

THE DYNAMICS OF THE STRUGGLES AND EXPLOITS OF ALBERT EINSTEIN, A GREAT SCIENCE PHENOMENON OF THE 20TH CENTURY AND CHALLENGES TO THE UPCOMING SCIENTISTS

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ABSTRACT

Albert Einstein was a scientist with the extraordinary ability for scientific inventions. He is considered an exceptional person, a science prodigy. Consequently, this paper discussed the dynamics of the struggles and exploits of Albert Einstein, a great science phenomenon of the 20th century and challenges to the upcoming scientists. He emerged as one of the most prominent scientists of his time. Although his success was unprecedented, it was doubtful at his early age because he could neither read nor speak fluently. He faced rejection and setbacks. He went through thick and thin before becoming a recipient of the Nobel Prize Awardee in science. His discoveries caused a revolution in the way scientists observed space. Through his latent prowess and insightful ability, Albert Einstein gave science some of the most powerful theories and equations that laid the foundation of modern science. The paper examined the life and time, challenges and breakthrough, innovations and legacy of Albert Einstein. His strength and weakness, failure and success are needed to trigger a spirit of science and develop a mechanism for accelerated scientific revolution in the upcoming scientists. Knowing that the scientific sagacity of Einstein is worth emulation by young scientists and is needed for the exploitation of nature and utilisation of science processes, the researcher recommended that government should provide an enabling platform for research while the upcoming scientists employ the good qualities of Einstein for a successful progression in their career.

Keywords: Struggle, Exploit, Einstein, Phenomenon, Challenge, Scientist

INTRODUCTION

Albert Einstein has been described as one of the most influential scientists of the 20th century. Scientists acknowledged that he was one of the greatest physicists of the century. Of all the scientists of his time, he was considered the culminating figure of the 20th scientific revolution. He received numerous awards as a profound scientist. His research work changed the way physicists perceived light, time space and gravity. In addition, he was a civil rights advocate and vehemently spoke against racism. Although he rose to the peak of his career as a Professor of Physics, he could be described as a partially dumb and retarded boy that turned into a Professor and prominent scientist. He lacked the human power of speech in his early life. He could not speak until he became three years old. In addition, he could not speak fluently or learn properly until age seven in elementary school. During that period, he struggled with learning to speak, and with learning to write in English. Most of the people around him, including his parents and teachers, never knew that one day the person whom they considered intellectually underdeveloped and a failure will become a great achiever, prominent mathematician, and profound physicist and re-write the future of humanity through his ground-breaking scientific ideas. Despite the initial challenges, he became a great science phenomenon in global history and turned out to be an influential scientist of the 20th century.

Science is a systematic way of observing the world and doing experiments to understand its structure and behaviour. A scientist is someone who systematically gathers and uses research findings for the growth of science. He is a person who conducts scientific research to advance knowledge for the all-round development of humanity. A scientist is someone who displays certain novel qualities that make them excel in their scientific investigation. Scientific attitude is a composite of several mental habits or tendencies to react consistently in certain ways to a novel or problematic situation. Some of these characteristics include observation, intellectual honesty, curiosity, logic, humility, creativity, persistence, scepticism, objectivity, critical thinking and peer review. Albert Einstein displayed many good qualities but also exhibited certain weaknesses. The upcoming should attempt to understand the attitude and character that defines a good scientist.

Africa has a growing population and economy but research works are not growing and publicised as expected. What is the concern of many upcoming scientists today? African youth that is gifted like Einstein will be the cornerstone of our indigenous research. The young scientists are indeed industrious, energetic, resilient and intelligent. Many of them have the desire to know what led to the present world and how it will be in the future. For some, lack of dependable research funding, the inadequacy of mentorship, lack of interest in research, barriers to a scientific breakthrough, lack of motivation, lack of enabling environment and unfriendly government policies in career development have turned them into businessmen, politicians, entertainers, fraudsters etc. Instead of using the knowledge of science for technological advancement, they expend their time and energy to pursue something else. The ones that religiously pursue scientific research do not have the temerity to remain or go about as scientists because of improper reportage of findings, social ills and insecurity of lives and properties. This is injurious to the growth of science in Nigeria and Africa. To reverse this delimitating scenario, all hands must be on deck to promote career-promoting factors in science.

The development of research findings results in changes in scientific ideas and inventions. The upcoming scientists are critical for our continent's scientific discoveries, technological drive and other technological developments. Indeed they exhibit a strong curiosity about the reality of global phenomena. They cultivate opportunities for scientific discoveries that are

equally needed for future generations. Today, young scientists are much needed for scientific innovations, technological advancement, productivity growth and economic development of our continent. Their roles are essential in the utilisation of scientific approaches for the benefit of humanity. Their impact is crucial for technological vision and the industrial revolution. For any nation to thrive technologically and economically, investment in research is essential. Presently, many challenges abound in carrying out research and discharging their duties. This paper, therefore, examined the struggle, strength, weakness, failure and success of Albert Einstein in his scientific exploits and thereby helps in strengthening scientific culture and serving as an impetus for raising more dedicated scientists. If Einstein could reach the pinnacle of his career through hard work and critical thinking, young scientists can imitate his doggedness to achieve the peak of their scientific works. What Albert Einstein stood for and what the forthcoming scientist would gain are the major aims of this paper.

