one asks the questioner about well-known facts recognized by all people, while the second seeks to assert a strong belief in an opinion in which the speaker seeks to correct an opinion expressed by him, or by others, until he comes to perceive that such a belief is true, although it is untrue.

Sophisticated speech are speeches that seek to accuse, claim an untruth as a truth, and what is illegal as legal. The speakers attempt to delude those who are not scholars that they are scholars.

Discourse speech are those speeches by which a person seeks to convince another of a given opinion, and to convince himself of what is said, and to believe it, regardless of the strength or weakness of this opinion.

Poetic speech is speech intended to imagine the whole discourse, whether as good or bad, as beautiful, ugly, passionate, or otherwise (Al-Farabi, Ihsa' al-'ulum 1968).

Some scholarship has described Al-Farabi's method of arranging the eight parts of logic as instruction (tartib al-Kalim). "The first three parts are described variously as preludes (tawtiat), introduction (madakhil) and means (turuq) to demonstrative syllogisms. These parts contain elements that are common to all the five remaining parts" (Bakar 1998: 130).

5.6. Eight Books of Logic

Al-Farabi's logic constituted eight parts, and each part was presented in a single book in the same method of sub-division employed by Aristotle. The eight books are as follows:

1. *Categories* contains intelligible vocabulary and the words that indicate them. This book is known in Latin as *Categories,* and in Arabic as *Al Maqoulat.*

2. *On Interpretation* contains all simple speech, 'the compound intelligible', which is composed of two single intelligible words, and their indicative words as mentioned in Barry Erminaas' book. This book is known in Latin as *On Interpretation,* and in Arabic book as *Al-E'barrah*.

3. *The Prior Analytics* contains the forms of speech concerned with measuring the five artefacts. Latin title of this book is *The Prior Analytics,* and the Arabic is *al Qyeass*.

4. *Posterior Analytics* contains the demonstrative form of speech, and the rules of matters with which philosophy is concerned. Latin title of this book is *Posterior Analytics*, and the Arabic is *Al-Borhan*.

5. *Topics* is the form of speech that examines controversial speech, and how to raise and answer controversial questions, which is to say how to cause controversy. The Latin title of the book is *Topics*, and the Arabic is *Al- Mawadie*.

6. *On Sophistical Refutations* concerns the rules of things which follow the correct path. It includes statistics concerning the forms it employs, including camouflage in science and speech. This book is titled *Sophism* in Latin, which means 'camouflaged wisdom'.

7. *Rhetoricism* contains all discourse speech, and their forms, together with the speeches given by rhetorics and speeches. This book is titled *Rhetoricism* in Latin, and *Khatabah* in Arabic.

8. *Utocism* contains the rules that govern poetry, and poetic speech, and enumerates the types of poetry. This book is titled Utocism in Latin, and Shei'r in Arabic (Al-Farabi, Ihsa' al-'ulum 1968: 87-89).

Al-Farabi furthermore prepared a *Demonstrative Book*, which is the most advanced part of his theory, and is characterized by honour and tactfulness. The other parts of logic can be seen as simply preparation for this fourth part. Accordingly, the three preceding parts were merely preliminary approaches and methods that lead to the fourth. Conversely, Al-Farabi provides each of the four parts with the details of how each can be employed. Accordingly, a person would be able to use any of these parts. Therefore, it presents the controversial stance of what does a person need to learn, and what things does he need to examine in his and other people's speech? If a person wishes to be a superlative speaker, then how many aspects do they need to learn? Do they need to understand the aspects they will examine about themselves, and others, in order to comprehend whether they have adopted the path of speech, or other paths? The same is true for the other aspects.

Al-Farabi compares logic to tools such as rulers and compasses, which are used to ensure exactness when measuring physical objects that are subject to error. Like these tools, logical measures can be employed by their users to verify both their own acts of reasoning, and the arguments of others. Indeed, logic is especially useful and important in

guiding the intellect when it is faced with the need to adjudicate between opposing and conflicting opinions and authorities.

Conclusions

1. Any researcher is able to discover, through studying the functions of logic in Al-Farabi's philosophy, where is he concerned with goals of the logic, and to make it easy to understand, together with the relationship between grammar and dialectics, and the way in which this can be employed to define religion. This is one of the reasons why Al-Farabi has exercised a great influence on science and knowledge for several centuries.
2. Al-Farabi, like other Islamic philosophers, was interested in computing the relationship between logic and language, especially in relation to reasoning and speech. This means he was concerned with the theory of demonstration.
3. Al-Farabi's logic was used by Islamic theologians, but in a different way, as "Theologians avoided the word mantiq (Logic), they spoke of adab al-kalam or adab al-jadal. If they reflected at all about what they were doing." (Van 1970: 22)
4. Al-Farabi was a great expert in the art and science of music, and invented several musical instruments, besides contributing to the knowledge of musical notes.
5. Al-Farabi laid down several rules for the honest training of youths in philosophy, including the study of logic as an instrument to distinguish the true from the false. This understanding is a great educational value before commencing the study of philosophy.
6. Al-Farabi's design of logic began to make the study of logic easier by dividing it into two categories: *Takhayyul* (idea), and *Thubut* (proof).
7. Al-Farabi believed that the objective of logic is to correct errors that we may find in ourselves and others, and errors that others find it in us.
8. According to Al-Farabi, if we do not understand logic, then we must either have faith in all people, or mistrust all people, or even differentiate between them. Such actions would be without evidence or experimentation.
9. Al-Farabi divided logic into eight parts, corresponding to the eight books of the Aristotelian Organon.

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