TEACHING BIOLOGY FROM AN ISLAMIC PERSPECTIVE AND STUDENTS' HOLISTIC DEVELOPMENT IN THE HIGHER SECONDARY SECTION OF ALJAMEA-TUS-SAIFIYAH UNIVERSITY, NAIROBI CAMPUS, KENYA

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DECLARATION

This research thesis is my original work, and that has not been presented in any other university or institution for an academic award.

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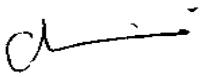
Sign:  Date: 04/09/2022

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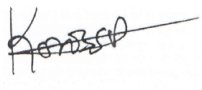
Sign:  Date: 07/09/2022

DEDICATION

To my family.

ABSTRACT

This study investigated how teaching biology from an Islamic perspective can lead to students' holistic development in the higher secondary section of Aljamea-tus-Saifiyah, Nairobi, Kenya. The study was underpinned on the Reconstructionism Theory by Theodore Brameld. The study was guided by four research questions: How does teaching Biology from an Islamic perspective help in students' holistic growth in Aljamea-tus-Saifiyah Nairobi? How do teachers perceive the teaching of biology from an Islamic perspective in relation to students' holistic development in Aljamea-tus-Saifiyah Nairobi? What challenges are associated with teaching biology from an Islamic perspective in relation to students' holistic development in Aljamea Nairobi? What measures can be put in place to curb the challenges associated with teaching biology from an Islamic perspective in relation to students' holistic development in Aljamea Nairobi? Convergent parallel mixed methods approach was used to guide the study. A cross-sectional survey design was used to collect quantitative data, while qualitative data was collected through a phenomenological design. The target population comprised 110 teachers, 400 students of Aljamea and 25 administrators. 11 teachers, 40 students, and 3 administrators were sampled for this study. Data collection instruments were questionnaires and interview guides. Quantitative data analysis was done by running both descriptive and inferential statistics with the help of SPSS software version 23 and Ms excel to generate frequencies and percentages to summarise the data. Qualitative data were organised into themes and presented in direct quotes and narratives. The validity and reliability of quantitative instruments and the trustworthiness of qualitative instruments were ascertained. Ethical issues were observed throughout the study. Key findings indicated that teaching biology from an Islamic perspective was instrumental in students' holistic development; it guided that to strengthen their gratitude to the creator and acknowledge His presence, among others**.** Challenges faced included the heterogenous nature of biology and religion and unclear theories; Science view of nature contradicts the Islamic perspective**.** Mitigation measures included pedagogy and procedures that help cross-curricular subject understanding, interactive and illustrative classes, and growing demand for creative skills to teach such subjects. The study recommended that Teaching Biology from an Islamic Perspective be practised in other schools owned by the Dawoodi Bohra community.

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ACRONYMS/ABBREVIATIONS

Acronym	Arabic	English Expression
SA	Salwat al Allah Alaihe صلوات اللہ علیہ	May the Almighty bless him with benedictions
RA	Ridhwan al Allah Alaihe رضوان اللہ علیہ	May the Almighty be pleased with him
SAW	Sallallaho Alaihe Wa Aalehi صلی اللہ علیہ والہ	May the Almighty grace him and his progeny with benedictions
QR	Qaddasallah o Ruhahu قدس اللہ روحہ	May the Almighty bless his soul
TUS	Tawal al Allah Umaraho Sharif طول اللہ عمرہ الشریف	May the Almighty grant him a long life

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Education holds high regard in Islam. Education became essential for establishing a universal and cohesive social order as religion and faith expanded across many peoples, as Nakosteen (2021) stated. According to Meacham (2015), having an informed and accurate view of Islam is extremely important in the twenty-first century. Therefore, education is responsible for preparing today's students to be global citizens; a sound understanding of Islam must be a core component of that preparation.

The concepts of Islamic education, the Islamic curriculum, and the essence of the Islamic religion are all intertwined, according to Ramdane and Souad (2020). Particularly in the Islamic culture, the curriculum is founded on what are seen as significant and unchanging divine facts, values, and standards. This complex intertwines flexible learning environments, human experiences, and skills. All of this is integrated by a Muslim instructor, who then imparts it to students for them to reach the level of perfection that Allah is associated with. In this way, the Islamic curriculum transcends the confines of physical space, explaining the fundamental religious principles that incorporate all helpful information. These concepts can be viewed in their purely ideal Islamic and puritanical forms, but they can also be used in a more grounded historical context.

The three main periods of Islamic education are described by the authors as follows: the stage of formation and standardization that corresponds to the Nabi Muhammed's ^{SAW} message (609 CE-661 CE); the stage of diversity in the post-

Classical era (661 CE-1450 CE), which can be divided into the pre-madrasa and madrasa eras; and the stage of regression and reform that runs from the 10th century (1495 CE-1591 CE) to the present. The Islamic curriculum was revived and reformatted by the 19th century's close. However, several complex problems, such as dualism, continue to haunt this approach. The downfall of the Islamic educational system is, therefore, a result of several historical, cultural, social, and political trends in the Muslim world.

Early Muslim education emphasised the practical implementation of studies, for example, the application of technological expertise to developing irrigation systems, architectural and art innovations, textiles, minerals, iron and steel products, earthenware, and leather products; manufacturing of paper and the discovery of unknown elements. By the 9th century, knowledge was mainly divided into the Islamic sciences, the philosophical and natural sciences, and the literary arts. The Islamic sciences emphasised the study of the Quran and Hadith and their interpretations (Szyliowicz, 2021). Natural science was also studied (Nakosteen, 2021). After the 11th century, however, denominational interests dominated higher learning, and the Islamic sciences achieved pre-eminence.

Cook (2020) highlights that despite its illustrious legacy by the seventeenth century, the Islamic world appeared unable to respond to the avalanche of Western achievement, either culturally or educationally. However, between the 7th to 14th centuries, that is also known as the Islamic golden age. Islamic scientific achievements encompassed many subjects, especially astronomy, mathematics, and medicine (Dallal, 2010).

Iqbal (2020) states that one of the most damaging aspects of European colonialism was the deterioration of indigenous cultural norms through secularism. Its reverence for human reason over divine revelation and its insistence on separating religion and state. At the same time, Western education institutions, with their pronounced secular/religious dichotomy, were infused into Islamic countries to produce functionaries to feed the bureaucratic and administrative needs of the state. The early modernisers did not fully realise the extent to which secularised education fundamentally conflicted with Islamic thought and traditional lifestyle. Therefore, religious education remained an individual responsibility, having no place in public education. Muslim students who desired spiritual training could supplement their moral instruction in traditional religious schools. Consequently, the two education systems evolved independently with little or no official interface.

Therefore, Stenmark (2005) opines that there is need a for a new conception of science in which science and values are explicitly linked. A science infused with or guided by values, ideology, or religion. Furthermore, Reiss (2009) also asserts that scholars' widespread and significant eagerness has risen in various countries to examine different science and religious characteristics; believing in God, following moral conduct and believing in sacred texts, and the possible relationship. Expounding on that, Stenmark (2005) states that many influential scholars within Christianity and Islam argue that the current science is not religiously neutral because of its naturalist inclination. Therefore, prominent scholars should respond to this by developing a faith-based science because education in Islam is viewed as a process involving transforming into a whole person, including the rational, spiritual, and social aspects. As al-Attas (1979) noted, Islam's complete and integrated approach to

education aims at the balanced development of the whole individual through training. Man's spirit, intellect, rational self, feelings, and physiological senses are all intertwined to the extent that faith is infused into the whole of his personality. Therefore, according to Syedi Najmuddin (1980), this is further supported by the educational philosophy of Aljamea-tus-Saifiyah that any education devoid of spirituality and bereft of moral teachings is lacking. For this reason, the education founded upon Fatimi philosophy comprises the pursuit of academic achievement, meaningful practice, character refinement, and moral virtue development. The attainment of these values results in a Well-rounded Personality.

A qualitative study by Pearce, Stones, Michael, Reiss and Mujtaba (2019) in England looked at broader issues about religion and science. The researchers found that students used language that informed their misconception of the epistemic distinctions between religion and science. Students used ‘truth’, ‘theory’ and ‘facts’ interchangeably when discussing science and religion. The authors recommended that religious education, therefore, should focus on epistemic literacy to avoid misconceptions and develop insights into specific knowledge manifested in science and religion.

Similarly, Peshkin (1986) paper on how a fundamentalist Baptist school educates its students within a liberal democracy shows how one can relate science and religion. He mentions a highly structured environment by integrating scripture into the curriculum and specific religious language used in school discourses. Furthermore, Cristillos (2004) paper based on an Islamic school in New York City examines the factors that contribute to the school’s Islamic environment due to the inclusion of Arabic as a sacred language. Therefore, it is essential for Aljamea-tus-Saifiyah, whose

foundations are on Islamic principles, to teach biology from an Islamic perspective to think critically and respond to the manufactured conflicts between religion and science (Nassaji, 2019). Meacham (2015) further emphasises that Islam is often portrayed with false and negative labels. Suppose we want our students to understand and participate in the global world and become engaged. In that case, they must develop a fundamental and sound understanding of Islam, and this can be done when true Islamic values are taught to the students. Additionally, this study feels that there must be a framework for true Islamic principles that accommodates a holistic relationship between religion and biology (Newdick, 2011).

Taber (2011), in the study on Secondary students' responses to perceptions of the relationship between science and religion, identified that it had been argued that learning science might be complicated and even compromised when students hold worldviews that may seem at odds with what is presented in science lessons. His study reported that science and religion were non-interacting due to inconsistent frameworks. In particular, in some parts of the world, there has been considerable concern that students from certain religious backgrounds may reject some science teaching if perceived as inconsistent with their faith commitments. Therefore, this study believes that a proper balance must be considered when teaching biology from an Islamic perspective. It should focus mainly on how to view the facts through Islamic lenses. Stenmark (2005) elaborates on the characteristics of science framed within an Islamic perspective, considering Allah Ta'ala as the universe's creator.

A quantitative study by Subali (2018) in Indonesia investigates the integration of Al-Quran and Hadith studies on biology. Many teachers do not integrate Al-Quran and Hadith into biology learning due to their limited information and knowledge

about Al-Quran and Hadith related to biology. Therefore, this study necessitates investigating the benefits of teaching biology from an Islamic perspective in Aljamea-tus-Saifiyah, Nairobi, Kenya. Few teachers ignore this approach and believe Islamic education does not resonate with science.

Eissa (2019), in a qualitative study on the development of character and life skills through Islamic methods of teaching science subjects at Islamic international schools in Malaysia, reveals that teachers of non-religious subjects in Islamic international schools believe that QPTMs (Quranic and Prophetic Teaching Methods) contribute to students' character development by inculcating characteristics and life skills. Therefore, Aljamea needs to incorporate Quranic and Prophetic teachings in biology lessons to acquire desired goals.

A paper on the scientificity of African traditional religion and its redefinition of secularism by Luyaluka (2017) in Congo affirms that secularism in the African context is wrongly defined due to European inherited or mimicked standards that place religion out of the field of science while the original African indigenous knowledge demonstrates that religion is one of the three components of African traditional science. Furthermore, it rationally explains Allah's relationship and the universe and cultural contents necessitated by applying the scientific and religious principles within specific milieus. Therefore, in this study on biology from an Islamic perspective, it is essential first to understand whether there is a relationship between biology and Islam and, if there is, how one can integrate it to achieve the desired goals of holistic learning.

Cohering to Nkonge (2014), religion and science have become a new mission and study area in Africa. He seeks to discover why religion continues to survive in

today's scientifically developing Africa, shows how science affects Africa's mission, and concludes that religion and science are distinct but inseparable entities required in Africa. Therefore, Africa needs both to survive, so they should coexist. However, Zukerman (2018) argues that religiosity predicts negative attitudes towards science and lower science literacy levels. Contradicting Zukerman (2018), the study feels that religiosity increases science curiosity, improving scientific literacy. A religious person seeks to investigate and understand the creator's wisdom in creation and use scientific knowledge to benefit humanity. A specific example from biology is that when students learn how the creator has provided different organs responsible for survival and a better life, they are harmed when they consume toxic substances such as alcohol.

A qualitative study by Radhika, Lauren, Albert, Christine, Samuel, David, Agrey and Jennifer (2019) investigated how gender and religion impact family planning in Northwest Tanzania. Women in Tanzania report a high unmet need for information about and access to family planning. Prior studies have demonstrated sub-Saharan Africa's complex and variable relationship between religious faith and family planning beliefs. They hypothesised that a significant reason for the low uptake of family planning in Tanzania is that women and their partners are uncertain whether pregnancy prevention is compatible with their religious beliefs.

They identified participants that found family planning incompatible with their faith and affirmed their responsibility to give birth to as many children as God would give them. Others found family planning acceptable given their moral obligation to care for and protect their children by limiting the family size. Therefore, they concluded that religious tradition and gender dynamics strongly influence family

planning uptake, with a wide range of interpretations of religious traditions affecting the perceived acceptability of family planning (Radhika Sundararajan, 2019). This review was beneficial because it highlighted the importance of integrating biological studies on reproduction and genetics and religious studies to yield holistic benefits.

An article on religion and social transformation in Africa: A critical and appreciative perspective by Obaji and Swart (2015) in South Africa investigates religion's role in the poverty and corruption crises in African society. He argues that whilst religion has been instrumentalised in some instances to perpetuate poverty and corruption on the continent, it remains a crucial component of 'Africanness' and could contribute to moral, socio-political and economic transformation. Although this article was not the subject of science or biology, it helped the researcher understand how religion is a critical influencer in infusing values and good character. This study also aims to determine how biology from an Islamic perspective can help students become steadfast in their religion, ignite humanism's spirit, and develop good character.

Based on a report in Kenya by Tamir, Connaughton and Salazar (2020), people's thoughts on whether God's belief is necessary to be moral vary by economic development, education and age. Questions were given to 38,426 people in 34 countries: What is the connection between belief in God and morality? Moreover, how important are God and prayer in people's lives? Across the thirty-four countries spanning six continents, 45% say it is necessary to believe in God to be moral and have good values. However, the answer had significant regional variations. In sub-Saharan African nations' majorities, belief in God is necessary to be moral. Over nine

in ten in Kenya and Nigeria (95% and 93%, respectively) connect faith in God with morality.

In comparison, 84% of South Africans agree. This study helped the researcher conclude the relationship between science and religion. It helped guide the study to establish the relationship between biology and Islam and how it can contribute to the students' holistic development of Aljamea-tus-Saifiyah, Nairobi.

A qualitative study on HIV/AIDS and Islamic religious education in Kisumu, Kenya, by Svensson (2009) describes how HIV/ADS is present in Islamic Religious Education, mainly in secondary schools in Kisumu, an area heavily affected by the pandemic. The researcher argues that the primary role of the local discourse on HIV/AIDS and Islam in IRE is to strengthen notions of religious and moral superiority and boost Muslim students' self-esteem. The data was collected from participants' observations and interviews during five fieldwork sessions from 2003 to 2006. This study's review helped the researcher establish that teaching biology from an Islamic perspective can help students explore how humans can avoid many diseases through valuable Islamic teachings.

According to Wamalwa (2016), in her paper on science and religion, an essential role in developing morality in Kenyan youth in Nairobi elucidates that the youths' character should be emphasised for a moral society tomorrow. He claims that science and religion are unique realities in our lives and that each can contribute uniquely to societal problems. This paper's review was helpful to this study because it identified how religion and science could contribute to overcoming societal problems and biology being the most influential. For example, in many societies, students can

apply knowledge to solve problems like drug addiction and smoking at a very young age.

According to Brooke (2011), most studies on the relationship between science and religion have focused on science and Christianity, with only a few publications devoted to other religious traditions. Few monographs pay attention to the relations between science and religion in non-Christian milieus like Judaism and Islam, as Clarke (2014) suggested. Therefore, several Christian authors have attempted to integrate science and religion, like Haught (1995) and Lamoureux (2008). During the assimilation of western culture in India, Brown (2012) expounds that it prompted various revivalist movements to reaffirm Hinduism cultural values. They put forward the idea of Vedic science.

The Dawoodi Bohra community runs hundreds of educational institutes worldwide, catering to students from every age group. A shared ethos of effectively synthesising tradition with modernity binds these various institutions of learning in a cohesive approach defined by the guiding words of Imam Ahmed al-Mastur, who states: 'It befits our brethren, may Allah give them strength, not to despise any field of knowledge, or shun a particular book, or bear prejudice towards a certain faith. Indeed our philosophy and faith encompass all faiths and all knowledge (Anonymous, 2022).'

Thus, it is essential for the teacher, parents, and the Dawoodi Bohra community to be familiar with how religion and biology impact the learners' attitudes, values, and beliefs. Thus, this study sought to determine the teaching of biology from an Islamic perspective and students' holistic development. From an Islamic perspective, this study feels biology is the pursuit of any knowledge with the

ultimate purpose of understanding the mysteries of creation in contemplation of the creator's existence. From an Islamic perspective, biology should be based on this definition and should necessarily cater to all the needs of human beings, whether that need is spiritual, ethical or vocational. For this reason, biology taught from an Islamic perspective may fill the gap between biology and Islam. Aljamea-tus-Saifiyah, Nairobi students may acquire complete knowledge of the natural world without deferring the scientific facts.

1.2 Statement of the Problem

Syedi Najmuddin (1980) writes that Islam has a holistic view of learning. It considers it impossible to separate humankind's mundane, empirical, and spiritual aspects and their education. Furthermore, Falade (2019) states that the coexistence of science with Christian, Islamic and African religious beliefs can positively impact the students. Obaji and Swart (2015) investigated that religion plays a vital role in transforming society. Lastly, based on a quantitative study by Tamir, Connaughton and Salazar (2020), believing in God is necessary for morality.

Eissa (2019) believes that QPTMs (Quranic and Prophetic Teaching Methods) can develop students' character by inculcating characteristics and life skills. Similarly, Aljamea-tus-Saifiyah ensures seamless integration of spiritual and material knowledge and understanding. The curriculum is designed in light of the Quran and the traditions of Rasulullah ^{SAW,} promoting a well-rounded personality. Therefore, it is mandatory for the students of the higher secondary section in Aljamea-tus-Saifiyah, Nairobi, to be equipped with the Islamic concepts that could help them develop holistically. According to Yaacob (2013), the traditional biology curriculum is void of basic Islamic concepts like acknowledging the creator, understanding His wisdom in

creation, and offering gratitude. Few teachers ignore this approach and believe that the Islamic perspective has no relationship with biology, which contradicts the core founding principles of Aljamea-tus-Saifiyah.

