

Ibn Sina's Role in Scientific Discoveries

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ABSTRACT---- *Ibn Sina is one of the greatest human history scholars as he left an indelible and appreciated mark in human evolution journey towards civilization. Ibn Sina has deepened in many science fields such as Medicine, Astronomy, Mathematics, Philosophy and psychology and classified hundreds of books in different sciences as well. It's also worth mentioning that many Western European scientists have admitted Ibn Sina's great efforts and major influence in finding many modern scientific theories.*

1. INTRODUCTION

Ibn Sina is regarded as one of the most significant human history scholars. He has been valuably credited for his great contributions in laying the foundations of plenty of scientific discoveries which greatly helped in human civilization's scientific and intellectual development. Ibn Sina has been noticed to be uniquely smart with a strong memory and knowledgeable brain since he was 10 years old. And he could reach a great level of genius and specialty in many fields by the age of twenty. He became a great scholar in Medicine, Astronomy and Mathematics and Imam in Philosophy. He addressed the topic of the soul through many theories as much as he did for the body. He allocated many letters and stories talking about theories of the soul and wrote many books as well. Ibn Sina has many contributions in many different fields such as religious, ethical, social, mental and physical and aesthetic education. He also has many significant philosophical and pedagogical views and opinions must not be overlooked for the sake of its importance in the life of the individual and humanity.

2. PURPOSE OF STUDY:

1. Lack of resources and scientific studies which addressed this subject despite of its importance.
2. Highlighting Ibn Sina's great remarkable contributions in knowledge and science.
3. Highlighting the efforts of Muslim scholars in the evolution of human civilization.
4. Disposing the controversial subject regarding Ibn Sina in many issues.

Study Approach

The researcher used the Historical approach.

The study classification

The study has been classified into an introduction and five chapters. The introduction includes the study's idea, purpose and approach. The researcher talks about Iben Sina's biography in the first chapter, Iben Sina's most significant scientific contributions in the second chapter, his remarkable works and publications in the third chapter, Iben Sina's philosophical and religious approach and his approach in research. And the fifth and final chapter includes Iben Sina's teachers and scientists opinions on him. The study conclusion includes the most important results and followed by recourses and references.

3. IBN SINA'S BIOGRAPHY

First: Name and Origins:

He's Abu Ali al-Husayn Ibn Abd Allan Ibn Sina⁽¹⁾, also known as (AL ShaikhALRais)⁽²⁾. He lived in the late fourth century and the beginning of the fifth century AH. IbenSina was born in Uzbekistan, in Kharmeeesh a village in Bukhara in August 908. And he was educated in his first years by his father who's one of Ismaili sect⁽³⁾ sheikhs. Ismaili sect is a community of Muslims whom their thoughts are based on pattern of Neo-Platonism. Said Yahya bin Ahmed Al-Kashi⁽⁴⁾ words of Ibn Sina himself said, "It was my father who answered the Egyptians need, he's from Ismailia and has heard them mention the soul and the mind the way they only know, as well as my brother. I hear and realize what they are saying but I'm not accepting it and began to call me for it".⁽⁵⁾

Although Ibn Sina has never followed his father's beliefs, he has been benefited from the fact that many literati were gathering in the House when his father to talk and debate. At the age of ten years, Ibn Sina could memorize the Qur'an and lots of Arabic poems and other literary works as well.⁽⁶⁾

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- (1) Alerbali, Wafyat Ala'ayan wa Anba Abnaa Alzaman (2/157)
 - (2) Ibn isbai'a, Oyon alanbaa in Tabaqat Alatbaa (437)
 - (3) ALthahaby, Sair A'alam Alnobala(17/531)
 - (4) Alkashi: Yahya ibn Ahmed Alkashi, died after 745 AH. He has many books in mathematics and literature.
 - (5) Althahaby, Sair A'alam Alnobala(17/531)
 - (6) Althahaby, Altafseer aw Almfasroon(2/313)

Ibn Sina remained in his hometown Bukhara until his twenty, then went to Khwarazm where he stayed about 10 years (392-402 AH), then went to Gorgan, then to Ray and then to Hamedan, where he remained for nine years and then started to serve the State in Isfahan and so he spent most of his life travelling until his death in 428 AH.⁽¹⁾

