

EMERGING PEDAGOGICAL APPROACHES: TRANSFORMING SCIENCE LEARNING IN MIDDLE SCHOOL

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Abstract

The research aims were to examine the emerging pedagogical approaches and how these innovative pedagogical approaches are transforming science learning in middle school. This survey based nature research utilized both quantitative and qualitative methods. The population of the study was the middle school science teachers and students of district Rahim Yar Khan. Sample was contained of seventy-two teachers, and three hundred-sixty elementary school students for a total sample size of four hundred-thirty two participants. As a research tool questionnaire was used for data collection. To ensure validity and reliability all research tool underwent pilot testing as well ensuring their accuracy through expert opinion while also having using Cronbach Alpha calculations to test questionnaire reliability. SPSS-24 statistical software was employed during analysis which involved utilizing relevant formulas such frequency measurement percentage measures standard deviation. The findings suggested that emerging pedagogical approaches are transforming science learning in middle school. On the base of these findings the researchers presented some recommendations.

Keywords: *Pedagogical Approaches, Science Learning, Middle School Education.*

Introduction

The role of science learning at the middle school level education is crucial, principally these emerging pedagogical approaches are transforming science learning in middle school. On this phase, students' changeover from real operational thinking to the direction of abstract reasoning, empowering them to grip multifaceted scientific concepts (Arshad et al., 2025; Riaz et al., 2026). However, research shows that traditional, lecture-based teaching methods often fail to sustain students' interest and may hinder the development of critical thinking and problem-solving skills (Hake, 1998). Consequently, many learners disengage from science by the end of middle school, which affects their future participation in advanced science courses and STEM-related careers. In the educational field philosophers and experts have stressed the requirement for new instructional strategies to extend over memorizing facts in order to solve these issues. It is becoming more widely acknowledged that methods like inquiry-centered learning, Project- and Design-Based Learning, Phenomenon-Based Learning, and Technology-Enhanced Active Learning are useful for developing energy, extensive knowledge, and skills that can be applied.

The instructive approaches inspire students to become active participants in constructing knowledge, rather than passive recipients of information. They also align with the 21st-century skills framework, which prioritizes collaboration, creativity, critical thinking, and

digital literacy (Riaz et al., 2018). A change in student-focused science courses that incorporate technology, cross-disciplinary projects, and real-world problem solving is also highlighted by worldwide education. These developments are becoming more recognized as essential for closing disparities in science accomplishment and preparing students for knowledge-driven economies in developing nations like South Asia. In light of this, it is crucial to investigate the function of new instructional techniques in science lessons for eighth graders (Riaz et al., 2024). It serves the larger aims of equity, motivation, and preparing students for civic and professional life in a scientifically complex world in addition to addressing brain evolution and knowledge accomplishment.

Statement of the Problem

Elementary School Teacher pedagogical competence boosts up the quality of teaching especially at secondary level, which also enlarge the quality of learning in Science. The secondary school teachers are therefore in a better position to contribute more to their students and colleagues in effective pedagogical role in Science .The secondary school teachers ‘emerging Pedagogical responsibilities, management, and academic advancement are the main goals of effective Pedagogical approaches of Science grade 8 Providing Elementary school teachers with an efficient pedagogical training process The statement of problem is“ Role of Rising Pedagogical come on in Science on Students’ Learning at Grade 8 in district Rahim Yar Khan.

Research Objectives

The objectives of study will be;

- To analyze the role of occurring pedagogical approaches in Science on students’ learning at Grade-8?
- To compare the role of emerging pedagogical approaches in Science on **boys and girls** students’ learning at Grade 8?
- To compare the role of materializing pedagogical approaches in Civics on **urban and rural** students’ learning at Grade 8?
- To compare the role of arising pedagogical approaches in Civic on students’ learning of **public and private** sector at Grade-8?

Research Questions

The research questions of study were:

1. What is the role of emerging pedagogical meets in Science on students’ learning at Grade-8?
2. Is there a characteristic in the role of emerging pedagogical approaches in Science on **boys and girls** students’ learning at Grade-8?
3. Is there difference in the role of emerging pedagogical approaches in Science on **urban and rural** students’ learning at Grade-8?
4. Is there diversity in the role of emerging pedagogical approaches in Elementary on students’ learning of **public and private** sector at Grade-8

Hypothesis

H_A: There is a meaningful role of emerging pedagogical approaches in Science on students’ learning at Grade-8

H₀: There is no much role of emerging pedagogical approaches in Science on **boys and girls** students’ learning at Grade-10

