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## Research Article

### Teachers' Pedagogical Beliefs and Classroom Practices in Teaching Science

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#### ABSTRACT

The study aimed to determine the teachers' pedagogical beliefs and classroom practices among elementary schools in Zone II, Division of Zambales. A descriptive research design was employed using a survey questionnaire as the primary instrument for data collection. Descriptive and inferential statistics were used to analyze and interpret the data. Findings revealed that the majority of the teacher-respondents were female, in middle adulthood, with MAED units, holding the position of Teacher I, and relatively new in the service. The respondents strongly agreed on both teacher-centered and student-centered pedagogical beliefs. Results further showed that there was no significant difference in teachers' pedagogical beliefs and classroom practices in teaching science when grouped according to profile variables. However, a significant relationship was found between teachers' pedagogical beliefs and their classroom practices, indicating a high correlation between the two. The effective use of strategies to reduce teachers' and students' resistance in science teaching requires purposeful developmental planning and the integration of active learning strategies. Moreover, the integration of technology in classroom instruction has the potential to promote more student-centered and constructivist beliefs among teachers. The study recommends that teachers employ differentiated activities and teaching strategies based on students' learning needs and conduct action research to further improve the teaching and learning process. Future researchers are encouraged to conduct broader and more in-depth studies to validate the findings.

**Keywords:** *Pedagogical Beliefs; Classroom Practices; Science Teaching; Elementary Teachers; Descriptive Research; Zone II, Division of Zambales*

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## Background

Today's students are no longer passive observers of instruction but active participants in the creation of knowledge and ideas. Contemporary learners engage meaningfully in learning processes through interaction, inquiry, and collaboration. Anchored in 21st-century instruction, three core pedagogical principles—personalization, participation, and productivity—guide effective teaching and learning. This framework allows learners to experience real-world situations, accomplish projects from beginning to end, and solve problems as they arise, all of which contribute to deeper and more meaningful learning. Productive learning is further strengthened when learners build cooperative relationships with teachers, peers, and community partners. Pedagogy is not about training; it is about critically educating individuals to be self-reflective and capable of addressing their relationship with others and the larger world. Pedagogy develops critical and intellectual abilities and enables meaningful engagement with society. Through pedagogy, teachers observe and assess students in ongoing classroom situations by collecting and interpreting multiple sources of evidence to evaluate continuous learning development (Burman, 2007; Cristillo, 2010; Pellegrino & Hilton, 2013).

The *National Development Plan of Latvia 2014–2020* emphasized the necessity for new curricula and learning methods to promote creativity in elementary and secondary education (Pārresoru koordinācijas centrs, 2012). A lack of strong pedagogical beliefs among teachers may negatively affect the implementation of innovative learning approaches.

A shift in education has occurred from “students must be prepared for school” to “schools must be prepared for every child,” highlighting inclusive learning, cooperation, and teachers' belief in every student's capacity to learn and progress (Aghazo & NaggarGaad, 2004; Alquarini, 2012; Tūna et al., 2014).

Pedagogical belief refers to teachers' understanding of teaching and learning (Tondeur, 2016). These beliefs function as cognitive filters that shape instructional decisions (Liu, 2011; Tondeur et al., 2016; Ding, 2019). Teachers' beliefs are commonly categorized as

teacher-centered or student-centered orientations (Deng, 2014; Ding et al., 2019). Teacher-centered beliefs are grounded in behaviorist traditions and emphasize knowledge transmission (Liu, 2011; Deng et al., 2014), whereas student-centered beliefs are rooted in constructivist theory and stress active learning, inquiry, and collaboration (Ertmer, 2012; Deng et al., 2014).

Pedagogy empowers both teachers and learners to enhance classroom learning processes. Teachers' beliefs significantly influence instructional practices (Amiryousefi, 2015). Reflecting critically on these beliefs enables teachers to align their classroom practices with reform-oriented philosophies (Bryan, 2012). Therefore, investigating teachers' pedagogical beliefs is essential for improving science teaching practices.