Second: Scientific life

Ibn Sina was a scientist, philosopher, doctor and a poet and was titled AL Shaikh ALRais⁽²⁾ and third master teacher after Aristotle and Al-Farabi⁽³⁾ as known as the Prince of Doctors and the Aristotle of Muslims.⁽⁴⁾ He deepened with his studies to study linguistics, logic, philosophy, doctrine and medicine and he was well known as a doctor before the age of 17 and then started to tour his land and classify books,⁽⁵⁾ and became famous specialist in medicine, astronomy, mathematics and philosophy by the age of 20⁽⁶⁾

Ibn Sina tells about himself saying, " I memorized the Quran and read literature and mastered logic and philosophy then wanted to study medicine, I did within the least possible period of time because it is not the hard science. And this experience was beyond description beneficial. And when I mastered logic and metaphysics I stated again to explore the science of God. One day, Sultan of Bukhara, Noah bin Mansour Alsmadi got sick and his doctors couldn't cure him so he called and brought me, and treated him then I asked him to authorize me to enter his library and read some books, his library was massively great, I read many beneficial books about wisdom.. I was eighteen years old"⁽⁷⁾

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- (1) Ibn isbai'a, Oyon alanbaa in Tabaqat Alatbaa(437)
 - (2) Ibn Sina, Nokat fe ahwal Alshakh ALRais Ibn Sina(10)
 - (3) Alrajhi, Lessons in Doctrine (6/13)
 - (4) Alwafyat wa Alahdath (99)
 - (5) The brief encyclopedia in thr Islamic history (comprehensive electronic library)
 - (6) Nwayhed, Glossary of Almfasreen(155)
 - (7) Ibn Sina, Nokat fe ahwal Alshakh ALRais Ibn Sina(10), alSa'ay aldor AlThameen fr Asmaa Almsanfeen

This access to Alsamandi⁽¹⁾ library after Ibn Sina's treatment of the Sultan Alsamandi⁽²⁾ had a great impact on his intellectual evaluation. Thus, Ibn Sina's journey was full of the great scientific achievements which helped in science evolution in his time and even today.

Third: Political Life

When Ibn Sina turned twenty years old his father died, he moved to Gorgan and then to Hamedan⁽³⁾, achieved great fame and became a Minister Shamseddin El bouihi⁽⁴⁾ but it didn't take long, Shamseddin died 1022. Ibn Sina finds himself in the middle of an uncomfortable surroundings and the death of the person who had his back in his worst⁽⁵⁾ made it worse so he managed to escape to Isfahan, 250 miles south of Tehran, accompanied by few agents, and he settled for 14 years in reassurances.

4. IBN SINA'S SCIENTIFIC CONTRIBUTIONS

Ibn Sina was a scientist, philosopher, doctor and a poet and was title AL Shaikh AL Rais and third master teacher after Aristotle and Al-Farabi as known as the Prince of Doctors and the Aristotle of Muslims. And he was ahead of his time in many intellectual fields. He wasn't a scientist who specialized in one science only but he was rather famous and creative in many.

First: Ibn Sina's contributions in Astronomy

Ibn Sina had many contributions to many science and Arts. In the field of astronomy, he could monitor Planet Venus pass through the disk of the sun circle visually in 423AH-1032, which was approved later by the English astronomer, "Jeremiah Rocks" in the seventeenth century and he did astronomical studies when he was in Isfahan and then in Hamdan. These studies resulted in a number of inferences that proved correct after centuries, for example, could monitor the planet Venus as a spot on the surface of the sun and concluded rightly that Planet Venus must be closer to Earth than the sun, also invented a device to monitor the coordinates of the stars.

Ibn Sina has also worked in monitoring and deepened in Astronomy and invented machines for malfunction which has never invented before.

Second: Ibn Sina's contributions in Biology.

Ibn Sina had many outstanding contributions in biology. It has a big value in geology, especially in metal and composition of rocks and mountains. He saw that it consisted of a viscous mud along the years, and then concreted. It seemed that the land was covered with water and seas bygone years. And is frequently found in the stones if broken parts of shells by aquatic animals.

