Logic and Thinking: Al-Fārābī's Conception and its Relationship to Knowledge and Education[*]

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Abstract

The weakening position of logic as one of the core sciences in knowledge and education is mainly due to the negligence of educational institutions and students in the Muslim world of its importance and, the pivotal role that it plays as an instrument in correcting and evaluating the components of their thinking and reasoning as well as in articulating their minds. However, the current feeble state of logic in the domain of knowledge and education was not the case in earlier Muslim scholarship. This article endeavours to analyse and demonstrate al-Fārābī's conception of logic concentrating on its benefits, objectives, as well as its relation to language and other sciences. The author provides an analysis

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of essential logical contents derived from al-Fārābī's conception. This may aid students and urge them to study logic, thus enabling them to articulate their minds, guide their thoughts and validate their arguments in all fields of knowledge and education.

Keywords
Logic, thinking, language, philosophy, knowledge, education, science.

Introduction

Both philosophy and the science of logic have yet to be taught in many educational institutions. If so, for the latter, it is not done in the manner that it should be. As a result, the process of thinking of our students who are to be future intellectuals and scholars is weakening. Such an element of thinking appears to deteriorate by the day in our students' reasoning, that is, both in their verbal and written arguments. The chief reason for the situation is because they only hear about logic, perhaps not even as a branch of philosophy, or the role it plays in articulating their thinking in knowledge and education, but as a mere subject which they think has nothing to do with their education.

Indeed, logic is generally accepted as a branch of philosophy that aims to study and evaluate arguments with some variations to its fundamental definition. In logic, argument means a set of statements, one of which provides the premise as a starting point of an argument. Therefore, the premise is often presented as evidence to support its conclusion. The purpose of the statement or argument is to establish a convincing and sound reasoning. A conclusion then is inferred arising from the meaningful premise. Thus, when evaluating an act of reasoning, one is satisfied that it is properly constructed. Yet, such an aspect is lacking in our students' thinking, simply because logic is not taught to assist them to

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articulate and strengthen their thinking capacity. Secondly, rather than about how we perceive things or how we want them to be, logic is about evaluating instances of reasoning and how we use language. Thirdly, logic concentrates on how we evaluate the components of our thinking. It does not concern itself with how people do think. Fourthly, we need to teach our university students that one of the most important components of logic is to identify logical rules that determine whether our arguments are valid, or otherwise, and that such rules have terminologies in logic, which are used as justification for validating our arguments, as well as judging other people's arguments. Fifthly, the relationship of logic to language and its nature as a necessary instrument for the study of all sciences are seldom made known to students.

Thus, based on the factors above, this study attempts to clarify the importance of the science of logic and its relationship to thinking in al-Fārābī's[1] conception with more reference to his *Iḥṣāʾ al-ʿUlūm* and, to come up with some logical contents that may encourage students to see the importance of logic in their education in terms of its role in shaping their thinking.

The Importance of Logic among Muslim Philosophers

According to historical sources on Islamic philosophy, Muslims embraced Aristotelian logic in the early reign of Khālid bin Yazīd, while others contend that this took place during the time of Abū Jaʿafar al-Mansūr. What appears to be true is that during the Umayyad reign (41–132H.), foreign sciences were

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1. Abū Naṣr Muḥammad bin Muḥammad Tarkhan al-Fārābī (870/258–950/339), was born in the region of Fārāb in Turkestan. Some biographers mention that his father was a leader and that he was a native of Persia. Al-Fārābī travelled to Baghdad seeking knowledge where he mastered subjects such as philosophy, logic, grammar, mathematics, music and other sciences. A popular and renowned philosopher in the Muslim world after al-Kindī, al-Fārābī was influenced by Aristotelian logic far more than al-Kindī and the Muʿtazilites, such that, by virtue of this, he was nicknamed "The Second Teacher" (*al-Muʿallim al-Thānī*) after Aristotle. See al-Fārābī, *Iḥṣāʾ al-ʿUlūm*, ed. ʿUthmān Amīn (Cairo: Maktabat al-Anjil al-Miṣriyyah, 1968) p. 38.

not given much attention. But, the official support of logical studies was obvious in the Abbasid dynasty. The second caliph, Abū Jaʿafar al-Mansūr (136–158H.) sponsored studies of Greek works in the field of astronomy. The fifth caliph, Hārūn al-Rashīd, continued the sponsorship of more studies to include logic, which was a branch of philosophy. This initiative proved to be significant because of the close relationship between medical studies in the Greek tradition and Greek philosophy, namely logic. The studies of Greek philosophy and its learning witnessed a remarkable enthusiasm during the reign of the seventh caliph al-Maʾmūn (198–218H.).[2]

They were acquainted with Porphyry's *Isagoge*[3] and gave it priority as an introduction, and consequently this became the foundation of human learning among them. Much information about the Syriac translation of Aristotle's logic was available and the majority of this survived. Some of this was published, such as *Categoriae*, *De Interpretatione* and *Analytica Priora*. The construction of Aristotelian logic was taken over by Muslims and Arab scholars with the same organisation of the subject matter of logic, and the usage of basic texts and its name in Arabic.[4] Rescher observed: "Logic long continued to play a central role in the training of physicians, and we may regard this as the principal reason for the flourishing of logic in an Arabic language setting in the 9th to 11th centuries."[5]

Muslim thinkers, namely philosophers, theologians and jurists, had different stances towards the novel science.[6]

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2. He was the founder of the popular *Bayt al-Ḥikmah* (House of Wisdom), which served as an Institute for Advanced Studies, specialising in translating the works relating to Greek science and philosophy.

