

Role of Emerging Pedagogical Approaches in Science on Students' Learning at Grade VIII

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Abstract

The main objectives of the study were to investigate current pedagogical trends in the Elementary level, analyze how caregiver competence affects students, and identify factors that affect caregiver performance at the elementary level. This survey-based study used both quantitative and qualitative methods (QUAN-qual.), with a sample of 72 teachers and 360 Elementary school children, for a total of 432 individuals. The researchers followed L.R.GAY's sampling chart when selecting participants. Research tools included questionnaires with three parts: part 1: demographic; part 2: closed-ended; and part 3: open-ended questions from sampled respondents. Additionally, an observation sheet was used to collect data specific to the Elementary class children. To ensure validity & reliability, all research tools underwent pilot testing to assess accuracy through expert opinion, and Cronbach's alpha was used to assess questionnaire reliability. SPSS-24 statistical software was used for analysis, which included relevant formulas such as frequency and percentage measures and standard deviation.

Keywords: Pedagogy, Pedagogical Trends, Pedagogical Approaches.

Introduction

Science education at the middle school level, particularly in grade 8, plays a critical role in shaping students' academic pathways and attitudes toward scientific inquiry. At this stage, students transition from concrete operational thinking toward more abstract reasoning, enabling them to grasp complex scientific ideas such as chemical reactions, ecosystems, and physical laws (Piaget, 1972). 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 (National Research Council, 2012; Mahar & Zafar, 2025).

Educational theorists and practitioners have stressed the need for new instructional strategies that go beyond memorizing facts to address these issues (Rasheed et al., 2023). It is becoming more widely acknowledged that methods like inquiry-centered learning (IBL), Project- and Design-Based Learning (PBL/DBL), Phenomenon-Based Learning, and Technology-Enhanced Active Learning (TEAL) are useful for developing energy, extensive knowledge, and skills that can be applied (Pedaste et al., 2015; Deslauriers et al., 2019; Ramzan et al., 2023; Hassan et al., 2024; Arshad, Ahmad, & Zafar, 2025; Shaheen et al., 2025).

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These approaches encourage 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 (Partnership for 21st Century Learning, 2019; Naz & Zafar, 2023; Munawar et al., 2024; Khursheed & Zafar, 2025; Shafique & Zafar, 2025).

A move in student-focused science courses that incorporate technology, cross-disciplinary projects, and real-world problem solving is also highlighted by worldwide schooling to schools, such as those taking place in the Netherlands, Singapore, Malaysia, and Australia (Larkin & Lowrie, 2022; Zafar et al., 2023; Abbas & Zafar, 2025). These developments are increasingly recognized as essential for closing disparities in scientific achievement and preparing students for knowledge-driven economies in developing nations like South Asia (Anjum & Zafar, 2022; Aidoo, 2023; Arshad et al., 2025; Bibi et al., 2025). In light of this, it is crucial to investigate the function of new instructional techniques in science lessons for eighth graders. 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 growth and learning achievement.

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 grade 8 science education, as children move from literal to more complex ideas about science.

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 as 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 comprises real experience, reflective observation, abstract conceptualization, and active experimentation. 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 deeper involvement in science-related activities.

Statement of the Problem

Elementary school teacher pedagogical competence enhances the quality of teaching, especially at the secondary level, thereby improving the quality of learning in Science. The secondary school teachers are therefore in a better position to contribute more effectively to their students and colleagues in a 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 the problem is "role of rising pedagogical approaches in science on students' learning at grade 8 in district Gotki."

Research Objectives

The objectives of the study will be:

- To analyze the role of occurring pedagogical approaches in Science on students' learning in Grade 8.
- To compare the role of emerging pedagogical approaches in Science on the learning of 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 emerging pedagogical approaches in Civic on students' learning of public and private sectors at Grade 8.

Research Questions

The research questions of the study were:

1. What is the role of emerging pedagogical meets in Science on students' learning in Grade 8?
2. Is there a characteristic in the role of emerging pedagogical approaches in Science on the learning of boys and girls students' learning at Grade 8?
3. Is there a 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 in the public and private sectors at Grade 8

Literature Review

A literature review is a survey of scholarly sources (such as books, journal articles, and theses) related to a specific topic or research question. It is often written as part of a thesis, dissertation, or research paper, in order to situate your work in relation to existing knowledge (Ahmad et al., 2021; Rao et al., 2023; Ahmad & Zafar, 2025).