The reviewed studies integrated religious concepts with various other subjects and not biology. Therefore, this study aims to introduce the Islamic perspective in biology teaching to correct that imbalance and fashion the student's understanding of their world on the firm belief in a purposeful creation and develop themselves into good human beings. This study also considers that it is essential for students of Aljamea to be equipped with skills that can help them combat manufactured conflicts against Islam.

1.3 Research Questions

This study was guided by the following research questions:

i. How does teaching Biology from an Islamic perspective help in students' holistic growth in Aljamea-tus-Saifiyah Nairobi??
ii. How do the teachers and students perceive the teaching of biology from an Islamic perspective in relation to students' holistic development in Aljamea-tus-Saifiyah, Nairobi?
iii. What challenges are associated with teaching biology from an Islamic perspective in relation to students' holistic development in Aljamea-tus-Saifiyah, Nairobi?
iv. What measures can be put in place to curb the challenges associated with teaching biology from an Islamic perspective in relation to students' holistic development in Aljamea-tus-Saifiyah, Nairobi?

1.4 Significance of the Study

The findings of this study will benefit society, considering that biology plays a vital role in science and technology. The greater the demand for graduates with a biology background justifies the need for more effective, life-changing teaching approaches. Thus, the learning institutions that apply the recommended strategies derived from the results of this study will be able to train students better. Therefore, the study findings may benefit all stakeholders, including the students of Aljamea-tus-Saifiyah, the teachers, the parents, the administrators, Aljamea-tus-Saifiyah university, and the Dawoodi Bohra community as a whole.

The Dawoodi Bohra community receives graduates from Aljamea who may eventually be part of this community and play an essential and pivotal role in further enhancing and developing the community members by infusing values into society members. The study findings will add knowledge to the already existing literature. This study will also enable other non-Dawoodi Bohra and non-Muslims to understand Islamic education better.

The findings of this study may improve the university in the development of the biology curriculum. Furthermore, it may foster new ways of enhancing knowledge, skills, and attitudes, thus preparing globally competitive students in the future. This study will also help in the advancement of the teaching evaluation approach.

Like all other employees, teachers need to appreciate the role of teaching biology from an Islamic Perspective. The study findings may benefit them as they are the ones who prepare the students to be well-equipped to use the knowledge gained in practice. Teachers will internalise the values of role models and transform the

students' values and attitudes to become better human beings and pious in their religion. According to Mansour (2010), this study drives teachers' thinking and interpretation of religion-related scientific issues. The findings of this study may also inform them of the relationship between biology and the Islamic perspective.

Parents play an essential role; therefore, this study's findings may also benefit the parents. The values, attitudes and good characters infused through teaching biology from an Islamic perspective should reflect students' daily dealings at home. Hence, parents may be able to evaluate now whether their child benefits through this method or not, and it gives parents a voice and participation in curriculum development, implementation and evaluation.

Like the other stakeholders, this study may also benefit the students of Aljamea-tus-Saifiyah by developing their good character and igniting the spirit of humanism. After completing the first four years in Aljamea, students go for community service, where they get an opportunity to conduct educational gatherings in the Dawoodi Bohra community. They can influence the knowledge and experience gained in Aljamea into the Dawoodi Bohra society. One of the things that they can control is teaching Dawoodi Bohra's students about the concept of understanding biology through the Islamic perspective. For instance, Prophet Mohammed ^{SAW} states, "Alcohol is the mother of all impurities" (Raudat Hidayat, 2015). A student of Aljamea can elaborate on how alcohol causes different diseases and ailments to the body that impure it. This study may strengthen society members' belief through knowing and understanding that the teachings and guidance are based on scientific facts; this may help them form a positive relationship between biology and the Islamic perspective.

This study's findings may benefit the researcher and other biological sciences researchers in understanding the relationship between biology and Islam. Furthermore, it may also help them comprehend the various stakeholders' perceptions to assist them in curriculum planning and development and finally identify the challenges and solutions to this study. Furthermore, the study's findings may also help address the contemporary societal challenges because today, education has become a preparation for examinations rather than a preparation for life. Therefore, the focus of the current study will be to create a balance between academic achievements and morality.

1.5 Scope and Delimitation of the Study

The study was conducted in Aljamea-tus-Saifiyah, Nairobi campus. It only targeted the teachers and students of this campus and did not cover the other three campuses' teachers and students. It did not extend to the other three campuses because few studies have been conducted in Nairobi, emphasising the Islamic perspective on science, specifically biology. However, the finding of the study might affect changes in the entire Aljamea-tus-Saifiyah learning institutions.

This study covered the relationship between teaching biology and the Islamic perspective and how effective it is for the students of Aljamea. The study only involved biology teachers and did not deal with other sciences such as chemistry, physics, maths and geography. The study focused on how teaching biology from an Islamic perspective can help students become pious in their religion, compassionate human beings, and have good character. The study covered the fundamentals of Islamic belief to acknowledge the creator and understand His wisdom in creation, the relationship between biology and Islamic perspective, stakeholders' perception, the challenges

encountered, and measures proposed. This study included all boys and girls studying biology from an Islamic perspective in the secondary section of Aljamea-tus-Saifiyah, Nairobi, Kenya.

1.6 Theoretical Framework

The Reconstructionism theory guided this study as a theoretical framework proposed by Theodore Brameld (1904-1987). Nyagah (2006) states that reconstructivism theory puts schools at the forefront of remaking society. Therefore, education becomes the driving force to bring about a change in society.

As per the principles of the theory, resources are available to solve the prevailing problems in society, and education could be the catalyst to prepare and organise future generations to make this possible. According to Laura, Albareda and Sison (2020), collective ownership would enable people to work together for the common good and promote emphasis and public welfare. Therefore, Theodore dedicated his efforts to employing schools as agents for social change. This theory emphasises addressing social questions and the quest to create a better society.

Highlighting the tenets of the theory, Mathews and Rulsamy (2020) state that education has two primary roles: transmitting and modifying culture. When a culture is in a crisis, the second of these roles- changing and innovating- becomes more critical. Therefore, it is to which path one should move forward for the reconstructionists. As per the Muslim society's contemporary social issues, it is essential to choose a way of education built on true Islamic principles.

Theodore believed that creating a new social order through education would fulfil society's fundamental values and harmonise with the modern world's underlying social and economic forces. According to the theory, the school could help

the individual develop socially and learn how to participate in social planning. Reconstructionists use multiple teaching materials such as lectures, readings, textbooks, multimedia components and other resources in a course and consider practical subject matter to serve the central cause of concern. Brameld also paid attention to politics, human relations, religion and arts and suggested searching for answers to human problems by exploring alternative approaches and defending the partialities that emerge from a debate of opposition.

Reconstructionist educators focus on a curriculum that emphasises social reform as the aim of education. In this context, the curriculum can be considered a reflection of the culture. For example, the curriculum taught in Aljamea-tus-Saifiyah upholds the values and customs of the Dawoodi Bohra community. These traditions include those in the broader society and traditions maintained in the school system. Therefore, planning a curriculum often involves various stakeholders, including the learners, parents, community leaders and teachers who serve as the agents of change and reform and help students become aware of the social problems confronting them. In addition, various groups' influence on curriculum planning is also considered. Each group has specific values they would want to incorporate into the curriculum.

1.6.1.1 Strengths of the Reconstructionism Theory

With reconstructionism in education, a student can gain first-hand experience studying real social problems and controversial issues. Most students do not or rarely see any connection between biology studied in school and Islamic beliefs, so this theory enabled them to learn and become pious in their Islamic beliefs.

According to Mayne (2014), social reconstructionism theory helps address society’s real problems and guides students to mitigate them through education.

Moreover, Hardy, Jonen, Möller and Stern (2006) opined that reconstructionism encourages a higher level of thinking as it actively engages learners and results in a higher recollection of learned material because of their engagement in real-life issues.

1.6.1.2 Weakness of the Reconstructionism Theory

According to Davis (2004), the weakness of reconstructionism theory is that it can politicise the curriculum and promote ideologies that influence society's power structure. However, the weakness pointed out by Davis is not considered of high regard because the curriculum in Aljamea-tus-Saifiyah is planned, implemented and evaluated by representatives from His Holiness Dr Syedna Mufaddal Saifuddin ^{TUS}. Hence no other parties are involved. Therefore, no promotion of ideologies occurs, except for implementing the true Islamic principles. Furthermore, the researcher ensured that no other parties infused their ideologies and beliefs except those of His Holiness Dr Syedna Mufaddal Saifuddin ^{TUS}. Thus, reconstructionism theory suits the biology curriculum in Aljamea-tus-Saifiyah, Nairobi.

1.6.3 Application of the Reconstructionism Theory to the Study

This theory guides and aids the students of Aljamea-tus-Saifiyah to become pious in their religion and reconstruct Islamic belief through the curriculum. It deals with education that aims to teach through culture and values. In addition, the theory emphasises ways to help improve an individual socially and educate how to participate in social planning. Therefore, teaching biology from an Islamic perspective helped reconstruct students' understanding of Muslim society's prevalent social problems.

According to Darraz (2012), Muslim society has several contemporary social problems. The first is the empirical scientific view that perceives nature as raw

material for our use. According to Seymour (2016), this causes imbalance and the disharmonic relationship between man and nature. Therefore, teaching biology from an Islamic perspective helped students reconstruct a strong relationship between man and nature. For example, by keenly observing our body's micro phenomena, we can understand the Earth's macro phenomena. Earth destabilises during an earthquake due to the crust's trapped heat, like the human body shivers during a fever.

Another social problem in Muslim society is the mechanistic view of nature. According to Keller (2009), all living things are machines with no life, purpose, or spirituality. Teaching biology from an Islamic perspective can guide the students toward the correct view of nature and reconstruct accurate knowledge to help mitigate Muslims' disbelief. It can demonstrate how every living thing has life, purpose and spirituality. For example, when studying animals' different teeth structures, one can quickly establish that structure follows function. Allah Ta'ala has granted animals a specific form required to survive; goats have broad ridged surface teeth for grinding rigid plant material, while lions and tigers have pointed incisors to kill and tear off the flesh of the prey. Through this example, nature's mechanistic view can be quashed and reconstruct life, purpose, and spirituality in all living things.

According to Harrison (2017), secularism has vanished the holy boundary of nature; to acknowledge the creator, understand his wisdom in creation, pay gratitude towards the bounties provided for life and always seek the betterment of the whole creation. Therefore, teaching biology from an Islamic perspective can help students incorporate temporal and spiritual aspects. For example, when studying, why do birds not have teeth? Instead, they have beaks. If birds had teeth, they would not maintain an efficient posture during flight. The absence of teeth and heavy jawbones helps to

reduce a bird's anterior weight. This allowed students to comprehend Allah Ta'ala's wisdom and benevolence on all creation by granting the best structures for survival.

Furthermore, many scholars like Rülke, Rieckmann, Nzau and Teucher (2020) state that anthropocentrism believes that humans are the centre of all things and that man is seen as the king of the universe. Therefore, human has the right to treat nature arbitrarily, and exploitation and environmental destruction are legitimate. This attitude of man towards nature has led to several globalised ecological problems. Teaching biology from an Islamic perspective can guide the student towards the commitment to environmental awareness and wisdom to protect the environment. For example, studying plants and understanding that plants are the backbone of life on Earth and essential for human well-being. This concept will guide the students to plant trees to protect the environment by making every citizen's responsibility and spreading awareness of the relationship between the environment's health and humans' health.

Teachers in Aljamea, Nairobi are supposed to teach the biology syllabus in a manner that has a connection with al-Quran, making them understand how to acknowledge the creator and how to understand His wisdom in creation; scientific examples should also be given from the revered books of Dawat-e-Hadiyah so that both of the content can be used for reference when needed. Moreover finally, the scientific knowledge that they learn should be in such a way that it can be applied (Abend, 2013) in Masakin Mohammediyah (boys' dormitory) and Rabwat Jibla (girls' dormitory) so that all the knowledge they learnt becomes meaningful in their lives.

1.7 Conceptual Framework

According to Miles (2014), a conceptual framework is either graphically or in narrative form of the main things studied – the key factors, variables, constructs, and presumed relationships. Moreover, Ravitch and Riggan (2017) state that a conceptual framework is an argument for the study and has two parts. First, the argument establishes the study's importance and intended audience. Second, it demonstrates alignment among research questions, data collection, analysis, and rigorous study procedures. The conceptual framework for teaching biology from an Islamic perspective is shown in Figure1.

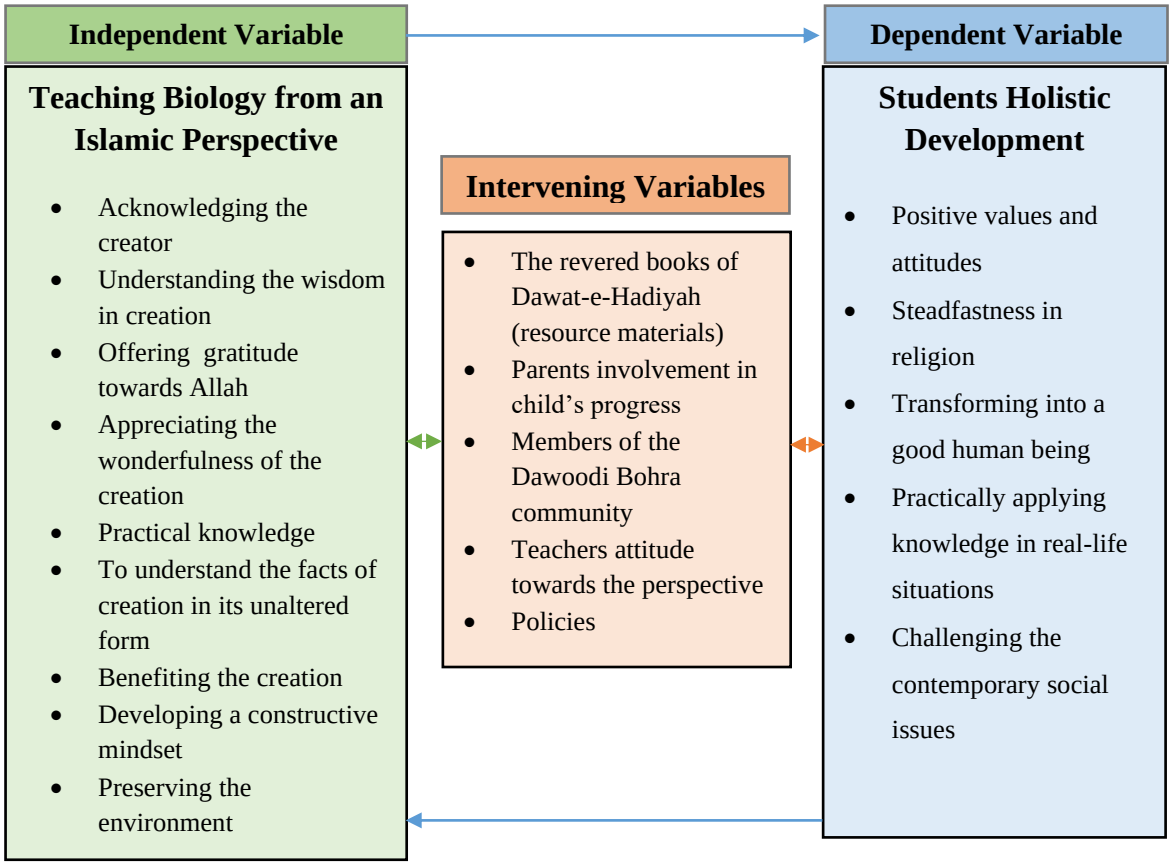

Figure 1: Relationship between Teaching Biology from an Islamic Perspective and Students Holistic Development

Source: Researcher, 2021

The conceptual framework shows that teaching biology from an Islamic perspective implies acknowledging the creator, understanding the wisdom in creation, paying gratitude Towards Allah, and having practical knowledge influence the students' thoughts and values towards learning and understanding the concepts in biology. Other factors under teaching may include acknowledging the creator, understanding Allah's wisdom in the creation, and offering gratitude towards Allah Ta'ala. Teaching biology from an Islamic perspective can also influence the transformation of values and attitudes in the students, steadfastness in religion, and transforming them into good human beings.

The intervening variables are the revered book of Dawat-e-Hadiyah as the resource materials, teachers, parents' involvement, members of the Dawoodi Bohra community, curriculum developers and school policy. All of these variables, when applied correctly, foster students' holistic development. This is likely to bring about the student's desired achievements: develop positive values and attitudes, hold steadfastness in religion, practically apply the acquired knowledge in real-life situations hence transforming into a good human being with sound morals and become able to challenge the contemporary social issues in Muslim society that deviate the believers from the fundamental of Islamic beliefs.

1.8 Operational Definitions of Terms

This study used the following operational definition of key terms:

Aljamea-tus-Saifiyah: Aljamea refers to the Arabic word combined. It is the connotation that mundane and spiritual knowledge has been integrated and taught in this university. Tus is a short vowel. Saifiyah refers to the two Dai who were the benefactors of this university, Al-Dai al-Ajal Syedna Abdeali Saifuddin [R.A.] and al-Dai al-Ajal Syedna Taher Saifuddin [R.A].

Biology: A scientific study of life. In Aljamea-tus-Saifiyah, the biology curriculum covers Cells, Enzymes, nutrients and nutrition, plant biology and the human organ system.

Higher Secondary Section: In this section, students are taught Science from an Islamic perspective. This section consists of four standards, from standard one to standard four. This section can be compared to the Associate Degree in Islamic and Arabic Studies or Secondary School Certificate (SSC)/GCSE/KCSE.

Holistic Development: Students become steadfast in religion and make themselves better human beings, infusing good character and acquiring the required knowledge about the subject, covering the aspects of intellectual, mental, emotional, physical and social abilities.

Islamic Perspective: The fundamentals of Islamic tenets acknowledge the creator's presence and comprehend His wisdom in creation. To teach in the light of the Quran and highlight important aspects of the teaching of Nabi [SAW].

Teaching: In Aljamea-tus-Saifiyah, teachers must incorporate Islamic tenets while teaching science subjects such as biology, chemistry, geography and physics. They

should relate it with verses of al-Quran and traditions of Rasulullah SAW to understand the content and develop critical thinking and good character.