3. Porphyry's *Isagoge*, written around 270, played an important and influential role in Islamic philosophy.

4. It was organised in this manner: Isagoge (Porphyry) (*al-Isāghūjī*), Categoriae (*al-Maqūlāt*), De Interpretatione (*al-ʿIbrah*), Analytica Priora (*al-Qiyās*), Analytica Posteriora (*al-Burhān*), Topica (*al-Jadal*), De Sophisticis (*al-Mughālaṭah*), Rhetorica (*al-Khiṭābah*), and Poetica (*al-Shiʿr*).

5. Nicholas Rescher, *The Development of Arabic Logic* (Pittsburgh: University of Pittsburgh Press, 1964), 19–20.

6. Ibn Taymiyyah, *Naqd al-Manṭiq*, ed. Muhammad Hamid al-Faqī (Cairo: Maktabat al-Sunnah al-Muḥammadiyyah, 1951), 15.

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Yet, the science of logic remained one of the main subjects alongside original sciences like *al-Naḥw* (Grammar), *al-Fiqh* (Jurisprudence), *al-Ḥadīth* (Prophetic tradition), *al-Tafsīr* (Commentaries of the Qurʾān) and *al-Kalām* (Islamic theology). A check with the logical structure of Islamic theology finds that all Muslim jurists and theologians used logic in their various interpretations of the Qurʾān and the prophetic tradition. Joseph Van Ess states:

> No Islamic jurist, or any other jurist, could do without logic, he had to use the most subtle hermeneutic method to interpret the Koran, and he had to apply all kinds of logical processes to adjust the commands found by this interpretation to the individual cases of daily life. The same is true of *kalām*, Islamic theology: theology is by definition nothing more than logical demonstration of believed truth. But here, strangely, the relationship to logic seems even more indefinite.[7]

It was normal that dialectics interwove with logic and such a phenomenon was critical in debates, intellectual and religious argumentations, which took place during their time. As such, all philosophical discussions and dialectic argumentations that took place in Islamic philosophical books had their origins in logic. Most of them possessed a good mixture of Aristotelian logic except those which were used as proofs by the *Mutakallimūn*. The first science that Ibn Muqaffaʿ, who was known as a translator and philosopher, singled out to translate from the philosophical sciences was logic and astronomy. He was known in the era of the Abbāsid state as the writer of Abū Jaʿafar al-Manṣūr who translated into Arabic the three books on logic by Aristotle, namely the Book of Categories, the Book of Bari Arminas and the Book of Analytica.[8]

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7.   Gustave Edmund Von Grunebaum, *Logic in Classical Islamic Culture* (Los Angeles: University of California, 1967), 21.
8.   Abū ʿAbbās bin Muḥammad al-Lawkarī, *Bayān al-Ḥaqq bī Damān al-Sidq*, ed. Ibrahim Dībāji (Teheran: Muʾassasat Intishārāt Amir Kabīr, 1986), 42; see also Saʿid bin Ahmad, *Tabaqāt al-Umam* (Beirut: Matbaʿat al-Kathulikiyyah, 1912), 14.

The term given to logic as an equivalent in Arabic is *manṭiq*. Rescher comments on this as follows:

> The rapidity of the assimilation of Greek logic in the Arabic speaking orbit may be illustrated by the word *manṭiq* (logic) itself. About 850 the philosopher *Ibn al-Sikkīt* (d. 857) was able to use *manṭiq* in its root sense "speech" (logia) in the title of his important treatise on the Arabic language "Reformation of Speech" (*Kitāb Iṣlāḥ al-Manṭiq*). A generation later its acceptance in the usage as the technical equivalent of Greek logicia would have rendered this employment difficult.[9]

Prior to al-Fārābī, and due to the importance given to logic in the Muslim scholarship, almost 25 prominent logicians devoted their time to the development of logic in Arabic, either by translating it from Syriac into Arabic or making commentaries on it. Notedly, amongst the translators and logicians involved in the endeavour were some non-Muslims.[10]

Al-Fārābī's Contribution to Logic

Al-Fārābī established logic within the Islamic heritage, and wrote about 50 books and one treatise on it. As many criticisms

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9. Rescher, *Development of Arabic Logic*, 22.
10. The 25 logicians were: Timotheus (728–823), Abū Amr ʿAbdullah ibn al-Muqaffaʿ (750–815), Yahyā Ibn al-Bitrīq (770–830), Al-Barmakī (780–840), Ibn al-Qāsim al-Raqqī (780–840), Ibn Naʿimah (780–840), Theodore (790–850), Yuhanna ibn Masawaih (790–857), Al-Kindī (805–873), Hunain ibn Ishāq (809–877), Muhammad ibn Musah (815–873), Qusta ibn Luqa (820–912), Hubaish ibn al-Hassān (830–890), Thābit ibn Qurrah (834–901), Al-Sarakashī (840–899), Al-Yaʿqūbī (840–897), Abū Yahaya Al-Marzawazīi (840–910), Ishāq ibn Hunain (845–910/911), Issa ibn Yahya (850–910), Qwairī (855–915), Abū Uthmān Al-Dimashqī (860–920), Ibn Hailan (860–920), Ibn Zahrūn (860–922), Al-Rāzī (865–925), and Abū Bishr Matta (870–940). See *Rescher, Development of Arabic Logic*, 93–4; for more information on senior-ranking logicians in the Muslim world, see al-Lawkarī, *Bayān al-Ḥaq*, 44–65.

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were directed to Aristotelian logic,[11] al-Fārābī titled one of his treatises, *Al-Mukhtaṣar al-Ṣaghīr fī al-Manṭiq ʿalā Tarīqat al-Mutakallimīn* (The Little Summary on Logic on the Method of *Mutakallimīn*). Regarded as a logical specialist, al-Fārābī devoted a great part of his research to the field of logic. He possessed other logical works,[12] which had been published and contributed tremendously towards establishing logic as an integral discipline within Islamic learning.