EARLY LIFE OF ALBERT EINSTEIN

A lot of things have been written about the life and time of Albert Einstein by many authors such as Straumann (2007), Burnham (2020), Waldrop (2017), English (2021), Howell (2019) and Adolfo (2015). Significant contributions to the outstanding performance of Einstein were also made by Kaku (2021), Nobel Lectures (1967), Andrews (2018), Mann (2019), The Star Child Team (2021) and Heilbronn (2003). Albert Einstein was a scientist in the early 1900s. His early life covered the period from 1879-1904. He was born on 14 March 1879 in the southern German city of Ulm, Württemberg, Germany. He was a German-American physicist. The family house was on top of a commemorative plague which was destroyed during World War II (Howell, 2019). Albert was the first child born to his parents, Hermann and Pauline. Einstein's parents were of Jewish heritage and gave birth to the first child in the third year of their marriage. They came from a long line of Jewish tradesmen who had lived in southern Germany for hundreds of years. Albert Einstein was therefore a German Jew. His parents were secular, middle-class Jews and his mother came from a fairly wealthy family. They were both intelligent and educated. Although his father gained a reputation in mathematics he could not proceed to the higher institution because of finances. Einstein's father, Hermann, was originally a featherbed businessman which was situated on the River Danube in southern Germany. According to Albert Einstein himself, the two wonders that deeply affected his early life were his encounter with a compass at age five and the discovery of a book of geometry at age 12, which he cherished so much and called his "sacred little geometry book."

Albert's father, Hermann began work as a merchant in the featherbed industry. Shortly after his birth, his father's featherbed business collapsed and the entire family moved to Munich where his father started an electrical-engineering business with his brother Jacob. To guard against failure, the new business was greatly supported by the Kochs, Pauline Einstein's parents. Albert Einstein grew up in a middle-class Jewish family in Munich. He spent most of his childhood in Munich, Germany. Later his father started running an electrochemical factory. Albert learned a lot about science and electronics from his father's electronics company. That is, Einstein was the son of a Jewish electrical engineer. His mother, Pauline Koch took care of the family, Albert and his younger sister, Maria. When Albert Einstein was young, his mother introduced him to music, especially the violin. In his childhood age, he loved reading mathematics books, building complex structures with blocks, constructing towers with playing cards, working on puzzles and playing alone instead of playing with his friends. As a child, he became fascinated by music, mathematics, physics and the compass that his father bought for him when he was five years old. He was inspired to delve into the unknown by the strange compass and by the book of geometry at age 12. His fields of study

when he grew up are light, relativity, photoelectric effect, Brownian motion and space-time. Einstein's mother enjoyed music and playing the piano. Einstein's co-curricular activity or hobby at home was playing the violin. Though he attended school as a young boy, he also received instruction at home on Judaism and violin. He composed several songs of praise. Anytime he was in dilemma about a particular concept, he resulted in playing the violin. Einstein received a lot of scientific inspiration when playing his violin. He became deeply religious when he was twelve years old. Due to his love and passion for the violin, he noted that if he had not taken the path of physics research, he would have ended his life as a musician. However, when he started reading science books that contradicted his religious beliefs, his religious inclination began to change. In 1893, Einstein's father and uncle sold their business and moved south to Pavia in Italy leaving Albert behind in a boarding house in Munich to complete his education in the gymnasium.

EDUCATION OF ALBERT EINSTEIN

As one would expect, Albert Einstein was not an extraordinary child because he had great difficulty speaking in early life. As he grew up, he became so intelligent but still had a problem communicating (Kaku, 2021; Nobel Lectures, 1967; Whittaker, 1955; Andrews, 2018; Mann, 2019; The Star Child Team, 2021). Consequently, he enjoyed thinking in pictures rather than in words. This could be responsible for his ability to think in unique ways and to develop new scientific concepts differently. Authors like Straumann (2007), Burnham (2020), Waldrop (2017), English (2021), Howell (2019) and Adolfo (2015) discussed the educational background and the outcomes of his educational pursuit. Einstein spent his childhood and his early education in the city of Munich where military drills dominated the school's atmosphere like in other cities. His education was disrupted by his father's repeated failures in his business.

Albert Einstein's formal education began at age six when he enrolled in the Petersschule on Blumenstrasse, a Catholic elementary school in Munich. Between 1884 and 1887 he attended a Catholic Primary school in Munich. Being a Jew, quiet, unsociable with peers and having speech difficulty, his colleagues did not treat him well. However, his parents cared more about his academic performance than his religious practices because they were not practising Jews. Similarly, his Uncle Jacob gave him a book of algebra and sent him mathematics puzzles to solve. In addition, a family friend who was a twenty-one-year-old medical student, Max Talmud gave him books on popular science and philosophy that directed his thought more toward scientific analysis. Between 1887 and 1894 he continued his education by attending Luitpold Gymnasium in Munich. It was a special institution that emphasized Latin and Greek over mathematics and science. But Einstein engaged himself in personal study outside the school because he was not happy with the educational programme of the school. He was maltreated by some teachers because he was against the educational system which lacked originality and creativity and hence was not compatible with his expectation. By the age of twelve, he had taught himself geometry. Though there were teachers that were fair to him, some were not. A teacher once told him that he would never amount to anything in life. In addition, frequent failures of his father's business also disrupted his education. In 1893, Einstein's father and uncle sold their business and moved south to Pavia in Italy in search of a better job. They left Albert behind in a boarding house to complete his education in Luitpold Gymnasium in Munich.