Rather than functioning as mutually exclusive orientations, contemporary classroom practice—particularly in developing education systems such as the Philippine public-school context—often reflects a hybrid or eclectic pedagogy. Teachers balance behaviorist foundations with constructivist mandates in response to curriculum standards, learner diversity, and classroom realities. Teachers' pedagogical beliefs significantly influence instructional practices, especially in science education where inquiry, experimentation, and critical thinking are central. Thus, examining teachers' pedagogical beliefs and classroom practices is crucial for understanding and improving the quality of science instruction in elementary schools.

## Statement of the Problem

This study determined “Teachers' Pedagogical Beliefs and Classroom Practices in Teaching Science” among elementary schools in Zone II, Schools Division of Zambales.

Specifically, it answered the following questions:

1. What is the profile of the respondent in terms of
  - 1.1. sex;
  - 1.2. age;
  - 1.3. position;
  - 1.4. years in service and
  - 1.5. highest educational attainment?

2. What are the pedagogical beliefs of elementary teachers in teaching science as to
  - 2.1 teacher centered and
  - 2.2 student centered?
3. How do the teacher respondents describe their classroom practices in teaching science as to
  - 3.1 teacher centered practices and
  - 3.2 student centered practices?
4. Is there significant difference on teachers' pedagogical beliefs and classroom practices in teaching science when grouped according to the profile variables?
5. Is there a significant relationship on the assessment of teachers on teachers' pedagogical beliefs and classroom practices in teaching science?
6. What teaching strategies can be designed and proposed to improve and mitigate teachers' and students' resistance to achieve teaching and learning science?

design. Quantitative research is a formal, objective, and systematic process in which numerical data are used to describe variables and examine relationships among them (Lamar, 2005).

The descriptive-correlational method aims to describe variables and determine the relationships that naturally occur among them without manipulating the research environment. The scope of this research design involves investigating the nature and strength of relationships between variables rather than establishing direct cause-and-effect relationships (Kothari, 2004).

Correlational research is appropriate when two or more quantitative variables are measured from the same group of respondents to determine the degree of association between them. In this study, the design was utilized to determine the relationship between science teachers' pedagogical beliefs and classroom practices among selected schools in Zone II, Division of Zambales.

## Methodology

### Research Design

Research is a systematic and logical process of inquiry conducted to obtain solutions to problems or answers to specific questions (Suryabarata, 2003). This study employed a descriptive-correlational quantitative research

### Respondents and Location

The respondents of this study were elementary teachers from selected public elementary schools in Zone II, Division of Zambales.

Table 1. Distribution of Teacher-Respondents from Public Elementary Schools in Zone II, Division of Zambales

Public Elementary Schools	Number of Teachers
Palauig Central School	20
Bulawen Elementary School	15
Botolan South Central School	15
Botolan North Integrated School	15
Paulo Abastillas Sr. Memorial Elementary School	20
Sta. Barbara Integrated School	15
Total	100

The population refers to the total number of individuals or elements that the findings of a study seek to represent (Sekaran, 2003). Therefore, this study aimed to draw conclusions applicable to the entire group of selected elementary teachers.

The required sample size was computed using G\*Power version 3.1.9.7, a statistical power

analysis program for various tests including correlation and regression analyses (Faul et al., 2007). Using the t-test and correlation: point biserial model as the test family and statistical test, respectively, and applying an effect size of 0.30, the computed sample size was determined to be 100 respondents.

**Instrument**

The primary instrument used in this study was a researcher-made questionnaire (see Appendix A). The survey questionnaire was designed to measure teachers' pedagogical beliefs and classroom practices in teaching science, particularly in terms of teacher-centered and student-centered orientations.

**Validity and Reliability of the Instrument**

The validity of the instrument was established through expert validation by the research panel during the proposal stage.

A pilot test was conducted among 180 teachers to determine the reliability of the instrument. Reliability was assessed using Cronbach's alpha, a measure of internal consistency developed by Cronbach (1951). Cronbach's alpha is widely used in educational research to determine the reliability of research instruments.