Al-Fārābī's scholarly works cover almost all the sciences. His fields of interest encompass a wide range of subjects, including politics, sociology, metaphysics, logic and music. However, for unknown reasons, he became famous for his political and metaphysical works. Some modern writers, such as Hammond, acknowledge his tremendous contribution to philosophy in general and mentions: ". . . in all justice to al-Fārābī and other Arabian thinkers, we should candidly admit that Christian philosophy owes a great deal to them."[13] Much

11. For information on this criticism see, C. A. Qadir, "An Early Islamic Critique of Aristotelian Logic," *International Philosophical Quarterly* 8, no. 4 (December 1968).

12. His published logical works are the following: 1. *Kitāb al-Tawtiʾat fī al-Manṭiq* (Introduction to Logic); 2. *Risālah Sadarat bihā al-Kitāb* (Introductory Treatise of the Book); 3. *Sharḥ Kitāb al-Maqūlāt li Aristutālis* (Commentary on Aristotle's Categoriae); 4. *Sharḥ Kitāb al-ʿIbarah li Aristutālis* (Commentary on Aristotle's De Interpretatione); 5. *Kitāb al-Qiyās al-Sagīr* (Short Commentary on Syllogism); 6. *Risālah fī Jawāb Masāʾil Suʾila ʿanhā* (Treatise in Answering to the issues About which He was Asked); 7. *Kitāb Sharāʾit al-Burhān* (Book on the Conditions of Demonstrations;) 8. *Sharḥ Kitāb al-Khiṭābah li Aristu* (Commentary on Aristotle's Rhetorica); 9. *Sadr Kitāb al-Khiṭābah* (Introduction to Aristotle's Rhetorica); 10. *Risālah fī Qawānin Sināʿat al-Shiʿr* (Treatise on the Canons of the Art of Poetry); 11. *Kitāb fī Shiʿr wa al-Qawāfī* (Book on Poetry and Metrics) and, 12. *Kitāb Iḥṣāʾ al-ʿUlūm* (Book on Classification of Sciences). In the book, the chapter on logic is the longest, which demonstrates that his concentration on logic was more than on other subjects and that al-Fārābī was a specialist in logic compared to any other known Muslim philosophers. According to O'Leary, ". . . his primary importance was as a teacher of logic." See his *Arabic Thought and Its Place in History*, rev. ed. (London: Routledge & Kegan Paul, 1939), 147.

13. Robert Hammond, *The Philosophy of Alfarabi* (New York: Hobson Book Press, 1947), Preface.

of al-Fārābī's works are unaccounted for while many of his books have yet to be published. Indeed, reliable information points to the fact that some of his works were rendered into Latin and Hebrew in the Middle Ages. Many scholars became well versed in Greek philosophy through the translations.

The Position of Logic in Education and in al-Fārābī's Enumeration of Sciences

One of the pivotal roles logic plays is that it organises the information of knowledge, especially in commenting on, and interpreting the revealed knowledge and prophetic tradition, without exploiting it intellectually and morally. It is also applied in law and social actions. Therefore, logic is always crucial in the education of Muslims to confront the challenges faced by them today. There should be zeal to confirm faith by reason and elucidate religious experiences to make them manageable for the human intellect. It is undeniable that the medieval Muslim philosophers and the *Mutakallimūn* had made some important contributions to the history of logic and exercised some influence on medieval scholastic logic. In fact, they had criticised the use of logic in divinities that caused confusion amongst people, created doubts in their faiths as well as misled them, rather than logic as an art whose aim is to demonstrate *burhān* (proof).[14] They strongly believed that logic as a study of general principles of reasoning was valuable to their entire education. The reason behind this was that they were able to intelligently and successfully debate over the divine attributes. They believed that a Muslim scholar should have a precise and a logical idea of the notions of existence and predication to be able to reason and explain, for example, "the oneness of God" in the argument: "God is one," to those who sought logical explanation. Besides, they also had a firm belief that a sound knowledge of the principles

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14. Kwame Gyekye, *Arabic Logic: Ibn Tayyib's Commentary on Porphyry's Eisagoge* (Albany: State University of New York Press, 1979), 35.

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and methods of reasoning would assist a Muslim scholar to discover the falsehoods and inconsistencies in the arguments of their opponents. Some Muslim theological philosophers considered logic as a science of secondary importance, without any need for it.[15] Furthermore, they claimed that logic could pontificate on reality and adjudicate upon the truth or falsity relating to the premises of the arguments.[16] However, since the *Mutakallimūn* obviously knew how they could use logic in their scholarship, they elected some of the logical theories that were preferred, appropriated and developed by them. Such logical theories were developed and articulated through writings. Al-Fārābī in his *al-Mukhtaṣar al-Ṣaghīr fī al-Manṭiq ʿalā Ṭariqat al-Mutakalimīn*, mentioned earlier, was merely expounding the logic of the arguments of the *Mutakallimūn*.