When he switched to the Luitpold grammar school, he was not able to cope with the school's authoritarian attitude. As a student, he developed a rebellious attitude towards his teachers and school authorities in general. He was equally deterred by the military duty every child at

age 16 would be subjected to. Since German law stipulated that if any boy should leave the country before the age of seventeen, he would be exempted from military service. He took the advantage to excuse himself from school. In 1894, Einstein rebelled against the educational policy and authoritarian attitude of some of his teachers and dropped out of school at 16. To reunite with his parents in Italy after six months of abandonment, he persuaded a doctor to write him an official note diagnosing him with "neurasthenic exhaustion." The trick provided him with an excuse for abandoning his school and joining his parents in Italy. His unexpected arrival at Pavia in Italy amazed his parents. His isolation and independence from the world around him were confirmed by his intention to renounce his German citizenship and Jewish faith. At the age of sixteen, he failed an examination to qualify him to be trained as an electrical engineer. Thereafter, he moved to Switzerland and resumed his schooling to possess a qualification that will guarantee his admission to the Swiss Federal Polytechnic School in Zurich, an advanced technical institute. Between 1895 and 1896 he attended the Argovian Cantonal School in Switzerland. He completed school with excellence in Mathematics and Physics but failed in French, Chemistry and Biology. Having finished with a result that could not guarantee admission to higher education, he began to develop a new plan for his future.

Based on the advice of the Principal of the Polytechnic, he spent a year in a Swiss Secondary school in Aarau to prepare him to retake the examination to complete his formal education. While in the school, he stayed in the home of Jost Winteler, a teacher at the school and enjoyed his study and companionship with the children of the teacher. To finish his formal schooling, he went to a special high school run by Jost Winteler in Aarau, Switzerland and graduated in 1896. Subsequently, he took an entrance examination for the Swiss Federal Polytechnic School (Eidgenössische Technische Hochschule, ETH), Zurich and gained admission to the school in 1896. Between 1896 and 1900 he attended ETH Zurich for his teaching profession in physics. ETH Zurich was originally set up as a polytechnic institute and did not attain university status until 1905. It began issuing doctorates in 1909. That is, in 1909, Swiss Federal Polytechnic School was upgraded to full university status and renamed Swiss Federal Institute of Technology, Zurich. Albert Einstein decided to study mathematics and physics to become a teacher. He opted for teaching because he thought he would be good in the teaching profession. Secondly, he noticed that he could think mathematically and abstractly but lacked in the area of imagination and practicality. As a student, he studied the equation by James Clerk Maxwell (Maxwell's equations) which described the nature of light. While studying the equation, Albert Einstein discovered that the speed of light remains the same no matter how fast one moves. This fact was not known to Maxwell himself. Likewise, his discovery violates Newton's laws of motion (or Isaac Newton's theory) which were devoid of absolute velocity. In the year 1896, he renounced his German citizenship. He was not a citizen of any country until 1901 when he became a citizen of Switzerland (or Swiss citizen). In 1901 he graduated and received his diploma to teach physics and mathematics but could not find a school to exercise his teaching profession. Later he began to work as a technical assistant in the Swiss Patent Office having acquired Swiss citizenship.

Between 1900 and 1905 he attended the University of Zurich for a doctoral degree. While pursuing his doctoral degree, Albert Einstein sought for teaching job to finance his education but could not get any suitable one. Having failed to get a teaching job, Einstein resolved to secure a job at the Swiss Patent Office in 1902 to be a source of income. He used his spare time in the office for his research work. He completed his thesis titled "A New Determination of Molecular Dimensions" under Alfred Kleiner, Professor of Experimental Physics, who served as Pro-forma advisor. Hence, in 1905 he earned his doctorate degree and was awarded

a Ph.D. from the University of Zurich while working at the Swiss patent office in Bern. Being a German Jew, a political character against Adolf Hitler, and a world-renowned public figure, Einstein became an unpopular figure and the target of hostility in Weimar Germany. Under the Nazis government of Adolf Hitler, the civil liberties of Einstein were suspended and he was barred from resuming his professorship at the Prussian Academy of Sciences in Berlin.

EXPERIMENTS OF ALBERT EINSTEIN

Albert Einstein was a theoretical physicist. Notwithstanding, his discoveries were not only theoretical. He employed a practical approach and his discoveries also generated numerous practical applications. Einstein also defined concepts in terms of laboratory experiments. Albert Einstein's curiosity and quest to unravel the unknown started when he was around five years old. As a child, he fell ill and his father had a compass to play with to make him feel better. Beyond playing with the compass, he became fascinated with it, examined it and raised many questions: How did the compass work? What was the mysterious force that caused the compass to point north? The questions dominated his thinking for years. As a child, the working of the compass ignited his curiosity to want to explain the unknown.

