European Economic Letters
ISSN 2323-5233
Vol 15, Issue 1 (2025)
http://eelet.org.uk

A STUDY ON THE RELATIONSHIP BETWEEN EPISTEMOLOGICAL BELIEFS, AND ACADEMIC ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS

Syamala Pilla
Research Scholar
Reg. No. 42100386
Department of Education
Lovely Professional University, Punjab
DR. Rajib Chakraborty
Research Supervisor
Department of Education
Lovely Professional University Punjab, India

ABSTRACT
This study investigates the relationship between secondary school students' epistemological beliefs and their academic achievement in the Krishna District of Andhra Pradesh. Epistemological beliefs are individuals' views regarding the nature of knowledge, including its certainty, simplicity, and the processes through which it is acquired and evaluated. Academic achievement, in this context, is measured by students' performance in exams and coursework. The primary objective of this study is to examine how students' beliefs about knowledge influence their learning approaches and, in turn, impact their academic success. We hypothesized that the relationship between epistemological beliefs and academic performance is bidirectional, with students' learning strategies and task demands affecting both their beliefs and outcomes. Additionally, we speculated that traditional teaching methods might reinforce certain epistemic beliefs, aligning them with conventional learning practices. To explore these ideas, we conducted a comparative analysis of the epistemological beliefs of students across three academic performance categories—high, average, and low performers comprising a sample of 200 students from secondary schools in the Krishna District. The research sought to determine whether differences in epistemological beliefs correlate with variations in academic performance within the specific context of Andhra Pradesh educational system. The findings indicate a significant positive correlation between students' epistemological beliefs and their academic achievements. Specifically, students who possessed more sophisticated and complex beliefs about the nature of knowledge tended to perform better academically. These results suggest that fostering more advanced epistemological beliefs among students could potentially enhance their learning processes and lead to improved academic outcomes.

Keywords: Epistemic Beliefs, Academic Achievement, and Learning Strategies.

INTRODUCTION

"Epistemic beliefs" is a critical and growing concept within the fields of educational psychology and education. Rooted in the philosophical domain of epistemology, which has been explored for centuries, epistemic beliefs focus on the nature of knowledge, its acquisition, and its limits. Traditionally, epistemology addresses questions about what constitutes knowledge, how it is obtained, and the extent of human understanding.

In educational psychology, the study of epistemic beliefs became more prominent in the mid-20th century with contributions from key figures like Piaget and Perry. Piaget's work on genetic epistemology in the 1950s laid the foundation by exploring how children develop their understanding of knowledge through cognitive development. This intersected philosophy with psychology, offering insight into how our beliefs about knowledge evolve as we grow.

In the 1960s, educational psychologist William Perry expanded on these ideas by conducting research with university students. He explored how students' epistemic beliefs about knowledge its limits, certainty, and methods of acquisition—affected their learning. Perry's research highlighted that individuals' views on knowledge are not fixed, but instead evolve through stages, reflecting changes in their understanding of the world and their learning processes.

Epistemic beliefs have since become a focal point in understanding how students approach learning tasks, interpret information, and make decisions about what they know. As this field has developed, it has become clear that epistemic beliefs are not only relevant to philosophy but are also essential in understanding how students engage with educational content and how they construct meaning.

Epistemological beliefs, which encompass individuals' views on the nature of knowledge and learning, significantly shape how they approach learning and the strategies they use to acquire and process information. There are differing perspectives on epistemological beliefs, particularly regarding their role and impact on knowledge acquisition. Those who adhere to the independence of knowledge perspective argue that knowledge is inherently uncertain and that experts are not the sole authority on truth. This view emphasizes that various sources can contribute to knowledge, and it encourages a broader, more inclusive approach to learning. On the other hand, proponents of contextual knowledge

maintain that knowledge can be evaluated in terms of its relevance and value in different contexts, while also acknowledging that certainty is not an intrinsic quality of knowledge. Both perspectives agree on the fluidity of knowledge but diverge in how they view the reliability and context-dependence of information (İlhan et al., 2013).