H₀: There is no significant role of emerging pedagogical approaches in Civic on **urban and rural** students’ learning at Grade-18

H₀: There is no monumental role of emerging pedagogical approaches in Science on students' learning in public and private sector at Grade- 8

Literature Review

Literature review is a written overview of major writings and other sources on a selected topic (Ansari et al., 2025; Ahmad, Yousaf, & Riaz, 2026). Review of the literature summarize and evaluate the text of writing of the definite theme, and provide frame work to think about the possible consequence of innovative study (Ahmad, Khokhar & Shaheen, 2026; Yousaf et al., 2026). Literature reviews summarizes and assesses the text of writing of the definite theme and provides a basis to think about the possible importance of innovative study (Ahmad et al., 2023; Ahmad et al, 2024). From these statements we can guess the importance of literature review. Following is the literature review related to the present research work.

Elementary science curriculum has traditionally placed a strong emphasis on instructional, didactic approaches that prioritize information recall over use and logical reasoning. Although these methods cover the material, they frequently demotivate students and restrict their ability to conduct research. While such approaches provide content coverage, they often disengage learners and limit opportunities for inquiry (Riaz, Rashid, Sanam, & Ahmad, 2026). In contrast, student-centered pedagogies such as inquiry-based, project-based, and technology-enhanced learning are shown to promote higher-order thinking and long-term retention. Constructive learning ideas, which contend learners actively generate understanding via connection and thought, are the foundation of the current change in the philosophy of learning.

Inquiry-Based Learning

The IBL's efficacy in fostering concept comprehension, fascination, and ability to solve issues in science classes is supported by study. A five-phase IBL model orientation, conceptualization, inquiry, outcome, and discussion was described by Pedaste et al. (2015) to assist students in participating in real-world investigations. According to more recent research, IBL improves students' cognitive and affective results while preparing them for important 21st-century skills including self-control, creativity, and teamwork (Oliveira et al., 2019; Bakht et al, 2026). But effective implementation requires adequate teacher training and resource support, as limited capacity often hampers adoption (Viro et al., 2020).

Project- and Design-Based Learning

Research backs up the effectiveness of the IBL in promoting students' understanding of concepts, interest, and problem-solving skills in scientific classes. To help students participate in actual-world inquiries, Hurd (2000) established a five-stage IBL model: orientation, conceptualization, inquiry, outcome, and exchange. IBL enhances students' mental and emotional results while equipping them with critical 21st-century abilities including self-control, creativity, and collaborate, per fairly recent studies (Rashid et al, 2026). However, as inadequate capacity frequently impedes acceptance, successful adoption necessitates sufficient teacher training and resource support (Krajcik & Czerniak, 2018).

Phenomenon-Based Learning

Concept-based schooling, which has its roots in Finland's curricular changes, places a strong emphasis on interdisciplinary research into pressing problems (Silander, 2015). Because kids observe firsthand how science ideas are used in social and environmental situations, research indicates that this method increases resonance and attention (Fraser et al., 2021; Riaz, Abdullah, Yousaf, & Ahmad, 2026). Such comprehensive instruction in elementary research

builds relationships between the sciences of physics, chemistry, and biology while also cultivating critical thinking and problem-solving skills.

.Active Learning and Technology Integration

An increasing amount of research backs up the use of gadgets in dynamic learning settings. According to systematic reviews, engaged study dramatically boosts outcomes in STEM subjects and lowers test scores by about one-third (Carter et al., 2014). Engaging techniques in learning about physics produce twice as many abstract gains as conventional seminars. Likewise, it has been demonstrated that MIT's technology-driven Activated Learning (TEAL) paradigm significantly improves student retention and participation (Hassard & Dias, 2013). Real-time data tools, collaboration devices, and models provide Grade 8 schools with chances to show off abstract ideas and conduct exploratory experiments.

Robotics, Coding, and Computer-Based Scaffolding

Teaching science is further enhanced by recent advancements in automation and computing. According to Bidarra and Rusman (2017), high school students' enthusiasm and analytical abilities are improved by robotics exercises. Software assignments also help students become engaged designers rather than passive users of technologies, which improves their creative and analytical abilities (Mena-Guacas., et al., 2025). Virtual pacing deepens intellectual comprehension by providing users with responsive assistance that goes exceed their existing capabilities (Christensen & Knezek 2015).

