



A Study Of Trajectory Of Evolution Of Conceptions About Living Organisms & Reproduction At Upper-Primary Level

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ABSTRACT-

The research objective before us is an intriguing exploration into the evolutionary journey of major biological concepts as they unfold with in the context of education at upper primary level. This objective seeks to a journey through the animals of pedagogy, where we can trace the historical and conceptual progression of these pivotal biological science themes across different levels of education, how these concepts evolve and are structured over time, reflecting the progression of complexity and depth in students' understanding as they advance from class 6 to class 8th. The selected biological concepts under scrutiny, derived from upper-primary level curriculum, form the foundation of our exploration. It provides an insightful lens through which we can trace the trajectory of biological science education. It presents a comprehensive and interconnected approach to teaching of biological science. let's delve into the progression of these major biological science concepts and explore how they evolve through out the secondary level curriculum. This study focuses on examining the development and evolution of biological science concepts among upper-primary level students. It aims to investigate how students' understanding of biological science evolves over time as they progress through their education. By analyzing the changes in their comprehension of various biological concepts, the research aims to provide insights into the effectiveness of science education at the upper-primary level and identify the areas where improvements may be needed.

KEY-WORDS: Trajectory, Evolution, Conceptions, Biological science, Living organisms, Reproduction, Upper-primary Level

INTRODUCTION

This study explores how students' understanding and application of biological science concepts change over time and what factors influence their learning process.

In class 6th, "characteristics of Living Organisms and Habitat" serves as the introductory chapter in a students' biological science education. At this stage, students are introduced to the fundamental building blocks of life. This includes understanding what distinguishes living organisms from non-living entities and delving into various habitats in which these organisms thrive. Students are encouraged to explore the living world through observation, classification and basic understanding of ecosystems which aims to ignite their curiosity and foster a sense of wonder about the diversity of life in the Earth.

Now, in the next step, they are introduced to the concepts of "joints and movements". This represents the foundational phase of educational trajectory. Students are familiarized with the structural aspects of the human body, focusing on skeletal system and role of joints in facilitating movements. The pedagogical approach at this level involves introductory lessons, including class room instruction, text-book readings and some basic hands-on activities to help students' grasp the fundamental principle.

In class 7th, the journey takes a significant step forward as students dive into the concept of adaptation. This theme builds upon the introductory knowledge acquired in class 6th and comes into dynamic world of evolutionary biology. Upper primary level students can think how living organisms adapt to their surroundings through various type of changes. On the other hand, animal nutrition and respiration present a significant step in biological science education, which shows the evolution of the curriculum. In this grade, students can understand that how living organisms acquire and utilize nutrients and oxygen. The pedagogical approach become complex and involves teaching tools like microscopes, visual aids and various related experiments or daily activities.

Concepts of grade 8th present an important point in evolution of upper-primary level biological science curriculum. In this stage, students face complex and intricate concepts, they introduced a microscopic level of biological science with a focus on 'cell structure and function', Reproduction in animals and Growth in humans with hormones. The research objective's purpose is to find the patterns and criteria of these selected biological science concepts with in secondary level curriculum.

It aims to provide insights into how students' understanding of biological science progresses as they move through their educational journey.

REVIEW OF RELATED LITERATURE

Uralovich, K.S., et al.,(2023) discussed by seeing the results of people's unfavourable views of the natural world. The effects on nature had gradually worn down the delicate equilibrium. The solution to such problems was dictated by the destiny of humanity, by its destiny tomorrow. We should prioritize educating the public about environmental issues, encouraging environmental practices and instilling a sense of responsibility to protect the natural resources for the benefit of future generations. The assurance of life of peace and prosperity for all were the stated goals of SDGs.

Parraguez, C.,et al., (2023) explained wealth of literature on students' competing views of evolution and natural selection, how these views shifted over time, how students' understanding of scientific processes evolve because of class room instruction.

Moore-Anderson, C. (2023) focused that lower secondary biology teaching was mostly on sub-organism systems, including physiology, at the expense of evolution and ecology and hindering the development of a comprehensive understanding of Biology. Additionally, it was suggested that through the pedagogical application of comparative biology, ecology, organism systems and evolution could be combined with an evolutionary perspective.

Olveira, G. D. S., et al., (2022) described the development and assessment of cell membrane biology learned activities within the context of experimental realism and model of educational reconstruction, the study findings grounded in theory and practiced. To begin, the author consulted the literature to construct analogy-based learning. The author observed how students learned through videotape teaching experiences. By viewing students' conceptual growth as paths to thought, the author was able to get to the bottom of their learned challenges. The students had a better understanding of cell membrane biology and updated their ideas on the concepts of environment.

