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On Decolonising Artificial Intelligence

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Abstract

Logic and probability as branches of Mathematics and aspects of Philosophy, underlie and play significant roles in the development of Artificial Intelligence (AI). In its simplest form, logic concerns right reasoning (especially one devoid of fallacies), patent truth and inferences. Probability has to do with uncertainties, that is, the likelihood of an event happening. The divide between traditional AI and modern AI regarding what roles logic and probability play in the development of AI has been mitigated with the notion that both are complementary without displacing the other. While the birth of AI as a field is usually linked to the 1956 conference with figures involving Marvin Minsky and John McCarthy, there are traces of what we refer to as robots, automatons and computations which form the foundation of AI in some non-Western philosophies. To this end, this paper chronicles the emergence of AI in non-Western philosophies, especially in African philosophy and then uses the Yoruba's 'ifá'[1] to exemplify the idea of decolonising Al, not forgetting that the basis of ifá itself is logic and, sometimes, probability.

Keywords: Artificial Intelligence, AI history, Ifá, Logic, Probability

Introduction

The main aim of this paper is to demonstrate that artificial intelligence (AI) and certain aspects of it, such as the use of robots and reliance on logic and probability, are rooted in antiquity and some non-Western philosophies. It, thus, chronicles these ideas among the Greeks and various other cultures, especially Africans. However, it mainly discusses ifá's connection with computer science and the application of logic and probability as tools to justify the earlier existence of AI in an African (Yoruba)tradition. The mathematical binary system coupled with the Aristotelian traditional logic is undoubtedly, and to a great length, constitutes the fundamental principle that underlies conventional computer science. Going through the whole gamut of Ifa itself, it will be seen as dominated right from the beginning to the end, by the binary code system aided with juggling and permutation. This is the idea hitherto referred as probability in this context.

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Early History of Artificial Intelligence

Artificial intelligence (AI) as a science was birthed at the Dartmouth conference in 1956 with the proposal and assertion that "every aspect of learning or any other feature of intelligence can be precisely described that a machine can be made to simulate (McCarthy et al., 1955). This conference was organised by two senior scientists – Marvin Minsky and John McCarthy; the latter coined the term 'artificial intelligence' as "the science and engineering of making intelligent machines" (McCarthy).

The history of AI, however, goes back to ancient times when philosophers tinkered with the possibility of artificial beings- mechanical humans with the existence of automatons one way or the other. The years between 300 and the late 1600s witnessed different scholars: Mathematicians, Theologians, Philosophers, and others considering various ideas relating to mechanics, calculations and numeral systems that finally led to the notion of mechanised "human" in a non-human being. At the beginning of the 1700s, representations of omniscient machines like computers existed in prevalent literature. In *Gulliver's Travel,* Jonathan Swift referred to an engine, one of the initial mentions of modern-day technology, particularly computers. The gadget aimed to improve knowledge and mechanical operations so that practically everyone, even the least clever person, would appear creative and skilled, thanks to the help and understanding of the non-human mind- artificial intelligence imitating human intelligence (Reynoso, 2024).

The dawn of 1900 witnessed a rapid increase in the development of AI. A science fiction play, "Rossum's Universal Robots", was launched by Karel Čapek, a Czech playwright. The play inquired into the notion of people who are products of manufacturing, which Čapek named robots, which was the first documented reference to the robot as a word. After this, the term robot became widely employed in research, art, and other innovative works. For instance, in 1927, *Metropolis,* another sci-fi film by Fritz Lang, had a female robot that was not recognisable from its human counterpart (Guizzo, 2010). The robotic female later turned violent, destroying a city. The significance of this film is that it was the first of its kind displayed on the screen. It, therefore, influenced similar popular non-human characters like C-P30, featured in 'Star Wars'.

Beyond this, Makoto Nishimura, a Japanese Biologist, invented Gakutensoku (which means "learning from the laws of nature), the first of its kind in Japan. The name points to the idea that the mind of the AI could harvest knowledge from both people and the environment, which, in contemporary times, we refer to as 'machine learning'. Gakutensoku could move its head and hands and also make facial expressions. In 1939, the Physicist and inventor John Vincent Atanasoff and his student, Clifford Berry, developed the Atanasoff-Berry Computer (ABC) at Iowa State University. The ABC, which weighed over 700 pounds, solved about 29 simultaneous linear equations. Nonetheless, in 1949, Edmund Berkeley documented that machines continue to manage vast amounts of information speedily and skillfully in his text, Giant Brains: Or Machines That Think. He compared machines and the human brain as if the

former were composed of hardware and wire rather than flesh and nerves, concluding by ascribing the thinking faculty to a machine. The years from the 1950s brought about a systematisation of the field currently called AI (Reynoso, 2024).