He also mentioned earthquakes in his writings and interpreted that it happens because of movement occurs for a part of the land because of what's underneath it, and inevitably it moves under the ground and then makes what above it moves in turn. He further explained that the body which can move under the ground is either a strong smoky steam body or body of water, air or fire.

And talking about clouds and its formation process, he said that they occur because of wet vapors if heat has surfaced for the cold layer of air; because basically the essence of the clouds is condensing steam cruised towards air. Steam is the essence of clouds, rain, snow, ice, and frost also on it appears the rainbow.

Third: Ibn Sina's contributions in Phytology:

Ibn Sina had a special interest in phytology and had serious scientific studies in the field of medicinal plants. He made sober scientific comparisons among plant roots, leaves and flowers and described them scientifically and carefully. And he also studied soil types and elements affecting the growth of plants. He talked about the phenomenon of Contribution to trees and palms, so that a tree may carry heavy load in a year and a light load in another year or carry or not carry another year.

And he referred to different food and the smell of the plants. And he was ahead of all the scholars of the West who spoke of the importance of diagnosis by sappiness.

Fourth: Ibn Sina's contributions in Pharmacology:

Ibn Sina had a very good knowledge and effectiveness of medicines. He classified medicines in six sets of single and compound medicines were cited in his own classifications especially in the great book *Canon in Medicine* which has a great value among scholars of medicine and Pharmacy. The number of medicines that were described in his book is about 760 drugs were ordered alphabetically.

It's really amazing that he was also practicing what is known as the experimental medicine and applies it to his patients. He was trying out any new medicine recognizes the animal first and then give it to humans after proving its competence.

He also talked about environmental pollution and its impact on the health of humans. He said, "As long as the air is clean and not polluted with mixtures of other substances contrary with breath mood, the health is found". He also mentioned the environmental pollutants impact to cause respiratory allergic diseases.

Fifth: Ibn Sina's contributions in Medicine:

Despite the broad fame achieved by Ibn Sina as a doctor and the scientific status he reached to be well-deserved called the prince of doctors, he had never sought to gain money or fame he was treating his patients for free and often giving them the drug which are prepared by him.

Ibn Sina was able to offer many great services to the humanity including that he was the first to detect numerous diseases continue to spread until now. He is the first to detect the parasite "Ancylostoma" and called it the round worm anteceding the Italian Dwbyny at approximately 900 years. And he's the first to describe the meningitis and the first who distinguished between paralysis causes of being either internal cause in the brain or external cause. And described the stroke caused by polycythemia, contrary to what the legends of ancient Greek medicine have said.

He was also the first who detected on some ways of infection of infectious diseases such as Smallpox and Measles. And he mentioned that the infection happens by some microorganisms in water and air. He said that the water contains very tiny animals which can't be visually seen with the naked eye which cause some diseases, and that what was confirmed by the scholars in the eighteenth century after the invention of the microscope.

Ibn Sina was ahead of his own time in many of his delicate medical notes. He studied the neurological disorders, mental and psychological factors such as fear, sadness, stress, joy, etc. And referred that they have a big impact on the organs of the body and their functions. He was also able to learn some psychological and pathological finding by psychoanalysis and was sometimes using some psychological methods to treat his patients.

Ibn Sina was also a brilliant surgeon, he had very precise surgical operations such as eradication of tumors in its first stages, tracheotomy, eradication of the abscess from the crystal membrane in the lung. And he talked about kidney stones and explained the ways of its eradication. He also mentioned the cases that we should and shouldn't use catheter. And he had a great role in the field of venereal diseases. He clearly described some of the women's diseases such as vaginal atresia and fibroids and he referred to the males for being responsible of deciding the fetus' sex which was proved by modern science recently.

Ibn Sina had also the great role of mathematics, he wrote many books in this field, and several other areas.

5. IBN SINA'S MOST REMARKABLE WORKS AND PUBLICATIONS.

First: Ibn Sina's most important works.