Clearly, indeed, Muslim theologians were generally not against logic as a rational system considered as relevant and valuable in arguments. For example, ibn Taymiyyah's main criticism was directed to divine philosophy, for he realised that it was a mixture of atheism and free-thinking. He expressed that "philosophisers" in natural philosophy could explore and illustrate matters to their satisfaction, but were ignorant and far from attaining true knowledge in divinities. According to him, Aristotle was the teacher of such "philosophisers," yet had little to say in divinities, and within them a great deal of mistakes were committed.[17] Being among the Muslim philosophers who were fascinated by Aristotelian logic, al-Ghazzālī in his book, *al-Mustasfā min ʿIlm al-Uṣūl*, begins his introduction with logic which he called *madārik al-ʿuqūl* because of its indispensability in all sciences. He states:

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15. For more information on the criticism of Aristotelian logic by Muslim thinkers, see Muṣṭafā Tabāṭabāʾī, *Al-Muffakirūn al-Muslimūn fī Muwājihat al-Manṭiq al-Yūnānī*, trans. Abdul Rahim al-Balushi (Beirut: Dār ibn Hazm, 1990).

16. Ibid., 3.

17. Ibn Taymiyyah, *Naqḍ al-Manṭiq*, 6–7.

> We shall mention in this introduction *madārik ʿuqūl*
> (things that are comprehended by the intellect)
> which are further summarised into definition (*al-
> ḥadd*) and demonstrative proof (*al-burhān*). We
> shall also discuss the condition of a true definition
> and that of a true proof, as well as the divisions of
> both, in a more abridged manner than we did in
> the books *Maḥakk al-Naẓar* and *Miʿyār al-ʿIlm*.
> This introduction does not belong to jurisprudence
> (*ʿilm al-uṣūl*) as a whole, nor is it an introduction
> to that science; rather, it is the introduction to all
> sciences. Should a person not have mastery over it,
> then in regard to his knowledge, he could not be
> relied upon at all (*man lā yuḥīṭ bihā fa-lā thiqata lahu
> biʿulūmihi aṣlan*).[18]

From al-Ghazzālī's aforementioned statement, one can deduce
the importance of logic, particularly as a highly significant
means in helping one arrive at knowledge. In contrast to him,
however, ibn Taymiyyah criticised logic profusely; yet, that in
itself was proof that he also studied, mastered, benefited from,
as well as implemented logic in his argumentations. Therefore,
his criticisms could be construed as being mainly directed to
those who misused logic on the issue of divinity.[19]

Al-Fārābī directs his concept of education towards
the purpose of education in general, which is to do with the
nature of man and his role in this universe. In his conception,
this cannot be separated from the question of the nature of
knowledge. He, therefore, uses the terms concerning the
purpose of education, which is society-centred, in which
education is conceived primarily to produce good citizens, as
well as individual-centred, in which the duty of education is to

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18. Abū Ḥāmid Muḥammad bin Muḥammad al-Ghazzālī, *Al-Mustaṣfā
    min ʿIlm al-Uṣūl*, ed. Muḥammad Tamir (Cairo: Dār al-Ḥadīth,
    2011), 39–40.
19. Ibn Taymiyyah, *Naqd al-Manṭiq*, 15. For more on al-Ghazzālī's criti-
    cal appraisal of logic, see the section on "al-Manṭiqiyyāt" in his *al-
    Munqidh min al-Dalāl*, ed. Jamīl Saliba and Kamil ʿĀyād (Beirut: Dar
    al-Andalus, n.d.), 103.

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create a perfect man. The terms can be found as he employs them in his writings such as: *ta'dīb* and *ta'līm* (disciplining and instructing respectively),[20] *taqwīm* (straightening or correcting),[21] *tahdhīb* (educating with the purpose of teaching well-mannered behaviour); *sadād* (aiming and guiding),[22] *irtiyāḍ* (exercising and learning),[23] and *tarbiyah* (upbringing),[24] and *adab* (good behaviour). Al-Fārābī views that the true and proper educational meaning ought to combine good behaviour and all genuine qualities.[25] Therefore, the element of *ta'dīb* (discipline), which is the verbal noun of *addaba*, should be the method of creating and enforcing the moral virtues in the nations.[26] In examining all the terms used by al-Fārābī for education, *ta'dīb* has a broad and inclusive meaning of the concept of education. This justifies the authenticity, correctness and rightness of al-Attas' argument that the coinage of the term *tarbiyah* to signify "education" in the modern system of teaching and learning is neither appropriate nor adequate in conveying the conception of education in the Islamic sense. For him, *ta'dīb*, rather than *tarbiyah*, serves as the more appropriate Arabic term for the word "education." He painstakingly explains the meaning of the term, *ta'dīb*, in the light of the prophet's saying, "My Lord educated me, and so made my education most excellent." He concludes:

> There should be neither doubt nor vacillation
> in accepting the proposition that the concept of

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20. Al-Fārābī, *Rasā'il* (Hyderabad: Maṭba'at Majlis Dā'irat al-Ma'ārif al-'Uthmāniyyah, 1926), 29.
21. Ibid., 32.
22. Al-Fārābī, *Fuṣūl Muntaza'ah*, ed. M. Fawzi Najar (Beirut: Dar El-Mashreq Publishers, 1971), 59.
23. Al-Fārābī, *Talkhīs Nawāmīs Aflatūn*, in *Afalātūn fī al-Islām*, ed. 'Abd al-Raḥmān Badawī (Beirut: Dar al-Andalus, 1982), 43.
24. Ibid., 71.
25. Al-Fārābī, "Al-As'ilah al-Lāmi'ah wa al-Ajwibah al-Jāmi'ah," in *Kitāb al-Millah*, ed. Muhsin Mahdi (Beirut: Imprimerie Catholique, 1968), 96.
26. Al-Fārābī, *Kitāb Taḥsīl al-Sa'ādah*, ed. Ja'afar al-Yāsin (Beirut: Dār al-Andalus, 1983), 78.

