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Saudi Universities Students' Point of View on the Evolution Theory

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Abstract

The Theory of Evolution is a major premise in education. Its understanding and reception became of importance to several educational institutions in all countries. The purpose of this study was to explore the perceptions of Saudi Universities students on the Evolution Theory and its concepts. The study used the descriptive methodology and used a questionnaire as an instrument to gather data. The study included 101 students from three different universities. The findings showed that one of the five identifiable concepts of evolutionary theory asserts the tenet of "Scientific Validity of the Theory of Evolution," which is also recognized as "Human Evolution." However, compared to the other three concepts elucidated here, the premise that "Human Evolution" is transpiring exhibits the smallest degree of substantiation. In general, students have an average reception of the Evolution Theory.

Keywords: *Evolution Theory, perceptions, scientific communities, university students.*

1. Introduction

The theory of evolution holds significant prominence in contemporary biological science. The theory had its genesis primarily through the scholarly works of Charles Darwin, who hypothesized that biological entities underwent the process of evolution through the mechanism of natural selection. Additionally, he conjectured that all life forms emanated from a shared precursor organism. The scientific community esteems the theory of evolution greatly, acknowledging its empirical foundation. Cofré et al (2018) posit that the theory in question displays a fundamental interconnectedness with ethical principles and beliefs. Notably, the theory proposes that the genesis of humanity can be traced back to a prior, less advanced species. Furthermore, the enforcement of ethical conduct is purportedly driven by the mechanisms of natural selection. Lastly, the theory suggests that natural processes are inherently unpredictable and uncontrollable, rendering them impervious to human intervention. The argument posited entailed a degree of difficulty in accepting the concept, as it appeared to be in contradiction with the prevailing notion of existence. According to empirical evidence and statistical analysis, it can be argued that what may appear to be random at first glance is subject to predictable patterns and outcomes. The abovementioned theory persists as a topic of considerable controversy among a significant portion of the global populace, particularly among those who hold religious convictions that are incongruous with established scientific theories (BouJaoude et al., 2011).

Numerous trends have been embraced to effectively teach the concept of evolution. One of the frameworks employed was the Concept Change Framework. This study aimed to

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facilitate the transformation of the students' erroneous concepts into scientifically accurate concepts. Advocates of this theoretical construct contend that the conceptualization of students' pre-existing ideas is intricately interwoven in a web of theoretical underpinnings. To effectuate a paradigm shift, educators must reframe the aforementioned concepts, as posited by Kuhn (1970). Samarapungavan and Wiers (1997) espouse the framework presented by Kuhn, providing empirical evidence through a study on students in the 5th and 7th grades that elucidates the classification of student responses into distinct categories such as creationism and spontaneous generation. Ontological differentiation within science education is another relevant conceptual framework. According to Ferrari and Chi (1998), it is considered imperative to ontologically classify ideas and learn them in accordance with their ontological classification. Teaching evolution poses a formidable challenge to them. The reason for this lies in the fact that their cognitive processes are organized according to an "event" taxonomy rather than an ontological "equilibrium" taxonomy. The current pedagogical practice of instructing on evolution has been identified to depict the subject matter as a fixed occurrence, whereas a more suitable approach would involve the portrayal of evolution as an ongoing and transformative process. Conceptual frameworks can present a challenge when all notions are construed as miscomprehensions, particularly when applied to notions such as evolution (Glaze et al., 2015).

The term "evolution" may also denote the phenomenon of altering or transforming. It has been widely observed that over successive generations, the genetic constitution of a given population undergoes gradual and nuanced alterations. This process ultimately contributes to the augmented variability that characterizes said population (Bhandari et al., 2017). Evolutionary theory constitutes a fundamental concept within the discipline of biology and warrants inclusion within the curricula of all science courses (Hill, 2014).

According to extant research, an individual's religious orientations and beliefs have the potential to significantly impact their perception, comprehension, and acknowledgement of biological evolution in circumstances where such orientations and beliefs are discordant with the scientific account of evolution (Southerland et al., 2001). Simultaneously, alternate investigations propose that comprehension of evolution possesses the ability to forecast the approbation of the evolutionary process (Rutledge and Warden 2000; Deniz et al. In the year 2008, or more precisely, during the calendar year of 2008, as delineated by the Gregorian calendar commonly used in the Western world, a significant event or occurrence took place. Furthermore, an expanding corpus of the literature suggests a correlation between an individual's recognition and comprehension of the principles underlying scientific inquiry and their acceptance of the theory of evolution (Asghar and Alter, 2011; Hokayem and BouJaoude, 2008; Lombrozo et al.). The year 2008. The findings underscore the significance of acquiring a comprehensive comprehension of the intrinsic characteristics of scientific knowledge and the principle of evolution to fully embrace the notion of evolution (Kim and Nehm, 2011).