University: The eleven-year duration of studies at Aljamea-tus-Saifiyah is divided into three stages known as *marāhil* (sing. *marahala*). Aljamea's four degrees are conferred at different points throughout these three stages. All stages are taught in Quranic studies, jurisprudence, history, literature, philosophy, modern languages, and empirical and social sciences.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter reviews past literature from other scholars on the teaching and learning of biology from the Islamic perspective. A review of related empirical literature was done as per research questions. First, it examines the critical evaluation of the theory of moral development and then reviews the conceptual and empirical studies on the relationship between teaching biology and the Islamic perspective. It also covers the stakeholders' perceptions, challenges encountered when teaching biology from an Islamic perspective and the mitigation measures. The chapter also summarises the reviewed conceptual and empirical studies and identifies the knowledge gaps.

According to Smith (2020), a literature review guides and helps identify areas, prevent duplication, and give other researchers credit. It also helps identify inconsistencies in previous studies' research conflicts and places the research within the existing literature.

2.2 Review of Theories Related to the Study

2.2.1 Theory of Moral Development

This section reviewed two related theories, pointing out their tenets, strengths and weaknesses. The first theory is the Theory of Moral Development, founded by Lawrence Kohlberg (1984). It proposes that all children are predisposed to moral and ethical thinking, feeling, choosing, and behaving. He acknowledges that a child's interactions with the environment are powerful influences yet propose that thinking is the primary process that allows the child to move into the moral realm. Morality is

viewed as the result of the development of ethical thinking based on the concept of justice. Moral schemas, which are cognitive structures that provide a way to organise important aspects of moral events or ideas, are thought to guide thinking about moral issues, with thinking providing a guide to behaviour.

According to the theory, moral logic is concerned with achieving and sustaining justice. Kendra (2021) states that theory suggests that moral development occurs in various stages; however, three are essential. They are: (1) The earliest stage of moral development is known as preconventional morality. It lasts until a child reaches the age of nine. Adult expectations and the penalties for breaking the rules influence children's decisions. (2) The next period of moral development is marked by accepting social rules regarding excellence and morality. During this time, adolescents and adults internalise the moral standards of their role models and society. This period also focuses on accepting authority and conforming to the norms of the group. (3) Postconventional morality focuses on understanding abstract principles of morality.

The principles mentioned earlier can be directly applied when teaching and learning biology from an Islamic perspective by making the students understand how responsible they are to the environment and society from a micro perspective. For example, Deforestation has a drastic effect. Millions of animals, especially those who nest on trees, lose their homes. Humans are also affected in subtle ways since deforestation alters the natural balance. Today, the environment faces a significant problem of increasing CO^2 levels. Generally, trees remove CO^2 from the air by photosynthesis. Today these forests are being cut down, due to which more CO^2 remains in the atmosphere. This creates an imbalance in Earth’s temperature, which

affects the whole ecosystem. Islamic laws and principles have always opposed deforestation and promoted afforestation. The term “afforestation” means "the establishment of trees on non-treed land. Through learning this, the students may develop morality towards the environment.

Huitt (2012) highlights the advantages that understanding these stages offers helpful insights into how children and adults make moral choices and moral thought can impact decisions and behaviours. Furthermore, Oleh (2017) states that the theory reinforces that as our thinking matures, our behaviour becomes less selfish and more caring, which means more moral.

In addition to the advantages, Susman (2021) states some of the disadvantages of this theory, stating that Moral reasoning does not equal moral behaviour. Although the theory is concerned with moral thought, there is a significant difference between understanding what we should do and doing it. Moral thinking may be influenced by compassion, care, and other interpersonal sentiments. As a result, moral reasoning may or may not lead to moral behaviour. Furthermore, he points out that Kohlberg's theory of moral development overemphasises that when making ethical decisions, one should consider the notion of fairness.

2.2.1 The Devine Command Theory

The Devine command theory proposed by philosophers including William of Ockham (c. 1287 – 1347), St Augustine (354-430), Duns Scotus (c. 1265 - 1308), and John Calvin (1509-1564) has presented various forms of divine command theory, which explains morality in the religious or external being, God, perspective (Harriet, 2011)The main idea is that what makes an action right or wrong depends on God’s commands. Central to the divine command moral theory, the idea is that character's

right and wrong, good and bad, are determined by God's commands. According to this theory, morality comes from God alone, with no other sources.

According to Denford (2020), this theory entails that the Devine command theory rejects the idea that things are good and that God commands things because they are good. Instead, It is a reverse or inverse to that theory, which says things are good because they are commanded or declared good by God. This proves that God is the centre of everything. God is the source of morality, and people only act according to God's commands; hence the Devine command theory becomes obligatory. People do things because they are obliged to, not for morality or anything, but because it has been commanded.

A few of the strengths of this strategy are that it provides an objective metaphysical foundation for morality. Such truths fit nicely within a theistic framework for those committed to objective moral facts. Furthermore, this theory offers a metaphysical basis for morality and lays the foundation for ethics.

On the other hand, this strategy's weaknesses are that the theory is implausible for some reasons, such as lack of rationality, freedom denial, and different understanding and conception of God. Also, the theory lacks the plausibility of its fallacious approach. The Devine command theory appeals to authority to explain or justify its morality. That authority is God, a fallacy to appeal to authority for one's responsibility. One example is that it may use the holy book to show and reveal what God wants, out there is a high probability that the religious leaders may say what is in their interest in God's name (Denford, 2020).

The review of this theory benefited this study because it helped the students establish and understand various signs Allah Ta'ala inscribed in all the creations.

Each sign indicates His greatness, wisdom, and perfection in design. Therefore, studying biology from an Islamic perspective guided the students to ponder and witness these signs profoundly.

2.3 Review of Conceptual and Empirical Studies

2.3.1 Teaching Biology from an Islamic Perspective Help in Students' Holistic Development

Teaching biology from an Islamic perspective means teaching in the light of al-Quran al-Majeed, narrations of Prophet Mohammed [SA] and with the context of the statements of Aimmat Tahereen [AS] and Duat Mutlaqeen [RA]. This kind of education is known as Islamic Education. Available literature shows that studies have been done on the relationship between the Islamic perspective and teaching biology. For instance, Ghareeb (2011) in Palestine has written on the diverse aspects of genetics and its application to the Quran and Hadith concepts. The author has compared passages from the Quran and Hadith with modern concepts in genetics, such as recessive inheritance, genetic counselling, genetic variation, genetics-environment interactions and gender determination.

This paper aims toward a fresh understanding of Islamic scripture that reveals references to genetics that predate recent discoveries and further suggests a need to explore possible links between biology and religion. The author scanned the Quran by manual reading, and narrations of hadith were searched for the same key terms using the online database at dorar.net and then verified using the online database at muhaddith.org. However, the researcher did not find research questions and has not mentioned how this knowledge can be utilised in schools and colleges, especially in the biology syllabus.

In one instance, the author quotes from the Prophets SAW narrations that a man was instructed to respect the mother before the father. The author then analyses the narrations through a biological perspective and writes that Prophet's SAW instruction was due to the natural configuration; regardless of the offspring's sex, cytoplasmic inheritance is exclusively maternal. This review helped the researcher understand how teaching biology from an Islamic perspective may foster steadfastness in the learners' religion because Prophet SAW stated science.

In conclusion, the author suggests the need to investigate further genetic discoveries, such as environmental factors that influence gender determination. These investigations would encourage seeking the science and knowledge of creation, a religious obligation for the believer. However, the researcher feels that Quran and hadith should not be taken as scientific scripts only. The primary purpose of these scripts is the guidance of humankind. Therefore, this study seeks to highlight those aspects of advice through teaching biology from an Islamic perspective, acknowledging the creator, offering gratitude for the bounties provided and understanding His wisdom in creation.

Studies have been done on faith and HIV therapies. For instance, Tocco (2011) has studied faith and HIV therapies in Islamic Northern Nigeria, highlighting Prophet Mohammed SAW *hadith* that every disease has its cure. This study used ethnographic data collected in Kano, northern Nigeria's largest city, to examine Muslims' perspectives on HIV treatment in the context of popular health beliefs and expand therapeutic options. According to the author, Northern Nigeria has one of the highest levels of HIV prevalence among societies that are predominantly Muslim.

The research found that HIV/AIDS practitioners and patients regularly cite passages from classical Islamic texts, especially when discussing the supposition that Allah sends a cure to humankind for every disease. Without denying the existence of a supernatural remedy for HIV, many Muslim patients on antiretroviral therapy (ART) and the primarily Muslim biomedical personnel who treat them are sceptical that the cure has yet to be disclosed to humans. Some religious scholars and practitioners working in the Islamic traditions of prophetic medicine believe that HIV can be cured entirely if one has enough confidence in the Quran's divine power; others believe that natural ingredients recommended in Islamic texts can cure HIV. Such claims challenge the biomedical view that HIV infection may be treated as a chronic illness but not cured with the proper therapy regimen. As a result, these claims challenge antiretroviral-based care's growing therapeutic predominance in Nigeria.

Despite recent efforts in Nigeria to express a unified Islamic perspective on HIV and AIDS, these data imply that substantive disputes about the disease's aetiology, therapies, and curability persist. Practitioners' and patients' interpretations of Islamic literature describing Allah's, humanity' ailments, and remedies are influenced by the medical systems in which they work.

The study did not provide research questions; target groups and data collection instruments were not stated, indicating the study's incredibility. Therefore, the current study intends to fill the gap and provide all of the above. Furthermore, the author's statement that every disease has its cure is not valid for HIV because, according to the dominant Western biomedical understanding of HIV, it is a virus for which there is no cure. However, the researcher disagrees with this statement. According to Islamic

belief, Allah Ta'ala has cured every disease. It is for humans to contemplate His vast and wonderful creation and discover these cures. If we look at the past, humankind suffered from malaria, pox and flu.

Nevertheless, they discovered a cure already present in Allah's creation due to medical science development. Therefore, the research believes that this virus's treatment is also current and is yet to be discovered. This is one of the relationships between biology and the Islamic perspective; having a complete grasp of Allah Ta′ala's creation is beyond human reach. As our knowledge increases and technology advances, more avenues of discovery open up. A perfect example is cells unknown to people earlier until the microscope's invention.

A descriptive paper by Aden (2017) on the integration of Islamic and secular education in Kenya unites literature on the contemporary thought and practice of integrating secular and Islamic education in Kenya. Integrated education aims to bring two educational paradigms with opposing ideas together.

On the one hand, Islamic education is a portion of Islamic philosophy that aims to indoctrinate youngsters into the Islamic faith to mould their character and prepare them to become responsible citizens and religious leaders who would ensure the Islamic religion's continuity. On the other hand, education's principal goal is to educate students for gainful employment in a secular context. The theory behind knowledge integration is that everything is connected to everything else. Hence, religious and secular education, linked to each other, should not be taught in isolation because they share the goal of eventually educating them.

One of the essential relationships the author has highlighted in his paper between Islamic education and secular education is that through integrated education,

the development of various aspects of the student (mind, body, emotion and spirit) is possible, further developing them into a better person. Integrated education promotes pupils' spiritual, moral, cultural, mental and physical development and prepares students for adult life's opportunities, responsibilities, and experiences.

The paper did not mention the relationship between biology and the Islamic perspective but highlighted some critical aspects of religious education's relationship with secular education; therefore, the current study intends to fill the gap and pan out the relationship between teaching biology and Islamic education perspective.

2.3.2 Teachers Perception Towards Teaching Biology from an Islamic Perspective with Students' Holistic Development

Available literature shows that studies have been done in different parts of the world. Memon, Chown and Alkouatli (2020), in a qualitative study on descriptions and enactments of Islamic pedagogy, highlighted reflections of alums from an Islamic teacher education program in Australia. This study explored educators' perspectives on Islamic pedagogy in practice after immersion in a teacher education programme designed for Islamic school educators.

The study was guided by this research question: What are alum educators' reflections on Islamic pedagogy in practice after immersion in the Islamic teacher education programme? Twenty alumni participated from eight countries; five were male, and fifteen were female. Research conversations were semi-structured, characterised by two open-ended questions for 45 minutes. The criteria for selection were educators who identified as Muslim and were Islamic teachers' education program alums. Interviews were manually transcribed to form a data corpus, coded for keywords and then thematically analysed. This study contributed new knowledge

to the under-researched area of Islamic pedagogy, highlighting that Islamic pedagogy renewal must include aspects of faith perspective and educational values that influence praxis in light of the unique visions of Islamic schools. This study also highlighted challenges such as a disconnect between purpose and practice in Islamic schools in western contexts. However, this study did not propose solutions for the given challenges; therefore, this study seeks to fill in the gap by providing solutions.

The researcher concurs with the authors in defining Islamic pedagogy as educational values, concepts, and Islamic perspectives rooted in Islamic tradition that inform educational praxis for Muslim students. These concepts are mentioned in the Quran, derived from Prophet Mohammed's ^{SAW} life, reflecting the purpose of learning in Islam and holding lessons for Muslim educators. Furthermore, one of the participants' perceptions was written as "it is not just about coming to school and taking part in these subjects and going home, but it is about creating a change from inside the classroom to outside being involved in the larger community." Moreover, classroom lessons should also focus on character education through the formal and informal curriculum by engaging the students with the themes such as honesty, mercy and love. The researcher highlights these themes while teaching biology from an Islamic perspective to acknowledge the creator, comprehend His wisdom, and offer gratitude for the bounties.

This study aims to find and analyse the science curriculum based on the Quran used in schools to improve the quality of student personality. This research used descriptive qualitative analysis. The study was conducted in High School Al-Muhajirin Purwakarta West Java. The study proclaims that using a science curriculum based on the Quran can change the quality of students' personalities; furthermore, it

can improve students' personalities to become religious people, have science in Islamiah, and have good behaviour. Therefore, learning science in schools needs various improvements and quality improvement curricula. This is implemented as a form of effort to improve the quality of education and students in school.

The study did not provide research questions that hindered understanding the study's total capacity. Therefore, this study aims to explain the Islamic perspective with defined research questions. However, the study highlighted the central concept of how teaching science and especially biology from an Islamic perspective can aid in developing good character in students.

Furthermore, Ajem and Memon (2020) outlined seven principles of Islamic pedagogy in this study. For pedagogy to be called Islamic, it must reflect ethos based on the Quran, teachings and practices of Prophet Mohammed ^{SAW}, intellectual and spiritual heritage of his followers. Furthermore, it must develop students' intelligence, faith, morality and character, and practical knowledge should address worldly responsibilities. Although the authors have mentioned these seven principles of Islamic pedagogy, the researcher seeks to elaborate on them by applying them specifically while teaching biology and measuring the students' holistic development.

A study that explored the perception of mental illness among South African Muslim students, non-Western cultural approaches to psychology, according to Gibson (2014), can provide insight into what adjustments may need to be included in mainstream psychology. The author suggested that Islam has a rich psychological tradition that makes it a good candidate for research to increase the inclusiveness of mainstream psychology.

The researchers looked into Muslim students' attitudes toward mental illness and psychology. A semi-structured strategy was used to conduct four focus groups of five to eight undergraduate psychology students. The resulting data were analysed using thematic analysis within a constructionist framework, and three main themes were identified. Three main themes were identified: stigma, faith in treating mental illness, and Islam's interaction with psychology. Participants held conflicting views on prayer as an intervention for mental illness and integrating Islam into psychotherapy. Ultimately, the results suggested that psychologists should learn about Islamic culture to understand their Muslim clients better rather than integrate Islam into psychology.

The study did not provide research questions and the target audience; therefore, the current study seeks to fill the gap. Furthermore, the researcher concurs with the author that Islamic knowledge should be primarily used to educate Muslims. This may develop a sense of pastoral responsibility in the students and steadfastness in their religious beliefs. Similarly, teaching biology from an Islamic perspective can also help students gain extensive knowledge about Allah’s creation and the contributions of Muslim scientists in biology.

In a study on Islamic education in Kenya from the colonial period, Isaack (2018) states that Islamic education in Kenya has existed side-by-side without dissonance but more often than not with conflicts and disagreements. Furthermore, the failure of Muslim students to achieve the same level of participation in education and other academic success compared to members of other faiths has made many Muslim scholars find an innovative and alternative system of education that allows the students to receive secular and spiritual education at the same time and same venue.

The author further writes that Islamic education has caused duality in Kenya, where formal education is carried out in schools and spiritual in Madrassahs. This has coupled with Parent's fears for their children to lose their identity as Muslims due to the substantial non-Islamic influence in the traditional schools. Therefore, some Muslim organisations have established integrated Islamic schools in predominantly Muslim regions of North Eastern, Coast province, Nairobi, and Western provinces.

The study's objective was to establish the penetration of Islamic education in Kenya from the colonial period. The study found that a student can understand what is meant by a genuinely religious approach to life through these integrated schools. However, this study could not provide research questions, conceptual framework, target population, sample and sampling technique and research design. Therefore, the current study seeks to fill in the gap in the missing parts of the research.

The researcher concurs with the author on observing the secondary schools' curricula. Kenya's Institute of Education has compiled a list of national educational objectives, and two of the objectives are closely related to religious education. Goal four aims to promote sound religious values that propose developing attitudes, knowledge, and skills that help Kenyan students grow into good Kenyans with self-discipline, self-reliance, and integration. Goal six aims to promote respect for and develop Kenya's rich and varied cultures to create positive attitudes among students and construct an understanding of the past and present cultures within the borders of Kenya and their rightful place in contemporary society with religious tolerance. The researcher seeks to fulfil these national goals through the current study of teaching biology from an Islamic perspective in Aljamea-tus-Saifiyah so that the students of Aljamea can contribute to the national goals and be part of a multicultural community.

2.3.3 Challenges Faced when Teaching Biology from an Islamic Perspective

Studies on challenges encountered when teaching biology from an Islamic perspective have been conducted globally. Hanley (2012), for example, investigated the views of teachers and 14-16-year-old students in England on the origin of life's teaching in science and religion education. It focused on discrepancies between what pupils are taught in school and their religious or cultural origins.

The study employed a mixed-methods approach. Teachers were polled and interviewed to understand their feelings about whether the topic was controversial and whether religious explanations should be included in science classes. Student surveys, student pairs, and small focus group questionnaires, on the other hand, sought students' opinions on how life on Earth began, including a qualitative component to see if they thought it was a complicated topic.

The schools represented three contexts: a Christian faith school, a non-faith school with a predominantly Muslim catchment, and two non-faith, mixed catchment schools. Grounded theory guided the design and analysis. The sample for this study was the students who followed the National curriculum aged 14-16. The study was guided by four research questions: What is Science and RE teachers' opinion about teaching scientific and religious explanations of the origin of life? What are students' views about the scientific and religious explanations of the origin of life? What are the differences between how the origin of life is dealt with in Science and RE classrooms? Are there differences between students' religious or cultural beliefs about the origin of life and what they are taught in school? If so, how do they accommodate these?