Before what could be referred to as the systematisation of AI, as we know it today, beginning from the 1956 Dartmouth conference, long before this, there were traces of what we now call AI in many non-western philosophies. For instance, Ancient Egyptians were said to have invented the first robots more than 4000 years ago. Over 4000 years ago, statues that simulate the tasks that humans carried out were created by ancient Egyptians using mechanical operating systems, the premier robots in the world and what are called "automatons."

Fig. 1 – Named 'Hathor' Based on the belief that it was made about 3,000 years ago to simulate the icon of motherhood, music and singing in ancient Egypt.

It is a wooden statue found in the Metropolitan Museum of Art. Experts in Egyptology found a mechanical operating system inside the statue that intersects the shoulder of the female statue, as shown in the picture. The shoulder moves around through a web of threads that pass through the left leg, which is concealed inside the statue. At each movement occurs the lifting and bringing down of hands.

Around the 8th century BC in the West, the ancient Greeks had Hephaestus, the god of fire, metallurgy, and blacksmith who invented living metal automatons. He carved out protective fighting instruments such as helmets and shields for Achilles. Hephaestus is regarded as the only god in Greco-Roman mythology who was a trader, engaged in laborious work and broke out in a sweat while he worked (Mayor, 2018). The protective metallic shields that he made "was one of the earliest artificial human enhancements…but what is most striking about the bronze armour of classical antiquity is its form. The main piece of armour, the cuirass or chest plate, was moulded to look like an idealised male physique cast in bronze" (Mayor, 2018).

Fig. 2 – Hephaestus, craftsman of Olympus, Smyth of gods known under other titles such as the god of blacksmithing, metalworking, and fire.

In the East, Indian legends narrate stories about robotic warriors responsible for securing Buddha's valuable artefacts. The legend of Ajatasatru[2] also had it that he had remarkable guards who were robots called "Bhuta vahana yanta" or "spirit movement machines (Mayor, 2019)."

Fig. 3 - Buddha's robotic warriors

In ancient China, there were reports of advanced robots who could sing, dance, run errands like servants, and carry out many other tasks. Sutherland (2015) notes that many of these extraordinary robots have human-like organs and features such as hair, moustache, bones, skin, joints, etc.

Fig 4: Robots in Ancient China

Beyond these, the invention of robots became popular in the Western world as technologists of the ancient Greeks were highly skilled in mechanics and metalwork. Their skill is exemplified in the 5th century BC Olympic Games, which had bronze robots. Thus, beginning from the 5th to 1st century BC, there was more production and the presence of robots. In approximately 850AD, the Byzantine Empire and the Arab nations were influenced by the Western world to produce their robots. According to the Royal Society, this reduced production in the West during the Middle Ages. It was reported that as soon as the Western world realised that the East had started the production of robots, there was a sharp drop in production in the West. Consequently, robots became associated with strangeness, suspicion, and negative curiosity after their realisation (Adams, 2019).

Available texts show that ancient Greeks had paintings of Nubian Africans in Greece circa 14th century BC. This points to the fact that, first, Africans were present in Greece approximately 500 years before the initial written account of artificial intelligence. Two, cross-fertilisation of ideas and beliefs must have existed between the African and Greek folklore, based on the similarities between their deities and the ifá tradition, which is the central religious belief system of the Yoruba and relies on binary code. Interestingly, the binary code is equally at the base of conventional computer science, which we will see more about shortly. Given that there is a traceable link between the earliest thought of AI and Africa, we might be able to safely state that there were practices and ideas on the African continent which inspired the field we now know as AI (Adams, 2019).