Elementary science curriculum has traditionally placed a strong emphasis on instructional, didactic approaches that prioritize information recall over use and logical reasoning (Hake, 1998). 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. 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 (Deslauriers et al., 2019). Constructivist learning ideas, which hold that learners actively construct understanding through connection and reflection, are the foundation of the current shift in the philosophy of learning (Piaget, 1972; Vygotsky, 1978).

Inquiry-Based Learning (IBL)

The IBL's efficacy in fostering conceptual understanding, fascination, and problem-solving in science classes is supported by studies. A five-phase IBL model—orientation, conceptualization, inquiry, outcome, and discussion—was described by Pedaste et al. (2015) to help students participate 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 (Guo et al., 2024; Bano & Zafar, 2025). But effective implementation requires adequate teacher training and resource support, as limited capacity often hampers adoption (Viro et al., 2020; Bashir & Zafar, 2025).

Project- and Design-Based Learning (PBL/DBL)

Research supports the effectiveness of IBL in promoting students' understanding of concepts, interest, and problem-solving skills in scientific classes. To help students engage in real-world

inquiries, educators (Mughal et al., 2023; Raiz et al., 2025) established a five-stage IBL model: orientation, conceptualization, inquiry, outcome, and exchange. IBL enhances students' mental and emotional well-being while equipping them with critical 21st-century skills, including self-control, creativity, and collaboration, according to recent studies (Guo et al., 2024). However, as inadequate capacity frequently impedes acceptance, successful adoption necessitates sufficient teacher training and resource support (Viro et al., 2020).

Research Methodology

The systematic, strategic approach to conducting research, including the design, methods, and analysis used to answer a research question, is called research methodology (Sadaf et al., 2024; Ahmad et al., 2025; Soomro et al., 2025; Yousaf et al., 2025). The research utilized surveys as its methodology, with a focus on description. "Design of the research comprises the whole procedure which is conducted in the research" (Ahmad et al., 2022). Both quantitative and qualitative (QUAN-qual.) approaches were employed, in conjunction with the explanatory sequential technique. The population is defined as a set of individuals, data, or items from which a statistical sample is taken (Younas et al., 2023). The study population consisted of all Secondary school teachers and all Grade 10 students in District Ghotki. The recommended study will employ cluster sampling. The sample of the study consists of seventy-two (72) Secondary school teachers, and there are 360 middle school pupils in the region of Ghotki in Pakistan. The total sample of the study was four hundred and fifty-six (432). The questionnaires were acquired for data collection from head teachers and Secondary school teachers. The observance sheet was designed for data collection from students of Elementary classes in District Ghotki. The questionnaire was acquired for data collection from Secondary school teachers. The observance sheet was designed for data collection from students of Secondary classes in District Ghotki. The researchers were able to properly analyze the collected data. The researcher will create a data sheet in SPSS and enter the data. The researcher will apply specific statistical tests and formulas to analyze the data, including frequency distributions, mean scores, percentages, and standard deviations.

Data Analysis

Part-I: Qualitative Data Analysis This part presents the quantitative data analysis and interpretation as follows:

Factors/ Indicators:

Note: 1. Never, 2. Rarely, 3. Some-times, 4. Mostly, 5.Always

Table 1: Factor-1: Human Organ System

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	overall		
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 1 represents that 30% of Jest teachers are mostly, 17.5% of Jest teachers are always, 17.5% of Jest teachers are sometimes, 32.5% of Jest teachers are rarely and 2.5% of Jest teachers rarely concurred to the claims made. As a whole majority of Jest teachers are mostly agreed with given statements. The mean score 3.2750 and standard deviation 1.1764 supported the statements.

Table 2: Factor-1: Human Organ System

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
2	F	4	24	6	20	18	72	1.0124	3.7250
	%	2.5	5.0	37.5	27.5	27.5	100		

Item 2 represents that 27.5% of Jest teachers are mostly, 27.5% of Jest teachers are always, 37.5% of Jest teachers are sometimes, 5.0% of Jest teachers are rarely and 2.5% of Jest teachers are never agreed with the given statements. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.7250 and the standard deviation of 1.0124.

Table 3: Factor-1: Human Organ System

RPS	Defining	Answers						SD	Mean
		1	2	3	4	5	Overall		
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 3 represents that 30% of Jest teachers are mostly, 32.5% of Jest teachers are always, 17.5% of Jest teachers are sometimes, 15.0% of Jest teachers are rarely and 5.0% of Jest teachers are rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.7250 and the standard deviation of 3.6750.