How educators present the theory of evolution to their pupils is predicated upon their attitude of acceptance or rejection towards said theoretical framework (Rutledge and Mitchell, 2002). According to Nehm and Schonfeld (2007), educators in the field of science serve as a crucial intermediary between the scientific community's perspective on evolution and the public's stance on the acceptance or rejection of this concept. Teachers who lack comprehension of evolutionary science and the corresponding advocacy to support its teaching may impede informed decision-making concerning the pedagogy of evolutionary theory. Further, such deficiency may also impede the comprehensive understanding of evolutionary biology in their students (Wiles, 2014). The theory of evolution, from its inception, has been a contentious topic in the Muslim context and continues to be so. The reception of the aforementioned theory among the academic community exhibits varied responses in different countries. Thusly, the present research

endeavoured to comprehend the degree of receptivity of the aforementioned theory within the population of Jordanian collegiate learners.

Numerous scholarly investigations have been undertaken regarding the subject matter of evolution and its ramifications on the attitudes of educators and learners within Muslim environments. The study conducted by BouJaoude et al (2011) focused on examining differentiations between the varied religious traditions exhibited by Lebanese and Egyptian Muslim high school students concerning their comprehension and reception of the concept of biological evolution. This research delved into the conceptions of evolution held by adolescent students from Muslim background within two cultural contexts. The first context pertained to regions with a predominantly Muslim population, such as Egypt, while the second context involved areas with a substantial number of Christians, such as Lebanon. The research was conducted by administering survey questionnaires to 162 Egyptian students and 629 Lebanese students. In order to augment the accuracy and reliability of the data, additional data was collected by way of semi-structured interviews conducted with a sample of 30 Lebanese students for purposes of triangulation. The findings discerned that a substantial proportion of Muslim students of Egyptian and Lebanese origin hold misguided beliefs about evolution and the scientific framework, ultimately resulting in their negation of the theory of evolution. Furthermore, Lebanese students who identify as Sunni or Shia, as well as Egyptian students who identify as Sunni demonstrate a notable inclination towards religiosity. Additionally, these students hold the conviction that their religious convictions are congruent with their perspectives on the concept of evolution.

The study conducted by Hokayem and Fayad (2023) delves into the significance of students' epistemological perspectives in their inclination towards accepting or refuting the theory of evolution. The sample consisted of 11 undergraduate biology students who were enrolled at a private university situated in Beirut, Lebanon. The study was designed to gather data via semi-structured interviews to investigate participants' perceptions regarding reservations, acceptable evidentiary demonstrations in support of evolution, and the extent to which religion influences their daily lives. The research has illuminated significant findings on the roles played by individuals in a given context. Specifically, the study has revealed that in comparison to their academic counterparts, students exhibit a relatively lower level of certainty regarding a theoretical framework, and may even reject it altogether on account of its proto-scientific nature. They negated the utilitarian value of historical evidence as legitimate epistemological evidence in the empirical realms of scientific inquiry, encountered difficulties in establishing vital affiliations between evolutionism and theological perspectives, and repudiated the notion of a shared lineage among different species due to a conviction that humans occupied a superior position in the hierarchy of creatures.

In his study of 2015, Clément analyzed the perceptions of Muslim educators in multiple nations regarding evolution. The assessment was executed using a 15-item questionnaire on evolution, which had been validated and sourced from the Biohead-Citizen initiative. The initial segment provides a comparative analysis of nine French-speaking nations, which differ in the extent of their adherence to either Islamic or Christian traditions. In the subsequent section of the study, a comparison is made between educators of Islamic and Christian faiths in nations that are analogous in demographic, socioeconomic, and political aspects. In the case of Lebanon, the minimal or nonexistent disparity in pedagogical approaches between these two groups was identified. The present study, in Part 3, endeavours to examine and analyze empirical data obtained from 2,130 surveyed Muslim educators. The primary objective of this analysis is to identify and ascertain control parameters that exhibit a significant correlation with teacher variability. The discourse is organized into three queries. Is there a correlation between being of the Muslim faith and possessing a greater aptitude for creativity in comparison to individuals of other religions or cultural backgrounds? Might the expertise of Muslim educators be

more (or less) associated with the promotion of creationist notions? Furthermore, is it typical for teachers who identify as Muslim in European countries to adhere to creationist beliefs?