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education and educational process is encompassed
in the term *taʾdīb*, and that the correct term to
denote education in Islam is sufficiently expressed
by it.[27]

For education to achieve its goal in an organised
manner, the curriculum must serve as a powerful instrument
to systematise it. At any given time, a nation has to realise
its objectives through education. Therefore, it must design a
programme listing and classifying matters which will educate
the individual and society about the cultural and civilisational
heritage of the nation. The individual and society, on the one
hand, also have to acquire knowledge which will lead them
to maturity in their minds, feelings, judgements and actions,
and in developing critical thinking to approach their state of
affairs. Due to the eminent and concrete role that education
plays in the individual and society in managing a nation's
state of affairs, al-Fārābī views that the sciences to be taught
ought to be properly designed and classified to achieve
their educational and learning objectives. He then executed
an independent work on this subject titled, *Iḥṣāʾ al-ʿUlūm*
(The Classification of Sciences).[28] In the work, al-Fārābī,
commences his classification of sciences and categorises them
in the following sequence: science of language (*ʿilm al-lisān*);[29]
science of logic (*ʿilm al-manṭiq*);[30] mathematical sciences (*ʿilm
al-taʿālīm*),[31] consisting of science of didactic or arithmetic
(*ʿilm al-ʿadad*), science of geometry (*ʿilm al-handasah*), science
of optics (*ʿilm al-manāẓir*), science of the stars (*ʿilm al-nujūm*)
with its two divisions, i.e., judicial astrology (*ʿilm aḥkām al-
nujūm*) and astrology (*ʿilm nujūm al-taʿlīmī*), science of music

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27. Syed Muhammad Naquib al-Attas, *The Concept of Education in
    Islām: A Framework for an Islamic Philosophy of Education* (Kuala
    Lumpur: ISTAC, 1991), 28.
28. Al-Fārābī, *Iḥṣāʾ al-ʿUlūm*.
29. Ibid., 57.
30. Ibid., 67.
31. Ibid., 93.

(ʿ*ilm al-mūsīqa*), science of weights (ʿ*ilm al-athqāl*), and science of ingenious devices or mechanics (ʿ*ilm al-ḥiyal*); then, natural sciences (*al-ʿilm al-ṭabīʿī*);[32] metaphysics or divine sciences (*al-ʿilm al-ilāhī*);[33] and, finally, political science (*al-ʿilm al-madanī*); jurisprudence (ʿ*ilm al-fiqh*); as well as theology (ʿ*ilm al-kalām*).[34]

Notedly, al-Fārābī was the first Muslim scholar and philosopher to classify the sciences in such a manner with education as an important objective. The significance of his classification begins with the science of language. In his view, education must start with mastering language and its sections as a foundation for other sciences of knowledge. He declares:

> The science of language within each community is divided into seven greater parts: the science of single expressions, the science of compound expressions, the science of the rules of the expressions when they are single and the rules of the expressions when they are compound, and the rules of rectifying writing, the rules of rectifying reading, and the rules of poems.[35]

Therefore, students must learn all the divisions of a language to enable them to express themselves in their speech to others. Al-Fārābī was fully aware of the powerful role language could play in education, for he himself had a command of a host of languages. Linguistic science, particularly grammar, according to him is a necessary science.

Next, al-Fārābī introduces logic, which he maintains as a science that is intermediate between the science of language and the philosophical sciences. According to him, the prime aim of the student of logic is to study the demonstrative art, because this art leads to the attainment of certain knowledge,

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32. Ibid., 111.
33. Ibid., 120.
34. Ibid., 124.
35. Ibid., 59.

and that logic as an instrument of all sciences, guides students to sound reasoning. Mathematics was ranked after logic. Indeed, the science of logic takes a lion's share in the classifications as the longest part in the five-chapter work.

Definition of Logic and Thinking as a Virtue in al-Fārābī's Conception

With reference to logic, the word *manṭiq* is derived from the verb *naṭaqa* which means: he has spoken with voice and letters through which the meanings are known. According to ibn Manẓūr in *Lisān al-ʿArab, al-manṭiq* means speech, while *al-minṭīq*, refers to a person who speaks metaphorically.[36] However, by this definition, we can conclude that the word *nuṭq* is peculiar to human beings who use their intellect in speaking. In the Qurʾān, the word is picked and used to depict the idea that a logical implication of the nature of prophethood is immunity from error: "He does not speak (*yanṭiqu*) of his wish, it is but what has been revealed unto him."[37] Al-Fārābī categorically made the difference between a statement (*qawl*) and an articulated speech (*nuṭq*). He states:

> The statement is not the articulated speech, the statement is surely a compound of expressions, and the articulated speech is its using of those expressions and declaring them through the tongue, making sound of it and seeking the meaning and sense of what is in the heart. Therefore, the articulated speech is a certain action, and its need is the need of a certain action.[38]

In al-Fārābī's conception, the significance and richness of the whole objective of logic is evident, for it is needed to

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36. Ibn Manẓūr, *Lisān Al-ʿArab*, vol. 7 (Cairo: Dār al-Ḥadīth, 2003), 601.
37. *Al-Najm* (53): 3–4.
38. Al-Fārābī, *Kitāb al-Ḥurūf* (Book of Letters), ed. Muhsin Mahdi, 2nd ed. (Beirut: Dar El-Mashreq Publishers, 1990), 163.