1. Bose-Einstein Condensates: By the collaboration work of Satyendra Nath Bose and Albert Einstein.
2. Existence of Atom: Einstein's experimental proof of the existence of atoms was his second famous publication in 1905.
3. Gravitation Waves: Einstein predicted gravitation waves and in 1993 a Nobel Prize was awarded to the discoverers of gravitation waves.
4. Paper Towels: Developed in 1901.
5. Concept of Mass and Energy: This is the fourth paper of Einstein in 1905.
6. Einstein's Brownian Motion Paper: Waldrop (2017) described how Einstein explained Brownian motion which was first noticed by English botanist Robert Brown in 1827.
7. Einstein-Podolsky-Rosen Paradox: In 1945, Einstein sketched two diagrams demonstrating a novel approach to the thought experiment called the Einstein-Podolsky-Rosen (EPR) paradox.

THEORIES OF ALBERT EINSTEIN

By May 1905, 26-year-old Albert Einstein was fast becoming the world's foremost theoretical physicist, having published two ground-breaking theories in just months while working as a clerk at the Swiss Patent Office (Burnham, 2020). In the words of English (2021), Albert Einstein is thought to have been a genius, and he is considered one of the world's greatest thinkers. He came up with some of the most important discoveries and theories in all of science. Although he was not known for inventions like some scientists, Einstein's theories and ideas related to physics changed the prospect of science. He laid the scientific foundations for paper towels, lasers, and more common products (Waldrop, 2017).

1. Special Theory of Relativity: Einstein developed his special relativity in 1905. Waldrop (2017) stated that relativity showed us that matter and energy are just two different forms of the same thing.
2. Quantum Theory: Another groundbreaking paper published by Einstein is the quantum theory which explained that light is a particle or photon. It was one of the results of many years of research work.
3. Theory of Light: English (2021) stated that Albert Einstein proposed his theory of light, stating that all light is composed of tiny packets of energy, called photons. The photons were considered to be particles but also had wave-like properties. The idea was completely new at the time.

4. Grand Unified Theory: Throughout the last years of his life, Albert Einstein continued his quest for a unified field theory.
5. General Theory of Relativity: Einstein published his general theory of relativity in 1916.

DISCOVERIES OF ALBERT EINSTEIN

When Einstein was 16 years old, Max Talmud, an informal teacher and a young medical student introduced him to a children's science series (Popular Books on Physical Science) by Aaron Bernstein. The book marked a turning point in the life of Einstein because it made him raise many questions that aided his scientific research. In the book, the author imagined riding alongside electricity that was travelling inside a telegraph wire. Einstein then asked: "What would happen if you run alongside a light beam?" He asked many other questions that later helped his probe into the unknown phenomena in the universe. His effort to proffer answers to the questions led him to most of his discoveries. Einstein's job at the patent office helped him a lot in achieving his dream. After analysing the patent applications, he spent the remaining time thinking and working on how to achieve his vision and age-long dream he had at 16 years old.

According to Howell (2019), a major validation of Einstein's work came in 1919, when Sir Arthur Eddington, secretary of the Royal Astronomical Society, led an expedition to Africa that measured the position of stars during a total solar eclipse. The group found that the position of stars was shifted due to the bending of light around the sun. During the 'World Year of Physics' much has been written on the epoch-making 1905 papers of Albert Einstein and his later great contributions to physics (Straumann, 2007). The year 1905 was regarded as Einstein's miracle year of discovery. That year alone, when Einstein was 26 years old, he produced nothing less than four groundbreaking papers. Most of the works on modern physics were discovered in the early 20th century and Albert Einstein laid much of the foundation for modern physics. A lot of people viewed Einstein's discoveries from different angles: spiritual, doubtful, mystical or idealistic views of the universe. Some of the discoveries are included in his experiments and theories. Additional discoveries are discussed below.

1. Photoelectric Effect: This is the first celebrated paper published by Einstein in 1905.
2. Existence of Atom: Einstein's experimental proof of the existence of atoms was his second famous publication in 1905.
3. Special Theory of Relativity: In 1905, Einstein developed his special relativity which implies that length and time are not fixed and depend on the observer's frame of reference.
4. Atomic Bomb: Einstein did not invent or work directly on the atomic bomb but his scientific discoveries contributed and played major roles in the development of the atomic bomb.
5. Theory of Cosmology: Einstein predicted the theory of cosmology and the theory explained that the universe was dynamic instead of static, and was capable of expanding and contracting.
6. Gravitation Waves: Einstein predicted gravitation waves and in 1993 a Nobel Prize was awarded to the discoverers of gravitation waves.
7. Mercury's Orbit: General theory of relativity showed that Mercury's motion is affected by the curvature of space-time and also changes its orbit. Mercury is a small planet that orbits close to the sun, a massive object. Mercury's orbit could not be understood until the general theory of relativity supplied the explanation.