Asghar (2013) conducted an inquiry into the confluence of religion, science, and education within the pedagogy of Muslim instructors of science across various contexts. This study focuses on investigating the level of comprehension among Muslim science educators at the secondary school level regarding the scientific hypothesis of evolution, within the framework of theological beliefs concerning the concept of creation. The study obtained data from a sample of 25 science instructors at the secondary school level, representing a range of educational institutions across Canada and Pakistan. The present study conducted qualitative interviews and focus group discussions to investigate the participant's perceptions of evolution concerning their religious beliefs, as well as their approaches towards the debate between evolution and creation in an educational setting. The acceptance of non-human evolution among Islamic science educators in Canada and Pakistan is predominantly contingent upon their aversion to endorsing human evolution as it seems to conflict with their fundamental Islamic convictions. The vast majority of science teachers hailing from Canada as well as Pakistan have been noted to possess a lack of lucidity regarding biological evolution. Furthermore, there exists a marked inclination among these teachers to impart an education that incorporates both scientific and religious standpoints in their science-based subjects.

2. Methods

The study used the descriptive methodology to answer the question of the study. This approach describes data extracted from several tools to reach specific conclusions. The sample of this study included 101 students from three universities. The study used a questionnaire as an instrument to gather data from the participants. The questionnaire was about the acceptance of the Theory of Evolution, which was adapted from several previous studies.

The collected data were analysed using statistical tools, such as percentages and mean scores. The survey was administered in Arabic according to the language of science instruction. The scoring criteria in the questionnaire followed the Likert scale, which was classified into five levels (Strongly agree, Agree, uncertain, disagree, and strongly disagree). The present study employed a qualitative approach to investigate and validate students' perspectives on evolution, as well as to investigate the linkage between their religious beliefs and their comprehension of the subject in question.

3. Results and Discussion

After gathering the returned questionnaires from the participants, and after conducting the analysis, the results of the study are presented below. The tables below show the level of acceptance of the Evolution Theory among Jordanian universities students.

Table 1. The level of acceptance of the concepts of the Evolution Theory

Evolution theory concepts	Strongly Agree		Agree		Uncertain		Disagree		Strongly Disagree	
	F	%	F	%	F	%	F	%	F	%
The process of evolution	33	14	101	45	40	17	33	14	14	10
The scientific validity	20	10	68	30	60	28	68	29	5	3
The evolution of humans	18	10	92	35	37	23	48	24	26	8
The proof of the theory	19	8	90	38	65	30	41	20	6	4

The perception among scientific communities	14	7	110	50	57	20	32	15	8	8

Table 1 presents the results from the responses of the participants to the question of the study on the acceptance of the Evolution Theory. The questionnaire included 101 students, of which 45% said they accepted the theory of evolution. This suggests that the frequency of student acceptance is comparable to the number of students participating in the survey. When responding to the second part, 30% of the participants agreed with the presence of the scientific validity of the Evolution Theory. On the other hand, 35% of the participants agreed on the concept of human evolution as presented by the Evolution Theory. The proof of the Evolution Theory received 38% of agreement among the participants while the perception of the theory among the scientific communities received 50%.

Table 2. The level of acceptance of the Evolution Theory in general

Acceptance Category	**Number of Students**	**Percentage (%)**
Very Low	18	24
Low	34	42
Moderate	24	28
High	14	5
Very High	10	1
Total	**101**	**100**

Data collected on the students' acceptance of evolution show that the average student acceptance rate of evolution is in the rather low range of 41.63%. This means that the levels of acceptance of the theory of evolution is rather low among students. As a direct result, evolution falls into the lowest possible category based on the degree of belief in it.

In light of the imperative to perpetually augment and refine knowledge, it is incumbent upon scholars, scientists, and Muslim intellectuals alike to persevere in the progression and evolution of their respective domains. On the one hand, it is incumbent upon them to arrange and execute endeavours that are oppositional to a particular academic discipline or doctrine that lacks a verifiable methodology and logical framework. Conversely, it is incumbent upon scholars to present evidence to the scientific community that substantiates the existence of a viable paradigm of evolution that aligns cohesively with religious convictions. As a result thereof, the selected and developed theory remains firmly rooted in the principles of Islamic teachings (or the teachings of other religious traditions), while also being congruent with the advances achieved in the domains of science and technology within the current era.