The body of knowledge and traditions of Africans, especially the Yorubas, equally foreshadow some aspects of AI as we know it in this age. Like the Greek Hephaestus, Ogun,

the god of iron, technology and creative intelligence, is a god the Yorubas have worshipped for about 12,000 years. Known for his skills in metalwork, his adherents, having shown respect to the ancestors, sometimes invoke automaton soldiers referred to as *sìgìdì* to mete punishment, both physical and spiritual harm on their enemies. *Sìgìdì* was thus used as a combatant war instrument. Furthermore, in 17th century Benin, the Obas (king) palaces had beautifications and aesthetics of bronze automatons called 'the Benin Bronzes' (Adams, 2019).

A critical question to ask at this point is whether *sìgìdì* is as physical as today's humanoid robots or whether it is spiritual. Is it an agent that always moves around physically and as modern-day AI? The rationale behind the mention of *sìgìdì* is not to assert that it has the exact working mechanism as a robot. Instead, it indicates that it was one of the early replicas of robots because both are programmed scientifically – metaphysical and empirical science. Divest both programmings done to them, and would you have mere stationary objects? A similar idea goes for mentioning Benin bronze; it does not qualify all artworks or artefacts as AI. The point being made is that in traditional societies, there are ideas that simulate or foreshadow robotic science as we have it today.

Ọ̀sanyìn is another form of *sìgìdì* but significantly different from the one described above. It is *sìgìdì*, as above, plus the ability to talk. In the traditional sense, it is an image moulded with clay that has the features of a human being but cannot talk. *Ọ̀sanyìn* is like ifá, whose ability to diagnose and recommend remedies has these qualities over and above those of some of the celebrated modern robots. It is consulted on a wide range of issues, such as marriage, disease, healing, human progress, death, etc. It can raise and answer questions. Spiritually, it moves around and runs errands for its owner. *Sìgìdì* cannot do all these but can only be sent on any mission, usually maleficent or with evil intent. Its movement is both spiritual and physical when on a mission; it transcends two distant locations spiritually but carries out its assignment physically. Only the initiates can know or explain how this is so. The idea of *sìgìdì* or *Ọ̀sanyìn* or their characters may not be peculiarly Yoruba, but this opens an avenue for further investigation. Summarising here, *sìgìdì* and *Ọ̀sanyìn* are typically traditional replicas of robots but not programmed using empirical science like the robots.

Fig. 5 - *Sìgìdì*

Fig. 6 – The Benin bronzes

More importantly, the ifá divination system, which is at the core of the belief system of the Yorubas and many other cultures in different parts of the world, has its roots in binary code. A fascinating thing about this is that the binary code also underlies conventional computer science, which births AI (Alamu et al., 2013).

Ifá and Computer Science: Any Relationship?

Once upon a time, the gods from the Yoruba people of Western Nigeria lived as humans. They had their means of passing on messages. Before they ceased to exist, they bequeathed to the people how they would communicate with the people; this way is referred to as ifá divination. ifá is Orunmila personified. Ifa, whatever form it takes - ekuro, eyo'wo, etc., is Orunmila on earth. Ifá is not the message. Rather, ifá dishes out messages. However, the concern here is how is ifá the origin of Al (Odeyemi, 2016).

Ifá, however, has a universal character, it is not restricted to the Yoruba people of Western Nigeria. It is called by different names in many parts of the world and is practised among other groups of people within Nigeria. For instance, it is referred to as Fa among the Fon of the Republic of Benin, Eva by Nupes, and ifá in Cuba, USA, Brazil, Trinidad and Tobago, Jamaica, Suriname and Haiti. Afa by the Ewe of Togo, Ephod by Jews, Geomancy by Europeans, Malagasy, and Ramal or Hati by Arabs. It is called ifá among the Edo people of Nigeria and practised among the Igbos of Eastern Nigeria, the Kamuku and Gwari of Northern Nigeria, the Igbirra in South Central Nigeria like Jukun of Eastern Nigeria, and all the tribes in the region around the Cross River. Among the Siwah people in the Sahara, Ifá is known as "Derb el'raml" or "Derb el fu." It is also widely practised in Ivory Coast, Ghana, and Sierra Leone, as well as in Liberia. The *Napoleon Book of Fate* is based entirely on ifá, likewise the Jewish Kabbala (Ogunleye, 2019). Indeed, since ifá is coexistent with *Olódùmarè*, the actual

title of ifá is ifá Olódùmarè. Others call Him *Òrìsà Àgbáyé* (Lord of the Universe), *Ọlọ́run* (Owner of Heaven), *Oòduà* (creator of Character and Destiny).