Ibn Sina was considered as an intellectual and philosophical extinction of Al-Farabi's thoughts. He took after him his two philosophies of metaphysics and existence of God and could later improve the theory of the soul which was famous by. Regarding this, Ibn Sina faced great religious opposition from religious scholars because of some principles which were issued by Ibn Sina as they claimed. Ibn Sina wrote the book "Al-Isharatwa Al-Tanbihat"⁽¹⁾ (Pointers and Reminders). This book is woven around Philosophy and followed Aristotle approach. He also wrote the book *The Canon of Medicine* which is one of his greatest publications in his whole life. This book was and still considered as one of the main resources to teach medicine in many universities.

Ibn Sina was also ahead of his time in many intellectual areas. His concentration on science never disregard him from contribution in public life of his time as well. He coexisted with his society problems, contributed with its intellectual thoughts, and helped in its civilizational and scientific renaissance.

And that also influenced his intellectuality, theories and point of views. And was reflected on his ideas and publications as well. IbnSina wasn't literally following or adhered to the results and theories reached by his predecessors, but herather used to analyze and criticize them and compare them to his own intellectuality. He was taking with met his thoughts and try to add and improve them by using his own researches resultsand expertise. IbnSina said, "Philosophers make mistakes same as any other human being. They are fallible"

Thus, he fought against astrology and some prevailingattitudesand thoughts around chemistry in his time. And he disagreed with his contemporaries who said that it's possible to turn base metals into gold and silver. IbnSina denied the possibility of this conversion of metals essence but explained that it's only a superficial change in metal's shape. And referred to each metal's special combination which can never been changed as a reason why. And this was all later approved by science.

Second: Ibn Sina's publications:

IbnSina wrote about 450 publications, only 240 of them were reachable today. 150 in Philosophy and 40 in Medicine which are the fields he had most of his contributions in. He also wrote in Psychology, Geology, Mathematics, Astronomy and Logic.

Ibn Sina wrote all his publications in Arabic language except only two books were written in Persian, his mother tongue, which are Encyclopedia of the Philosophical Sciences and the other one was a study about pulse.

Ibn Sina's book, Canon of Medicine was widely acclaimed in Europe. It was taught around the world for a very good period of time. And it was translated into Latin and printed about 15 times in Europe in 878-906 AH 1473-1500. And was printed twenty times in sixteenth century too.

This book was also considered as a main resource and reference to teach medicine in Europe throughout the fifteenth and sixteenth centuries. There were 40 copies of it only in Europe. And they kept teaching it in universities in Italy, France and Belgium until the mid-seventeenth century.

And another important book of Ibn Sina's is "Alshifa" which is a massive encyclopedia in logic, metaphysics and Goddess. Parts of this book were translated into Latin in middle ages. They also translated and studied his book "Alnaja" which is a whole summary of his book "Alshifa". His book "Al-Isharatwa Al-Tanbihat" was also translated into French in 1892.

Following are Ibn Sina's most famous publications which I will talk about some of them and their rule in scientific development.

Ibn Sina's publications in Medicine:

1. Book of Cardiac medications
2. Daf'aAlmadarAlkoliaA'nAlabdanAlensania
3. Alqawlanj
4. Thesis on the body and driks virtues
5. Thesis on Anatomy
6. Thesis on Phlebotomy
7. Thesis on food and medicine.

Ibn Sina's publications in metaphysics:

1. Thesis on invalidation the provisions of stars.
2. Thesis on celestial bodies and the causes of light and thunder
3. Thesis on Space.
4. Thesis on animals and planets

Ibn Sina's publications in Mathematics:

1. Dissertation on Angles
2. Euclid Abstract
3. Alirtmatiqi Abstract
4. Astronomy Abstract
5. Almagest Abstract
6. Thesis on explaining the flaw of the existence of the earth amidst the sky.

Ibn Sina's approach in philosophy:

Ibn Sina's Intellectual life was fertile and his educational philosophy revolved around the development of the individual from the aspect that he's a human whom his goal is child raising and care and dealing with the moral and behavioral formation and the psychological upbringing of the child using the best pedagogical methods. Ibn Sina emphasized the need to take account of children's psychological, so they do not feel very angry, very scared, grief or insomnia. And Ibn Sina explained this being beneficial for two reasons: firstly, for his soul to be raised up on morals since childhood which helps him in his life ahead second is for his body, because bad morals and bad moods are linked together, so by keeping your morals and ethics you're keeping all of soul and body healthy."