In line with these views, research on epistemological beliefs often reveals that individuals tend to see knowledge as complex and evolving. These beliefs about knowledge and learning are not static; they can be influenced and reshaped through social interactions, reflective thinking, and exposure to different viewpoints, creating a dynamic environment for personal growth and development (Bendixen, 2002, cited in Arslan et al.).
Epistemological beliefs also interact closely with the learning strategies individuals use. These beliefs shape how students approach learning tasks, such as whether they view learning as a passive absorption of facts or as an active, ongoing process of constructing meaning. Conversely, the strategies that students employ to process information also influence their epistemological beliefs.

However, there are scholars who contend that epistemological beliefs should focus exclusively on one's beliefs about knowledge itself, excluding beliefs about learning processes (Clarebout et al., 2001, cited in Belet & Güven, 2011). This debate highlights the complex nature of epistemological beliefs and their potential to shape both how knowledge is understood and how it is acquired, suggesting that these beliefs are integral to students' academic experiences.

Studies consistently distinguish between cognition and metacognition, emphasizing that these are separate but complementary constructs. Cognitive skills are essential for carrying out tasks, while metacognitive skills involve understanding and regulating how those tasks are approached. Research suggests that metacognitive abilities are more influential in predicting learning outcomes than general intelligence.

Exploring the link between Epistemological beliefs and Academic achievement
Early research on the connection between epistemic beliefs and learning outcomes, including academic achievement, drew heavily from the foundational work of Schommer (1998) and Hofer and Pintrich (1997). They proposed that students' beliefs about the nature of knowledge, often referred to as epistemic beliefs, play a crucial role in shaping their learning goals. These goals, in turn, influence the strategies students use to approach learning and problem-solving. Scholars believe that the strategies students adopt and the goals they aim to achieve directly influence their academic performance and overall achievement. By understanding how these beliefs and strategies interact, scholars sought to better understand how learners approach challenges, regulate their learning, and ultimately succeed in educational contexts. For instance, a student who views knowledge as a collection of discrete, unrelated facts is likely to set a goal of accumulating a vast store of separate pieces of information. Such a student may prefer strategies like rote memorization and excel in memory-based exams but struggle with tests that require higher-order thinking. In contrast, a student who believes knowledge is a network of interconnected concepts might prioritize goals that involve understanding the relationships between ideas. This student is more inclined to use advanced strategies such as organization and elaboration, excelling in exams that assess complex cognitive skills but possibly underperforming on exams focused solely on recall.

Thus, we see self-regulated learning strategies as a key mechanism through which epistemic beliefs influence academic performance. Their underlying beliefs about knowledge shape the way learners approach and regulate their learning, and these strategies impact achievement. Building on this foundation, Muis (2007) proposed a more comprehensive framework to explain how epistemic beliefs influence learning. His model suggests four key propositions:

1. **Epistemic beliefs affect self-motivation:** Learners' beliefs about knowledge influence their achievement goals, outcome expectations, and intrinsic interest in the subject, all of which are critical components of motivation.
2. **Epistemic beliefs guide learning standards:** These beliefs help set the standards by which learners evaluate their progress, which in turn shape the learning strategies they use.
3. **Epistemic beliefs inform metacognition:** The standards set by learners based on their epistemic beliefs serve as benchmarks against which they monitor their learning outcomes. This metacognitive monitoring helps learners assess whether they are meeting their learning goals.
4. **Reciprocal relationship between epistemic beliefs and self-regulated learning:** The model also posits a dynamic, reciprocal relationship where epistemic beliefs influence self-regulated learning strategies, and in turn, the experiences gained from self-regulation further refine epistemic beliefs.