Theoretical Framework

By placing emergent instructional methods within important academic and cognitive frameworks, their efficacy in scientific learning may be more clearly demonstrated. These ideas serve as a basis for inquiry-driven education, technological integration, and student-centered pedagogies in science education in grade 8, when children move from literal into more complex ideas about science.

Constructivism

According to constructivist theory, which has its roots in the writings of Piaget (1972) and Bruner (1961), students create material by encounters as opposed to taking in it. Inquiry-based learning and project-based learning, which enable learners to develop theories, test concepts, and hone learning via investigation, are supported by structuralism in the study of science. Constructivist methods are especially pertinent for kids in Grade 8 since they correspond with the phase of growth at which they are starting to combine real-world exploration and abstraction.

Socio-Cultural Theory

The Zone of Proximal Development (ZPD), cultural resources, and interactions with others are all important components of development, according to Vygotsky's sociocultural hypothesis from 1978. This idea informs modern schools that emphasize peer engagement, discourse, and directed guidance, such alternate classes, creative learning, and fun. Structured group projects and instructor reinforcement in science enable eighth-grade students go beyond their own comfort zones and enhance their basic and practical expertise.

Experiential Learning Theory

A further foundation for creative teaching is Kolb's (1984) learning cycle, which consists of real experience, reflective observation, abstract conceptualization, and active exploration. Immersive training is embodied by methods like virtual reality (VR) sims and practical lab tasks, which immerse students in phenomena they can control and consider. Students are encouraged to see science as a dynamic process rather than static knowledge as a result of these encounters, which promote more profound involvement with science-related activities.

Self-Determination Theory

Additionally, theories of motives, particularly the concept of self-determination, align with creative institutions (Deci & Ryan, 1985). SDT holds that when kids' needs for freedom, abilities, and commitment are met, they thrive. Interaction but invert education instantly satisfies these criteria; students feel independent while looking for resources, develop interpersonal skills through group projects, and acquire expertise through mastered rewards. Aspiration is crucial for eighth-grade science students to stay interested in complex theoretical subjects like packs or increase ties.

Cognitive Load Theory

The theory of cognitive overload (CLT) (Sweller, 1988) offers a paradigm for regulating the effort that is needed to acquire information as novel technology like AR/VR and learning analytics are added. CLT states that educational layout should promote relevant load for schema building while minimizing unnecessary load on the mind. This explains the reason why teenage science students, who could otherwise become overwhelmed by complicated online operations, require support, systematic direction, and succinct graphics.

Conceptual Framework

Independent Variable Role of Emerging Pedagogical Approaches in Science	Dependent Variable Students' Learning at Grade Elementary Level
1. Cooperative teaching	1. Cognizance
2. Active Teaching	3. Expertise
4. Problem Solving	2. Behavior
5. Inquiry	4. Encouragement

Theories of Science

Science is not only a body of knowledge but also a dynamic process shaped by philosophical assumptions, social contexts, and methodological practices. Understanding the theories of science is essential in education because it guides how science is taught, interpreted, and applied. For Grade 8 learners, theories of science offer insight into the nature of scientific knowledge, fostering curiosity, critical thinking, and awareness that science evolves over time.

1. Positivism

Positivism asserts that knowledge is based on observable, measurable facts and that science seeks objective truths through empirical methods (Comte, 1853/1974). In science classrooms, this translates into experimentation, measurement, and verification. Grade 8 lessons on physical properties of matter or chemical reactions often rely on positivist traditions—collecting data, making observations, and drawing conclusions.

Relevance: Positivism underpins laboratory-based learning and helps students understand the importance of evidence in scientific inquiry.

2. Empiricism

Empiricism emphasizes that knowledge arises from sensory experience (Locke, 1690/1995). Scientific theories must therefore be grounded in observation and experiment rather than speculation.

Relevance: For Grade 8 students, empiricism justifies hands-on experiments in topics like forces, energy, or ecosystems, reinforcing that science is learned by “doing” rather than memorizing.

3. Rationalism

Rationalism holds that reason and logic are essential to knowledge acquisition (Descartes, 1641/1996). In science, this is reflected in the role of hypotheses, models, and theoretical reasoning that extend beyond direct observation. Relevance: Grade 8 learners engage in rationalist thinking when they develop models (e.g., atomic structure, plate tectonics) that cannot be seen directly but are inferred logically.

4. Falsificationism (Karl Popper)

Popper (1959) argued that scientific theories can never be conclusively proven but can be tested and potentially falsified. A theory is scientific only if it can be disproven through evidence.