Carlisle, J.,et al., (2019) discussed on the periphery of public knowledge of society, scientific communication and education and science in society towards the theory of biological evolution had garnered more and more interest. Human evolution had been the subject of both small-scale qualitative interviews and larger scale quantitative surveys.

Nehm, R. H. (2019) looked at the state of biology education researched and the possibilities and threats it faces. One obstacle to understanding the student thinking about living systems and developing unified conceptual frameworks for these systems was the ongoing discipline fragmentation. The lack of conceptual frame work could make it difficult to discover how students thought about biological systems and to guide biology instruction, as shown through a review of concept inventory study.

RESEARCH QUESTIONS

- 1) How students correlate their previous knowledge to new topics with respect to progression of class?
- 2) Are students able to apply the learned concepts in their daily life?

RESEARCH METHODOLOGY

STUDY AREA- The population of the study has been collected randomly from the students studying at upper-primary classes of Jaunpur city of Uttar Pradesh. The researcher has selected Kerakat block for her study as she is working in a gov. school of Nyaya-panchayat Narhan which comes under Kerakat block, Jaunpur city (Uttar Pradesh).

The researcher has chosen two schools in Kerakat block of Jaunpur city (rural area) -composite school Saroj-Badewar and Composite School Adarsh Kerakat. She randomly selected 40 students from one class of a school i.e. 80 students from class 6th of both school,80 from 7th and 80 from class 8th. There is no fix ratio of girls and boys from each class. Both schools are government running under Basic Shiksha Parishad (U.P.).

METHODOLOGY ADOPTED-

Researcher has framed self-made questionnaire from both topics i.e. Living Organisms and Reproduction. These are multiple choice type questions and students have to tick the correct answer.

DATA COLLECTION-

The methodical collection and measurement of data on variables of the interest to address research questions, test hypothesis and assess results is referred to as data collection in research. Data has been created by the researcher themselves with the aid of tests, surveys and interviews that have been specifically created to comprehend and address the study problem at hand. The researcher also creates a questionnaire using a questionnaire method that contains a list of pertinent questions. The questionnaire then records the respondent's responses. The information is obtained directly from the respondents, this method is useful for collecting the primary data.

Secondary data has been collected from variety of sources, government reports, academic studies, articles, libraries, internet and organizations.

DATA ANALYSIS-**Descriptive analysis of LIVING ORGANISMS**

Living organisms	Class 6 th	Class 7 th	Class 8 th
mean	4.5125	5.1750	9.6000
Standard deviation	1.70623	1.96665	1.36502

The table shows the mean value of three grade levels: for class 6th 4.5125, mean value for class 7th is 5.1750 and for class 8th- mean value is 9.6000. the standard deviation for each grade level, tells us how much values within each grade level vary. For class 6th, the standard deviation is 1.70623, for class 7th, it is 1.96665, suggesting slightly more variability in the data compared to class 6th. For class 8th, the standard deviation is 1.36502, which is lowest among three grade levels.

Descriptive analysis of REPRODUCTION

reproduction	Class 6 th	Class 7 th	Class 8 th
mean	4.9750	4.9375	9.6625
Standard Deviation	1.85537	1.82350	1.43151

While seeing the values of reproduction, for class 6th, mean value is 4.9750, mean value for class 7th is 4.9375 and for class 8th it is 9.6625. the standard deviation for each grade level, which tells us how much the values within each grade level vary- for class 8th, it is lowest and highest for class 6th among all the three grade levels.

RESULT-

The outcome of the study describes statistical displayed by students categorised according to different grade level. Within each level, students are evaluated with each concept. It shows the ability to correlate various topics of subject based on students' performance. It indicates the strength and direction of the relationship with in selected topics from class to class. This correlation ability is used to assess the relationship between assessments within each class.

DISCUSSION-

The way biological science is taught significantly impacts the evolution of students' concepts. Research by Tanner and Allen (2004) emphasized those active learning strategies, problem- based learning and hands on experiences can promote deeper understanding and conceptual change. Therefore, educators must employ effective teaching strategies that encourage students to actively engage with the subject matter. (Linder, 2013).

The findings of this study have practical implications for curriculum development. It suggests that curricula should be designed in a way that allows for the gradual progression of complex biological concepts over the years in secondary school. Furthermore, educators should be given the flexibility to adapt their teaching methods to align with the evolving needs of their students. Understanding this process is crucial for educators and curriculum developers to design more effective and targeted science education program. By incorporating these insights into practice, we can better equip students to navigate the complex world of biological science.

Research by Carey (1985) suggests that the age at which students acquires certain biological concepts varies, reflecting the developmental appropriateness of specific ideas. It means, younger students might have difficulty comprehending complex genetic concepts, while older students can grasp them more readily which highlights the importance of curriculum with students' cognitive developmental stages.

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