Ibn Sinahad pointed the three sections of the linkage between education and philosophy

1. The science of morality: looking at the person's acts and behaviors.
2. Housekeeping: looking at the relations between family members and family life status.
3. Political Science: looking at people's relationships with each other in one city and urban relationships to one another and their relations with other countries.

Ibn Sina had many classifications in philosophy of education, including:

Prophecy, education, special education, knowledge of self, nodal, penalty value. Happiness, the range, in the man and his political

Ibn Sina's had addressed in his contributions various philosophical and educational topics that contributed to the formation of human behaviors that indicates the degree of attention to studies on humans, monitor the physical and scientific potential to help in human evolution.

6. IBN SINA'S APPROACH

First: Ibn Sina's approach in understanding the Islamic religion

Ibn Sina as a Muslim believes in Quran and a philosopher who loves philosophy, keen on the safety of its views, was careful to reconcile religion and philosophy, to be religiously and philosophically satisfied. The Quran which is the first pillar of Islam's pillars. Ibn Sina reconciled between the texts of the Quran and philosophical theories which are opposite to them, the process which I consider such an evil to religion and an attempt of invalidation of the Quran fixed and explicit facts.

Ibn Sina looked at both Quran and philosophy so he got to explain the theories of one in the light of the other. He explained the Quran texts philosophically. And this method he used to use in his explanation is often to explain the religious thoughts by the philosophical opinions.

Because it was believed that the Quran is only the symbols that the Prophet, peace be upon him, used to refer to facts that people were unable to comprehend so he symbolized it to them in a way they could comprehend. And Ibn Sina says, "It's stipulated for the prophet's speech to be symbolized and contains insinuations. And he took Plato's lines in Alnawomies book," who didn't pay attention to the meanings of the prophets symbols, he didn't nail the Kingdom of God, and the Prophet Muhammad peace be upon him wouldn't stop anyone from science especially that he was sent for all human beings"

Ibn Sina who memorized the Quran at the age of ten as he was responding to those who accuse him of atheism and heresy by saying, "My faith in God is unwavering. If I were an infidel so there is no any other real Muslim on earth."

Second: Ibn Sina approach in scientific research:

what Ibn Sina has sought is clear and specific purposes at the scientific method that he followed in the ways, methods, means, choices and practices. (whatever that would play role in the service of the established goals and objectives.)

As the fourth the Moslem calendar century scientists cared to develop experimental method in the study of natural phenomena fit with this natural phenomena characteristic of constantly change and evolution, Ibn Sina cared about experiments and exercised it in his scientific reality. Ibn Sina practiced what is known as the experimental medicine and applies it to his patients. He was trying out any new medicine recognizes the animal first and then give it to humans after proving its competence.

Comparisons and experiments were not the only methods for Ibn Sina to approve the hypothesis, but he also used the method of reverse proof. And in this way we find that the researcher is not satisfied that he is certain that a particular circumstance is the illness close to the phenomenon unless it has demonstrated that this circumstance is always preceded

by the phenomenon or accompanied. But it must also prove that if you have not achieved this circumstance or invalidated or did not appear there was no phenomenon in question.

Ibn Sina did not only abide by the scientific hypothesis' conditions accuracy, but he had also added instructions that the researcher should be taken into consideration while he's is in the stage of hypotheses , namely:

That the researcher must make a classification for all the evidence classified consistently with the type of material or the subject of research so that they can then analyze and criticized. And decide Ibn Sina that the critical researcher who improves the classification of his observations so moving them to the correct destination in the research and distinguish between what is intrinsic significant and what is incidental is not taken into account. Ibn Sina had also combined them between induction and deduction for the collection of scientific knowledge, and he realized the relationship between theory and practice of science, and believed that specialization does not mean the separation of these sciences from each other which is connected with each other, it helps the researcher to be undated and aware of all things.