Relevance: This helps Grade 8 students appreciate that science is tentative and self-correcting. For instance, learning about outdated models like the geocentric theory demonstrates how scientific knowledge changes when disproven.

5. Paradigm Shifts (Thomas Kuhn)

Kuhn (1962) introduced the idea of scientific revolutions: normal science operates within paradigms, but occasionally, anomalies lead to paradigm shifts. For example, the shift from Newtonian mechanics to Einstein's relativity. Relevance: Grade 8 students can study paradigm shifts (e.g., cell theory development, atomic models) to understand science as a human endeavor that evolves through crises and revolutions.

6. Constructivist Views of Science

Constructivism emphasizes that scientific knowledge is constructed through interaction between theory, evidence, and human interpretation (Driver et al., 1994). Science is not just discovery but also meaning-making. Relevance: In classrooms, constructivism supports inquiry-based and project-based learning, where students actively build understanding of scientific concepts rather than passively receiving facts.

7. Socio-Cultural and Critical Theories of Science

Modern perspectives highlight the social and cultural dimensions of science. Science is shaped by society, politics, and ethics, rather than existing in isolation (Longino, 1990). Relevance: Grade 8 students can explore contemporary issues such as climate change, biotechnology, or renewable energy, recognizing that science interacts with values, communities, and global challenges.

Models of Science Education

Science education has evolved through different models that reflect philosophical, psychological, and pedagogical perspectives on learning. Each model provides a lens for organizing instruction, selecting methods, and structuring curriculum. For Grade 8 students, which stood at a vital moment of cognitive and social development—these models impact how theoretical academic principles are delivered and processed. Teachers can match instruction to learning objectives, student requirements, and social expectations by having a thorough knowledge of science teaching paradigms.

1. The Traditional (Content/Knowledge Transmission) Model

This approach is founded on positivist and empiricist scientific concepts which hold that expertise was universal and factual. Through lectures, textbooks, and rote reinforcement, children are supposed to learn material from their educators, who serve as knowledge carriers (Twinkl, 2025). **Qualifications:** Effective at covering content; helps pupils become ready for assessments that are standardized. **Criticisms:** Encourages retention and idle study with no

emphasis on imagination in execution (Bybee, 2010). Pertinence to eighth grade: useful for basic subjects like physics vocabulary or data about the periodic table, but not enough for more complex scientific thinking.

2. The Inquiry-Based Model

This concept, which has its roots in postmodern ideas about learning, sees science as an investigative process. The five E's of education: Get involved, Find out, Express Elaborate, Evaluate is widely used in inquiry-based science classrooms (Bybee, 2010). Highlights: Encourages awareness of the nature of scientific discoveries, thinking critically, and creative thinking. Drawbacks: Needs teaching experience, labs time, and funding. Significance to Grade 8: Makes science more relatable by encouraging students to research real-world phenomena like ecosystems, chemical reactions, or energy transmission.

3. The Constructivist/Student-Centered Model

According to Driver et al. (1994), this paradigm highlights that students actively create information instead of merely absorbing it. As facilitators, teachers lead their students in group projects, debates, and introspective exercises.

Strengths: Promotes imagination, deeper thinking, and students being in charge of their education. Restrictions: time-consuming; if done incorrectly, it could lead to gaps in factual coverage. Pertinence to eighth grade: encourages a more thorough investigation of obscure concepts like warming temperatures and atomic makeup.

4. The Socio-Cultural Model

This paradigm, which is based on Vygotsky's concept of the region of proximal development (ZPD), highlights how social contact, communication, and teamwork are key components of learning (Vygotsky, 1978). This concept is reflected in educational events including cooperative initiatives, peer mentoring, and group research.

Positive traits: Promotes acceptance, learning from others, and interpersonal ability.

Limitations: Might not work as well in large classrooms or in situations where students lack teamwork abilities.

Importance at Grade 8: Promotes cooperation in teamwork exercises and laboratory settings.

5. The Humanistic/Experiential Model

This approach focuses on the complete kid and connects science education to students' principles, hobbies, and life. It is in line with inclusive instruction and actual schooling (Emdin, 2017).

Benefits: Encourages drive, significance, and a sense of personal connection to science.

Restrictions: If individual desires take precedence over fundamental scientific knowledge, there is the possibility of diminished integrity in academia.

Importance in Level 8: Good at introducing socially conscious subjects like health, computer principles, and preserving the environment.

6. The Technological/Digital Learning Model

Multimodal educational materials, simulated laboratories, and virtual reality are all incorporated into this concept. In order to assist students with research-based lessons, platforms such as iOLab and PhET simulations can offer implicitly underpinning (Wieman et al., 2013; Khan et al., 2024).