The pilot test data were analyzed using the Statistical Package for Social Sciences (SPSS). The results showed that the questionnaire was highly reliable, with acceptable Cronbach's alpha coefficients for both Teachers' Pedagogical Beliefs and Classroom Practices in Teaching Science.

**Data Collection**

Data collection instruments refer to the tools and methods used by researchers to gather information (Kothari, 2004).

Prior to data collection, permission was sought from the Schools Division Superintendent through a formal letter submitted to the Schools Division Office. Upon approval, the researcher administered the survey questionnaire through Google Forms. The generated link was sent to teacher-respondents to facilitate accessibility and efficient retrieval of responses.

All information gathered in this study was treated with strict confidentiality.

**Data Analysis**

Data were analyzed using Statistical Package for Social Sciences (SPSS) and Microsoft Excel. The following statistical tools were employed:

**1. Frequency Distribution**

Used to determine frequency counts and percentage distributions of respondents' profile variables.

**2. Mean**

Applied to measure teachers' pedagogical beliefs and classroom practices in terms of teacher-centered and student-centered approaches.

**3. Likert Scale**

Teachers' Pedagogical Beliefs

Scale	Range	Interpretation	Symbol
4	3.25-4.00	Strongly Agree	SA
3	2.50-3.24	Agree	A
2	1.75-2.49	Disagree	D
1	1.00-1.74	Strongly Disagree	SD

Classroom Practices

Scale	Range	Interpretation	Symbol
4	3.25-4.00	Always Practiced	AP
3	2.50-3.24	Often Practiced	OP
2	1.75-2.49	Seldom Practiced	SP
1	1.00-1.74	Never Practiced	NP

**4. Correlation Analysis**

Spearman's rho ( $\rho$ ) was used to determine the strength and direction of the relationship between teachers' pedagogical beliefs and classroom practices in teaching science.

Interpretation of Correlation Coefficient

Correlation Coefficient	Description	Symbol
$\pm 1.00$	Perfect correlation	PC
$\pm 0.75$ to $\pm 0.99$	Very high correlation	VHC
$\pm 0.50$ to $\pm 0.74$	High correlation	HC
$\pm 0.25$ to $\pm 0.49$	Low correlation	LC
$\pm 0.01$ to $\pm 0.24$	Very low correlation	VLC
0	No correlation	NC

### 5. Mann-Whitney U Test

The Mann-Whitney U test, a non-parametric alternative to the independent samples t-test, was used to determine significant differences in teachers' pedagogical beliefs and classroom practices when grouped according to profile variables. This test is appropriate when the assumption of normal distribution is not met.

Decision Rule:

- If  $p < .05$ , reject the null hypothesis.
- If  $p > .05$ , fail to reject the null hypothesis.

### 6. Kruskal-Wallis Test

The Kruskal-Wallis test (one-way ANOVA on ranks) was used to determine whether

statistically significant differences existed in teachers' pedagogical beliefs and classroom practices when grouped according to profile variables with more than two categories. It serves as the generalized form of the Mann-Whitney U test.

Decision Rule:

- If  $p < .05$ , reject the null hypothesis.
- If  $p > .05$ , fail to reject the null hypothesis.

### Results and Discussion

This chapter presents the results and interpretation of the findings based on the gathered and processed data in tabular form.

### 1. Profile of the respondents

Table 2. Sex of Teacher-Respondents ( $N = 100$ )

Sex	Frequency	Percentage
Female	88	88%
Male	12	12%

#### Sex of Teacher-Respondents

The findings reveal that 88% of the teacher-respondents are female, while only 12% are male. This indicates that science teaching at the elementary level in Zone II, Division of Zambales, is predominantly handled by women.