PUBLICATIONS OF ALBERT EINSTEIN

In 1931, Einstein published a book with the title “*A hundred authors against Einstein*” in Leipzig. In an attempt to justify his submissions in the book, Einstein wrote “If I were wrong, one professor would have been enough”. A year after the publication, Einstein left Germany for the United States. In 1933 Adolf Hitler, representing the Nazis government seized power in Germany and waged war against the Jews. By May 1933, Nazis raided his property and burned his books. The year 1905 was a remarkable year in the field of science and is often referred to as Einstein’s “miracle year”. Within the year Einstein published four papers in the *Annalen der Physik*. Although each of the four publications contained special scientific revelation and discovery that would eventually alter the course of modern physics, the physics community of the time ignored the papers initially. It took the intervention of one influential physicist of his generation, Max Planck who was the founder of quantum theory to accept the papers and allow Einstein to explain his discovery.

In the year 1905, Albert Einstein, Theoretical Physicist, published four papers at 26 years old. This is a challenge for young scientists. During the 'World Year of Physics' much has been written on the epoch-making 1905 papers of Albert Einstein and his later great contributions to physics (Straumann, 2007). In all, Einstein's scientific publications include 319 science journal articles, 32 chapters in books and 16 books (Wikipedia, 2022). In addition to his scientific publications, Einstein published many popular tracts on themes such as religion, human rights, economics, government, nuclear war, and personal development.

APPOINTMENT OF ALBERT EINSTEIN

Albert Einstein did not wait in Germany to seek employment because of hostility against him. If Einstein had stayed in Germany he would not have been able to secure the teaching profession at the University as a Jewish person. Einstein graduated in 1900. After school, Einstein searched for a job but had difficulty getting a recommendation for a job at a university. He could not secure a job in time because some of the professors, especially Heinrich Friedrich Weber and Jean Pernet, were not comfortable giving him a letter of recommendation because of his attitude to his studies. He was not punctual in class but studied on his own. Therefore, Einstein was turned down for every academic position that he applied to. Albert Einstein studied and taught at the Federal Institute of Technology (ETH) in Zurich. He graduated in 1900 and later returned to teach theoretical physics in 1912. In fact, his pursuit of a career sent him to multiple countries and some of his appointments include a temporary high school teacher, a patent officer in Bern Switzerland, Institute for Advanced Study in Princeton, New Jersey and University Lecturer.

CONTEMPORARY SCIENTISTS OF ALBERT EINSTEIN

1. Max Planck: He was a physicist, the founder of quantum theory and the most influential physicist at the time of Einstein. In 1905, Einstein’s papers were disregarded by the physicists of the time. Fortunately, Max accepted him and recommended his works to others. Consequently, Einstein was invited to Solvay Conference and other international conferences just to explain his discoveries.
2. Niels Bohr: Einstein collaborated with Bohr, a physicist, to the furtherance of his research works. In an attempt to incorporate quantum theory in his calculations, he discussed extensively with Niels Bohr to authenticate quantum theory.
3. Satyendra Nath Bose (1894-1974): He was an Indian mathematician and physicist. He was a graduate of the University of Calcutta. He lectured and published many scientific papers such as *Planck’s Law and the Hypothesis of Light Quanta* that led Einstein to seek

- collaboration with him. To develop a theory concerning the gas-like qualities of electromagnetic radiation, Einstein sought collaborative work with Satyendra Nath Bose.
4. Max Talmud: He was a young medical student. It is on record that Max Talmud (or Max Talmey) used to have his dinner at the Einstein home. As an informal teacher, Talmud introduced Einstein to higher mathematics and philosophy. When Einstein was 16 years old, Talmud introduced him to a children's science series (Popular Books on Physical Science) by Aaron Bernstein. The book marked a turning point in the life of Einstein by raising many questions that aided his scientific research.
 5. Marcel Grossmann: He was a mathematician. He was Einstein's student at the University of Zurich who became his loyal friend.
 6. Michele Besso: Einstein described Michele Besso as the best sounding board in all of Europe (Burnham, 2020). He was Einstein's student at the University of Zurich who turned out to be his loyal friend and colleague in research work. Einstein enjoyed lengthy conversations about space, time and relativity with Besso. Michele Besso helped his friend in the birth of the Theory of relativity which Einstein published a few weeks after their scientific discussion.

SCIENTIFIC LEGACY OF ALBERT EINSTEIN

Einstein has a lot of scientific innovations to showcase to the world. His works ushered in the scientific revolution of the time. It is believed that every conceptual revolution is always followed by major technological advances. By May 1905, 26-year-old Albert Einstein was fast becoming the world's foremost theoretical physicist, having published two groundbreaking theories in just months while working as a clerk at the Swiss Patent Office (Burnham, 2020). According to Howell (2019), there are many notable applications of Einstein's work covering motion, nuclear astronomy etc. His legacy will continue to inspire generations of great thinkers. Some of his legacies are stated below. Within one year, 1905, Albert Einstein, Theoretical Physicist, published four papers at 26 years old. This is a challenge for young scientists. Of all his works, his theory of relativity had perhaps the farthest-reaching implications for scholars and intellectuals in all fields. Although he is best remembered for his extraordinary contributions to modern physics, Einstein's life and thought left an impact not only on science, but also on philosophy, visual art, and literature.