Positive aspects: Promotes self-paced learning, boosts engagement, and improves the comprehension of intangible concepts.

Limits: Relies on equal access, teacher preparation, and facilities.

Pertinence to eighth grade: beneficial for modeling astronomy events, energy changes, and subatomic exchanges.

.7. The Integrated/STEAM Model

In order to fix contemporary issues using multidisciplinary techniques, the STEM/STEAM framework model combines the sciences, technology, engineering, creative arts, and maths (Sánchez Milara & Cortés Orduña, 2024). Here, design-based learning (DBL), which emphasizes creativity and practicality, is a popular approach.

Potential: Encourages invention, teamwork, and ingenuity.

Limits: Needs resources and comprehensive education help.

Relevance to Grade 8: Projects that show science as a component of larger societal challenges include creating ecosystems and modeling power from renewable sources.

8. The Critical/Transformative Model

The STEM, or STEAM, concept uses multidisciplinary ways that address practical issues by integrating the fields of science, technology, engineering, the arts, and mathematics (Sánchez Milara & Cortés Orduña, 2024). A popular approach here is design-based learners (DBL), which places an emphasis on creativity and execution.

Strengths: Encourages originality, cooperation, and creativity.

The need for comprehensive curriculum support and resources is one of its limitations.

Relevance to Grade 8: Projects like creating rainforests or modeling green power show science as a component of larger social problems.

Research Methodology

Research methodology encompasses various aspects such as design of study, population and sample selection techniques, and sampling methods including determining appropriate sample size. Moreover, it examines various tools for conducting research along with a pilot study before moving onto data collection and analysis procedures.

Research Design

“Design of the research comprises of the whole procedure which is conducted research” (Ahmad et al., 2022, p524. Using a combination of quantitative and qualitative methodologies (QUAN-qual) yet a clarifying serial strategy, the research was survey-driven and analytical in character.

Population

The term population, as used in research, refers to all the members of a particular group. It is group of interest to the researcher, the group to whom the researcher would like to generalize the result of study. Population of the study was contained:

- Elementary School Teachers
- Students

Targeted Population

All the Teachers and Students studying in Government and Schools in District Rahim Yar Khan.

Accessible Population

72 teacher and 360 children studying in Government Schools in District Rahim Yar Khan.

Sample, Sampling and Sample Size

Sample

Sample may be any part of population of individual on whom information is obtained.

Sampling

Sampling is the process of selecting individuals who will participate in research study. "the selection of specific data sources from which data are collected to address the research objectives."(Gentles, Charles et al. 2015).

Table 1.Sampling Chart

Elementary Schools	Rahim Yaar Khan
Boys	90
Girls	90
Urban	90
Rural	90
Total	360

3.3.3 Sample Size

In studies of markets, the total quantity of participants included in the total measurement of respondents is referred to as the amount of samples.

For this suggested investigation, the group picking process was used. District Rahim Yaar Khan provided the requested statistics. The research study's representative recruitment, and collection count were made up of.

- Twenty (72) Elementary school JEST Teacher with the same ratio of male and female
- Three Hundred Sixty (360) children of Elementary classes with the same ratio of male and female

Research Tools

The questionnaire and observation sheet were used for the proposed study. The questionnaires were developed for data collection from Junior Elementary School Teacher. The observation sheet was developed for data collection from Elementary School Students.

Types of Items

Questionnaire

First part: General Information

The first part of the questionnaire was developed for general information i.e.

Second Part:

3.4.1Types of Items:

Factor -1: Human Organ system:

Item No.1 I teach Nervous System through Inquiry Based Learning.

Item No.2 I teach Reflex Action Hands on Activities.

Item No.3 I teach Voluntary Action Hands on Activities.

Item No.4 I teach Involuntary Action Hands on Action.

Factor -2: Heredity in Organism:

Item No.5 I teach Cell Division through Deductive Reasoning.

Item No.6 I teach Chromosome through Inductive Reasoning.

Item No.7 I teach Deoxyribonucleic Acid through Collaborative Method.

Item No.8 I teach Heredity through Demonstration Method.

Factor-3: Biotechnology:

Item No. 9 I teach Biotechnology through Laboratory Method

- Item No.10 I teach Genetic Modification through Project Method
Item No.11 I teach Biotechnology products Saving Lives (Insulin, Vaccines) Role Play Method
Item No.12 I teach General Applications (Agriculture, Environment, Food, Production and Preservation) through Co-operative Learning.