According to the author, most science teachers referenced religious beliefs in teaching the origins of life, while most religious education teachers mentioned scientific theories. Students tended to perceive science as based on fact and closed to questioning or discussing their concerns. In contrast, religious education had a more interactive pedagogy, encouraging challenges and expressing opinions. However, there was little cross-departmental coordination, raising concerns about erroneous scientific theories being taught in religious education and potentially insensitive, counter-productive treatment of religious students in science.

A few challenges the author has stated are that teachers' worldviews and beliefs, particularly regarding religion, interact with their knowledge and affect their teaching. Furthermore, diverse personal perspectives impact how science is presented to pupils. According to the findings, teachers did not always recognise how this issue affected students who needed assistance reconciling conflicts between science and their religious beliefs. Finally, the author suggested that the engagement typology might create a simple questionnaire that instructors may use to gauge student response before approaching potentially sensitive or contentious issues. Furthermore, building up cross-curricular work may increase teacher knowledge and confidence and provide better support for students.

The study reviewed has extensively discussed the theory of evolution and how teachers and students of different religions view and deal with it during science lessons. However, the study did not provide solutions to the challenges the teachers and students face when relating other theories of the origin of life with religion. Therefore, the current study seeks to explain how students may deal with the theory of evolution under Islamic values without differing scientific knowledge. Furthermore,

the current study explored the challenges faced by Aljamea-tus-Saifiyah, Nairobi, when studying the theory of evolution.

Nyangweso's (2018) paper on the challenges of instructing and researching religions of Africa: Towards Pedagogical Effectiveness in the 21st century writes that studying African religions has presented challenges to the students and instructors. Some of these challenges include the nature of African religions, adequate resources, specific communities' beliefs, a history of misconception and marginalisation, pedagogy, theoretical framework and approaches to instruction. These challenges continue to affect the effectiveness of African religion as an academic field, especially in the 21st century.

The author of this paper has described these challenges to highlight how they inhibit this field's effectiveness and argue that African religions as an academic field of study are central to religious and world knowledge. The author retorts that while recent efforts to incorporate African studies and beliefs into mainstream academics should be applauded, more work is needed to promote the field's effectiveness in the 21st century. The author suggests that an intersectionality approach should be employed to interrogate the varied facets to which these challenges intersect to inhibit progress and how these can be deconstructed for effectiveness. Furthermore, African religions must seek to compete and remain relevant by embracing creatively and innovatively frameworks and tools that engage a modernizing world. Islam is one of the African religions; therefore, the current study seeks to exhibit the effectiveness of the Islamic perspective on biology and how it may resourcefully contribute to the modernizing world.

Fatuma (2012) studied the role of the Islamic integrated education programme in learners' moral and religious development in selected Islamic secondary schools in Nairobi County. The objective of this study was to find out the content of the religious curriculum offered to the learners to achieve its goals. It used the triangulation of theory and methodologies, which ensured a thorough investigation into the problem. It employed the religious, sociological theory of Emile Durkheim, ethnomethodological approach and grounded theory as a base for developing the study methodology.

The study was qualitative and quantitative in approach to ensure an in-depth investigation. The target population for this study were students of WAMY High school, Rasul Al-Akram girls' secondary school, Muslim Academy boys and girls and Maina Wanjigi secondary school. The research looked at the problems that the Nairobi IIEP system is facing. These issues are seen to be impeding the system's growth and establishment. In addition, the report included suggestions for the IIEP's future.

A few challenges the author quotes are that the diversity of Islam into sects causes hindrances in forming a fixed curriculum. However, one has to note that all the Muslims believe in Allah and the teaching of His Prophet Mohammed Rasulallah ^{SAW}, so for the starting point, one can establish the learning from the Quran, and the teaching of Prophet Mohammed ^{SAW} because a majority of the answers to the problems are found in these teachings.

2.3.4 Measures to Curb the Challenges Associated with Teaching Biology from an Islamic Perspective

Studies on measures that can be put in place to curb teaching biology challenges from an Islamic perspective have been conducted globally. For instance, Ali (2014) explores perspectives on drug addiction in Islamic history and theology in an article. He claims that Islamic scripture and theology provide the resources needed to establish rigorous theological models to explain addiction, which can then be utilized to develop programs to assist Muslims struggling with addiction.

The author has tried to explore three models that can be employed to understand drug addiction from an Islamic perspective. Two are preventative models based on understanding society rooted in a shame culture. In contrast, the third model, called Millati Islami, practised in the USA, is founded on the Islamic understanding of *tawba* (repentance). The article aims to answer the following questions, how does Islam view substance addiction? What happens to the soul of the person suffering from an addictive disorder? What happens to his relationship with God?

The author has attempted to focus the models on the exterior of the human being (addiction as crime) moving towards the interior (dependence as a spiritual disease); and focused on the "shame" aspect of Islamic theology, as well as its guilt aspect. The article concludes that these models address the social and spiritual aspects of the human being and can be used as exemplary intervention and prevention models.

The review of this article was beneficial for this study to evaluate how Islamic teachings are helpful for a single person and society. They can also widen this perspective when going for community service and foster the members of the society on Islamic principles. Therefore, teaching biology from an Islamic perspective in

Aljamea-tus-Saifiyah guided the students toward morality and developing social intelligence.

Juma (2012), in his study, states the challenges of teaching Islamic religious education to the spiritual and academic formation of secondary school students in Nairobi, Kenya. The author mentions that the primary goal of any religious education is moral refinement, spiritual formation and noble character building. Therefore, Islamic religious studies are essential in developing various skills of the students.

The framework of the study was derived from the Quran and Hadith, and various perspectives were used. The study adopted systematic and purposive sampling procedures to select 12 secondary schools out of 37 that offer Islamic religious education in Nairobi. Four categories of respondents were selected. Teachers and students in Islamic spiritual education, directors and managers of Islamic organizations such as the Islamic Foundation, the Ummah Foundation, the Supreme Council of Kenya Muslims, and curriculum planners and developers are among them. Data was gathered through interviews and questionnaires and analyzed using frequency distribution tables and percentages.

The study showed multiple challenges facing the teaching of Islamic education; the first one is the shortage of trained teachers. The current challenge is that Aljamea-tus-Saifiyah can be mitigated as biology from the Islamic perspective is taught by teachers trained in this field. Other challenges include inadequate teaching and learning resources and a lack of capacity building and staff development programmes. The major challenge identified by the researcher is that few students, parents and teachers have a negative attitude towards the subject. Therefore, the

current study seeks to find solutions to teaching biology from an Islamic perspective that can benefit students academically and morally.

2.4 Summary of Reviewed Literature and Identification of Research Gap

Chapter two reviews the related literature that addressed biology, science, religion, Islam, perceptions of teachers and school staff, and how good character and habits can be acquired if science is given a religious dimension. It also indicated a need in Muslim society to teach biology from an Islamic perspective. It influences a change in values and attitudes in Muslim students, though it has not been extensively studied.

Most of the related literature reviewed was global since more Islamic countries and Muslims are outside Kenya and Africa. Moreover, there are more dedicated Islamic universities globally. However, few studies have been conducted in Africa and Kenya about Islamic science and general Islamic education. Moreover, most of the studies were either singly quantitative or qualitative, which has limitations. For instance, qualitative research has limitations of neither verifiable nor statistically representative results. Hence it cannot be generalized to the study population. Quantitative research instruments are vulnerable to errors in measurement and flawed sampling techniques. Most of the reviewed studies did not capture the validity and reliability of research instruments, that might have compromised the study findings. The current study ensured that the instruments had explicit content to gather the required information from the participants. The current study used a convergent parallel mixed-methods design, specifically the triangulation design, which capitalizes on the strengths of qualitative and quantitative research while offsetting the drawbacks of each method.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The chapter presents the research design that guided the study. It describes the study area, target population, sample and sampling techniques, data collection instruments, validity, reliability and trustworthiness of the research instruments. It further captures pilot testing of research instruments, data collection procedures, data analysis, and ethical considerations that were adhered to during the study.

3.2 Locale of the Study

The study was conducted at Aljamea-tus-Saifiyah University, located in Saifee Park in Karen, Nairobi County, Kenya. The institution borders the national park to the East, Mutty court residences to the West, the Catholic University of Eastern Africa to the North, and Karen residences to the South. The university is within Nairobi city boundaries, with good access to essential city amenities such as the internet and other infrastructure. Aljamea-tus-Saifiyah seeks to provide young Dawoodi Bohra men and women with an education based on the principles of the Fatimi philosophy. The eleven-year programme in Aljamea covers higher secondary, undergraduate and graduate education. Although students specialise in select disciplines, its philosophy mandates that they acquire from and appreciate a broad spectrum of branches of knowledge. In this respect, students study subjects within the empirical sciences, social sciences and the humanities and select modern languages. Therefore, this area is ideal for teaching biology from an Islamic perspective and students' holistic development.

3.3 Research Design

According to Creswell (2018), the function of a research design is to ensure that the evidence obtained enables you to effectively address the research problem logically and as unambiguously as possible. This study used a mixed-method approach, mainly convergent parallel design comprising quantitative and qualitative research designs. According to Edmonds and Kennedy (2017), the convergent-parallel approach is contemporary. It involves simultaneously collecting qualitative and quantitative data and combining and comparing these multiple data sources. This approach consists of collecting different but complementary data on the same phenomena. Thus, it is used to converge and subsequent interpretation of quantitative and qualitative data. According to Wisdom (2013), mixed methods are instrumental in understanding contradictions between quantitative and qualitative findings and reflect participants' perspectives. Mixed methods give a voice to study participants and ensure those study findings are grounded in participants' experiences.

This study used a cross-sectional survey research design to collect quantitative data. According to Thomas (2020), a cross-sectional study is a type of research design in which the researcher simultaneously collects data from many individuals. The advantage of a cross-sectional study is that it is an easy way to gather initial data and identify correlations. Therefore, it helped the current study investigate teaching biology from an Islamic perspective and students' holistic development in Aljamea-tus-Saifiyah, Nairobi, Kenya. In addition, the study collected information across various categories of teachers and students in the same institution.

For qualitative data collection, a phenomenology approach was used. According to Neubauer, Witkop and Varpio (2019), a phenomenology approach seeks

to describe a phenomenon by exploring it from the perspective of those who have experienced it. The goal is to explain the meaning of experiences regarding what was experienced and how it was experienced. The study targeted students, teachers and administrators who narrated their lived experiences in the teaching and learning of biology from an Islamic perspective. Through this process, the researcher arrived at a more profound understanding of the phenomenon of teaching and learning biology from an Islamic perspective by converging both qualitative and quantitative data.

3.4 Target Population

According to Nghiem (2018), the target population is the group of individuals the study intends to conduct research and draw conclusions. The study targeted the higher secondary section of Aljamea-tus-Saifiyah, Nairobi, Kenya, with 110 teachers, 400 students from this campus and 25 administrators. This gives us a total of 535 participants. The majority of the student and staff are from the Dawoodi Bohra community. The entire student population and a more significant percentage of the staff reside within the university hostels and staff residential houses.

The study targeted teachers because they are directly involved in teaching and learning activities; therefore, they were essential in informing various students' holistic development in teaching biology from an Islamic perspective. This study also targeted the students because their holistic development was measured from an Islamic perspective while studying biology. The other target population were the administrators because they played an essential role in determining the implementation of the biology syllabus from an Islamic perspective. Therefore, the study relied on them to give critical information about their views on teaching biology from an Islamic perspective.

3.5 Sampling Procedures and Sample Size

According to McCombes (2021), a sample is the specific group of individuals the researcher will collect. The sample size for this study was 40 students from standard one to four, 11 teachers teaching biology in these classes and 3 administrators. Different sampling procedures were used to select the sample frame of the study.

3.5.1 Sampling of Teachers

There are 110 teachers in Aljamea-tus-Saifiyah, Nairobi, Kenya. Non-probability sampling, particularly the study, used expert-purposive sampling to select 11 biology teachers as key informants. The teachers possess critical information about the students' holistic development because the researcher believes these individuals fit the profile of the people he needs to reach. According to McCombes (2021), expert-purposive sampling involves the researcher using their expertise to select the most useful sample for the research. Sampling was done according to the guidelines Mugenda and Mugenda (2013) provided. When the study population is less than 10 000, a sample size of 10 and 30% is a good representation of the target population; hence 10 % is adequate for analysis.

3.5.2 Sampling of Students

With a total student population of 400 students, the study targeted a sample size of about 10 per cent of students to participate according to the population sampling guidelines Mugenda and Mugenda (2013). The researcher used a stratified random sampling method to identify the research participants from standard one to four of Aljamea-tus-Saifiyah, Nairobi. According to McColl (2019), stratified random sampling involves dividing a population into smaller groups, known as strata. The

strata are formed based on members' shared attributes or characteristics. It is meant to be an unbiased representation of a group. Therefore, students were stratified into four groups, standard one, two, three and four. This was done because each standard studies a different biology syllabus.

After the stratification, simple random sampling was done among the strata to select the sample size for this study. This was done by writing *yes* and *no* on papers and asking participants of standard one to four, male and female, to pick a number. Those who got yes were legible to participate in this study, while those who chose no did not participate. This ensured that all the students from standard one to four of Aljamea-tus-Saifiyah, Nairobi get an equal chance to participate in the survey because these students are the key informants in teaching biology from an Islamic perspective. In addition, these are the students currently studying biology from an Islamic perspective.

3.5.3 Sampling of Administrators

The researcher used non-probability sampling, particularly expert-purposive sampling, to select three administrators to be key informants. This is because these 3 administrators observed the implementation of the biology syllabus according to the Islamic perspective in all the standards of the higher secondary section in Aljamea-tus-Saifiyah. Therefore, their observation determined whether or not the intended syllabus was taught and teaching and learning took place.

Table 1

Population and Sample Matrix

Category	**Target Population**	**Sampling Procedure**	**Sample**	**Percentage**
Teachers	110	Purposive-Expert	11	10%
Students	400	Stratified and Simple Random	40	10%
Administrators	25	Purposive-Expert	3	10%
Total	**1044**		**54**	

Source: *Field Data 2021*

3.6 Description of Research Instruments

According to Mugenda & Mugenda (2013), research instruments are designed tools that aid in collecting data for analysis. The study used a questionnaire for quantitative data and an interview guide for qualitative data. There are several types of research instruments.

3.6.1 Questionnaire for Students

According to Denzin and Lincoln (2011), a questionnaire is a set of questions typically used for research purposes that can be qualitative and quantitative. Therefore, the questionnaire was considered an appropriate tool for the study since it can collect extensive data from many participants at one place at a time.

The questionnaire consisted of five sections addressing the research questions. Section A helped gather general information about age, gender and background. Section B had questions about how teaching biology from an Islamic perspective help students' in their holistic development. Section C consisted of questions about

teachers' perceptions, students and parents on teaching biology from an Islamic perspective. Section D consisted of questions on the challenges of teaching biology from an Islamic perspective. Finally, section E comprised questions about solutions for improving biology teaching from an Islamic perspective and students' holistic development, as indicated in appendix II.

3.6.2 Interview Guides for Biology Teachers

According to Kumar (2011), personal interviewing is undertaken to reach the objectives since it is the most versatile and productive method for communication. The main advantages of interviews are: that they help obtain detailed information about personal feelings, perceptions and opinions. Moreover, they allow more detailed questions and usually achieve a high response rate. The interview guide was divided into four sections. Section A helped gather demographic information about their age, gender and years of experience in teaching. Section B consisted of questions about how teaching biology from an Islamic perspective help in students' holistic development. Section C comprised questions about their perceptions of teaching biology from an Islamic perspective. Finally, section D asked them how they measure students' holistic development through the Islamic perspective, the challenges they face, and their suggestions, as indicated in appendix IV.

3.6.3 Interview Guides for Administrators

The interview guide will be divided into four sections. Section A helped gather demographic information about their age, gender and years of experience in teaching. Section B consisted of questions about how teaching biology from an Islamic perspective help in students' holistic development. Section C comprised questions about their perceptions of teaching biology from an Islamic perspective.

Finally, section D asked them about implementing the biology syllabus from an Islamic perspective, how teachers measure students' holistic development through the Islamic perspective and the challenges they face, and suggestions for the challenges indicated in appendix IV.

3.7 Validity, Pilot Testing and Reliability of Research Instruments

3.7.1 Validity of the Instruments

According to Heale (2015), the validity of instruments assesses the extent to which the instrument measures what it is designed to measure. Research instruments were subjected to a content validity test, whereby they were given to experts in research to critique and check for relevance and clarity. Furthermore, content validity also informed the researcher on how items used in the survey represent the content domain, how clear they are, and how they maintain the theoretical factor assessed by the factor analysis (Middleton, 2019).

3.7.2 Pilot Testing

Pilot testing ensured that the instruments measured what was intended to measure. According to Wright (2021), pilot testing is a rehearsal of the research study, allowing the researcher to test the research approach with a small number of test participants before conducting the main study. Before conducting the actual study, the researcher pilot tested the instrument with the students, administrators, and teachers of Aljamea-tus-Saifiyah, Karachi, Pakistan, before collecting data Aljamea-tus-Saifiyah, Nairobi, Kenya. The researcher sought to determine the desired results without modifying or changing anything. This improved instruments' efficiency and ascertained their validity and reliability. The researcher has chosen the Karachi branch of Aljamea-tus-Saifiyah because of its resemblance to Aljamea-tus-Saifiyah, Nairobi,

in its curriculum, infrastructure and teaching staff. Therefore, it is predicted that the results the researcher gained from the pilot testing helped determine the research instruments' validity and reliability.

3.7.3 Reliability of Questionnaires

According to Dudovskiy (2019), research reliability is how the research method produces stable and consistent results. A specific measure is reliable if its application on the same measurement object often produces the same results.

Cronbach Alpha reliability coefficient was used to check the reliability of the questionnaires. According to Salkind (2015), a rule of thumb for interpreting alpha for dichotomous questions or Likert scale questions is 0.90 and above, excellent 0.70-0.90, good 0.50-0.70, acceptable 0.50 and below, inadequate or unacceptable. If the threshold is not met, the items in the questionnaire will be subjected to revision. Therefore, the researcher ensured that the processes within the study was ported in detail; this enabled future researchers to repeat the work and get the same result.

3.7.4 Trustworthiness of the Qualitative Instruments and the Research Process

Qualitative research collects and analyses non-numerical data to understand concepts, opinions, or experiences. Thus, it can gather in-depth insights into a problem or generate new ideas for research, rather than effect predictions or generalize. However, Bhandari (2019) states that validity in qualitative research depends on the researcher's ability to identify and correct errors before they are built into the developing model and subvert the analysis. Therefore, Noble (2014) asserts that all qualitative researchers must incorporate strategies to enhance the credibility,

transferability, dependability, and confirmability of the study during research design and implementation.