To further explore this conceptual framework, a comprehensive understanding of evolutionary principles can prove advantageous in addressing challenges that impact human well-being across a diverse range of spheres of daily existence. An illustration of this concept lies in the medical research domain, where a thorough comprehension and proficient management of the evolution pattern of the pathogenic microorganism causing a disease can place the researcher at a distinct advantage in combating it. The utilization of this methodology will enable the researcher to devise novel therapies with augmented potency against the pathogenic agent. The aforementioned can be attributed to the researcher's capability to impede the advancement of the illness. This assertion stems from the premise that with a comprehensive comprehension of the pattern, the researcher will be equipped with the necessary skills and knowledge to effectively combat the illness.

Hence, the utilization of the study of evolution in this particular manner possesses the capacity to augment the overall agreement of an individual's existence as a human entity. The elucidation of the process of evolution could offer valuable insights into the gradual

progression of human development over time, as suggested by prominent scholars Dobzhansky (2013) and Kyriazis (2020). It is plausible to deduce that the biological phenomenon of evolution is among the most momentous facets in the discipline, and conceivably even essential to the existence of humanity itself (Cole, 1954; Simpson, 1953). This inference can be derived through the application of rational deduction and logical analysis. The present-day complex and sophisticated biological concepts can be satisfactorily explained by the principles of evolution, owing to the extensive timeline over which natural selection has operated. The acquisition of knowledge regarding evolution results in a notable expansion of an individual's outlook, facilitating the continuous development and evolution of their thoughts and beliefs as they engage in extensive research and critical reflection to unravel the intricacies of an ongoing discourse or concept. To facilitate their complete development into individuals with a constant capacity for intellectual expansion and limited susceptibility to temporal impediments to their cognitive growth.

The present investigation has revealed that a noteworthy association exists between the recognition of inaccurate beliefs concerning the theory of evolution and the impact on comprehension outcomes. These observations were demonstrated through several distinct methodologies. As a means of addressing the prevalent misconceptions surrounding the theory of evolution, pedagogical techniques designed to facilitate active learning were employed. The outcome of these efforts was a discernible enhancement in the students' comprehension and assimilation of the theory (Alters & Nelson, 2002).

It was previously conventional that a mere fraction of students, specifically 64.65% of the total student cohort, held the belief that evolution constitutes a legitimate scientific theory. Consequent to undergoing active learning interventions, namely Debate, Group Investigation (GI), and Everyone Is a Teacher Here, there has been a discernible rise in the average number of students espousing the tenets of the theory of evolution. The results derived from the regression analysis indicate a significant correlation between the identification of misconceptions and the attainment of learning outcomes by students, amounting to a magnitude of 37.7%. These findings lend strong support to their validity and interpretation. The results derived from the regression analysis indicate a significant association between the detection of false beliefs and the academic achievements of pupils.

The role of certainty holds great relevance in the discourse surrounding the intersection of evolutionary theory and religious belief. "The adoption of the theory of evolution may heighten an individual's focus on subtle unconscious cognitive processes, closely linked to neural activity, and foster a heightened sense of comprehension or recognition of the fundamentals of the theory of evolution." The rationale behind this assertion can be attributed to the direct interlinkage that exists between the brain and the subconscious and intuitive aspects of cognitive functioning (Schore, 2011). The perceptual understanding of an individual and the interconnectedness among these cognitive processes are important determinants that exhibit profound associations with diverse religious customs. The perceptual understanding of an individual and the interconnectedness among these cognitive processes are important determinants that exhibit profound associations with diverse religious customs. Henceforth, upon gaining comprehension, an individual may increasingly direct their attention towards overarching principles pertinent to intuitive cognitive mechanisms, akin to one who is devoted to the scholarly exploration of scientific quandaries. The phenomenon of transformative processes in living organisms and the emergence of novel forms of sustainable energy sources manifestly illustrate the influence of intuitive cognitive mechanisms.

4. Conclusion

Based on the data presented, it can be inferred that the subset about the adoption of the theory of evolution among pupils exhibits a level of acceptance that is comparable to that of the low-performing group, on average. One of the five identifiable concepts of evolutionary theory asserts the tenet of "Scientific Validity of the Theory of Evolution," which is also recognized as "Human Evolution." However, compared to the other three concepts elucidated here, the premise that "Human Evolution" is transpiring exhibits the smallest degree of substantiation.

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