Factor-4: Pollutants and their Effect on Environment:

- Item No.13 I teach Air Pollutants through Discussion Method
Item No. 14 I teach Sources (Natural and Human Activities) through Inquiry based learning
Item No. 15 I teach Harmful Effect of Human on Environment through Discussion Method
Item No.16 I teach Effect of Human on Environment through discussion Method

Factor-5: Chemical Reactions

- Item No. 17 I teach Chemical Reaction (Definition and Application through Visual Aids)
Item No. 18 Chemical Equation and Balance through Collaborative learning
Item No. 19 I teach Law of Conservation of Mass through contextual learning
Item No.20 I teach types of Chemical Reaction (Addition and Decomposition) through Discussion

Pilot Study

A pilot study is a preliminary investigation that assesses different aspects of methodologies intended for a larger, more comprehensive or conclusive research. Usually conducted to evaluate the adequacy of proposed procedures and approaches by researchers.

Validity

The view of experts was used to guarantee that the survey's accuracy. After considering the opinions of specialists, this survey was improved and changed.

Reliability

Additionally, the Cronbach's alpha approach was used in SPSS -27 for determining the devices' accuracy, and the results were as follows:

Table3.2. Reliability of Research tools

Sr. #	Tool	No. of Items	Cronbach's Alpha
1	Questionnaire	50	0.902
	Average	50	0.902

The reliability statistics of research tools are displayed in the previous list. Studies methods, such as educational survey responses, had a consistency of 0.902, and the Cronbach's alpha approach yielded a score of 0.902, that is accepted as strong.

Data Collection

In order to get material about the chosen individuals (those who replied), the scholar physically attended the educational institutions.

Data Analysis

Data collected is analyzed and interpreted using both SPSS-27 software and Microsoft Excel in the data analysis process. These tools provide comprehensive analyses, presenting results visually through tables and graphs for easy comprehension. Complicated explanations of every survey assertion are made possible by the use of structured tables, which also make it possible to clearly display responses that were acquired. Using statistical approaches like proportion, frequency, standard deviation, and mean score computed after entering into a spreadsheet

categorized by scientific effort, scholars can obtain significant findings while drawing well-informed conclusions based on this interpretation to better understand the data collected from the questionnaire or research subjects.

Data Analysis

Table. 1. Factor-1: Human Organ System

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Total		
Item.1	F	2	23	13	22	12	72	1.1764	3.2750
	%	2.5	32.5	17.5	30.0	17.5	100		
Item.2	F	4	24	6	20	18	72	1.0124	3.7250
	%	2.5	5.0	37.5	27.5	27.5	100		
Item.3	F	4	11	13	24	20	72	1.2065	3.6750
	%	5.0	15.0	17.5	32.5	30.0	100		
Item.4	F	0	7	11	38	16	72	.88252	3.8750
	%	0	10.0	15.0	52.5	22.5	100		
Total	F	2	5.3	8.1	12.5	11.9	7	1.127	3.70
	%	3.8	13.4	21.4	31.4	29.9	100		

Table. 1: Factor-1: Human Organ System Data analysis represents that 31.4% of Jests teacher are mostly, 29.9% of Jests Teacher are always, 21.4% of Jests Teacher are sometimes, 13.4% of Jests Teacher are rarely and 3.8% of Jests Teacher are never agreed with the given statements. A large number of Jests Teachers generally concur with the assertions made. The claims were validated by an average result of 3.70 as well as the standard deviation of 1.127.

Table. 2. Factor-2: Heredity in Organism

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.5	F	2	13	18	26	13	72	1.08	3.525
	%	2.5	18	25.0	35.0	20.0	100		
Item.6	F	2	13	9	38	10	72	1.03	3.61
	%	2.5	18	12.5	50.5	12.0	100		
Item.7	F	4	15	17	18	18	72	1.240	3.500
	%	5.0	20.0	22.5	25.0	26	100		
Item.8	F	4	13	11	11	33	72	1.337	3.82
	%	5.0	18	15.0	15.0	48	100		
Total	F	1.37	6	7.25	14.3	11.2	40	1.11	3.709
	%	4	15	19	35	27	100		

Table. 2: Factor-1: Heredity in Organism; Data analysis represents that 35% of Jests teacher are mostly, 27% of Jests Teacher are always, 19% of Jests Teacher are sometimes, 15% of Jests Teacher are rarely and 4% of Jests Teacher are never agreed with the given statements. A large number of Jests Teachers generally concur with the assertions made. The claims were validated by an average result of 3.709 as well as the standard deviation of 1.11