This finding aligns with both national and global trends in elementary education, where teaching is often associated with caregiving and nurturing roles (Bongco & Abenes, 2019; Lee & Lee, 2016). Globally, female teachers dominate primary education, while administrative positions are often occupied by males (Wood, 2012). Research further suggests that female teachers tend to demonstrate more

positive attitudes toward inclusive education (Aghazo & Naggaraad, 2004; Alquarini, 2012).

Although the global population remains slightly male-dominated, females increasingly outperform males in higher education and selected academic domains (Organisation for Economic Co-operation and Development [OECD], 2008). Some scholars argue that boys are more prone to behavioral concerns, while girls exhibit greater collaboration and organizational skills (Sommers, 2008). These gendered classroom patterns may influence science classroom dynamics, particularly in fostering collaborative and student-centered practices.

Table 4. Educational Attainment of Teacher-Respondents

Educational Level	Frequency	Percentage
Bachelor's Degree	29	29%
MAED Units	54	54%
Master's Degree	12	12%
Doctorate Degree	3	3%
Doctor of Education Units	2	2%

The majority of teachers have MAEd units, reflecting their pursuit of higher education and continuous professional development. Teachers who hold master's or doctoral degrees tend to have greater flexibility in career advancement and broader professional opportunities

(Pellegrino & Hilton, 2013). Furthermore, higher educational attainment is associated with improved job performance, enhanced capacity to manage complex tasks, and more efficient utilization of available resources (Pellegrino & Hilton, 2013).

Table 5. Teaching Position/Rank of Teacher-Respondents

Rank	Frequency	Percentage
Teacher I	44	44%
Teacher II	21	21%
Teacher III	23	23%
Master Teacher I	8	8%
Master Teacher II	4	4%

Most respondents are Teacher I, implying that many are still completing postgraduate units required for promotion. In the Philippine public school system, teacher ranking and promotion are based on performance, years of

experience, professional accomplishments, educational qualifications, training, demonstrated potential, and psychosocial attributes (Department of Education [DepEd], 2007).

Table 6. Years in Service of Teacher-Respondents

Years in Service	Frequency	Percentage
0-5	29	29%
6-10	22	22%
11-15	11	11%
16-20	12	12%
21-25	12	12%
26+	14	14%

A significant portion of teachers are in their first 0-5 years of service, indicating early-career commitment and professional engagement. Research suggests that teacher effectiveness may plateau or decline after extended years in service, particularly beyond 25 years (Harris & Sass, 2007; Ladd, 2008). Overall, the data reflect a balanced composition of novice and highly experienced teachers,

demonstrating both dedication and sustained professional development within the division.

## 2. Teachers' Pedagogical Beliefs in Teaching Science

The pedagogical beliefs of teacher-respondents are presented on Tables 6 and 7. There are two domains: Teacher-Centered and Student-Centered.

## 2.1 Teacher Centered

Table 7. Teachers' Pedagogical Beliefs in Teaching Science as to Teacher Centered

Teacher Centered Beliefs	Mean	Std. Deviation	Verbal Interpretation	Rank
1. Teachers demonstrate the correct solutions to a problem	3.54	0.673	Strongly agree	7
2. Teachers should only depend on tests for assessing students' learning	3.02	0.876	Agree	10
3. Teachers should encourage students to demonstrate problem solving	3.72	0.451	Strongly agree	3
4. Makes the classroom conducive to learning	3.86	0.377	Strongly agree	2
5. Scientific knowledge is relative to social context in which it is generated	3.49	0.502	Strongly agree	9
6. Make sure that the lessons were aligned to the Most Essential Learning Competencies	3.87	0.367	Strongly agree	1
7. Teacher's role is to facilitate students' own enquiry	3.62	0.508	Strongly agree	6
8. Teacher allows students to think of solutions to practical problems before showing them how they are solved	3.69	0.465	Strongly agree	4
9. Teachers allow students to search online using internet for source materials	3.51	0.559	Strongly agree	8
10. Teachers seek student's point of view in order to understand student learning for use in subsequent conceptions	3.63	0.506	Strongly agree	5

**Overall Mean:** The overall mean score was 3.60, indicating a "Strongly Agree" level. Teachers strongly agreed that lessons should align with the Most Essential Learning Competencies

(Department of Education, 2020). The lowest-rated item was the reliance on tests for student assessment.