Table 4: Factor-1: Human Organ System

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.4	F	0	7	11	38	16	72	.88252	3.8750
	%	0	10.0	15.0	52.5	22.5	100		

Item 4 represents that 52.5% of Jest teachers are mostly, 22.5% of Jest teachers are always, 15.0% of Jest teachers are sometimes, 10.0% of Jest teachers are rarely and 0% of Jest teachers are rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.8750 and the standard deviation of .88252.

Table 5: 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 5 represents that 35.0% of Jest teachers are mostly, 20.0% of Jest teachers are always, 25.0% of Jest teachers are sometimes, 18% of Jest teachers are rarely and 2.5% of Jest teachers are rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.525 and the standard deviation of 1.08.

Table 6: Factor-2: Heredity in organism

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.6	F	2	13	9	38	10	72	1.03	3.61
	%	2.5	18	12.5	50.5	12.0	100		

Item 6 represents that 50.5% of Jest teachers are mostly, 12.0% of Jest teachers are always, 12.5% of Jest teachers are sometimes, 18% of Jest teachers are rarely and 2.5% of Jest teachers rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.61 and the standard deviation of 1.03.

Table 7: Factor-2: Heredity in organism

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.7	F	4	15	17	18	18	72	1.240	3.500
	%	5.0	20.0	22.5	25.0	26	100		

Item 7 represents that 26% of Jest teachers are mostly, 25.0% of Jest teachers are always, 22.5% of Jest teachers are sometimes, 20% of Jest teachers are rarely and 5.0% of Jest teachers are rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.500 and the standard deviation of 1.240.

Table 8: Factor-2: Heredity in organism

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.8	F	4	13	11	11	33	72	1.337	3.82
	%	5.0	18	15.0	15.0	48	100		

Item 8 represents that 48% of Jest teachers are mostly, 15.0% of Jest teachers are always, 15.0% of Jest teachers are sometimes, 18% of Jest teachers are rarely and 5.0% of Jest teachers are rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.82 and the Standard Deviation of 1.337.

Table 9:Factor-3: Biotechnology

RPS	Defining..	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.9	F	0	13	11	29	19	72	1.0498	3.78
	%	0	17.5	15.0	40.0	27.5	100		

Item 9 represents that 40% of Jest teachers are mostly, 27.5% of Jest teachers are always, 15.0% of Jest teachers are sometimes, 17% of Jest teachers are rarely and 0% of Jest teachers are rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.78 and the standard deviation of 1.0498.

Table 10: Factor-3: Biotechnology

RPS	Defining..	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.10	F	0	6	18	18	30	72	.9997	4.02
	%	0	7.5	25.0	25.0	42.5	100		

Item 10 represents that 42.5% of Jest teachers are mostly, 25.0% of Jest teachers are always, 25.0% of Jest teachers are sometimes, 7.5% of Jest teachers are rarely and 0% of Jest teachers rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 4.02 and the standard deviation of .9997.

Table 11: Factor-3: Biotechnology

RPS	Defining..	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.11	F	0	11	13	31	17	72	.9997	3.76
	%	0	15.0	17.5	42.5	25.0	100		

Item 11 represents that 42.5% of Jest teachers are mostly, 25.0% of Jest teachers are always, 17.5% of Jest teachers are sometimes, 15.0% of Jest teachers are rarely and 0% of Jest teachers rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.76 and the standard deviation of .9997.

Table 12: Factor-3: Biotechnology

RPS	Defining..	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.12	F	4	20	6	22	22	72	1.321	3.51
	%	5.0	27.5	7.5	30.0	30.0	100		

Item 12 represents that 30.0% of Jest teachers are mostly, 30.0% of Jest teachers are always, 7.5% of Jest teachers are sometimes, 27.5% of Jest teachers are rarely and 5.0% of Jest teachers rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.51 and the standard deviation of 1.321.

Table 13: 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 13 represents that 41.5% of Jest teachers are mostly, 1.0% of Jest teachers are always, 14% of Jest teachers are sometimes, 14% of Jest teachers are rarely and 2% of Jest teachers rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.9750 and the standard deviation of 1.09749.

Table 14: Factor-4: Pollutants and their Effect on their Environment

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
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 14 represents that 30.0% of Jest teachers are mostly, 25.0% of Jest teachers are always, 25% of Jest teachers are sometimes, 17.5% of Jest teachers are rarely and 2.5% of Jest teachers rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.624 and the standard deviation of 1.17.