Table. 3. Factor-3: Biotechnology

RPS	Stat.	Responses						SD	Mean
		1	2	3	4	5	Total		
Item.9	F	0	13	11	29	19	72	1.0498	3.78
	%	0	17.5	15.0	40.0	27.5	100		
Item.10	F	0	6	18	18	30	72	.9997	4.02
	%	0	7.5	25.0	25.0	42.5	100		
Item.11	F	0	11	13	31	17	72	.9997	3.76
	%	0	15.0	17.5	42.5	25.0	100		
Item.12	F	4	20	6	22	22	72	1.321	3.51
	%	5.0	27.5	7.5	30.0	30.0	100		
Total	F	1.12	5.75	7.62	13	13	40	1.118	3.76
	%	2.8	14.3	19.0	33	31.2	100		

Table.3: According to research, 33% of Jests instructors support the claims provided majority of their time, 31.2% of supervisors and caretakers accept with them constantly, 19% believe with them occasionally, 14.3% believe with them infrequently, and 2.8% never approve. A large number of Jests Teachers generally concur with the assertions made. The claims were validated by an average result of 3.76 as well as the standard deviation of 1.118

Table .4. Factor-4: Pollutants and their Effect on their Environment

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.13	F	2	8	11	24	1	72	1.09749	3.9750
	%	2	14	14	41.5	1.0	100		
Item.14	F	2	13	18	18	21	72	1.17	3.624
	%	2.5	17.5	25.0	25.0	30.0	100		
Item.15	F	4	16	16	25	11	72	1.141	3.33
	%	5.0	22.5	22.5	35.0	15.0	100		
Item.16	F	4	8	12	10	38	72	1.2609	4.001
	%	5.0	10.0	17.5	15.0	52.5	100		
Total	F	2.8	5.6	8.6	11.8	11.2	40	1.167	3.763
	%	7	13	22	30	28	100		

Table .4. Factor-4: Pollutants and their Effect on their Environment Data analysis represents that 30 % of Jests Teacher are mostly, 28% of Jests Teacher are always, 22% of Jests Teacher are sometimes, 13% of Jests Teacher and caregivers are rarely and 7% of Jests Teacher are never agreed with the given statements. A large number of Jests Teachers generally concur with the assertions made. The claims were validated by an average result of 3.763 as well as the standard deviation of 1.167

Table 5. Factor-5: Chemical Reaction5

RPS	Stat.	Responses						SD	Mean
		1	2	3	4	5	Total		
Item.17	F	0	10	11	30	21	72	.9819	3.9001
	%	0	12.5	15.0	42.5	30.0	100		
Item.18	F	2	9	20	18	23	72	1.1318	3.73

	%	2.5	12.5	27.5	25.0	32.5	100		
Item.19	F	0	4	19	20	29	72	.947	4.026
	%	0	5.0	27.5	27.5	40.0	100		
Item.20	F	0	10	11	30	21	72	.9819	3.9001
	%	0	12.5	15.0	42.5	30.0	100		
Total	F	1	8	17	21	25	40	1.021	3.884
	%	1.16	10	23.3	31.6	34.1	100		

Factor-5: Chemical Reactions Data analysis represents that 34.1 % of Jests Teacher are mostly, 31.6% of Jests Teacher are always, 23.3% of Jests Teacher are sometimes, 10% of Jests Teacher and caregivers are rarely and 1.16% of Jests Teacher are never agreed with the given statements. A large number of Jests Teachers generally concur with the assertions made. The claims were validated by an average result of 3.884 as well as the standard deviation of 1.021.

Research Findings

Table. 1: Factor-1: Human Organ System Data analysis represents that 31.4% of Jests teacher are mostly, 29.9% of Jests Teacher are always, 21.4% of Jests Teacher are sometimes, 13.4% of Jests Teacher are rarely and 3.8% of Jests Teacher are never agreed with the given statements. A large number of Jests Teachers generally concur with the assertions made. The claims were validated by an average result of 3.70 as well as the standard deviation of 1.127.