This study ensured all four tenets of trustworthiness in the fundamental research, from the problem identification to the final report. The researcher has an in-depth observation of the phenomenon under study and has done rigorous literature research. The researcher sought his supervisors' assistance, measurement and evaluation experts, and curriculum studies for data collection instruments. As a result, this study adhered to academic honesty in the literature review and identified the current study gaps.

The study subjected the instruments for pilot testing to respondents similar to the sampled group. Thus, the researcher was constantly debriefed by supervisors and peer scrutiny with colleagues about the findings from the pilot testing. In addition, the researcher established a relationship with the respondents, to be frank and open in their contributions; anyone could refuse to participate in the study.

The study established data credibility by spending time in the field to understand the phenomenon under investigation. The researcher also triangulated various data sources by examining evidence from the sources and created a coherent justification for themes. Thus, enabling the study to develop significant and robust themes across the cases during the analysis.

In the final report, the researcher had frequent debriefing sessions with supervisors and made ample use of their suggestions to enhance the accuracy of the accounts. The researcher also looked at past research findings to assess how the results can be consistent with past studies.

A colleague and an external study established reliability and confirmability through data audit to ensure the accuracy and completeness of the research procedures. The study focuses on infusing good character and holistic development through teaching biology from an Islamic perspective. However, the study kept this positionality constant and did not allow this bias to rule the study by bracketing its feelings throughout the research. This study enabled the respondents to form the results, not the researcher's interest, motivation or prejudice.

3.8 Description of the Data Collection Procedures

The researcher first obtained an approval letter from Aljamea-tus-Saifiyah, head office, to conduct the research. First, the researcher interviewed the sampled teachers and parents. Afterwards, the researcher booked appointments with the sampled teachers and parents through online platforms such as google meet or zoom and administered the interview. Then, the researcher trained the class teacher to collect data from the respondents, give instructions to the students, and assure them of confidentiality. Finally, questionnaires were given to the class teachers, who provided the students to fill them out. If not, the researcher was available through contact number and emailed to clarify any difficulties students might encounter while filling out the forms.

3.9 Description of Data Analysis Procedures

As Kothari (2012) defined, data analysis transforms raw data into usable information often presented in analytical articles to add value to the statistical output. Once the data were collected, transcripts were prepared, and the data was reread several times to ascertain that what the participants said was consistent.

3.9.1 Quantitative Data Analysis Procedures

According to the guidelines provided by Warren (2020), the transcripts of the questionnaire were thoroughly analysed and reread several times. After the data collection, the participant's responses were compared to determine significant discrepancies. Data was organized, coded and entered into computer software SPSS (version 23) and Microsoft excel 2013 to generate frequencies and percentages to summarise data. The latter was represented using frequency tables, pie charts and bars for interpretation.

3.9.2 Qualitative Data Analysis Procedures

The researcher used content analysis to categorise data obtained through interviews. The first step in the analysis was coding the transcripts representing a theme or an idea. The second step was identifying themes, patterns, and relationships by repeating words and phrases and comparing primary and secondary data. The final step was summarising the data.

3.10 Ethical Considerations

Before the interviews and surveys, the researcher asked for permission from the principal head of academics. The researcher sought their consent on the research questions from the participants. However, none of the respondent’s confidential information was shared with the public without their permission. Confidentiality was maintained, and the anonymity of the identity of the respondents was safeguarded by using numbers. Additionally, the result of the study was available to participants on request. The research participants were empowered to share their views within the study process and avoided discussing the same beyond the interviews as this would put them at risk of exposure. More importantly, the integrity of the process was

protected by respecting the participants' privacy and avoiding actions that would expose the participants' characters to risks. Surveys were only conducted through informed consent, and personal information regarding the participants was not revealed to any third party. Research participants were informed that they could withdraw from the research if they felt that they no longer wanted to participate.

When compiling the research findings, the researcher ensured that there was no omission of any critical information provided by the participants or falsifying the participants' information to suit the researchers' opinions. Furthermore, the researcher acknowledged and referenced all the information sources to avoid any form of plagiarism.

CHAPTER FOUR

PRESENTATION, INTERPRETATION AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter provides the study findings collected from the field whereby data is presented, discussed and interpreted in line with research questions. It is organized under the following subheadings: Instrument return rate, demographic information of the respondents, and ways in which teaching biology from an Islamic perspective aids in the holistic development of the learners. It examines the challenges encountered when teaching biology from an Islamic perspective and proposes remedial measures to curb those challenges.

4.2 Instrument Response Rate

The researcher administered questionnaires to 40 students and interviewed 11 teachers and 3 administrators of Aljamea-tus-Saifiyah, Nairobi. Only those selected to participate in the study were given questionnaires to fill in the required information. Their return rate is as indicated in Table 2.

Table 2

Instrument Response Rate n=54

Participants	**Sample**	**Response**	**%**
Students	40	40	100
Teachers	11	11	100
Administrators	3	3	100
Questionnaires	40	40	100
Interviews	14	14	100

Source: *Field data 2022*

Table 2 indicates that all 40 students, 11 teachers and 3 administrators that were sampled successfully participated in the study. The 40 questionnaires given to the 40 students were returned, and the interviews of all 11 teachers and 3 administrators were conducted successfully. The response rate was higher than the 70% threshold, as Fincham (2008) recommended, so the researcher proceeded with the data analysis. The high response rate could have been that the researcher requested the class teacher ensure that all student participants filled out the questionnaire and returned it to the researcher. After collecting the questionnaire, the researcher confirmed the count by numbering each questionnaire to correspond to the count.

4.3 Demographic Information

Demographic characteristics refer to the participants' background information to understand the type of respondents the researcher was dealing with. The demographic information sought was their gender, age, level of Education at the study time, and years of experience. The information gathered from the participants is discussed in the following subsequent sub-themes.

4.3.1 Gender and Age of the Participants

The study sought to establish the participants' gender and age. The researcher sought to know the participants' age bracket to determine their level of maturity, hence their responses' objectivity. The study aimed to determine the gender distribution of the participants. This was to ensure that the findings of the study were not gender-biased. The information on participants' gender was sought from teachers, administrators and students.

The researcher collected data from both males and females to conclude that one group might not represent how other group experiences biology from an Islamic

perspective. This is because gender plays an essential role in how one interacts with the world and minimizes gender bias. The participants' responses are displayed in Table 3.

Table 3

Number of All Participants Categorised in Terms of Gender and Age n=54

Gender	Participants	12-14 Years	14-16 Years	Above 16
Female	26	10	10	6
Male	28	12	8	8

Source: *Field data 2022*

Table 3 indicates that there were 54 participants involved in the study, categorised in terms of gender and age. Female participants were 48%, of which 38% were between the age of 12 to 14 years, 35% were between the age of 14 to 16 years and the rest 27% were above 16 years. In addition, the male participants were 52%, of which 43% were between the ages of 12 to 14 years, 28% were between the age of 14 to 16 years, and 29% of the male participants were above 16 years of age. The information also suggests that the students were mature enough to respond to the questions because, according to the California Department of Education (2020), adolescence is a crucial time for cognitive growth since it changes how people approach problems and formulate arguments. Individuals can classify and arrange items, reverse processes, reason logically about tangible objects, and think about several perspectives at once throughout their early adolescence. However, adolescents gain more from concrete experiences than abstract concepts and principles at this stage of development. Adolescents get better at solving more speculative and hypothetical issues as their cognitive abilities become more complicated. The ability

to process hypotheses methodically, the capacity for speculative thought about abstract concepts, and the capacity for future planning are all examples of this sort of thinking's elements.

4.3.2 Participants' Level of Education

The participating students were requested to indicate their level of education to find out the biology syllabus studied and their duration of exposure to the Islamic perspective on biology. This is because students in higher standards are likely to display better results in Islamic Education than those in lower standards. The participants' responses are presented in Table 4.

Table 4

Number of Participants Categorised in Terms of Level of Education n=40

Participants	Sample	Std 1	Std 2	Std 3	Std 4
Male students	20	3	2	8	7
Female students	20	2	5	7	6

Source: *Field data 2022*

Table 4 indicates the level of education of the 54 participant students who filled out the questionnaire survey. About 22 male participants and 18 female participants were from the higher secondary section of Aljamea-tus-Saifiyah. Therefore, it indicates that all the student participants are studying biology from the Islamic perspective. These were deemed appropriate as they could give the correct information to the questions because they had lived different experiences of interacting with the curriculum.

4.3.3 Years of Experience in Teaching and Administration

The participating teachers and administrators were requested to indicate their years of experience to determine whether all the teachers and administrators had the required expertise and knowledge to impart knowledge and skills to the learners and assess their progress in education. This is because experienced teachers and administrators are more likely to implement and administer Islamic Education appropriately than those with minimum experience and exposure. The participants' responses are presented in Table 5.

Table 5

Number of Participants Categorised in Terms of Years of Experience n=14

Participants	**Sample**	**5 years**	**10 years**	**15 years**
Teachers	11	7	4	0
Administrators	3	0	1	2

Source: *Field data 2022*

According to the California Teaching Credential (CTC, 2017), a teacher to receive a full credential requires a minimum of two years of teaching experience. Table 5 indicates the years of experience of the 14 participant teachers and administrators who the researcher interviewed. About 7 teachers had five years' experience teaching biology from the Islamic perspective. Four teachers had ten years' experience, one administrator had 10 years of experience administrating the biology curriculum implementation, and two had fifteen years of experience. Therefore, it indicates that all the teachers and administrators had sufficient knowledge to teach and administer teaching and learning biology from the Islamic perspective.

4.4 Teaching Biology from an Islamic Perspective Help in Students' Holistic Development

The first research question asked the study participants to state how teaching biology from an Islamic perspective helped students' holistic development. Students were given several statements in which they were required to indicate their level of agreement/disagreement using the following Likert scale. These statements were formulated under the framework of the critical elements of holistic development. Sarkar (2020) stated that holistic growth targets child personality development through cognitive, moral, social, emotional, and physical development.

Key: SA=Strongly agree, A=Agree, UN=Undecided, D=Disagree, SD=Strongly Disagree. Figure 2 presents the students' responses and level of agreement.

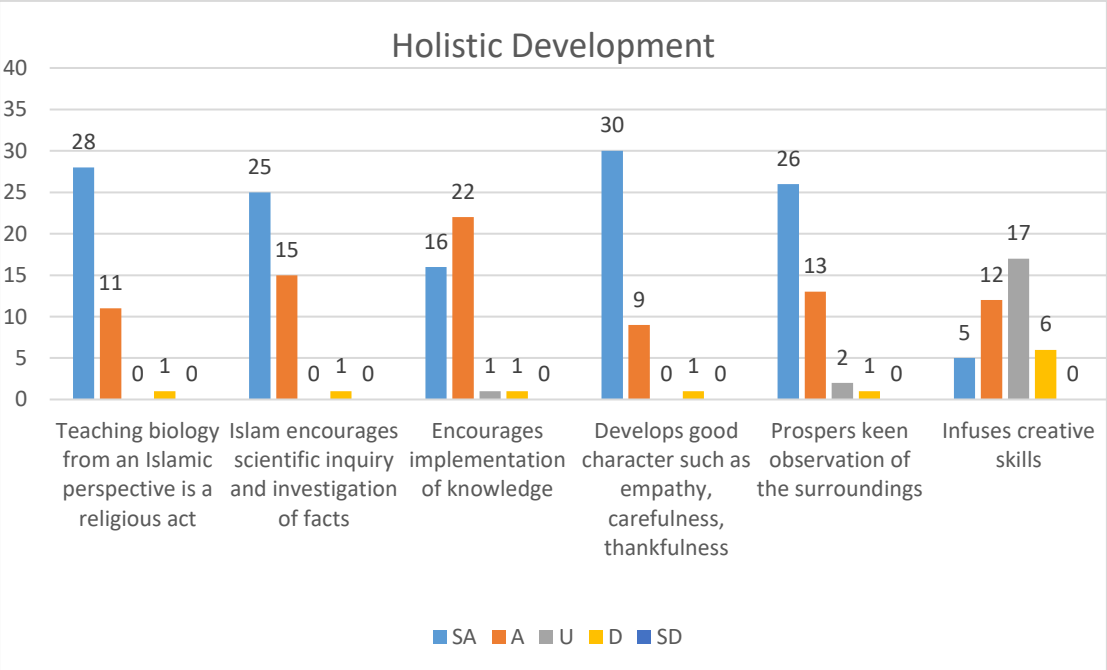

Figure 2: Clustered Columns showing students responses on Holistic Development

Source: *Field data 2022*

Clustered columns in figure 2 indicate that most respondents strongly agreed that teaching biology from an Islamic perspective leads to holistic development. Discussion on how each aspect of holistic development is influenced by teaching biology from an Islamic perspective is discussed further.

4.4.1 Emotional Development

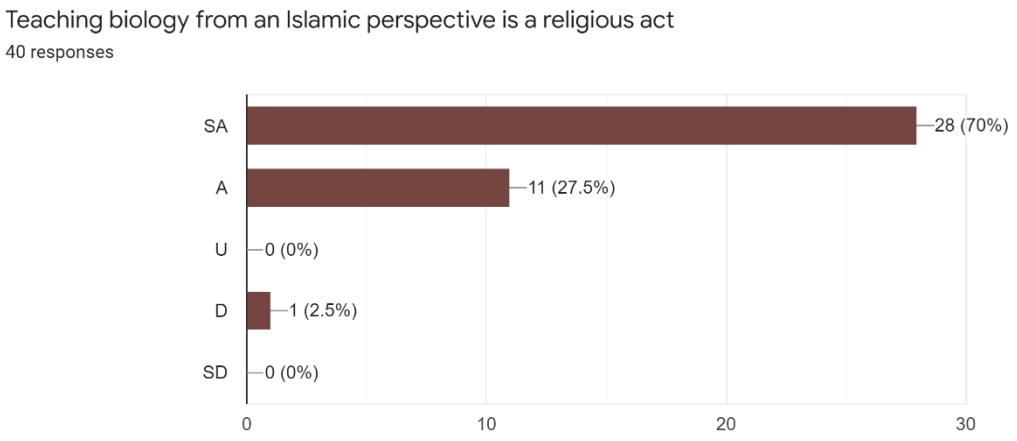

Figure 3: Bar Stacks showing Teaching biology from an Islamic perspective is a religious act.

Source: *Field data 2022*

As shown in Figure 3, most students strongly agreed that teaching biology from an Islamic perspective is a religious act. According to the Oxford dictionary (2022), religion means a particular system of faith and worship. The Quran directs Muslims to keenly observe and study the skies, the Earth, and everything Allah has created. This directive forms the basis of teaching and learning biology from an Islamic perspective in Aljamea-tus-Saifiyah. The Quran teaches us to acknowledge the creator, understand the wisdom of the creator, and offer gratitude towards the bounties provided. Therefore, teaching biology from an Islamic perspective is

considered a religious act. To list down a few examples, students, when learning about the intricate design and complexities of the human body, are encouraged and guided to contemplate and deduce that there must be a creator behind this awe-inspiring structure. Students are taught to pay gratitude towards Allah when studying bounties such as water, air and land; if they were not to be, how would they survive?

The findings of this study concur with Maigidia's (2017) study on knowledge in modern education and its scriptural justification in Islam. In the study, Maigidia argues for the positive disposition of Islam to seek knowledge and reason and evidence from al-Quran and al-Hadith. Therefore, al-Quran must be studied so that it guides toward holistic learning. The findings of this study agreed with Fatuma (2012) in her study on the role of Islamic education programmes in learners' moral and religious development. In her study, she affirmed that this kind of education helps mould future members of society.

The researcher went further to investigate how teaching biology from an Islamic perspective promoted students' holistic development. The responses of the students' are indicated in figure 4.

4.4.2 Cognitive Development

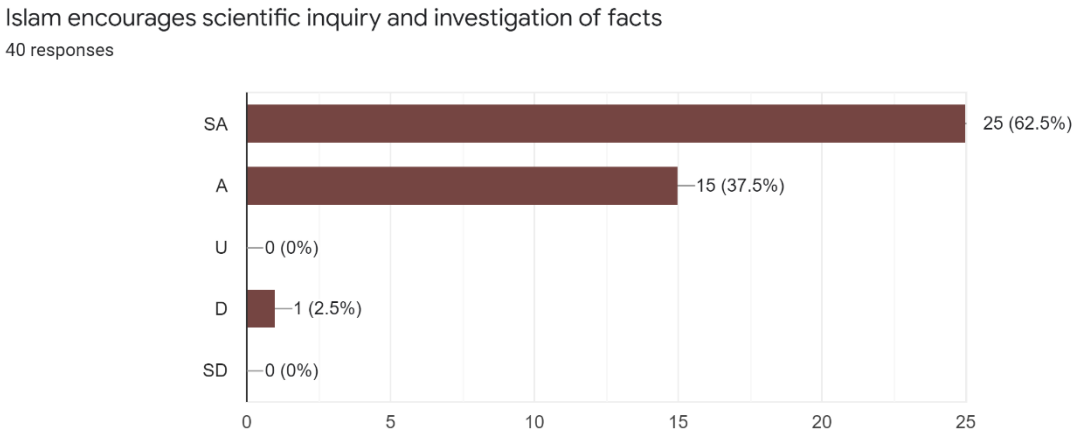

Figure 4: Bar Stacks showing Teaching biology from an Islamic perspective encourages scientific inquiry and investigation of facts.

Source: *Field data 2022*

The National Research Council (2010) states that it is crucial to spark curiosity in students by engaging them in scientifically oriented questions. The researcher found that 62.5% of the students strongly agreed, while 37.5% agreed that teaching biology from an Islamic perspective encourages scientific inquiry and investigation of facts. Students understand scientific concepts through Allah Ta'ala's wisdom; for example, why do humans have teeth and birds have beaks? Students prioritise the evidence to the question by formulating the explanations from the evidence and connecting the answer to scientific knowledge. And finally, justify reasons that it is due to Allah's wisdom that it made birds fly to accommodate it gave bird's beak to reduce the weight of the jaw bone.

Similar practices enable the students to understand scientific concepts with a clear perspective and deduce correct conclusions. The findings of this study disagree

with Zukerman (2018), who argues that religiosity predicts negative attitudes towards science and lowers science literacy levels. However, the researcher affirms through these findings that religiosity increases scientific literacy and further develops skills for scientific inquiry. Islamic education seeks to correct that imbalance and fashion the student's understanding of his world on the firm belief in a purposeful creation. One of the teachers said, "*we believe that all knowledge is descended from one source, Allah, so who are we to separate it."* (Interview on 09th March 2022).