Ọdẹyẹmi (2016) differentiates between *Ọ̀rúnmìlà* and ifá. He asserts that both are different, as Ògún is the god of iron but not iron itself, like how Mohammed is not the Quran and Moses is not the Bible. *Ọ̀rúnmìlà* is thus the bearer and spokesperson of the Divine Message of Olódùmarè, the message being ifá. While *Ọ̀rúnmìlà* receives the message, he is different and detached from the message. *Ọ̀rúnmìlà*, being the deputy or assoẹiate to Olódùmarè in everything that has to do with omniscience, wisdom, and spiritual salvation, knows how humans came to be and being. *Ọ̀rúnmìlà* worked closely with Olódùmarè from the inception of the world and, therefore, knows the beginning of creation and its completion (Odeyemi, 2016). This point regarding the relationship between ifá and *Ọ̀rúnmìlà* is also implied by Makinde when he said: "as a repository of knowledge, Ifá's position is derived from *Ọ̀rúnmìlà*, the ultimate possessor of knowledge" (Makinde, 2007, p. 69).

Beyond being universal, ifá is also multifaceted. According to Wande Abimbola, the text on Ifá divination is a collection of knowledge with many arms. In his words: "This is, indeed, the way ifá divination literature is handed over from generation to generation. Priests of Ifá are not agreed on the maximum branches involved" (Abimbola, 1968, p.30). Beyond being a collection of knowledge, Makinde Taiwo argued that ifá is a stockroom of knowledge. The wisdom and knowledge which *Ọ̀rúnmìlà* brought through ifá to the world are many and varied, with numerous branches: Physics, the science of nature, animals (Biology), plants (Botany), the study of herbalism, i.e. medicinal plants, oral tradition (*Ọfọ̀*), and the sciences that deal with healing of diseases which is known as medicine (Makinde, 2007). To this list, I add Computer science and, by extension, artificial intelligence, which is an offshoot of the former since ifá is based on binary code and the different *Odù* and *ẹ̀ṣẹ́* ifá.

Computer science is similar to ifá divination; it is sometimes stated that it originated from ifá. To this end, ifá is indeed an ancient binary computer system which connects the probabilities of numbers with the complex and technical nature of the human condition. Ifá relies on an 8-bit pattern and an 8-piece divination chain, with 16 main *Odù* (chapters) the *Odù*s totalling 256 (Alamu et al., 2016). The *Odù* has *ẹ̀ṣẹ́* out of which sixteen are the main ones, and the other 240 are the mixed or minor *Odù*s. Going by the name, the mixed *Odù* is gotten through a coming together of two principal *Odù*. A particular binary sign indicates both the major and the minor Odù. All *Odù* comprise two parts represented by the first two principal *Odù*: *Èjì-Ogbè* and *Ọ̀yẹ̀kú Méjì* (Alamu et al., 2013). Bade Ajayi stressed that *Odù* is obtained through a calculated mathematical framework considering the stated course of conduct requisite from each Odù (Alamu et al., 2013).

Several studies reported a connection between computer science, the advent of AI, and the *Ifá* divination system (Omoregie: 2024; Alamu et al., 2013). For instance, Odeyemi asserts that for ease of access to the ifá, the Divine Message, *Ọ̀rúnmìlà* came up with the computer-compatible binary coding long before the advent of computers to modern humans. *Ifá* is

therefore safeguarded in the binary coded format, the output of which is Parable. "*Ifá* is coded within 256 *Odù*s or Corpus, each *Odù* representing an esoteric pigeonhole, itself divisible into 256 sub-holes. Within the 256 *Odù*s are 1,680 Sacred Verses, all presented in Parable–Format. Thus, the body of *Ifá* consists of 430,080 messages for humankind" (Odeyemi, 2016, p. 2).