Table. 2: Factor-2: Heredity in Organism; Data analysis represents that 35% of Jests teacher are mostly, 27% of Jests Teacher are always, 19% of Jests Teacher are sometimes, 15% of Jests Teacher are rarely and 4% of Jests Teacher are never agreed with the given statements. A large number of Jests Teachers generally concur with the assertions made. The claims were validated by an average result of 3.709 as well as the standard deviation of 1.11

Table. 3 Factor-3: According to research, 33% of Jests instructors support the claims provided majority of their time, 31.2% of supervisors and caretakers accept with them constantly, 19% believe with them occasionally, 14.3% believe with them infrequently, and 2.8% never approve. A large number of Jests Teachers generally concur with the assertions made. The claims were validated by an average result of 3.76 as well as the standard deviation of 1.118

Table. 4 Factor-4. Pollutants and their Effect on their Environment Data analysis represents that 30 % of Jests Teacher are mostly, 28% of Jests Teacher are always, 22% of Jests Teacher are sometimes, 13% of Jests Teacher and caregivers are rarely and 7% of Jests Teacher are never agreed with the given statements. A large number of Jests Teachers generally concur with the assertions made. The claims were validated by an average result of 3.763 as well as the standard deviation of 1.167

Table. 5 Factor-5: Chemical Reactions Data analysis represents that 34.1 % of Jests Teacher are mostly, 31.6% of Jests Teacher are always, 23.3% of Jests Teacher are sometimes, 10% of Jests Teacher and caregivers are rarely and 1.16% of Jests Teacher are never agreed with the given statements. A large number of Jests Teachers generally concur with the assertions made. The claims were validated by an average result of 3.884 as well as the standard deviation of 1.021

Conclusion

First Indicator of the study was Human Organ System, the study concluded that majority of the overall JESTs and Students were agreed with the statement that they teach Nervous system in science class 8 through the Inquiry Based Learning , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided,

they teach Reflex Action in science class 8 through the hands on activities , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they teach Voluntary Action Hands on Activities in science class 8 through the reading, teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they teach Involuntary Action Hands on Activities in science class 8 through the reading, teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided,

Second Indicator of the study was Heredity in organism , the study concluded that majority of the overall JESTs and Students were agreed with the statement that they teach Cell Division in science class 8 through the Deductive Reasoning , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided they teach Chromosome in science class 8 through the inductive Reasoning , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they teach Deoxyribonucleic in science class 8 through the Collaborative Method , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they teach Heredity in science class 8 through Demonstration Method, teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided,

Three Indicator of the study was Biotechnology , the study concluded that majority of the overall JESTs and Students were agreed with the statement that they teach Air Pollutants in science class 8 through the Discussion Method , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they Genetic Modification in science class 8 through the hands through project methods , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they teach Biotechnology products in science class 8 through the hands on activities , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they General Application in science class 8 through the hands on activities , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided,

Four Indicator Pollutants and their Effects on Environment of the study was , the study concluded that majority of the overall JESTs and Students were agreed with the statement that they teach Air Pollutants in science class 8 through the , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they teach sources in science class 8 through the inquiry based learning , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they teach harmful Effect group discussion in science class 8 through the reading, teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they teach effects of human on environment in science class 8 through the Discussion method , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided,

Five Indicator of the study was Chemical Reaction , the study concluded that majority of the overall JESTs and Students were agreed with the statement that they teach chemical reaction in science class 8 through the visual aids , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they teach chemical Equation in science class 8 through the collaborative learning , teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided, they teach laws of conservation of mass in science class 8 through contextual , teachers expertise in the

subject matter they instruct while some of were not agreed whereas few were undecided, they teach types of chemical reaction in science class 8 through the group discussion, teachers expertise in the subject matter they instruct while some of were not agreed whereas few were undecided,

Recommendations

- The Emerging pedagogical approaches are necessary for students learning during unit Human Organ System in science at grade-8. The modern pedagogical approaches may be adopted and preferred in teaching of science at elementary level.
- The Emerging pedagogical approaches are necessary for students learning during unit 2 Heredity in organism in science at grade-8. The modern pedagogical approaches may be adopted and preferred in teaching of science at elementary level.
- The Emerging pedagogical approaches are necessary for students learning during unit 3 Biotechnology in science at grade-8. The modern pedagogical approaches may be adopted and preferred in teaching of science at elementary level.
- The Emerging pedagogical approaches are necessary for students learning during unit 4 Pollutants and their effects on Environment in science at grade-8. The modern pedagogical approaches may be adopted and preferred in teaching of science at elementary level.
- The Emerging pedagogical approaches are necessary for students learning during unit 5 Chemical Reaction in science at grade-8. The modern pedagogical approaches may be adopted and preferred in teaching of science at elementary level.

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