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not just to correct ourselves but also others in everything. In his conception, *manṭiq* (logic) is derived from speech or utterance (*nuṭq*), which, according to the classical scholars, has three significances: First, it is a statement that produces a sound through which the tongue expresses what is in the heart. Second, it is a statement embedded firmly in the heart and an intelligible one which signifies expression. Third, it is a natural mental faculty in man, with which humans are especially distinguished from animals.[39] The intelligibles, sciences and professions are also experienced by man through it. It is with this that a man reflects and differentiates between beautiful and ugly actions. According to al-Fārābī, this natural mental power exists in every human being, even infants.[40] On the nature of logic, he explains:

> The art of logic provides all the rules whose concern it is to straighten the mind, and to guide a human being towards what is correct, and what is true in terms of any of the propositions with regard to which a human being may possibly err; the rules that can preserve and protect him from errors and lapses regarding the propositions and the rules for examining the propositions with regard to which one cannot rely that someone did not err in them in the past.[41]

Of the propositions, there are some in regard to which human beings find themselves naturally or intuitively certain. For example, the whole is greater than its part; and every three is an odd number. Yet, as regards other propositions, it is possible for them to err and divert from what is true to what is not; that being so, it is imperative that they arrive at the truth of such propositions with thought and contemplation, and through analogy and reasoning. For this, a human being who seeks certainty in all his claims is obliged to the rules of logic.[42]

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39. Al-Fārābī, *Iḥṣāʾ al-ʿUlūm*, 78.
40. Ibid., 76.
41. Ibid., 67.
42. Ibid., 67–8.

According to al-Fārābī, a similarity exists in the function of the science of logic and grammar because the former deals with the intellect and propositions, while the latter with language and expressions.[43] This is because all the rules that grammar provides are in expressions; similarly with the science of logic which provides rules in propositions. Nevertheless, al-Fārābī's view differs slightly from his teacher, Abū Bishr Matta ibn Yūnus, on this issue. In his famous debate with the grammarian, Abū Saʿīd al-Sīrāfī, Abū Bishr states: "The logician has no need for grammar, whereas the grammarian does need logic; since logic enquires into the sense, whereas grammar enquires into the sound."[44]

Scholars such as Muhsin Mahdi believes that the debate was considered in the literary and academic milieu of Baghdad as victory for grammar over logic as well as victory for grammarians and theologians over logicians and philosophers.[45] According to him, since Abū Bishr was not well versed in Arabic grammar, he could not answer some of the questions posed by al-Sīrāfī or, even if he did, some of his answers lacked conviction. Nevertheless, with al-Fārābī's vast knowledge of logic and Arabic grammar, he managed to respond to the questions which Abū Bishr could not. In fact, he even prolonged his explanation on the origin of language and grammar and their connection to logic as a branch of philosophy in his book *Kitāb al-Ḥurūf* (Book of Letters).[46]

According to al-Fārābī, in examining varieties of propositions, the rules of the science of logic are the instruments without the soundness of which human beings may possibly err or fall short in arriving at truth. They are like weights and measures, which are tools for the assessment of many substances, without whose soundness senses may err or fall

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43. Ibid., 68.
44. D. S. Margoliouth, "The Discussion between Abū Bishr Matta and Abū Saʿīd al-Sīrāfī on the Merits of Logic and Grammar," *The Journal of the Royal Asiatic Society* (1905): 116.
45. Al-Fārābī, *Kitāb al-Ḥurūf*, 47.
46. Ibid., 48.

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short in estimating their value. To al-Fārābī, if we possess the knowledge of the rules, and seek to know or correct something within ourselves by deduction, we will be able to prevent our minds from roaming haphazardly in unlimited areas as this may cause us to go astray and be confused by what is truth and what is not.[47] Similarly, others who intend to correct our opinion can have their statements and proofs examined with rules that we possess and accept them based on our knowledge and inner sight.[48]

Muslim philosophers give their views on the nature of the science of logic. For al-Ghazzālī, the benefit of logic is obvious in that the unknown entity cannot be identified or determined except through the known entity. He states:

> Logic gives the laws by which we differentiate the true from the false and thus certain knowledge from that which is not certain. It is like a balance and standard measure for all sciences. Neither the superiority nor the inferiority, neither the gain nor the loss of anything can be known, unless that thing has been measured by means of the balance.[49]

Ibn Sīnā views logic as an essential tool and as a protector of the intellect from lapses and errors. He writes: "Logic is a tool or an instrument that protects the intellect from committing error regarding that which we conceive and give assent to. It is that which leads to true belief by providing the reasons and methods of reaching at it."[50]

In relation to the nature of logic being an art or science, it is thought that since art has to do with the making of things, it therefore gives reasonable orders for making things. Logic puts into order the various activities of thinking itself.

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47. Al-Fārābī, *Iḥṣāʾ al-ʿUlūm*, 69.
48. Ibid., 70.
49. Al-Ghazzālī, *Maqāṣid al-Falāsifah*, ed. Sulaymān Dunyā (Cairo: Dār al-Maʿārif, 1960), 36.
50. Ibn Sīna, *Al-Ilāhiyyāt*, ed. Sulaymān Dunyā (Cairo: Dār al-Maʿārif, 1960), 10.

It is considered, as an art, a developed capacity or habit of using the rules in the pursuit of truth by reason. Logic was traditionally grouped along with grammar and rhetoric under liberal arts. Some logicians define logic as a science as well as an art. Science is used in this sense in its older fashion, which means that it is an organised body of knowledge established on the basis of causes and principles that are evident and can be shown as true.[51] It must be emphasised that logic, as well as the other liberal arts, was part of the knowledge of cultivated people in an epoch, and was independently studied as a science.[52]

Based on the justifications above, logic is one of the sciences, and therefore, a part of absolute knowledge whose function is to search for the unknown. Indeed, it can be called a tool for its use in other sciences. Al-Lawkarī defines logic as: "a science through which we learn the different changes from issues that occur in the human mind to issues acquired outside it and the situation of those issues."[53] He further states that this science is called logic either because it shapes up the actions of the speaking soul or it assists in arguments and debates.[54]