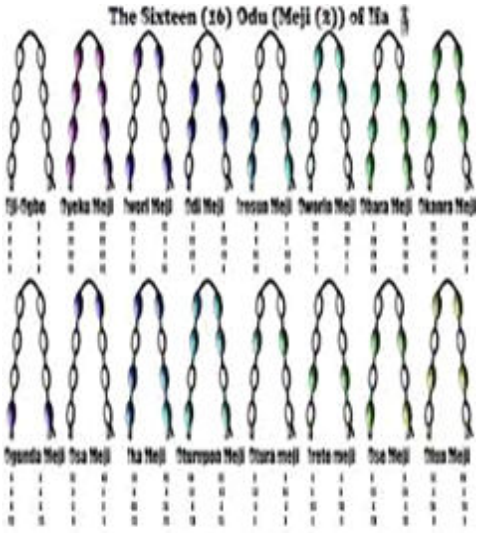

Fig. 7 – Ifá binary system

Fig. 8 – Computer Science binary code

Alamu F.O. et al. argue that the computer employs binary systems. Like the computer, Yoruba anthomancy relies on a binary system; thus, it is a computer-based science we can use in mathematical education. Many Ìbò, tools for casting lot are employed to unravel information about a presented problem during divination. The commoner's type of *Ìbò* is the cowry shells stringed together and animal bone *Ìho* (horn). At times, they may not necessarily be strung together. *Ìbò* is about yes or no as answers to a particular inquiry. This act of divination relates to science, specifically computer science, which uses prediction and scientific and reliable methods. It is important to note that the system of ifá, especially among the Yoruba, cannot be divorced from the complex numbering system of the Yoruba themselves (Sertima, 1991).

For instance, a particular method of ifá divination, as demonstrated below, shows the closest affinity to binary. Lipede and Akanbi (2024: xiv) argue that "...traditional ifá divination diagnostics can be performed either with a divining chain or a cluster of 16 palm nuts (the sacred "*ìkín*")." The palm nuts in the cluster tend to be so large that they are difficult to grasp in a single hand all at once. During divination, the left and right hands are enclosed over the *ìkín*. The diviner shakes the palm nuts in both hands and then abruptly tries to grasp all of the 16 palm nuts with his right hand. Inevitably, as the nuts are so large, one or more will fall. If

two nuts remain, he makes one mark. If one nut remains, he makes two marks. If more than two or no nuts remain, he makes no mark. He continues to make marks in this way until two columns of four marks have been completed as follows:

II	I	or	0	00
II	II		0	0
I	I		00	00
II	II		0	0

This particular combination of markings above represents the Odù called 'Ose Oturupon'. There are 16 major figures or principal *Odù*." The above pattern is not different from one of the Aristotelian basic logical operatives of conjunction where 1- true, 0 - false, and these are the basis of computer science. It can be stated thus:

1 1 = 1
1 0 = 0
0 1 = 0
0 0 = 0

Above is to state the obvious that ifá adequately demonstrates its close relationship to AI, thus substantiating the assertion of its origin from antiquity.

Fig. 9 *- Ìbò*

Ifá, Logic and Probability

Modern-day computers employ binary code, like the ifá. Yoruba divination rests on a binary system used by computer science, mathematical education, and AI algorithms. When divination is being performed, many *ìbò* [3] (tools used in casting lot) are employed to reveal facts about a client's problem. This is like today's computer language, which uses prediction. It resembles

the scientific method in that the process before the divination and the divination itself pertains to steps in the scientific method, such as observation, formulation of hypothesis, the definition of problem, experimentation, and conclusion.

Part of the divination tools is *Ọpẹ̀lẹ̀* which has two arms of 8 beads on either side of the right, known as male, and the left, referred to as female. This is like in computer science, where a byte comprises eight bits, and the nibble stands for four bits. The four beads are one-half of the *Ọpẹ̀lẹ̀* comparable to a nibble, and all eight nuts make up a byte in computer science. Similar to how a byte is organised in various patterns of zeros and ones to make up a certain binary number or digit, the same way binary numbers are gotten from the coming together of zeros and ones in computer science is similar to an *Odù* Ifá in divination.