The researcher sought further to know why teaching biology from an Islamic perspective encourages the implementation of knowledge and how it enriches students' holistic development. The responses of the participant students' are indicated in figure 5.

The researcher further questioned how teaching biology from an Islamic perspective inspired students' holistic development. The responses of the students' are indicated in Figure 7.

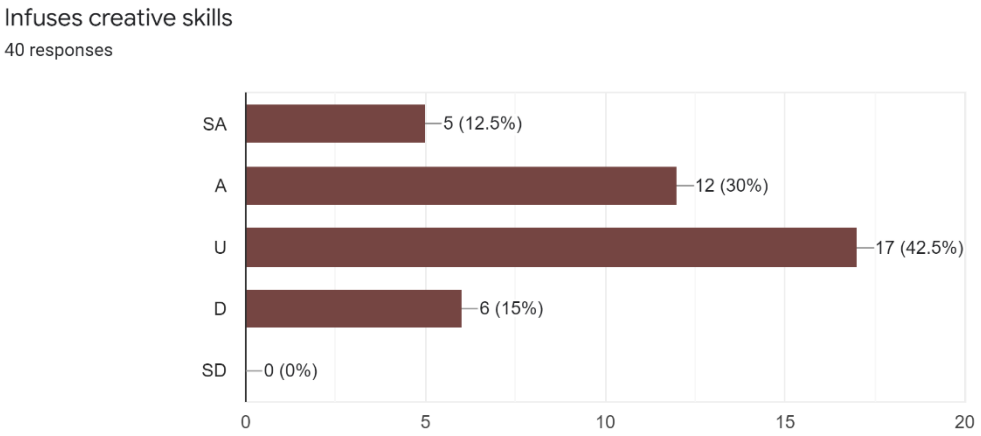

Figure 5: Bar Stacks showing Teaching biology from an Islamic perspective infuses creative skills.

Source: *Field data 2022*

The Quran, in many instances, ordered the believers to ponder upon creation and deemed it a form of worship. In fact, through deep thinking and contemplation, one comes up with creative ideas. Developing creative skills is one of the essential elements of cognitive development (Sarkar, 2020). The researcher investigated whether teaching biology from an Islamic perspective infuses creative skills. According to Tomaszewski (2022), creativity is the ability to think about a task or a problem in a new or different way, come up with fresh ideas, or use your creativity. Creativity allows you to solve complex challenges and develop novel approaches to assignments. When you're creative, you see things from a different angle.

The researcher found that 12.5% of the respondents strongly agreed, 30% agreed, 42.5% were undecided, and 15% disagreed. The researcher received a mixed response to this question and considered it necessary to elaborate on how teaching biology from an Islamic perspective can infuse creative skills in the students. To foster innovative knowledge, students in classrooms are tasked with relating the concept with things around them to find new ways to explain scientific phenomena, make predictions, solve problems, and state or imply what is not known. A student responded, "*Understanding cells and their organelles was first challenging for me. After my teacher related it to Aljamea, cell as a university, it became very clear and easy."*

The findings harmonize with Ajem and Memon (2020), that education should reflect ethos based on the Quran, the teachings and practices of Prophet Mohammed SAW, and his followers' intellectual and spiritual heritage. Furthermore, it should develop students' intelligence, faith, morality and character.

4.4.3 Physical Development

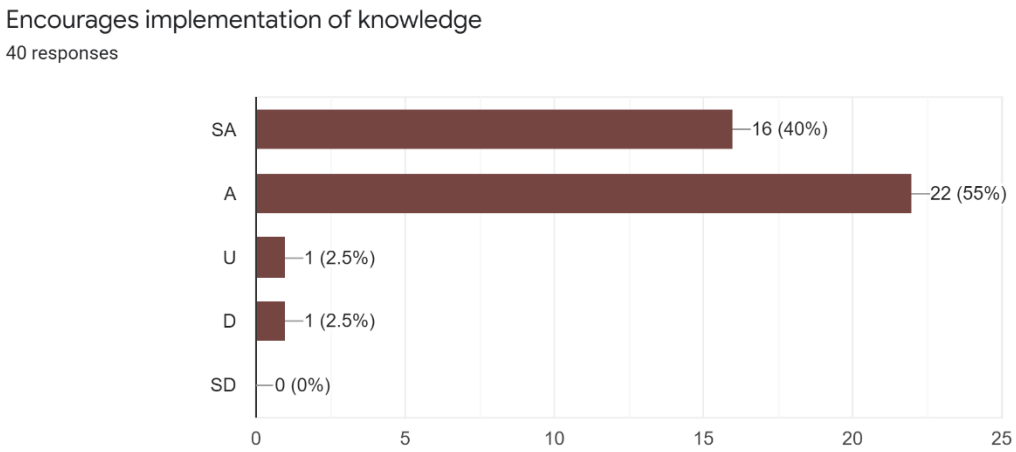

Figure 6: Bar Stacks showing Teaching biology from an Islamic perspective encourages implementation of knowledge.

Source: *Field data 2022*

According to Long (2016), implementation of knowledge is essential to maximise the impact of retention of what is learnt. It is the only way to become proficient in a new skill or behaviour. Furthermore, it helps one grow and improve. The researcher asked the participant students whether Biology from an Islamic perspective encourages practice. The researcher found out that 40% of the students strongly agreed, while 55% agreed that Biology from an Islamic perspective promotes the implementation of knowledge. For example, while studying the respiratory system, students reflect on the reality to the community about cigarette smoking and how it is fatal and harmful to health. This understanding could lead them to create awareness in their society by putting forward scientific facts about how cigarettes damage the lungs and how one smoker in the family is a threat to all. This practice

will ensure the retention of what is learnt in the classroom and further develop students' social-emotional skills, one of the essential parts of holistic development.

The findings agreed with Svensson (2009) that teaching biology from an Islamic perspective can help students explore how humans can avoid many diseases through valuable Islamic teachings. Furthermore, the findings of this study also concurred with Wamalwa (2016) that science and religion play an essential role in developing morality in Kenyan society and emphasise a moral community tomorrow. Furthermore, these findings agreed with that of Khalili (2016) that the rise in the development of the Muslim world in the 16th and 17th centuries was due to scholars' usage of knowledge in solving society's problems. It also coincides with the findings of Abdulaziz (2017), who discusses various avenues for practical implementation solutions of Islamic education and bringing about a modern technological change. Therefore, the researcher deems it very important that all knowledge be reflected through its application, which is also what the participants agreed upon.

The researcher further explored how teaching biology from an Islamic perspective encouraged students' holistic development. The responses of the students' are indicated in figure 7.

4.4.4 Moral Development

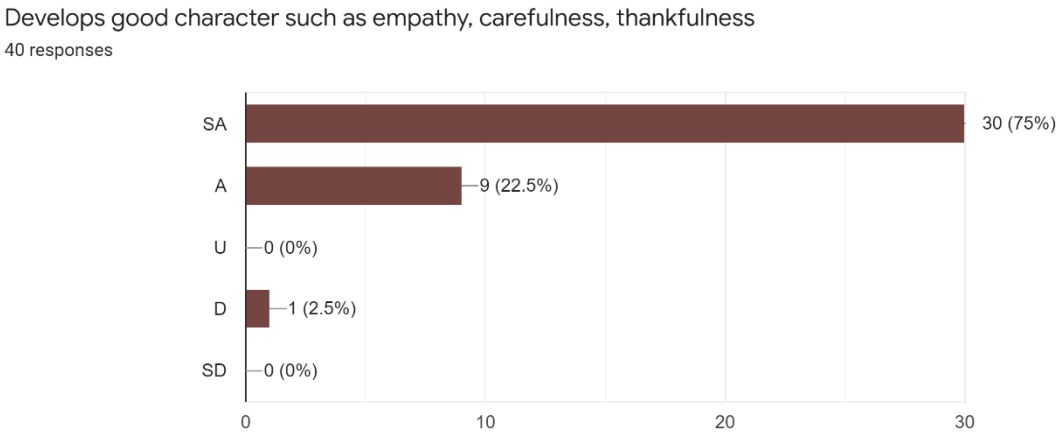

Figure 7: Bar Stacks showing Teaching biology from an Islamic perspective develops good character such as empathy, carefulness, and thankfulness.

Source: Field data 2022

Islamic education emphasises the importance of instilling moral values and developing character. Various departments assist students in behaving according to the ideals learned in class by maintaining a balance between compassion and discipline. In accordance with the philosophy of Islamic education, the researcher found that 80% of the respondents strongly agreed that biology from an Islamic perspective should develop a student's character, while 17.5% agreed. Therefore, the researcher sought to determine whether teaching biology from an Islamic perspective develops good character such as empathy, carefulness and thankfulness. 75% of the students strongly agreed, while 22.5% agreed that teaching biology from an Islamic perspective aid in developing good character.

According to Jill (2019), people considered good characters often have traits like integrity, honesty, courage, loyalty, fortitude, and other essential virtues that

promote good behaviour. In biology, students learn about various resources Allah has provided that are essential for survival and sustaining life. Resources such as oxygen, water, and plants are the backbone of life on Earth and vital resources for human well-being. Therefore, students are taught to always offer gratitude for the bounties provided and should never take them for granted. Furthermore, students are also infused with the realisation of how valuable these bounties are and how they should take care of these valuable resources.

The findings of this study were in line with the study by Eissa (2019) on the development of character and life skills through Islamic methods of teaching science subjects at Islamic schools in Malaysia. Emphasising that point, one of the administrators of Aljamea said, "*Aljamea-tus-Saifiyah is an Arabic-Islamic institute. We should teach our students the good characters and norms in the Quran, and the traditions of our Nabi* ^{SAW} *in all the subjects we teach. Because the goal of every education should be becoming a good human being."* (Interview on 19th March 2022).

Furthermore, the findings were in line with the results of Abdullah (2012). He sheds light on the conservationist approach to nature in his study on Islamic Eco-cosmology in Ikhwan al-Safa's view. He retorts that we should have an attitude of paying thanks to the creator when using natural resources; this attitude will change the moderate use of resources and, therefore, result in homeostasis. The findings of this study and the concurred reviewed literature suggest that paying gratitude towards the creator should be implied in all biology lessons.

The researcher further inquired about how teaching biology from an Islamic perspective stimulated students' holistic development. The responses of the students' are shown in Figure 8.

4.4.5 Social Development

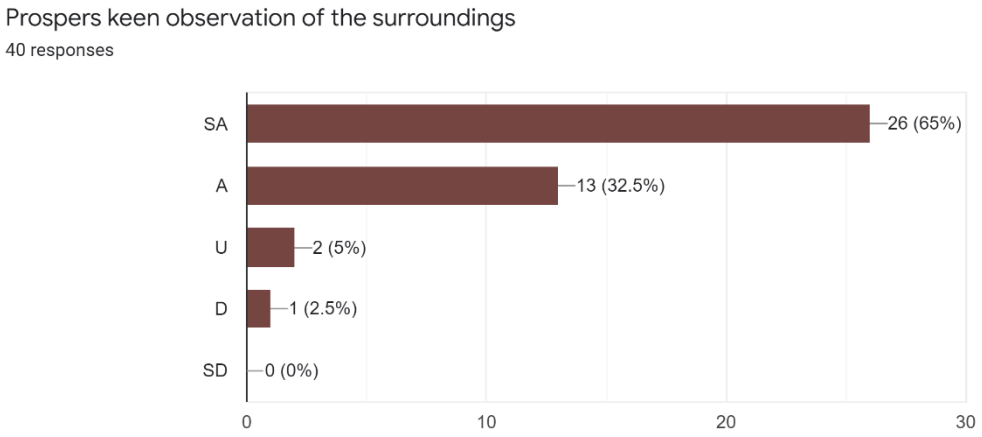

Figure 8: Bar Stacks showing Teaching biology from an Islamic perspective prospers keen observation of the surroundings.

Source: *Field data 2022*

The researcher investigated the teaching of biology from an Islamic perspective, prospers keen observation of the surroundings in the students. Most students strongly agreed that teaching biology from an Islamic perspective encourages students to observe their surroundings. Out of which 65% of the students strongly agreed, while 32.5% agreed with the above.

The Quran instructs us to observe how and what Allah Ta'ala has created. Through the journey of students studying biology, they observe various plants and animals Allah Ta'ala has created around them. While observing, they interact in how, why, what is made and how the interaction between heredity and environment is often the most crucial factor. The ultimate goal is to assist the student in marvelling at the awe-inspiring creation of Allah Ta'ala (Aljamea-tus-Saifiyah, Uloom Kawniyah, 2015).

For example, when studying the cause of the increase of red blood cells in the body, students learn that high altitude plays a vital role in increasing the number of red blood cells. At sea level, oxygen is abundantly present everywhere, and it is easy for our lungs to breathe oxygenated air. This is then carried by the red blood cells around the body. The air density is lower at higher altitudes, and there is less oxygen. The pressure on our lungs is also higher. We breathe quickly at high altitudes to go in more oxygen. After some time, more red blood cells are produced, and the oxygen-carrying capacity increases. This is one of the reasons why people living at high altitudes have red cheeks: the increased production rate of red blood cells from childhood (Aljamea-tus-Saifiyah, Uloom Kawniyah, 2015). The researcher did not find this aspect in any of the reviewed literature. Therefore, it is the unique point of this current study; the researcher intends to fill the knowledge gap through this current research.

To find out whether teaching biology from an Islamic perspective help students in their holistic development or not. The researcher questioned the participants. The responses are highlighted in figure 9.

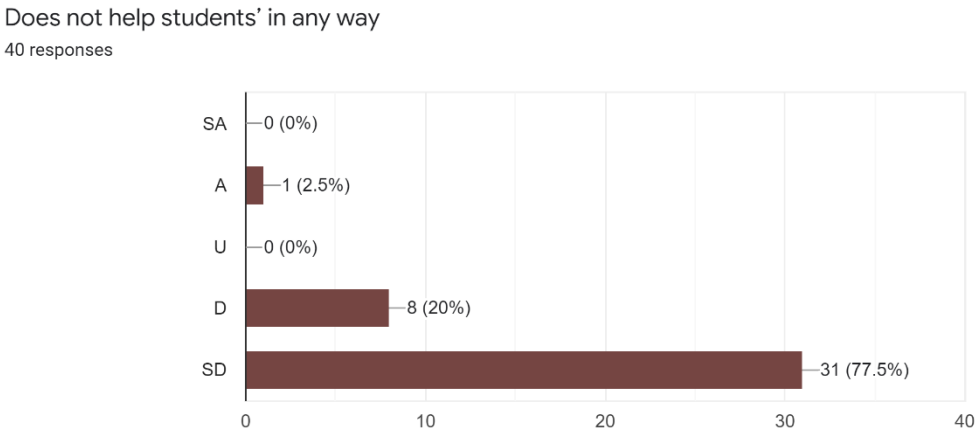

Figure 9: Bar Stacks shows that teaching biology from an Islamic perspective does not help students.

Source: *Field data 2022*

To conclude on the results of the holistic development, the researcher investigated the negative aspects of teaching biology from an Islamic perspective, where the majority of the respondents strongly disagreed. Although 77.5% of the respondents strongly disagreed and 20% disagreed, 2.5% agreed. One teacher participant quoted, "*Islamic education is a way of life for the students of Aljamea-tus-Saifiyah; therefore, there would not be anything that does not benefit them."* (Interview on 10th March 2022). The findings of this study agreed with Fatuma (2012) in her study on the role of Islamic education programmes in learners' moral and religious development. In her study, she affirmed that this kind of education helps mould future members of society.

4.5 Teachers Perception Towards Biology's Teaching from an Islamic Perspective with Students' Holistic Development

The second research question investigated the perceptions towards teaching biology from an Islamic perspective and students' holistic development. Students were given several statements in which they were required to indicate their level of agreement using the following Likert scale. These statements were extracted from the interviews conducted with the teachers and administrators and grouped according to the key elements of holistic development (Sarkar, 2020). The student participants' responses are shown in Figure 10.

Key: SA=strongly agree, A=agree, UN=Undecided, D=Disagree, SD=Strongly Disagree. Participants' responses are shown in Figure 9.

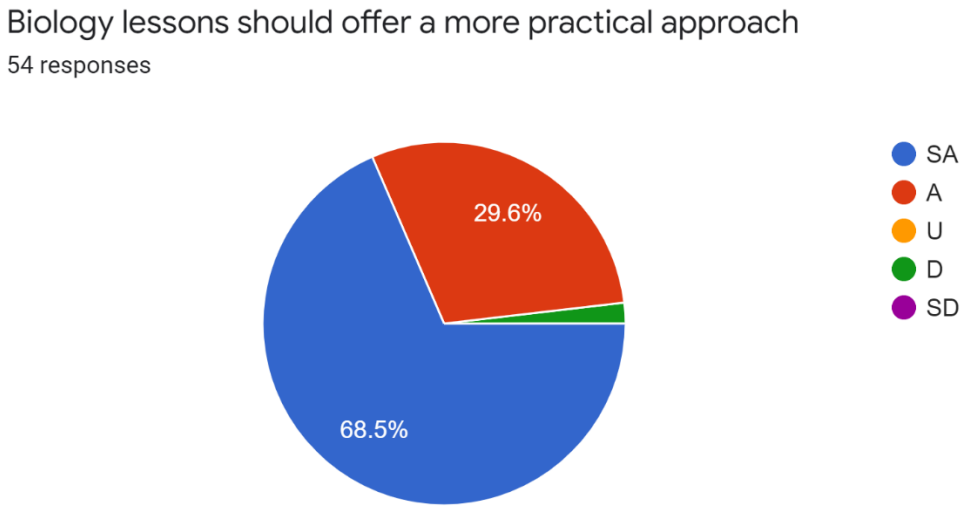

Figure 10: Pie chart shows Teachers, Administrators, and Students' views on teaching biology from an Islamic perspective should offer a more practical approach. Source: *Field data 2022*

According to Figure 10, (37 out of 54) 68.5% of the students strongly agreed that biology lessons should offer a more practical approach, (16 out of 54) 29.6% agreed, while (1 out of 54) 1.9% disagreed. The Quran and the revered books of Dawat-e-Hadiyah emphasise the practical application of knowledge because it results in the retention of what is learnt. Therefore, the students in Aljamea-tus-Saifiyah are encouraged toward practical application of scientific concepts because it enhances their understanding of what they have learnt in the classroom. Furthermore, laboratory activities and demonstrations represent an essential part of practical science training for students. Written materials and pictures can convey an enormous amount of information. Still, students more fully understand the concepts related to science when they participate in or observe learning activities involving experiments and

demonstrations. In addition, these activities allow students to learn the process and techniques of science laboratory investigation.