## 2.2 Student Centered

Table 8. Teachers' Pedagogical Beliefs in Teaching Science as to Student Centered

Student Centered Beliefs	Mean	Std. Deviation	Verbal Interpretation	Rank
1. Guide students by giving them clear and concise solutions to a problem	3.76	0.429	Strongly agree	1.5
2. Students' learning depends on how much knowledge transmitted to them	3.47	0.627	Agree	10
3. Ensure common standards in evaluations for assessing students' progress	3.72	0.451	Strongly agree	4
4. Develop strategies in integrating ICT and other teaching approaches to enhance students' learning	3.66	0.517	Strongly agree	6
5. Students learn best by finding solutions to a problem on their own	3.56	0.538	Strongly agree	8
6. Thinking and reasoning processes are more important than specific curriculum content	3.54	0.540	Strongly agree	9

Student Centered Beliefs	Mean	Std. Deviation	Verbal Interpretation	Rank
7. Students were given a chance to explain their ideas to other students	3.76	0.429	Strongly agree	1.5
8. Encourage students to reflect on their progress and identify skills to develop	3.70	0.461	Strongly agree	5
9. Provide materials to students to build their definitions	3.60	0.569	Strongly agree	7
10. Assessment of student learning is blended with teaching	3.73	0.446	Strongly agree	3

The overall mean score was 3.65, indicating a “Strongly Agree” level. Students are more engaged when allowed to interact and participate actively. Teacher-centered pedagogy tends to reinforce passive learning (Burman, 2007;

Cristillo, 2010), whereas student-centered pedagogy promotes active learning, reflection, and collaboration (Haney, Lumpe, & Czerniak, 2002).

### 3. Perception of Teacher Respondents on Classroom Practices in Teaching Science

#### 3.1 Teacher Centered Classroom Practices

Table 9. Classroom Practices in Teaching Science as to Teacher Centered

Teacher Centered Practices	Mean	Std. Deviation	Verbal Interpretation
1. Communicates effectively regarding instructional and learning goals	3.79	0.409	Always practiced
2. Recognizes areas of growth and need	3.67	0.493	Always practiced
3. Maintains consistent order and discipline in the classroom	3.77	0.423	Always practiced
4. I let students be quiet as I present new information and lead activities	3.65	0.539	Always practiced
5. Teacher is the center of knowledge and in charge of learning	3.54	0.593	Always practiced
6. Reprimands students if misbehaving	3.38	0.678	Always practiced
7. Uses assessment information to improve learning	3.71	0.456	Always practiced
8. Maintains absolute authority over content	3.44	0.625	Always practiced
9. Sets quality and productivity goals	3.74	0.463	Always practiced
10. Provides encouragement and effective feedback to students	3.79	0.409	Always practiced

The results show that both teacher-centered and student-centered classroom practices were consistently rated as “Always Practiced,” indicating that science instruction in Zone II classrooms reflects a balanced integration of structured guidance and learner participation. Teacher-centered practices, such as maintaining classroom order, communicating learning goals, and providing feedback, support instructional clarity and discipline. At the same time, student-centered practices—including

respect for student opinions, cooperative learning, and opportunities for explanation—promote engagement and active learning. The overall weighted mean was 3.65, indicating that these practices were consistently implemented. Teachers consistently practiced effective communication and provided feedback (Cristillo, 2010). Although reprimanding misbehavior received the lowest mean, it was still consistently practiced.