Fig. 10 *- Ọpẹ̀lẹ̀*

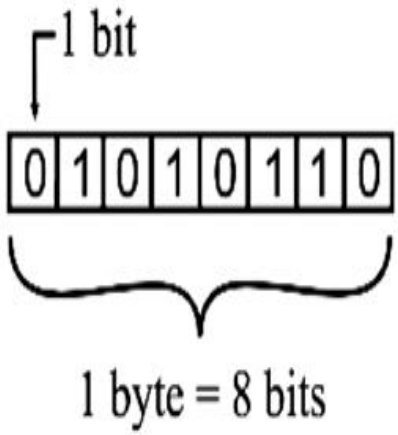

Fig. 11 – byte in Computer science

Given the connection between ifá, computer science and AI, ifá is thus an endless, boundless, infinite stockroom of knowledge. (ìmò àìmò tán). It is a deity or divine being of wisdom and the development of the intellect. It is usually involved in judging and providing solutions to problems. It is equally a connection between the people and God known as *Elédùmarè*. To this end, what we know regarding the world is quite minute compared to what we can ever know. Despite that, we endeavour to learn more by studying ifá; our knowledge of things around us and those that transcend us will always be incomplete and imperfect. As Stanley Jevons (1958) puts it, "the measure of such an imperfect knowledge is probability." The idea of imperfect knowledge that underlies AI is particularly instructive since we are neither omniscient beings nor *Ọ̀rúnmìlà*, humans thus, cannot have perfect knowledge. We must, therefore, be content with imperfect knowledge, the nature of which has to do with a high degree of probability. Based on this, the entire gamut of ifá literary corpus can be interpreted probabilistically (Makinde, 2007).

The two most significant branches of philosophy and mathematics in AI research are logic and probability, in which AI optimisation is rooted. Since the days of Gottfried Leibniz, scholars have attempted to unite logic and probability. AI researchers, referred to as 'classical', are so-called because they make use of first-order logic; the reason they want to unify logic and probability is to be able to tackle the issue of uncertainty and expedite learning from accurate data. However, the reason of 'modern' AI scholars is based mainly on probability theory geared towards obtaining formal languages with adequate means of tackling challenging aspects and bringing on previous knowledge (Russel: 2014).

Given that logic and probability underlie AI's epistemology, it is essential to note that analytical epistemology and AI are complementary fields of study for epistemic relations. While AI uses formal and computational elements, traditional epistemology uses aspects of epistemic realism concerning conceptual properties. Therefore, the two fields should go paras passau (Wheeler and Pereira: 2004). Further, logic and probability theory are two fundamental instruments employed in the formal study of reasoning, which are crucial for generating, reasoning, and making decisions in computer science, mathematics, cognitive science, artificial intelligence, etc (Lorenz et al., 2019). Despite AI's short history, it has been greatly motivated by logical ideas, even as it has relied on several research methodologies. While some scholars query the essence of logical formalism, there is a relatively unanimous agreement among other scholars regarding the importance of logic in certain fundamental aspects of AI research. At the same time, some authoritative minority affirms logic as the most significant element that enables strategic and fundamental advances.

Probabilistic reasoning pertains to how knowledge is represented, whereas probability is employed to show the degree of uncertainty in knowledge. In the field of AI, probability models are used to evaluate data with the help of statistical codes. This was one of the earliest machine-learning methods and is still extensively used (Lorenz et al., 2019). Uncertainty is a commonality between the quest for knowledge in ifá and the use of logic and probability. There is no need to mention how the pursuit of certainty in knowledge, as couched in terms of justification of knowledge claims, has defined and devilled the history of epistemology from the ancient to the contemporary era.

Conclusion

In conclusion, artificial intelligence has long roots in antiquity and non-western philosophies. The paper has shown the prevalence of automatons in various traditions long before the term robot and its current usage ever surfaced. It also demonstrates the unity of ifá and Computer Science and, by implication, AI. This is seen first in the universality of ifá, the similarity between its binary system and the binary code of computer science; the byte and the *Ọ̀pẹ̀lẹ̀*; the prediction in science and the act of divination with the use of *ìbò*; and finally, the quest for certainty in knowledge and the challenge of probability and imperfection in knowledge. Finally, the idea of decolonising stems from the fact the AI contents were already in the Yoruba's ifá

only without the scientific framework within which AI can be recognised, known and discussed as AI. A framework without contents does not convey any meaningful information; it is nothing until it is filled with contents.

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Footnotes

1. The word ifá is deliberately not italicised. This is because of its significance in the corpus of knowledge, its universal nature, and the author's attempt to decolonise it from Western hegemony.
2. He was a king between 492-460 BC.
3. *Ìbò* is a cowry shell stringed to one another indicating types and some animal bones that stand for *ìho* (horn).