The findings of this study were in line with the study on Science Practical Work And its Impact on Students' Science Achievement by Shana and Abulibdeh (2020); this quasi-experimental study aims to assess the overall impact of practical work on science students' academic achievement. The participants were chosen from chemistry and biology students in the tenth grade and chemistry students in the eleventh grade, respectively. To all groups, pre-and post-tests were administered. The experimental groups received identical information through extensive practical work, whereas the control groups received it through typical scientific education techniques. The mean score comparison showed that the experimental and control groups' attainment scores differed significantly. Thus, students should be given ample opportunity to engage in practical lessons in secondary schools.

Whether teaching biology from an Islamic perspective should have elaborative explanations on the scientific information in al-Quran and al-Hadith, the researcher went further to investigate and highlighted the responses in Figure 11.

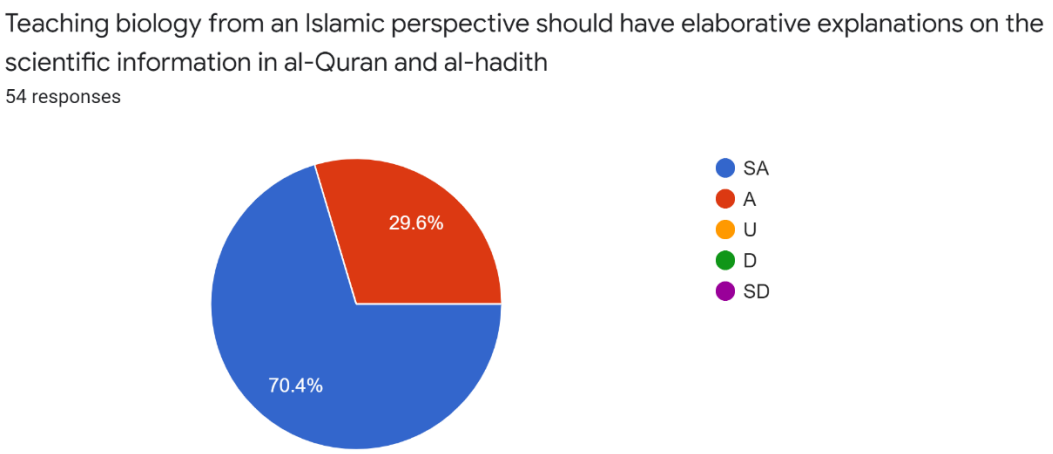

Figure 11: Pie chart shows Teachers, Administrators, and Students' views on teaching biology from an Islamic perspective should have elaborative explanations of the scientific information in al-Quran and al-Hadith.

Source: *Field data 2022*

To teach in the light of the Quran and highlight important aspects of the teaching of Nabi ^{SAW}. The researcher found that (38 out of 54) 70.4% of the participants strongly agreed that teaching biology from an Islamic perspective should have elaborative explanations of the scientific information in the Quran and Hadith. In comparison, (16 out of 54) 29.6% also agreed. According to the researcher (2022), teaching biology from an Islamic perspective means teaching the students the fundamentals of Islamic tenets, acknowledging the creator's presence, and comprehending His wisdom in creation. Therefore, it is crucial to incorporate scientific information to emphasise Islamic guidance. While interviewing a participant, these were the sentiments. "*Integrating aayat from the Quran and Hadith adds more value to the subject because students become more curious and eager to know how they can synthesise Quran and other subjects."* (Interview on 11th March 2022).

For example, in the Quran and Hadith, it is mentioned that Alcohol, with its harmful effects on a person's soul, has severe repercussions on physical health. Therefore, in biology lessons, students are taught how alcohol causes physical damage to a person's health. A sample of what is taught in the class is attached in appendix XII. The findings correlated with Subali (2018) on the integration of Al-Quran and Hadith studies on Biology. He concluded that biological science is a body of knowledge that studies, understands, and investigates natural events or phenomena

of the natural world with all its practical aspects using scientific methods that contain the skills of the scientific process. Therefore, inserting Quranic aayaats will result in holistic learning.

The researcher went further to investigate the perceptions of teachers and students on whether biology and religion should be taught separately. The responses are displayed in Figure 12.

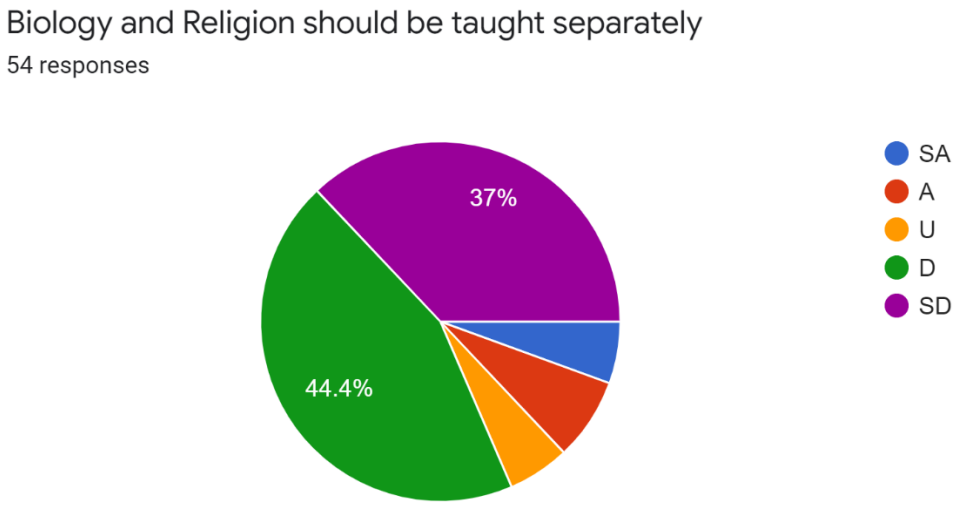

Figure 12: Pie chart shows Teachers, Administrators, and Students' views on biology and religion should be taught separately.

Source: *Field data 2022*

Figure 12 explains that (24 out of 54) 44.4% of the participants disagreed, while (20 out of 54) 37 % said they strongly disagreed. The rest strongly agreed, agreed or were neutral. The findings were as per Aljamea-tus-Saifiyah's learning philosophy, which takes a holistic approach. It believes that man's mundane, empirical, and spiritual components and education cannot be separated. Modern school education lacks the spiritual dimension and moral principles required for a

healthy life. Like other religions, Islamic education aims to redress this imbalance by moulding students' perception of the universe and instilling a solid conviction in a purposeful creation.

The findings of this study did not agree with those of Zukerman (2018), who argues that religiosity predicts negative attitudes towards science and lower literacy levels. While strongly agrees with Eissa's (2019) conclusion that Quranic and Prophetic teachings contribute to students' character development by inculcating characteristics and life skills.

According to Bassiouni (2012), Islam emphasises a social revolution based on individual and societal morality and accountability. Equality, justice, fairness, brotherhood, kindness, compassion, solidarity, and freedom of choice are used in the Quran to describe collective morality. In addition to that, and per the principles of the reconstructionism theory, resources are available to solve the prevailing problems in society. Education could be the catalyst to prepare and organise future generations to make this possible. Therefore, teaching biology from an Islamic perspective could be one of the catalysts to bring about a change in the community. Thus, the researcher sought to find whether teaching biology from an Islamic perspective can bring about changes in social reforms. The findings are highlighted in Figure 13.

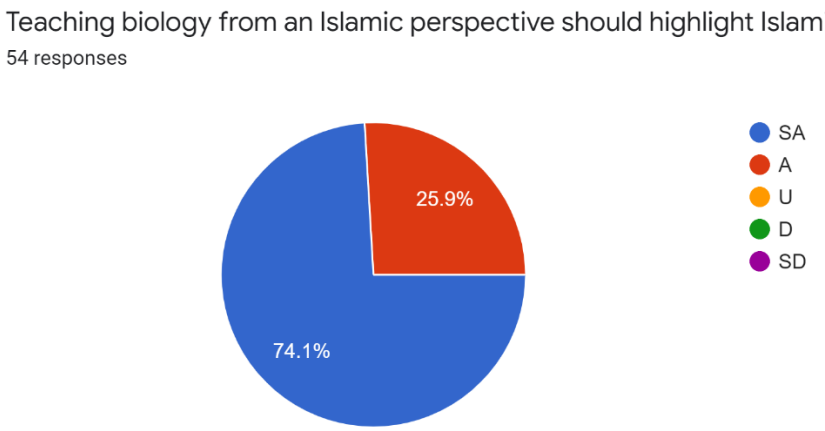

Figure 13: Pie chart shows Teachers, Administrators, and Students' views on teaching biology from an Islamic perspective should highlight Islamic social values. Source: *Field data* 2022

The researcher found that (40 out of 54) 74.1% of the respondents strongly agreed, while (14 out of 54) 25.9% agreed that teaching biology from an Islamic perspective should highlight Islamic social values. Students of Aljamea-tus-Saifiyah, while studying biology, reflect on Islamic social values. For instance, while learning about plants and realizing that they are the foundation of life on Earth and necessary for human survival. This concept will encourage students to plant trees to safeguard the environment by making everyone responsible for environmental protection and raising knowledge of the link between environmental and human health. One of the respondents stated, " *Today in the 21st-century, education should address moral values to enable the students to serve the society better."* Examples of such kinds establish that teaching biology from an Islamic perspective reflects Islamic social values; hence it benefits the student's holistic development.

Many teachers and students prompted that teaching biology from an Islamic perspective should include real-life examples and challenges. Therefore, the researcher investigated and displayed the findings in Figure 14.

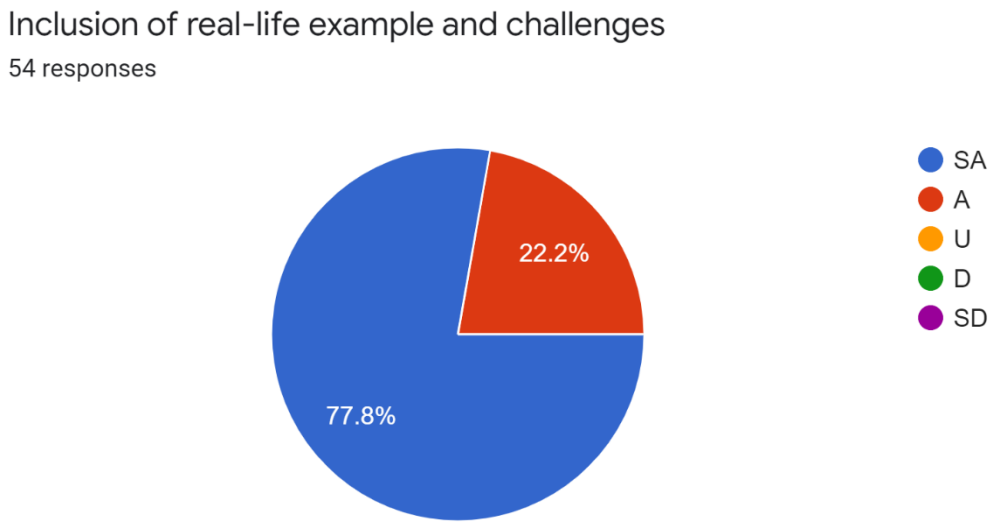

Figure 14: Pie chart shows Teachers, Administrators, and Students' views on teaching biology from an Islamic perspective should include real-life examples and challenges.

Source: *Field data 2022*

The researcher found that (42 out of 54) 77.8.5%, respondents strongly agreed, while (12 out of 54) 22.2%, agreed that teaching biology should have real-life examples and challenges from an Islamic perspective. According to Yalcin (2017), real examples provide concrete applications to knowledge and skills learned in the classroom related to students and society. Real examples also encourage students to be aware of their choices and how they fit into a greater societal context. Students in Aljamea-tus-Saifiyah are given examples from real-life situations to understand the concept better and how they can contribute to society in mitigating those challenges.

For example, students can apply knowledge to solve problems like drug addiction and smoking at a very young age and how it affects the respiratory and cardiovascular systems.

4.6 Challenges Faced when Teaching Biology from an Islamic Perspective

To find out about the challenges of teaching biology from an Islamic perspective, the researcher asked students open-ended questions and interviewed the teachers about the challenges they face. In contrast, learning/teaching biology from an Islamic perspective and the participants gave different responses as provided by participants A, B, C, D and E.

According to respondent A*, "Students always try to point out the conflict rather than harmony."* (Interview on 17th March 2022).

Respondent B wrote, *"Heavy teaching workload that adversely affects efficiency and performance of teachers and students."* (Interview on 17th March 2022).

While interviewing respondent C, the following were the statements, "*Teachers are not equipped nor trained to answer critical questions."*

According to respondent D*, "Students are unaware of the Islamic history in science and development and are constantly infused with western names."* (Interview on 21st March 2022).

Respondent E stated during the interview*, "Not sufficient answers regarding the theory of evolution."*

The researcher categorised challenges faced by students, teachers and administrators into themes. The thematic challenges are provided in figure 15.

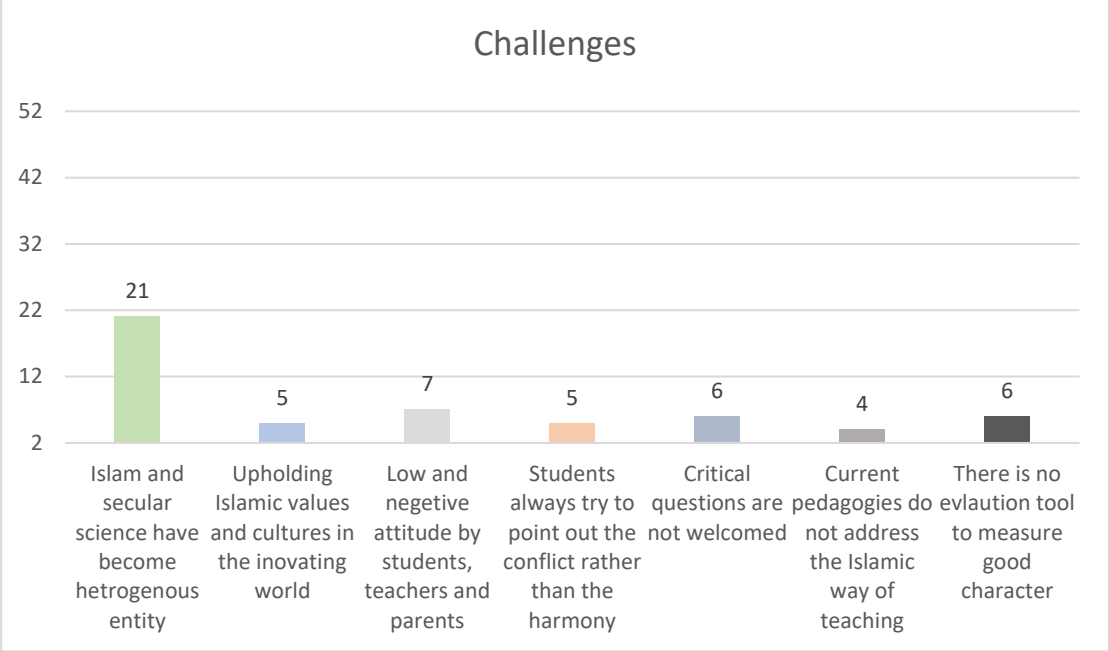

Figure 15: Challenges faced by Teachers, Administrators and Students.

Source: *Field data 2022*

According to Figure 15, the majority of 21 out of 54 (38.8%) participants from the teachers, administrators, and students believed that their most significant challenge was that today Islam and secular science had become heterogeneous entities. While other challenges were almost equally spread out in the responses of the participants, as displayed in figure 15. Therefore, the researcher concludes that the students' most significant challenge was harmonising biology's spiritual and temporal aspects. The findings of this study concurred with Hanley (2019), where the author states that teachers' worldviews and beliefs, particularly regarding religion, interact with the knowledge and affect their teaching. Therefore, the author suggested that building cross-curricular work may increase teacher knowledge and confidence and provide better student support.

Furthermore, the researcher found that 6 out of 54 (11%) participants concluded that critical questions are not welcomed. This could be because the

teachers are not equipped or trained to deal with questions of such type, or the questions asked by the students are not well structured. These findings agreed with Pearce, Stones, Michael, Reiss, and Mujtaba (2019), who looked at broader issues about religion and science. The researchers found that students used language that informed their misconception of the epistemic distinctions between religion and science. The researchers recommended that religious education, therefore, should focus on epistemic literacy to avoid misunderstandings and develop insights into specific knowledge manifested in science and religion.

4.7 Measures to Curb the Challenges Associated with Teaching Biology from an Islamic Perspective

The fourth research question sought ways to mitigate the challenges encountered by students and teachers when teaching and learning biology from Islamic perspectives. This study was to scale-out suggestions proposed by teachers and students regarding teaching biology from an Islamic perspective and how it can help understand students' holistic development. The researcher interviewed the 14 sampled teachers and administrators and asked open-ended questions to 40 students, making a total of 54 participants and themed their suggestions in Figure 16.