### 3.2 Student Centered Classroom Practices

Table 10. Classroom Practices in Teaching Science as to Student Centered

Student Centered Practices	Mean	Std. Deviation	Verbal Interpretation
1. Gives students opportunities to choose related activities	3.56	0.608	Always practiced
2. Guides students to resource learning	3.73	0.446	Always practiced
3. Let students use technology applications and learning tools	3.55	0.557	Always practiced
4. Utilizes cooperative learning strategies from time to time	3.66	0.476	Always practiced
5. Monitors students effectively during experiments	3.76	0.429	Always practiced
6. Respects differences in opinions among students	3.88	0.327	Always practiced
7. Makes students partners in setting classroom rules	3.71	0.478	Always practiced
8. Encourages students to construct their own meanings	3.54	0.558	Always practiced
9. Allows students to explain their ideas to classmates	3.65	0.500	Always practiced
10. Assigns enough projects and assignments	3.50	0.611	Always practiced

**Overall Weighted Mean:** 3.65 – Always Practiced Respecting student opinions scored the highest, while assigning projects scored the lowest. Both teacher-centered and student-centered classroom practices were consistently “Always Practiced” (Cristillo, 2010; Haney, Lumpe, & Czerniak, 2002).

### 4. Test of Difference on Teachers' Pedagogical Beliefs and Classroom Practices by Profile Variables

#### 4.1 Kruskal-Wallis Test by Sex

Table 11. Analysis for Kruskal-Wallis Test on Pedagogical Beliefs and Classroom Practices by Sex

Factor	Group	N	Rank Average	Sum of Ranks	z	p	Decision/ Interpretation
Pedagogical beliefs	Male	12	50.50	606.00	0.000	1.000	Accept Ho – Not Significant
	Female	88	50.50	4444.00			
Classroom practices	Male	12	23.91	550.00	0.235	0.814	Accept Ho – Not Significant
	Female	88	31.70	1046.00			

No significant difference in pedagogical beliefs and classroom practices when grouped by sex (Kruskal-Wallis, n.d.).

#### 4.2 Kruskal-Wallis Test by Age

Table 12. Analysis for Kruskal-Wallis Test on Pedagogical Beliefs and Classroom Practices by Age

Factor	Group	N	Rank Average	Chi-Square	df	p	Decision/ Interpretation
Pedagogical beliefs	21–30	27	54.11	7.150	3	0.067	Accept Ho – Not Significant
	31–40	27	58.26				
	41–50	27	38.35				
	51–60	19	51.61				

Factor	Group	N	Rank Average	Chi-Square	df	p	Decision/ Interpretation
Classroom practices	21-30	27	55.80	3.036	3	0.386	Accept Ho - Not Significant
	31-40	27	53.96				
	41-50	27	43.48				
	51-60	19	48.03				

No significant difference in pedagogical beliefs or classroom practices was found by age. Age and experience impact teaching effectiveness, but burnout is not always age-related (Bi-yani, 2013; Zafer & Aslihan, 2012; Aloka & Bojuwoye, 2013).

### 4.3 Kruskal-Wallis Test by Highest Educational Attainment

Table 13. Analysis for Kruskal-Wallis Test by Educational Attainment

Factor	Group	N	Rank Average	Chi-Square	df	p	Decision/ Interpretation
Pedagogical beliefs	Bachelor's	29	47.91	1.479	4	0.830	Accept Ho - Not Significant
	MAEd units	54	50.93				
	Master's	12	49.17				
	Doctorate units	2	69.25				
	Doctoral degree	3	60.67				
Classroom practices	Bachelor's	29	48.34	1.778	4	0.776	Accept Ho - Not Significant
	MAEd units	54	50.30				
	Master's	12	50.17				
	Doctorate units	2	72.50				
	Doctoral degree	3	61.67				

No significant difference in beliefs or practices was observed based on educational attainment (Department of Education, 2007).

### 4.4 Kruskal-Wallis Test by Position

Table 14. Analysis for Kruskal-Wallis Test by Position

Factor	Group	N	Rank Average	Chi-Square	df	p	Decision/ Interpretation
Pedagogical beliefs	Teacher I	44	48.02	0.232	4	0.056	Accept Ho - Not Significant
	Teacher II	21	54.93				
	Teacher III	23	58.46				
	Master Teacher I	8	48.25				
	Master Teacher II	4	13.25				
Classroom practices	Teacher I	44	50.31	9.411	4	0.052	Accept Ho - Not Significant
	Teacher II	21	55.38				
	Teacher III	23	55.48				
	Master Teacher I	8	44.58				
	Master Teacher II	4	10.25				

No significant difference was found by position. Promotion enhances self-worth, achievement, and professional growth (Department of Education, 2007).