Table 15: Factor-4: Pollutants and their Effect on their Environment

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
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 15 represents that 35.0% of Jest teachers are mostly, 15.0% of Jest teachers are always, 22.5% of Jest teachers are sometimes, 22.5% of Jest teachers are rarely and 5.0% of Jest teachers rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.33 and the standard deviation of 1.141.

Table 16: Factor-4: Pollutants and their Effect on their Environment

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.16	F	4	8	12	10	38	72	1.2609	4.001
	%	5.0	10.0	17.5	15.0	52.5	100		

Item 16 represents that 52.5% of Jest teachers are mostly, 15.0% of Jest teachers are always, 17.5% of Jest teachers are sometimes, 10.0% of Jest teachers are rarely and 5.0% of Jest teachers rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 4.001 and the standard deviation of 1.2609.

Table 17: Factor-5: Chemical Reaction

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.17	F	0	10	11	30	21	72	.9819	3.9001
	%	0	12.5	15.0	42.5	30.0	100		

Item 17 represents that 42.5% of Jest teachers are mostly, 30.0% of Jest teachers are always, 15.0% of Jest teachers are sometimes, 12.5% of Jest teachers are rarely and 0% of Jest teachers rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.9001 and the standard deviation of .9819.

Table 18: Factor-5: Chemical Reaction

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
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 18 represents that 32.5% of Jest teachers are mostly, 25.0% of Jest teachers are always, 27.5% of Jest teachers are sometimes, 12.5% of Jest teachers are rarely and 2.5% of Jest teachers rarely concurred to the claims made. As a whole majority of Head teachers and caregivers are mostly agreed with given statements. The mean score 3.73 and standard deviation 1.1318 supported the statements.

Table 19: Factor-5: Chemical Reaction

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.19	F	0	4	19	20	29	72	.947	4.026
	%	0	5.0	27.5	27.5	40.0	100		

Item 19 represents that 40.0% of Jest teachers are mostly, 27.5% of Jest teachers are always, 27.5% of Jest teachers are sometimes, 5.0 % of Jest teachers are rarely and 0% of Jest teachers are never agreed rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 4.026 and the standard deviation of .947.

Table 20: Factor-5: Chemical Reaction

RPS	Defining.	Answers						SD	Mean
		1	2	3	4	5	Overall		
Item.20	F	0	10	11	30	21	72	.9819	3.9001
	%	0	12.5	15.0	42.5	30.0	100		

Item 20 represents that 42.5% of Jest teachers are mostly, 30.0% of Jest teachers are always, 15.0% of Jest teachers are sometimes, 12.5% of Jest teachers are rarely and 0% of Jest teachers rarely concurred to the claims made. A large percentage of Jest teachers generally concur with the assertions made. The propositions were backed by a mean score of 3.9001 and the standard deviation of .9819.

Findings and Discussion

Findings of the study were:

Indicator: Human Organ System

- *Item 1:* represents that 30% of Jest teachers are mostly, 17.5% of Jest teachers are always, 17.5% of Jest teachers are sometimes, 32.5% of Jest teachers are rarely and 2.5% of Jest teachers rarely concurred with the claims made. Overall, the majority of Jest teachers agree with the given statements. The mean score was 3.2750, and the standard deviation of 1.1764 supported the statements.
- *Item 2:* represents that 27.5% of Jest teachers are mostly, 27.5% of Jest teachers are always, 37.5% of Jest teachers are sometimes, 5.0% of Jest teachers are rarely and 2.5% of Jest teachers never agree with the given statements. A large percentage of Jest teachers generally concur with the assertions made. The propositions were supported by a mean score of 3.7250 and a standard deviation of 1.0124.
- *Item 3:* represents that 30% of Jest teachers are mostly, 32.5% of Jest teachers are always, 17.5% of Jest teachers are sometimes, 15.0% of Jest teachers are rarely and 5.0% of Jest teachers rarely concurred with

the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were supported by a mean score of 3.7250 and a standard deviation of 3.6750.