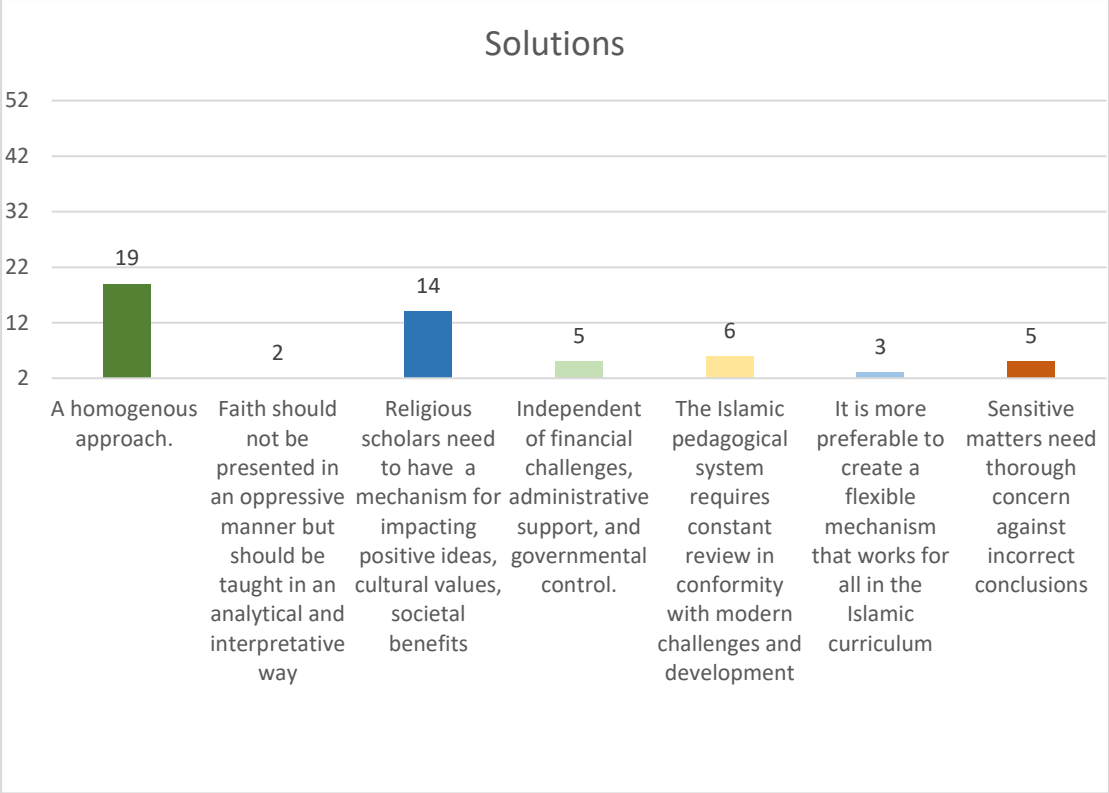

Figure 16: Solutions provided by Teachers, Administrators and Students.

Source: *Field data 2022*

The x-axis in the figure indicates the suggestions the teachers, administrators, and students provided, and the y-axis shows the frequency rate. As indicated in the figure, a homogenous approach and religious scholars must have a mechanism to positively impact the learners had a higher frequency rate, 19 out of 54 (35%) and 14 out of 54 (26%). The findings of this study concurred with Nkonge (2014) on the relationship between Religion and Science in mission. The author discovers why religion continues to survive in today's scientifically developing Africa because religion and science are distinct but inseparable entities required in African society.

From the solutions provided by the participants, the researcher believes that studying biology from an Islamic perspective does not mean blindly believing Allah

Ta'ala has created everything. But the correct method is to contemplate the facets of His creation and conclude that there has to be a Creator because of the complexity of the creation. Similarly, through contemplation, the student should also understand the mercy that Allah Ta'ala has graced His creation with, accept His omnipotence, and understand His wisdom in creation and how to use scientific knowledge for the betterment of all creation. To understand the above statement, one should consider this example of arteries and veins in the circulatory system. It is the point to contemplate why Allah Ta'ala made the walls of the arteries thick and valves for the veins. It shows the intention of the creator here; without the apparent purpose, there would be no creation. So how could one conclude after looking at these facets that this complex creation is created without a creator? So, this independent contemplation enables the student to dig deeper and find the pearls of knowledge. These findings agreed with Nasser (2012) that it is predominantly evident that learning and teaching science from an Islamic perspective will cause no problems to teachers or students.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions, and recommendations made from the findings of this study. Suggestions for future studies related to teaching biology from an Islamic perspective and students' holistic development are also discussed herein.

5.2 Summary of the Study

This study investigated teaching biology from an Islamic perspective and students' holistic development in the higher secondary section of Aljamea-tus-Saifiyah, Nairobi campus. It was supported by the reconstructionism theory guided by the following four research questions: How does teaching Biology from an Islamic perspective help in students' holistic growth in Aljamea-tus-Saifiyah Nairobi? How do teachers perceive the teaching of biology from an Islamic perspective in relation to students' holistic development in Aljamea-tus-Saifiyah Nairobi? What challenges are associated with teaching biology from an Islamic perspective in relation to students' holistic development in Aljamea Nairobi? What measures can be put in place to curb the challenges associated with teaching biology from an Islamic perspective in relation to students' holistic development in Aljamea Nairobi?

Using the convergent parallel design of the mixed-methods paradigm, the study collected quantitative data by applying cross-sectional design and phenomenology research techniques to collect qualitative data. With a total population of approximately 535 people, the study sampled 54 participants using simple random and purposive sampling methods. The study focused on students,

teachers and administrators. Data was collected through interviews and questionnaires. Both quantitative and qualitative instruments were piloted to ensure they were effective and reliable.

SPSS software (version 23) and Microsoft Excel software 2013 were used to analyze quantitative data for this investigation. Qualitative data were transcribed, coded, and categorised, themes were produced from the categories, themes were interconnected, and ultimately these themes were interpreted. All ethical issues were followed, such as secrecy, privacy, and approval from relevant departments.

5.3 Key Findings

From the data analysis for this study, teaching biology from an Islamic perspective in Aljamea-tus-Saifiyah plays a crucial role in students' holistic development. According to most participants, teaching biology from an Islamic perspective helps the students adhere to Islamic principles. Believing in one creator – Allah Ta'ala and to be in His obedience, comprehending His wisdom in creation, offering gratitude towards His bounties and using the knowledge for the betterment of humankind.

This study found that teaching biology from an Islamic perspective can guide the students of Aljamea-tus-Saifiyah to become better humans. It found out that education's core message is to use knowledge to mitigate societal problems. It also established that teaching biology from an Islamic perspective makes students more literate in science by increasing their curiosity. The study also sought to find out the various perceptions of teachers and administrators about teaching biology from an Islamic perspective concerning students' holistic development. Most of the teachers

and administrators agreed on the student's holistic development through teaching biology from an Islamic perspective.

This study investigated various challenges that the teachers, administrators and students face when teaching and learning biology from an Islamic perspective. Some students said it sometimes becomes hard to balance their beliefs between conflicting ideas. Some of them stated that sometimes Islamic concepts confuse the learners' minds because they cannot decide whether to give importance to the temporal or spiritual aspects.

This study was also able to surface solutions for improving the teaching of biology from an Islamic perspective. One of the solutions given was introducing a more practical approach to the concepts in the syllabus. Some teachers also suggested that a comparative study should be undertaken so that students are well aware of non-Islamic concepts.

5.4 Conclusions

All the data was collected from teachers, administrators and students of Aljamea tus-Saifiyah. The participants were classified according to classes in which the biology syllabus is taught to determine the learning outcome of teaching biology from an Islamic perspective. As indicated by the findings of the study, there was a significant positive impression of teaching biology from an Islamic perspective regarding the fundamentals of Islam. Teachers, administrators, and students agreed that teaching biology from an Islamic perspective positively impacts life's spiritual, intellectual, social, moral and physical aspects. Furthermore, teaching biology from an Islamic perspective also positively impacted understanding scientific concepts and using them to eradicate societal problems. Students organically acknowledged the

creator and were more equipped to comprehend His wisdom in creation rather than concluding on non-Islamic ideologies.

Some challenges came with teaching biology from an Islamic perspective in Aljamea-tus-Saifiyah. Some students felt it challenging to balance beliefs with scientific theories and the secular approach of science with religion. Additionally, few teachers have not graduated from Aljamea. Therefore, they are not acquainted with teaching biology from an Islamic perspective. To mitigate these challenges, the participants suggested several solutions; however, creating a unified approach between science and religion will benefit all and organising teacher's training sessions for non-graduates from Aljamea.

5.5 Recommendations

Based on the findings of the study, the researcher makes the following recommendations to various stakeholders. These include the Dawoodi Bohra community, teachers, students and curriculum developers.

5.5.1 Dawoodi Bohra Community

The findings of this research will be used in schools owned and run by the Dawoodi Bohra community, such as Al-Madrasa Saifiyah Burhaniyah, to emphasise teaching biology from an Islamic perspective. This method should be widely used in schools and religious institutions owned by the Dawoodi Bohra community because it is the fundamental belief of the Dawoodi Bohra community to look into any knowledge in the light of the Quran and the saying of Rasulallah ^{SA}. The experience teachers from Aljamea-tus-Saifiyah and other qualified trainers can train other school teachers for this method to be practised.

5.5.2 Teachers

The findings of this research will aid the teachers in constructing their understanding of teaching biology from an Islamic perspective. Further, the teachers in Aljamea-tus-Saifiyah should develop their lesson plans and incorporate concepts that direct the holistic development of the students. Because the core principle of this institution is to develop students physically, morally and intellectually, and it will further help the students broaden their vision in their educational journey.

5.5.3 Students

The findings of this research will be of assistance to the students Aljamea-tus-Saifiyah. It will help them be steadfast in their religious beliefs rather than confused thoughts on creation, specifically on the theory of evolution. The students should use the knowledge gained to guide the other members of the Dawoodi Bohra community when they go for community service. The study strongly recommends the students to have a practical approach throughout their community services for a more impactful result.

5.5.4 Curriculum Developers

The findings of this research will also help the local, regional, and other Islamic schools. Through the findings of this study, curriculum developers should assess and evaluate the current methodology of teaching biology from an Islamic perspective in Kenya and worldwide. Because there are not many schools in Kenya and worldwide that foster this teaching; therefore, the medium of education and the true principles of Islamic education can be studied and understood.

5.6 Suggestions for Further Research

The study recommends that:

a. An in-depth analysis will investigate strategies applied by curriculum developers to incorporate Religious study with Biology in Kenya.

b. An analysis is done to determine how Kenya and countries in Africa and worldwide manage teaching Biology from an Islamic perspective.

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APPENDICES

Appendix I

Questionnaire Consent Form

RE: Participation in Research

I am a postgraduate student at The Catholic University of Eastern Africa researching Teaching biology from an Islamic perspective and students' holistic development in Aljamea-tus-Saifiyah, Nairobi, Kenya. This research is for academic purposes only. In this regard, I am seeking your consent to respond to the questionnaire concerning the study. Kindly respond to all items to reflect your opinion and experience. Information you provide for the study will be treated with confidentiality. The raw data will only be used for data analysis and the supervisor's examination purposes, after which they will be destroyed through shredding. I will highly appreciate your participation in this exercise, as it is crucial to completing my study.

I thank you in advance.

Yours Faithfully,

HUZEFA JIVANJEE

APPENDIX II
Questionnaire for Students

I am a postgraduate student at The Catholic University of Eastern Africa researching Teaching biology from an Islamic perspective and students' holistic development in the higher secondary section of Aljamea-tus-Saifiyah, Nairobi, Kenya. This study investigates how biology from an Islamic perspective can aid in infusing good character in students and striving toward holistic development. This research is for academic purposes only. Information provided through filling out this questionnaire is considered of extreme value to this study and will be considered discretion. You need not sign the questionnaire and are assured that your response will remain CONFIDENTIAL. Kindly spare a few minutes and answer all your questions. Thank you

Section A
Demographic Details

1 Gender: (i) Male (ii) Female

2 Age: (i) 12-14 (ii) 14-16 (iii) Above 16

3 Level of Education:

(i) Std one [ ] (ii) Std two [ ] (iii) Std three [ ] (iv) Std four [ ]

Section B: Teaching Biology from an Islamic Perspective Help in Students' Holistic Development

Science and religion are closely interconnected. Furthermore, there are a spectrum of viewpoints on Biology and Islamic perspective. Kindly indicate the degree to which you agree or disagree with this statement.

SA: Strongly Agree, **A:** Agree, **U:** Undecided**, D:** Disagree, **SD:** Strongly Disagree,

		SA	**A**	**U**	**D**	**SD**
		5	**4**	**3**	**2**	**1**
4	Teaching biology from an Islamic perspective is a religious act					
5	Islam encourages scientific inquiry and investigation of facts					
6	Encourages implementation of knowledge					
7	Develops good character such as empathy, carefulness, thankfulness					
8	Prosper's keen observation of the surroundings					
9	Infuses creative skills					
10	It does not help students in any way					

Section C: Stakeholders' Perceptions Towards Biology's Teaching from an Islamic Perspective and Students' Achievement

Evidence shows stakeholders' perception is crucial for planning teaching and learning resources. For example, teaching biology from an Islamic perspective can help students' holistic development. Kindly indicate the degree to which you agree or disagree with this statement.

SA: Strongly Agree, **A:** Agree, **U:** Undecided**, D:** Disagree, **SD:** Strongly Disagree,

		SA	**A**	**U**	**D**	**SD**
		5	**4**	**3**	**2**	**1**
11	Biology lessons should offer a more practical approach					
12	Teaching biology from an Islamic perspective should have elaborative explanations of the scientific information in al-Quran and al-hadith					
13	Biology and Religion should be taught separately					
14	Teaching biology from an Islamic perspective should highlight Islamic social values					
15	Inclusion of real-life examples and challenges					

Section D: Challenges Faced when Teaching Biology from an Islamic Perspective

Students in their Educational endeavour face many challenges; likewise, learning science from an Islamic perspective also has many challenges; kindly indicate the challenges you face

Challenges I face when learning biology from an Islamic perspective:

i.

ii.

iii.

Section E: Solutions for Improving the Teaching of Biology from an Islamic Perspective and Students' Holistic Development.

Providing solutions improves and simplifies complex tasks; similarly, teaching biology from an Islamic perspective is also complex. Kindly offer possible solutions that could help improve its productivity

Suggestions I would like to provide are:

i.

ii.

iii.

APPENDIX III
Interview Guide for Teachers

1. Demographic Information

   Gender:

   Which age bracket do you belong to?

   (25-35) – (35-45) – (45-55)

2. Years of experience as a teacher?

   (5 Years) – (10 Years) – (15 years)

3. What are the advantages of teaching biology from an Islamic perspective?

   Probe: Are there any disadvantages?

4. How does teaching biology from an Islamic perspective aid in students' holistic development?

   Probe: Do you recommend teaching biology from an Islamic perspective?

5. What challenges do you face while teaching biology from an Islamic perspective regarding students' holistic development?

6. Suggest ways to overcome the challenges faced when teaching biology from an Islamic perspective concerning students' holistic development.

APPENDIX IV
Interview Guide for Administrators

7. Demographic Information

   Gender:

   Which age bracket do you belong to?

   (25-35) – (35-45) – (45-55)

8. Years of experience as an administrator?

   (5 Years) – (10 Years) – (15 years)

9. What are the advantages of teaching biology from an Islamic perspective?

   Probe: Do you recommend teaching biology from an Islamic perspective?

10. How does teaching biology from an Islamic perspective aid in students' holistic development?

11. What are the challenges teachers face while teaching biology from an Islamic perspective in regard to students' holistic development?

12. Suggest ways to overcome the challenges faced when teaching biology from an Islamic perspective concerning students' holistic development.

APPENDIX V
Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **193085**

Date of Issue: **14/February/2022**

RESEARCH LICENSE



This is to Certify that Mr.. HUZEFA JIVANJEE of Catholic University of Eastern Africa, has been licensed to conduct research in Nairobi on the topic: TEACHING BIOLOGY FROM AN ISLAMIC PERSPECTIVE AND STUDENTS' HOLISTIC DEVELOPMENT IN THE HIGHER SECONDARY SECTION OF ALJAMEA-TUS-SAIFIYAH UNIVERSITY, NAIROBI CAMPUS, KENYA for the period ending : 14/February/2023.

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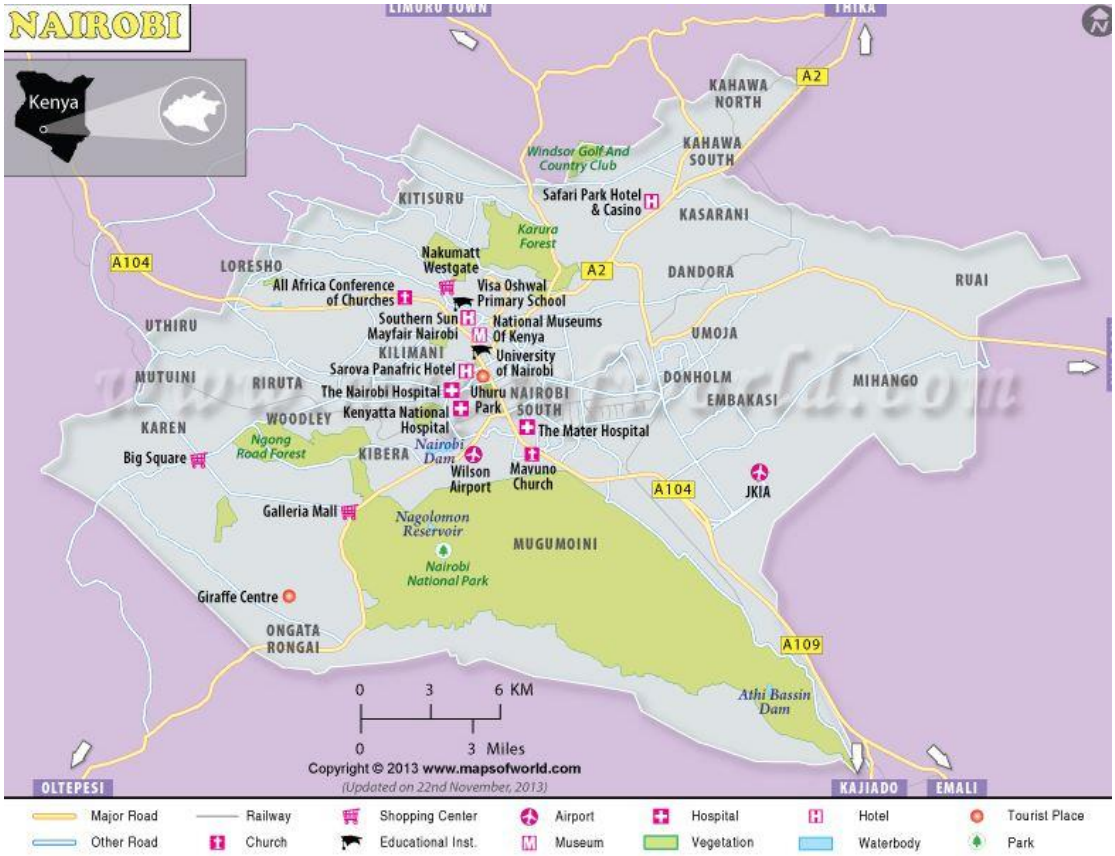
APPENDIX VI
Map of Kenya Showing Nairobi County



Source: *https://www.google.com/search, 2021*

APPENDIX VII

Map of Nairobi County Showing Location of Area of Study



Source: *https://www.google.com/search, 2021*

APPENDIX VIII

Map of Aljamea-tus-Saifiyah, Nairobi Campus



Source: *https://jameasaifiyah.edu*, *2021*