1. Einstein's general theory of relativity assisted a lot when synchronizing the network of Global Positioning System (GPS) satellites orbiting the Earth. This allows our satellites and smartphone map apps to show descriptions or directions to our unknown destination.
2. General relativity passed a recent major test in 2019 in an experiment involving a supermassive black hole at the centre of the Milky Way. This shows that Einstein's researches have tremendous global impacts.
3. Albert was a humanitarian and sponsored many charitable organizations. In 1940 Einstein auctioned off a handwritten version of his Theory of Relativity for 6 million dollars to help with the war effort.
4. While studying a solar eclipse in 1919, astronomers verified predictions made by Einstein regarding the general theory of relativity. Further confirmations were made by scientists concerning predictions of general relativity by Einstein. Some of the verification included a shift in the orbit of the planet Mercury and the probable existence of black holes.
5. In April 2019, the Event Horizon telescope showed the first-ever images of a black hole. The photographs also confirmed several facets of general relativity, including not only that black holes exist, but also that they have a circular event horizon.
6. In 1955, one week before his death, he agreed to have his name appear on a manifesto calling for the end to nuclear weapons.

7. The orbit of Mercury planet could not be understood until general relativity showed that the curvature of space-time is affecting Mercury's motions and changing its orbit.
8. After World War II, Einstein called for the establishment of a world government that would control nuclear technology and prevent future armed conflict.
9. The principle behind the workability of lasers, our automatic doors and computer clocks are part of the ingenuity of Einstein.
10. In all of his discoveries, Einstein helped transform the image of the scientist from a highly specialized student of nature to a public personality deeply concerned about the fate of humanity.
11. Einstein's legacy also ignited a new public perception of the role of the scientist in the society. He believed that scientists have a moral responsibility to humanity. In addition to his scientific publications, he published popular tracts on themes such as religion, human rights, economics, government, nuclear war, and personal development.
12. Einstein's relativity theory gave rise to a particular philosophical approach to science called logical positivism. It means that only statements known to be true are those that positive experimental evidence can verify. This is to rid science of all metaphysical speculation and based it on empiricism and analytical statements of logic.
13. Einstein spent much of his later years trying to merge the fields of electromagnetism and gravity. He was unsuccessful but may have been ahead of his time. Other physicists are still working on this problem.
14. Einstein was both a scientist, social activist and humanitarian. Among the four intellectuals in Germany, only Einstein signed a manifesto opposing Germany's entry into World War I. He spoke out against the German involvement in War.
15. He was an outspoken supporter of pacifism, internationalism, democracy, and human dignity. He was also a lifelong supporter of Jewish causes, especially cultural Zionism.
16. Einstein's work won many Nobel Prizes for succeeding physicists. In 1993 a Nobel Prize was awarded to the discoverers of gravitation waves which were predicted by Einstein. Likewise in 1995, a Nobel Prize was awarded to the discoverers of Bose-Einstein condensates; a new form of matter that can occur at extremely low temperatures.
17. Einstein took it upon himself to travel the world lecturing and raising funds for a planned Hebrew University in Jerusalem.
18. Albert Einstein was well respected by both students and faculty at the University of Berlin. When chaos erupted in the University of Berlin in November 1918 after World War I, Einstein and Max Born were invited to mediate in the crisis because some students held the rector of the college and several professors hostage. Einstein, together with Max, brokered a compromise that resolved the catastrophe and averted any further tragic confrontation.
19. In 1944 he wrote his 1905 theory of relativity with his hand and allowed it to be auctioned. The handwritten book was sold for six million dollars. He donated the money to the campaign effort to win World War II. The book is kept in the Library of Congress in Washington, D.C.
20. Einstein's discoveries laid the foundation for most of the research into the evolution of the universe as well as modern technology such as lasers and computer chips.

AWARD OF ALBERT EINSTEIN

Albert Einstein received several scientific awards and honours in recognition of his contribution to the revolution of science and service to humanity. Globally, everyone believed that he deserved the award and merited the honours.

1. 1921: Won the Nobel Prize award for Physics for becoming an important discoverer of many branches of science.

2. 1921: Conferred with the award for his work on photoelectric
3. 1921: Awarded the Matteucci Medal.
4. 1925: Bestowed with the Copley Medal award by the Royal Society.
5. 1926: Awarded a Gold Medal of the Royal Astronomical Society.
6. 1929: Won the Max Planck Medal.
7. 1935: Conferred with the Franklin Medal of the Franklin Institute.
8. 1995: Bestowed with a Nobel Prize award for the discovery of Bose-Einstein Condensates with Bose. 1993: Awarded a Nobel Prize for the discovery of gravitation waves.
9. 1999: Awarded the Time Person of the Century when Time magazine named him the Person of the Century.