- *Item4:* represents that 52.5% of Jest teachers are mostly, 22.5% of Jests are always, 15.0% of Jests are sometimes, 10.0% of Jests are rarely, and 0% of Jests are rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.8750 and the standard deviation of .88252.
- *Item5:* represents that 35.0% of Jest teachers are mostly, 20.0% of Jests are always, 25.0% of Jests are sometimes, 18% of Jests are rarely, and 2.5% of Jests are rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.525 and the standard deviation of 1.08.
- *Item 6:* represents that 50.5% of Jest teachers are mostly, 12.0% of Jests are always, 12.5% of Jests are sometimes, 18% of Jests are rarely, and 2.5% of Jests rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.61 and the standard deviation of 1.03.
- *Item 7:* represents that 26% of Jest teachers are mostly, 25.0% of Jests are always, 22.5% of Jests are sometimes, 20% of Jests are rarely, and 5.0% of Jests are rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.500 and the standard deviation of 1.240.
- *Item8:* represents that 48% of Jest teachers are mostly, 15.0% of Jests are always, 15.0% of Jests are sometimes, 18% of Jests are rarely, and 5.0% of Jests are rarely concurred to the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.82 and the standard deviation of 1.337.

Indicator: Biotechnology

- *Item 9:* represents that 40% of Jest teachers are mostly, 27.5% of Jests are always, 15.0% of Jests are sometimes, 17% of Jests are rarely, and 0% of Jests are rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.78 and the Standard Deviation of 1.0498.
- *Item10:* represents that 42.5% of Jest teachers are mostly, 25.0% of Jests are always, 25.0% of Jests are sometimes, 7.5% of Jests are rarely, and 0% of Jests rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 4.02 and the Standard Deviation of .9997.
- *Item 11:* represents that 42.5% of Jest teachers are mostly, 25.0% of Jests are always, 17.5% of Jests are sometimes, 15.0% of Jests are rarely, and 0% of Jests rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.76 and the standard deviation of .9997.
- *Item 12:* represents that 30.0% of Jest teachers are mostly, 30.0% of Jests are always, 7.5% of Jests are sometimes, 27.5% of Jests are rarely and 5.0% of Jests rarely concurred to the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.51 and the standard deviation of 1.321.

Indicator: Pollutants and Their Effects on the Environment

- *Item13:* represents that 41.5% of JEST teachers are mostly, 1.0% of Jests are always, 14% of Jests are sometimes, 14% of Jests are rarely, and 2% of Jests are rarely concurred to the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.9750 and the standard deviation of 1.09749.

- *Item 14:* represents that 30.0% of JEST teachers are mostly, 25.0% of Jests are always, 25% of Jests are sometimes, 17.5% of Jests are rarely and 2.5% of Jests rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.624 and the standard deviation of 1.17.
- *Item 15:* represents that 35.0% of JEST teachers are mostly, 15.0% of Jests are always, 22.5% of Jests are sometimes, 22.5% of Jests are rarely and 5.0% of Jests rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.33 and the standard deviation of 1.141.
- *Item 16:* represents that 52.5% of JEST teachers are mostly, 15.0% of Jests are always, 17.5% of Jests are sometimes, 10.0% of Jests are rarely and 5.0% of Jests are rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 4.001 and the standard deviation of 1.2609.

Indicator: Chemical Reaction

- *Item 17:* represents that 42.5% of JEST teachers are mostly, 30.0% of Jests are always, 15.0% of Jests are sometimes, 12.5% of Jests are rarely, and 0% of Jests are never agree with the given statements. As a whole, the majority of Head teachers and caregivers mostly agree with the given statements. The mean score of 3.9001 and standard deviation of .9819 supported the statements.
- *Item 18:* represents that 32.5% of JEST teachers are mostly, 25.0% of Jests are always, 27.5% of Jests are sometimes, 12.5% of Jests are rarely, and 2.5% of Jests rarely concurred with the claims made. As a whole, the majority of Head teachers and caregivers mostly agree with the given statements. The mean score of 3.73 and the standard deviation of 1.1318 supported the statements.
- *Item 19:* represents that 40.0% of JEST teachers are mostly, 27.5% of Jests are always, 27.5% of Jests are sometimes, 5.0 % of Jests are rarely, and 0% of Jests are never agreed rarely concurred to the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 4.026 and the standard deviation of .947.
- *Item 20:* represents that 42.5% of JEST teachers are mostly, 30.0% of Jests are always, 15.0% of Jests are sometimes, 12.5% of Jests are rarely, and 0% of Jests rarely concurred with the claims made. A large percentage of Jests generally concur with the assertions made. The propositions were backed by a mean score of 3.9001 and the standard deviation of .9819.

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,

Third 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.

Fourth 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,

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