#### 4.5 Kruskal-Wallis Test by Years in Service

Table 15. Analysis for Kruskal-Wallis Test by Years in Service

Factor	Group	N	Rank Average	Chi-Square	df	p	Decision/ Interpretation
Pedagogical beliefs	6-10	29	44.07	1.231	4	0.873	Accept Ho – Not Significant
	11-15	22	43.89				
	16-20	11	49.55				
	21-25	12	39.67				
	26+	11	39.71				
Classroom practices	6-10	29	43.78	0.406	4	0.982	Accept Ho – Not Significant
	11-15	22	45.75				
	16-20	11	43.45				
	21-25	12	41.38				
	26+	11	40.88				

Years in service do not significantly influence pedagogical beliefs or classroom practices (Bi-yani, 2013; Zafer & Aslihan, 2012).

#### 5. Relationship Between Pedagogical Beliefs and Classroom Practices

Table 16. Spearman's rho Correlation – Teacher Centered

Sources of Correlation	Pedagogical Beliefs	Classroom Practices	Decision/Interpretation
Spearman rho	1.000	0.725**	Low Positive Relationship – Reject Ho
Sig. (2-tailed)	.	0.000	
N	100	100	

Pedagogical beliefs and classroom practices are positively correlated ( $r = 0.725$ ,  $p = 0.000$ ) (based on the present study).

Table 17. Spearman's rho Correlation – Student Centered

Sources of Correlation	Pedagogical Beliefs	Classroom Practices	Decision/Interpretation
Spearman rho	1.000	0.782**	Low Positive Relationship – Reject Ho
Sig. (2-tailed)	.	0.000	
N	100	100	

A positive correlation exists between beliefs and practices,  $r = .782$ ,  $p < .001$  (Haney, Lumpe, & Czerniak, 2002).

Table 18. Summary Spearman's rho Correlation – Overall

Pedagogical Beliefs	Classroom Practices	Correlation Coefficient	Sig (2-tailed)
		0.838	0.000

The overall results reveal a very high and statistically significant relationship between pedagogical beliefs and classroom practices ( $r = 0.838$ ,  $p = 0.000$ ). This finding indicates a strong alignment between what teachers believe and how they teach science. Contrary to studies that report a belief–practice gap, the results suggest that teachers in Zone II are generally able to translate their pedagogical beliefs into classroom practice. This alignment may be attributed to contextual support, familiarity with MELCs, and the use of structured yet flexible instructional strategies. Teachers' beliefs therefore function as guiding principles that shape instructional decisions and classroom behavior (Jeanna, 2009; Haney, Lumpe, & Czerniak, 2002).

## 6. Teaching Strategies to Improve Resistance

Based on the finding that alignment with the Most Essential Learning Competencies (MELCs) obtained the highest mean score, this study proposes the MELC–Socio–Tech Strategy Framework to reduce teacher and student resistance in science learning. The framework emphasizes prioritizing essential competencies while contextualizing lessons through local experiences and integrating available technology to support inquiry and engagement.

Under this framework, teachers anchor lessons on the Most Essential Learning Competencies (MELCs), contextualize science concepts using learners' sociocultural environments, and utilize digital tools such as simulations, videos, and interactive applications to enhance understanding. By embedding innovation within mandated competencies, the framework ensures that instructional change remains both pedagogically meaningful and institutionally aligned, thereby minimizing resistance and improving science learning outcomes. Effective strategies, such as integrating technology, reduce teacher and student resistance to science learning while promoting student-centered learning and supporting the iterative reconstruction of teacher beliefs (Haney, Lumpe, & Czerniak, 2002).

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