MARITAL LIFE OF ALBERT EINSTEIN

When Albert Einstein was a student at the Swiss Federal Polytechnic Institute in Zurich, he fell in love with his fellow student Mileva Maric, a physics student from Serbia. She was the only female among the six students in the mathematics and physics section of the teaching diploma course in the institution. Maric's family was Eastern Orthodox Christian. He had the intention of marrying her but his parents opposed the match. Einstein's relationship with Maric deepened, but his parents vehemently opposed the relationship. His mother especially objected to her Serbian background. It was also difficult for him to marry Maric and support a family without a job. In addition, his father's business had gone bankrupt. In desperation to marry her, he took lowly jobs tutoring children as a part-time tutor but he was later fired from the job. Since he lacked the money to marry, he could not continue with the relationship. However, they had a child out of wedlock, Lieserl who was born in early 1902. About the time he was about to secure a job after many years of searching, Einstein's father became seriously ill. Before his father died, he gave his blessing for his son to marry Maric. When he secured a job as a clerk at the Swiss patent office in Bern, Einstein married Maric in 1903 and they had two children: Hans Albert (1904) and Eduard Albert (1910). Though Einstein's fame as a physicist and international speaker continued to spread, his marriage was gradually falling apart due to frequent arguments about their children and their meagre finances. The marriage was finally dissolved and Einstein divorced Maric in 1919 but agreed to compensate her with the money he would realize on winning the Nobel Prize. Knowing that his marriage was about to collapse, Einstein began an affair with another lady. While he was the director of the Kaiser Wilhelm Institute for Physics at the University of Berlin, he fell in love with his cousin, Elsa Löwenthal. They had been in a relationship since 1912. Both of them later married after divorcing Mileva. Einstein was a professor at the University of Berlin for a time but fled Germany with Löwenthal in 1933, during the rise of Adolf Hitler. They were together until 1936 when Elsa Löwenthal died.

DEATH OF ALBERT EINSTEIN

His undying patience and unrelenting pursuit of novel discoveries later led to his deteriorating health of Einstein. In 1928, his busy schedule led to a physical collapse. In 1949 he had serious health challenges which lingered for years. In 1952, Einstein declined an offer extended to him by David Ben-Gurion, Israel's premier, to become president of Israel. He rejected the offer of the presidency of Israel because of his worsening health. After 76 years on earth, Albert Einstein died on 18 April 1955 in Princeton, New Jersey. He died of a ruptured aneurysm in the New Jersey hospital. Quoting the American Museum of Natural History (AMNH), Howell (2019) stated that Einstein died of an aortic aneurysm on April 18, 1955, during which a blood vessel burst near his heart. Before his death, he received the following awards and honours: Nobel Prize in 1921 and Copley Model in 1925. According to

Kaku (2021), Albert Einstein's brain was removed without permission during his autopsy and was sent to be tested for its perceived secrets. Howell (2019) also noted that Harvey's 1985 study authors reported that Einstein's brain had a higher number of glial cells (those that support and insulate the nervous system) per neurons (nerve cells) than other brains they examined. In conclusion, the report indicated that the neurons had a higher metabolic need. That is Einstein's brain cells needed and used more energy, which could have been why he had such advanced thinking abilities and conceptual skills. Mann (2019) confirmed that Einstein's body was cremated and his ashes were spread in an undisclosed location, according to the American Museum of Natural History. He noted that a doctor performed an unauthorized craniotomy before this and removed and saved Einstein's brain.

CHALLENGES TO UPCOMING SCIENTISTS

1. Albert Einstein wrote his first scientific paper, an investigation of the nature of ether when he was a teenager. Young scientists are advised to make hay while the sun shines.
2. He created an environment of intellectual freedom for himself and was able to defend the scientific publications which eventually earned him global recognition. A scientist should be able to create a private and public conducive environment for successful research, discovery and development of acceptable submissions for appropriate utilization and manipulation.
3. Albert won the world's most prestigious scientific award in his time for becoming an important discoverer of many branches of science. This is the consequence of hard work and should challenge the upcoming scientist to also work harder to tackle global challenges.
4. The miracle year of Albert Einstein was 1905 when he published four papers that laid the foundation of modern physics. The upcoming scientists should be prepared to contribute immensely to the development of our world and rewrite the history of science by doing what will change the perspective on space, time, mass, and energy.
5. Einstein tried to unify all the forces of the universe in a single theory. That is, he attempted to work on a theory of everything. That was the last work because he was still working on it till the time of his death. Coming scientists should not see it as labour in vain but see Albert as a sagacious, workaholic, industrious and relentless scientist who worked assiduously for the emancipation of scientific innovations and remained active in the science community till the last day of his life.
6. Till his death, he stood against the use of atomic bombs and other nuclear weapons in fighting humanity. He fought for what he believed in. He did not support a situation in which the results of scientific research are used against humankind. Today, nation fights against nation using scientific weapons. Nations organise war which leads to the destruction of lives and properties on a massive scale. But Einstein was a man of peace and valued human life. He believed that racism was a disease. Therefore, the scientist should consider the ethical aspect and the right application of scientific discovery. Otherwise, the new technologies will pose novel problems.
7. Einstein's last words while on the sick bed should challenge the upcoming scientists to do their best in making life more suitable for living. He said: "It is tasteless to prolong life artificially. I have done my share, it is time to go. I will do it elegantly". Every scientist should have the mind to develop science to make a great and positive impact on our environment and the lives of people.
8. Albert Einstein was a visionary thinker. This led to his profound exploit in the field of science. He was able to change people's understanding of the universe. Young scientists need visionary and brilliant thinking for excellent performance and recognition nationally and globally.