Further validation of this model was provided by Muis and Franco (2009), who found empirical support for the idea that epistemic beliefs influence students' achievement goals. These goals, in turn, shaped their learning strategies and, ultimately, their academic success. Their research highlighted how epistemic beliefs serve as a foundational framework that guides not only how students approach learning but also how they interpret and evaluate their academic experiences. This concept, originally developed by Biggs (1987) and later expanded by Marton and Saljo (1997), suggests that students adopt different strategies when engaging with learning tasks. These strategies, or approaches, can be broadly classified into three categories: the surface approach, where students are primarily motivated by extrinsic factors and focus on rote

memorization and regurgitation of information; the deep approach, characterized by intrinsic motivation and a focus on understanding core principles and constructing meaning from the material; and the achievement approach, where students pursue deep understanding but also emphasize mastering organizational strategies and achieving academic success.

Further studies, such as those by Chen and Pajares (2010), emphasize the importance of both epistemic beliefs and goal orientation in shaping academic achievement. These factors function as mediators between students' implicit theories of intelligence, such as Carol Dweck and Ellen Leggett's (1988) distinction between fixed and incremental mindsets, and their performance, particularly in science. This research underscores the interconnectedness between students' self-perceptions of ability, their learning strategies, and their academic goals. Taken together, these findings suggest that both students' beliefs about their own capabilities and the methods they use to approach learning play critical roles in determining their academic outcomes. This complex interplay between personal beliefs, goal orientation, and learning strategies highlights the need for a holistic understanding of academic achievement, where cognitive, motivational, and behavioral factors all contribute to student success.

LITERATURE REVIEW

Sandoval (2005)

Sandoval's study, titled Understanding Students' Epistemological Beliefs through Multiple Research Approaches, emphasizes the complexity of students' epistemological beliefs and the challenge of identifying a single best method for exploring them. The research concludes that various methodologies provide unique insights, and a combination of approaches is essential for gaining a comprehensive understanding. The study also highlights the dynamic nature of epistemological beliefs, noting that these beliefs are not static but can evolve over time, influenced by a range of factors.

Pandey K & Singh N (2016)

Pandey and Singh's research, Epistemological Beliefs of Male and Female Pupil Teachers in Online Learning Environments, explores how epistemological beliefs and self-regulated learning practices influence academic success among Indian pupil teachers. The study found that epistemological beliefs did not differ between male and female participants in the context of online learning. Additionally, the research highlighted that epistemological beliefs and self-regulated learning were significant predictors of academic achievement, suggesting that both factors play an essential role in shaping the educational experiences of pupil teachers. The study also touched on the Indian philosophical perspective of knowledge, reflecting on the classical Nyaya school's views on epistemology, validity, and knowledge sources.

Niranjana (2018)

Niranjana surveyed 1,200 students from Kerala, India, in her study, The Influence of Epistemological Beliefs, Achievement Goals, and Self-Regulated Learning on Academic Achievement in Accountancy, to investigate the relationship between students' beliefs about knowledge, their learning strategies, achievement goals, and academic performance in accountancy. The research uncovered several significant findings. Gender differences were particularly evident, with female students demonstrating more advanced epistemological beliefs and employing more effective learning strategies compared to male students. Additionally, the study revealed that students from rural schools tended to have higher achievement goals and performed better academically in accountancy than their peers from urban schools. The study concluded those students' epistemological beliefs—how they understand the nature of knowledge along with their achievement goals and self-regulated learning strategies played a crucial role in shaping their academic success in accountancy. We found that these factors had a direct and substantial impact on academic outcomes in the subject.