In the definition of thinking, the term used in Arabic to connote its English counterpart is *tafakkur* and *fikr*. *Tafakkur* is the noun of *tafkīr*, and signifies contemplation, thinking, obtaining clear knowledge of something and employment of the mind.[55] The term has been mentioned in the Qur'ān in verbal forms rather than as a noun, indicating that thinking is a process, and therefore, it urges the continuity of action of that process.[56] Other synonyms in the Qur'ān of the term

51. Daniel J. Sullivan, *Fundamentals of Logic* (New York: McGraw-Hill Book Company, Inc, 1963), 11.
52. Anton Dimitriu, *History of Logic*, vol. 1 (New Delhi: Heritage Publishers, 1991), 320.
53. Al-Lawkarī, *Bayān al-Ḥaqq*, 120.
54. Ibid., 121.
55. E. W. Lane, *Arabic–English Lexicon*, vol. 2 (Cambridge: The Islamic Texts Society Trust, 1984), 2431.
56. *Al-Baqarah* (2): 219 and 266; see also *al-Aʿrāf* (7): 176.

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tafakkur are *tadhakkur* (bearing something in mind), *tafaqquh* (full comprehension), *tadabbur*—(foresight), *tabaṣṣur* (inner sighting), *naẓar* (considering), and *taʿaqqul* (using one's intellect). For *taʿaqqul*, al-Fārābī defines it as the "ability which leads to excellent opinion and better deduction of things, and which is more proper in what it does in order for human being to acquire great righteousness."[57]

As thinking has a special position in al-Fārābī's conception, he describes it as a virtue, and states:

> The virtue pertaining to thinking (*al-faḍīlah al-fikriyyah*) is one which enables man to make an excellent deduction as to what is most beneficial for a people, a community, or a town, on any one common occasion, in relation to their shared noble goal. It also involves the deduction of that which concerns what changes within short durations—this being considered the ability to carry out different sorts of temporal, particular managements when incidents, one after another, befall a people, a community, or a town.[58]

He, therefore, categorically makes it clear that the faculty of thinking (*al-quwwah al-fikriyyah*) is not virtuous which is aimed at deducing evil.

Subject Matter of Logic and its Benefits in Knowledge and Education

The subject matter of logic according to al-Fārābī, "deals with intelligibles as long as they are proved by expressions, and with expressions as long as they are proved by intelligible."[59] This is because we correct our own opinion by thinking, reflecting and then forming issues and intelligibles in ourselves whose

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57. Al-Fārābī, *Fuṣūl Muntazaʿah*, 55.
58. Ibid., 99.
59. Ibid., 74.

business is to correct that opinion. In addition, we correct opinions of others by addressing them with expressions, and make them understand the issues and intelligibles.

Al-Fārābī makes it clear that logic and grammar provide rules of expressions, but logic differs from grammar in that it is like a kind of universal grammar, whose validity encompasses all humanity due to two reasons:

> First, logic is concerned with thoughts or interior speech, which belongs to all humanity. Second, logic is only interested in expressions to the extent that they are common to the languages of all. As for grammar, it does take into account features that the language in question has in common with those of other communities, but it does not study them insofar as they are common features. The main concern of grammar is the rules peculiar to the language of a given community.[60]

Such is the difference between the outlook of grammarians and that of logicians. Therefore, the science of logic provides the rules of expressions which are common to all communities, and does not consider the specifics in the expressions of a certain community, but urges that what is needed can be considered from the knowledgeable ones of the particular language.

Many logical contents exist in al-Fārābī's conception of logic among which are the particular relation between the science of both logic and language, as well as the general relation of logic to other sciences. The two relations are worth explaining here owing to their importance to tertiary education. Al-Fārābī asserts that the benefit of logic in knowledge and education is an answer to many claims. First, to those who claim that having experience in argumentative conversations and in teaching, for instance engineering and mathematics, can replace the rules of science of logic by

60. Osman Bakar, *Classification of Knowledge in Islam* (Kuala Lumpur: Institute for Policy Research, 1992), 131.

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providing man a mental faculty to examine every statement, proof and opinion. It also guides him towards truth and certainty, to the extent that he does not err in anything of the generally known sciences at all. Second, to those who claim that experience and practice in memorising poems, orations and narrating them can straighten the tongue, and prevent man from making mistakes in grammatical rules. Third, it is also a response to those who claim that the science of logic is redundant and unnecessary, for it is possible to find a genius who is without any knowledge of the rules of logic arriving at truth in his thoughts. This is similar to those who claim that grammar is redundant too, for there exist among people who without any knowledge of the rules of grammar do not err at all.[61] In al-Fārābī's view, such claims are absurd and their responses are as stated.

Relation of Logic to Language and to Other Sciences and its Manifestation in Knowledge and Education

In the hierarchy of sciences as classified by al-Fārābī, the science of logic is ranked immediately after the science of language. This depicts the close relation between the two sciences. The word *lūghah* or "language" literally in Arabic syntax is derived from the word *laghiyah* which means "to mention and to speak." Originally a verbal noun *lughyun* or *lughwun*, the third letter is replaced with *tā* of the feminine, therefore it becomes *lūghah*. Technically, it is the voices through which every community expresses its needs. It is also said that language is that which occurs on the tongue of a certain people or a technical speech within each tribe, or a phrase that is placed for a certain sense.[62] In the following Qurʾānic verse: "We sent not a messenger except to teach in the tongue (language) of his own people in

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61. Al-Fārābī, *Iḥṣā al-ʿUlūm*, 74.
62. Butrus Albustānī, *Muhīṭ al-Muhīṭ* (Beirut: Muṭābiʿat Muʾassasat Jawād li Ṭibāʿah, 1983), 830.

order to make things clear to them,"[63] the tongue of a people is not merely the formal patterns of their language, but the meanings conveyed by the language. Language is the vessel of meaning and, hence, the conveyance of the sense seeks much more than the surface aptitudes required to pass the examination of English as a foreign language.