9. Einstein was considered to be a complete failure in his childhood because he lacked the human power of speech in his early life. But he became a global phenomenon and rose to the peak of his career as a Professor of Physics. He could be described as a partially dumb and retarded boy that turned into a Professor and prominent scientist. This is a challenge to the upcoming scientists not to allow hindrances in the pursuit of their careers.
10. There are certain characteristics expected of a scientist. Einstein exhibited many but also displayed some habits that look unbecoming of a scientist. The upcoming scientists should critically examine those traits. Some of the attributes of scientific attitudes that are qualities of a scientist include humility, objectivity, open-mindedness, perseverance, inquisitiveness, inventiveness, belief, critical mindedness, logical and systematic investigation.

CONCLUSION

According to Howell (2019), Rosenkranz, (2011), Yang, & Hamilton (2010), Adolfo (2015), Mann (2019), The Star Child Team (2021), Kaku (2021), Nobel Lectures (1967), Straumann (2007), Burnham (2020), Waldrop (2017), English (2021), Andrews (2018), Pietrow (2019) and Howard (2005), Albert Einstein lived a hectic lifestyle as a scientist, physicist, researcher, famous figure, humanitarian, guest speaker and traveller with good track records. As stated by Albert Einstein himself, the two wonders that deeply affected his early life were his encounter with a compass at age five and the discovery of a book of geometry at age 12, which he cherished so much and called his “sacred little geometry book.” On the other side, he was sad about how his father died with a pitiable notion about him. Towards the end of his travail as a job seeker, his father fell ill and died. This brought great sadness to Einstein remembering that his father died and left this world thinking of him as a failure. The whole story changed and the discoveries of Einstein have brought a great scientific revolution to the world.

According to Howell (2019), Albert Einstein is often cited as one of the most influential scientists of the 20th century. His work continues to help astronomers study everything from gravitational waves to mercury's orbit. Albert Einstein developed his ground-breaking theories while working as a clerk in the Swiss patent office in Bern. He published four scientific articles in 1905. Through these publications especially the general theory of relativity and the photoelectric effect, he won worldwide fame and a Nobel Prize in 1921. Scientists noted that all the great advances in modern physics such as the theory of relativity, quantum theory, and cosmology were made in the first third of the 20th century. It is believed that in all, Einstein's contributions to these fields were greater than those of any other scientist. Einstein's discoveries laid the foundation for most of the research into the evolution of the universe as well as modern technology such as lasers and computer chips. Though great among equals, Albert Einstein made some mistakes. However, in the 20th century, despite some scientific errors made by Einstein, it was agreed that he would overturn Newton's concept of the universe.

The world needs scholars that will pursue experimental development, display scientific capability and encourage scientific research. Today, a set of talented, skilled and trained personnel is needed to advance the course of science. Albert Einstein's name was synonymous with genius because of the inherent potential he displayed to revolutionise science and gained global recognition. He did not obtain the feat with ease but through hard work and resilience to surmount all the obstacles he encountered in the pursuit of his career. Just like other great men, Albert Einstein had unending fortitude and will to stand for what he believed and to pursue it to the end.

RECOMMENDATIONS

1. One of the ways to encourage the upcoming scientists is for the government to make funds available for scientific research and innovations to improve the way science is done universally. If there is improved funding, many youths will be encouraged to pursue a career.
2. Profound performance in the field of science also requires incentives. Financial support and added incentives should not be limited to the government alone. Lack of funds has been the central obstacle facing the adequate functionality of scientists. Public, private and non-profit agencies should be responsible for funding, promoting and developing scientific innovations.
3. A technological breakthrough can be possible in an atmosphere that is conducive to research work. Scientists are motivated to work in several ways. Hence, it is expedient for the government to ensure the preservation of peace and provide an enabling environment for research work. This will help to mitigate the lukewarm attitude among science scholars and develop research interests in young scientists.
4. Einstein collaborated with scientists like Niels Bohr and SatyendraNath Bose. Collaborative work is a good thing that upcoming scientists should imbibe especially at a time when Covid-19 and other pandemics are ravaging every facet of life. The danger of the global plagues should teach us the significance of scientific collaboration.
5. The upcoming scientists should work on the weakness and failures of Einstein and consider his struggles, strength and success as machinery for developing science. While climbing the ladder of success, he fought a lot of battles, and encountered disappointments but persevered. Young scientists need that quality for a successful progression in their exploits.
6. There is a need for appropriate communication of significant scientific works, ideas and findings in order not to undermine the efforts of scientists. Therefore, the requisite synergy between the government, policymakers, journalists, regulatory bodies, science scholars, publishing firms, and a repository of scientific research and technological products for end users should be encouraged.

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