Yang, Bhagat, and Cheng (2019)

Yang, Bhagat, and Cheng's comparative study, Epistemological Beliefs in Science Learning: A Cross-Cultural Analysis, investigated the epistemological beliefs of university students from Taiwan and India. The study revealed significant cultural differences in students' beliefs across three key dimensions: the certainty, development, and justification of knowledge. Taiwanese students were found to exhibit a more pronounced orientation toward scientific reasoning, emphasizing a more structured, objective understanding of knowledge. In contrast, Indian students demonstrated a more flexible and balanced perspective on science learning, incorporating diverse viewpoints and recognizing the evolving nature of scientific knowledge. The study further explored the interplay between students' epistemological beliefs, their scientific reasoning abilities, and their learning experiences. It highlighted that Taiwanese students, with their stronger emphasis on objective knowledge, tended to display higher levels of scientific reasoning, while Indian students, with a more integrative approach, showed greater adaptability and openness in their learning. These findings underscore the cultural nuances in how students from different backgrounds approach science, as well as how their beliefs about knowledge influence their academic practices and reasoning skills.

Ahmed & Hasan (2021)

Ahmed and Hasan's study, Scientific Epistemological Views among Postgraduate Students of Different Disciplines, sought to investigate the scientific epistemological views of postgraduate students in relation to their gender, discipline,

and locality (rural vs. urban). The study found significant differences between students from science and non-science disciplines, with science students exhibiting more sophisticated beliefs about scientific knowledge. Although there were no significant gender differences, urban students showed slightly higher levels of scientific epistemological views compared to their rural counterparts, suggesting the influence of local context on students' views of science.

Ahmed and Alshumaili (2023)
Ahmed and Alshumaili's research, The Role of Epistemological Beliefs and Metacognition in Problem-Solving Performance of Emirati High School Students, explored how epistemological beliefs and metacognitive skills impacted students' problem-solving abilities in engineering. The study found that both epistemological beliefs and metacognition played a critical role in enhancing students' problem-solving performance, particularly in tasks involving problem identification, planning, monitoring, and evaluating solutions. The findings suggest that fostering strong epistemological beliefs and metacognitive skills can significantly boost students' problem-solving capabilities in complex tasks.

STATEMENT OF THE PROBLEM

OBJECTIVES OF THE STUDY

1. To find out the level of Epistemological Beliefs of the secondary school students.
2. To find out the influence of the following variables on Epistemological Beliefs of secondary school students.
   1. Gender : Boys / Girls
   2. Locality : Rural / Urban
   3. Type of Management : Government / Private
   4. Birth order : One/Two/Three
3. To find out the level of Academic achievement of the secondary school students.
4. To find out the influence of the following variables on Academic achievement of secondary school students.
   1. Gender : Boys / Girls
   2. Locality : Rural / Urban
   3. Type of Management : Government / Private
   4. Birth order : One/Two/Three
5. Exploring the Link between Epistemological Beliefs and Academic Achievement in Secondary School Students

HYPOTHESIS OF THE STUDY

Hypothesis 1: There would be no significant difference in the epistemological beliefs of secondary school students based on gender (boys vs. girls).
Hypothesis 2: There would be no significant difference in the epistemological beliefs of secondary school students based on geographical location (rural vs. urban).
Hypothesis 3: There would be no significant difference in the epistemological beliefs of secondary school students based on the type of school they attend (government vs. private).
Hypothesis 4: There would be no significant difference in the epistemological beliefs of secondary school students based on the professional status of their parents (professional vs. non-professional).
Hypothesis 5: There would be no significant difference in the academic achievement of secondary school students based on gender (boys vs. girls).
Hypothesis 6: There would be no significant difference in the academic achievement of secondary school students based on geographical location (rural vs. urban).
Hypothesis 7: There would be no significant difference in the academic achievement of secondary school students based on the type of school they attend (government vs. private).
Hypothesis 8: There would be no significant difference in the academic achievement of secondary school students based on the professional status of their parents (professional vs. non-professional).
Hypothesis 9: There would be no significant relationship between the epistemological beliefs and academic achievement of secondary school students.