Two concepts are profoundly related to the tongue which is employed here for language, namely *nuṭq*, speech, and *bayān*, expression. *Bayān*, whose infinitive verb is *bayana*, is to grant expression of the internalised meaning. The word *nuṭq* (speech) is derived from the same root as the term *manṭiq* or logic. This common source for both implies a symbiotic relationship between language and sound intellect, which is *manṭiq* or logic.

The importance of language and its relation to logic is apparent in al-Fārābī's discussion of logic; for this reason, he deems it appropriate to commence with the science of language in his enumeration of sciences.[64] According to him, one of the most important functions of language is that it creates rules which govern important expressions.[65] His main thesis is that every art has rules of which the chief goal is to gain correct understanding of all entities in it to enable it to be different from another. The rules also provide ways of examining errors that may have been committed by one who ignores them and makes the contents of the art easy to learn.

Confusion does not arise between logic and language, but rather from the nature of grammar and logic. For John Stuart Mills, grammar is part of logic. He states:

> It is the most elementary part of logic. It is the beginning of the analysis of the thinking process. The principles and rules of grammar are the means by which the forms of language are made to

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63. *Ibrahīm* (14): 4.
64. He called the science of language *ʿlm al-lisān*. Al-Fārābī, *Iḥṣāʾ al-ʿUlūm*, 57.
65. Ibid.

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correspond with the universal forms of thought. The distinction between the various parts of speech, the cases of nouns, the moods and tense of verbs, the functions of particles, are distinctions in thought, not merely in words. The structure of every sentence is a lesson in logic.[66]

Al-Fārābī's focus on examining language was also due to two important points, namely, simple and composite expressions. Since the study of simple and composite expressions, according to him, is the concern of grammar, we can conclude that he reduces the study of the science of language, entirely into the study of grammar. The justification of this is apparent in his definition of grammar as the touchstone of language where there is a possibility of an error in language, in regard to the method of expression. Therefore, in his view, grammar is the art that provides correct rules for oral and written use of a given language. Such rules govern the structure of simple expressions and their composition into sentence.[67] Al-Fārābī emphasises that the art of logic provides rules to the rational faculty for the inner speech which is the propositions and rules shared in common by all languages for the outer speech which is the expressions.[68]

The nature of logic and its relation to language as a necessary instrument for the study of all sciences, as mentioned earlier by al-Ghazzālī, are seldom explained to students in such a manner that they may be able to implement it directly consciously or unconsciously in all other sciences. Logic is a living science. Whenever it has been considered a dead science is because it was conceived without its history. In ancient scholasticism, logic was an integral part of philosophy. It was removed and belongs, henceforth, to another field of study, that of mathematics. As Dumitriu states:

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66. John Stuart Mills, *Dissertations and Discussions: Political, Philosophical and Historical*, vol. IV (New York: Henry Holt and Col., 1874), 352–353.
67. Al-Fārābī, *Iḥṣāʾ al-ʿUlūm*, 62.
68. Ibid., 78–9.

> In this way, logic has escaped from the jurisdiction of philosophy, but philosophy has remained independent of logic. In the past, logic was, on the contrary, closely connected to philosophy, whether it was conceived as part of philosophy, or an introduction to it, or as an organon, or even as the philosophy itself.[69]

Thus, in the academies, division of the curriculum of Syriac Christians who lived in the diaspora, the so-called Monophysites in the west of the Islamic state and the Nestorians in the Iranian east, logic along with mathematics was a central subject of the preparatory programme, and therefore, played an integral part in the various branches of learning. Such type of organisation of the educational curriculum is reflected in the sciences of the Syriac-speaking philosophers who played an important role in the translation of the Aristotelian logic into Arabic. Rescher observes: "As a result, the conception of the place of logic among the sciences and the role of logic in the program of instruction in medicine and astronomy was also passed to the Arabs."[70]

The relation of logic to other sciences is general, for it is in the chronological order of intellectual procedures that the science of logic is preceded by judging and reasoning, just as speaking and writing preceded grammar in the case of language. In the logical order, however, it is prior to all other sciences. In all sciences, the intellect, from given information, judges in regard to truths resulting from such information. We also reason from such information for the establishment of such truths. The science of logic as seen develops the rules of thought which govern the action of intellect in all such procedures. As a science, it is distinct from all other sciences. Yet, it permeates them all, giving rules to the intellect in all its judgment and reasoning, whatever the objects may be about which it is employed.

69. Dumitriu, *History of Logic*, see x.
70. Rescher, *Development of Arabic Logic*, 19.

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Conclusion

The main logical contents derived from the discussion above with regard to al-Fārābī's conception of logic and thinking are: (1) the particular relation between the science of logic and the science of language; (2) the general relation between logic and other sciences; (3) the understanding of information from which one seeks the truth; (4) the internalisation of information; (5) the articulating of the mind for the purification of information; (6) the expressing and demonstrating of knowledge in the appropriate manner; (7) the organisation of thoughts in argumentations and in debates in such a manner that they sound logical; and (8) the ability of correcting one's own thoughts and that of others. Notedly, such logical contents are epistemological in nature and, they are part of philosophy in their traditional—i.e. classical, medieval, and Islamic—sense. They constitute part of the theory of knowledge on which the rest of the philosophical systems with regard to epistemology are based. Therefore, logic should be taught in all fields of education to help students demonstrate independence in thinking and learning due to the pivotal role it plays in lifelong education and knowledge.