7. IBEN SINA'S TEACHERS AND SCIENTISTS OPINIONS ON HIM.

First: Ibn Sina's teachers

Ibn Sina was taught by senior scientists and philosophers of his time, which led to his scientific brilliancy, some of those were:

1. Abu Bakr al khwarizmi: Muhammad bin al Abbas Abu Bakr al khwarizmi, poet and writer, was the only one of his time in memorizing the language and poetry, combining the useful and wonderful eloquence and rhetoric, and lecturing the Arab life and their divans. And he's also teaching linguistics, grammar and poetry. Ibn Sina was taught linguistics by him.
2. Ismail Alzahid: Abu Assaad al Samman Al Hafez Ismail bin Ali bin alhussianalhafez Alzahid. He was an Imam of recitations, narrations, and Islamic jurisprudence of the Zaidi. He died in 544 AH. Ibn Sina was taught jurisprudence by him.
3. Abu Abdullah Alnatly: was a wise with beautiful ethics and morals. He was a scientist in logic and philosophy and he was also interested in learning mathematics and cones. Ibn Sina was taught philosophy and logic by him.

Ibn Sina was also taught by Philosopher Abu Nasr al Farabi and and the Greek philosopher Aristotle as well.

Second: Ibn Sina in the eyes of the west

Ibn Sina has received scientists and researchers' recognition and respect throughout the ages.

1. Georges Sarton said about him, "Ibn Sina is a great intellectual phenomenon that we may not find anyone who's equal to his worth, intelligence or production activity" and he further added describing that " Ibn Sina's thought represents the ideal of medieval philosophy
2. De Boer said that Ibn Sina's influence on Christian philosophy in middle ages was great and he considered him as great as Aristotle.
3. Aubervil said that Ibn Sina known in the middle ages and the frequency of his name was on everyone's lips and he was worth the value invalidates filled his age, and he was considered as one of the greathumanity senior scholars at all.
4. Dub holmiard described him saying that Europe's scientists described Ibn Sina as being the Aristotle of Arabs. And certainly he was one of the best scholars ever in medicine and geology.

Third: Ibn Sina in the eyes of Muslim scholars

Muslim scholars showed much respect and appreciation to Ibn Sina's effort and role in science evolution at his time and his great intelligence and abilities as well. Despite their great belief in Ibn Sina and is scientific and humanitarian contributions, they could not but respond to his philosophical ideas which affect their religion and Islamic beliefs.

Ibn Taymiyyah said, "Ibn Sina spoke of things related to theology, prophecies and Shari'a which his predecessor didn't speak of them. He had learnt from some atheists who are associated to Muslims such as Isma'ilism. His family was following this group of belief whom are following Alhakem AlObeidi whom were known as atheists.

Abu Hamid al Ghazali and Ibn Qayyim Al-Jawziyya had the same point of view because Ibn Sina had talked of many corrupt doctrines such as the ancient world, God's ignorance of particulars and his denial of resurrection. It was said that when Ibn Sina got sick and became unable he said that treatment won't help him so he washed himself, repented, applied injustices, and kept on reading the Quran. Said his student Abu Obaid Aljuzjani, when Ibn Sina got sick he went to Isbahan, he became weak and tended to wash up, apply injustices and read the Quran"

Then Ibn Sina died because of severe disease in Bahmdanin 428 AH.

8. CONCLUSION

The study found out many important facts:

1. The environment in which Ibn Sina was raised up was an environment with philosophical approach.
2. Ibn Sina was observed to be genius from a very young age and became a physician scientist at his teenage.
3. Ibn Sina shortened his life on one specialization, but he learnt and worked in many fields.
4. Ibn Sina could reconcile between philosophy and religion, explained his understanding of religion from a philosophical perspective.
5. Ibn Sina has many great contributions to science and that its impact has continued to this day.
6. Ibn Sina is one of the scientists who had a great role in the West progress.
7. Western scholars admit Ibn Sina's efforts in putting science basis.
8. Ibn Sina had interpreted many doctrines from a philosophical perspective which led to the rejection of Muslim scholars and considering him an infidel.

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