VARIABLES OF THE STUDY

Table 1
Classification of the Variables

S.NO	Independent Variables	Dependent Variables	Demographical Variables
1	Epistemological Beliefs	Academic achievement	**Gender** : Boys / Girls **Locality** : Rural / Urban **Type of Management:** Government / Private **Parental Education**:

			Professional and Non Professional

SCOPE OF THE STUDY

The present study is focused on the Vijayawada Krishna District in Andhra Pradesh. The sample selected for this research consisted of 200 students from 9th grade in secondary schools, drawn from both rural and urban areas. The study aimed to explore the influence of several variables, including gender**,** type of school management**,** locality (rural/urban)**,** and parental education, on various academic and behavioral outcomes.

METHOD OF THE STUDY

The research process encompasses several key components, including observation, planning, methodology, and the analysis of outcomes under specific conditions. For the current study, the researcher has chosen the normative survey method as the primary approach. This method involves collecting data through structured surveys to examine patterns, trends, and relationships within a particular population. The survey design allows for the systematic gathering of information that can then be analyzed to draw conclusions and provide insights into the subject matter being studied.

POPULATION FOR THE STUDY

The present study focuses on 9th-grade secondary school students from both government and private schools in the Vijayawada region of Krishna District, Andhra Pradesh. In this area, there is a strong emphasis on academic achievement, with both students and parents prioritizing high ranks in examinations. However, there is also a growing recognition of the importance of developing strong personalities and character traits. This dual focus on academic success and holistic development motivated the researcher to choose this particular region for the study.

SAMPLE SELECTED FOR THE STUDY

A total of 200 students from class IX were selected as the sample, representing a diverse range of areas within the district. The study considered several key variables in the sampling process, including gender**,** type of management (government or private)**,** locality (urban or rural), and parental education level. These factors were taken into account to better understand their potential influence on the students' academic performance and other related aspects being studied.

TOOL OF THE STUDY

For the successful completion of the investigation, it is essential to use appropriate tools for gathering sample data. The selection of these tools depends on several factors, including the objectives of the study, the availability of reliable testing methods, and the researcher's expertise in applying these tools. With the aim of addressing the specific goals of this investigation.

Tool: Epistemological beliefs Scale (Anne Marie M.Conley, 2004).

STATISTICAL TECHNIQUES USED FOR THE STUDY

The investigator gathered raw scores after utilizing a scoring key to perform initial calculations. To extract valuable insights and draw valid conclusions from this data, it was crucial to organize and summarize it effectively.

1. **Arithmetic Mean**
   This measure was used to find the average of the raw scores, providing a central tendency of the data.
2. **Standard Deviation**
   Standard deviation was calculated to understand the variability or spread of the raw scores from the mean. It indicates the extent of deviation from the average score.
3. **Percentage of Mean**

This calculation was used to express the individual data points or subsets of data as percentages of the overall mean, aiding in relative comparisons.

4. **t' test**

A t-test was performed to compare the means of two groups or conditions, helping determine if there was a statistically significant difference between them.

R-value (Correlation)

The correlation coefficient (r-value) was calculated to assess the strength and direction of the relationship between two variables, helping to understand the degree to which they are related. These techniques together enabled the investigator to draw reliable conclusions from the raw data by providing a comprehensive statistical analysis.

DATA ANALYSIS

Objective-1: To find out the level of Epistemological Beliefs of the secondary school students.

Table 4.1

Epistemological Beliefs: **Whole sample Analysis**

Whole sample	Mean	SD	% of Mean
300	109.78	17.64	68.61

Interpretation:

From the data presented in Table 1, the following key observations have been made: The total sample is 300. The mean value for the dataset is 109.78, with this value representing 68.61% of the total range. Additionally, the standard deviation is calculated to be 17.64, suggesting some level of variability around the mean. Based on these figures, it can be concluded that the Epistemological Beliefs of the students are above average.

Findings:

Referring to the data in Table 4.1, the analysis reveals that all secondary school students in the sample are classified as having above-average Epistemological Beliefs. Consequently, the hypothesis that secondary school students exhibit lower levels of Epistemological Beliefs is rejected, as the findings demonstrate that the students are experiencing a level of Epistemological Beliefs that exceeds the average.

Objective-2: To explore the influence of the following variables on Epistemological Beliefs of secondary school students with respect to the following variables i.e. Gender, Type of Management, Locality, Parental Education.

Table .2

Epistemological Beliefs – Gender wise Analysis

Gender	Sample size	Mean	% of Mean	SD	SED	't' Value
Boys	150	102.44	75.88	17.24	0.76	1.73^{NS}
Girls	150	104.23	77.20	17.36		

Not significant at 0.05 level &Table value 1.96.

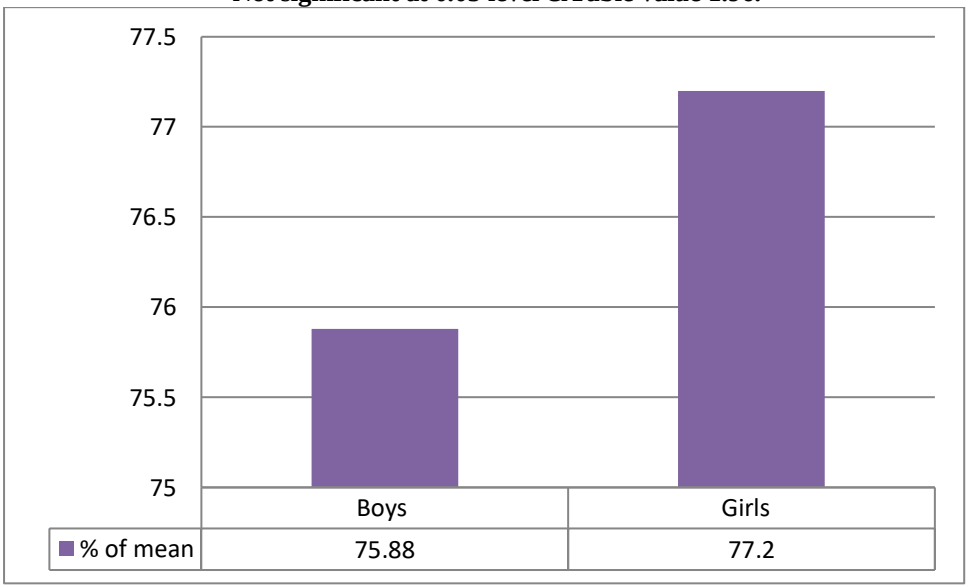

Figure-1 Epistemological Beliefs–Gender wise Analysis

Interpretation and Findings:

Based on the data presented in Table 2, the following observations have been made:

- The total number of students is 300, consisting of 150 boys and 150 girls.
- The mean Epistemological Beliefs score for boys is 102.44, with a standard deviation of 17.24.
- The mean Epistemological Beliefs score for girls is 104.23, with a standard deviation of 77.20.
- The Standard Error of Difference (SED) between the means of boys and girls is 0.76.
- The calculated "t" value is 1.73.

To assess the significance of the difference in Epistemological Beliefs between boys and girls, we compare the calculated "t" value to the critical value from the t-distribution table at the 0.05 significance level. The table value of "t" at this level is 1.96. Since the calculated "t" value (1.73) is less than the table value (1.96), the result is not statistically significant.

Conclusion:
The findings suggest that gender does not have a significant impact on Epistemological Beliefs among secondary school students. There is no statistically significant difference between boys and girls in terms of their levels of Epistemological Beliefs. Consequently, both boys and girls exhibit similar levels of Epistemological Beliefs.
Hypothesis 2: There would be no significant difference in the epistemological beliefs of secondary school students based on geographical location (rural vs. urban).

Table - 3
Epistemological Beliefs– Locality wise analysis

Locality	Sample size	Mean	% of mean	SD	SED	't' Value
Rural	150	103.01	76.30	17.27	0.88	1.70^{NS}
Urban	150	105.04	77.80	17.48		

****Significant at 0.05 level &Table value 1.96.**

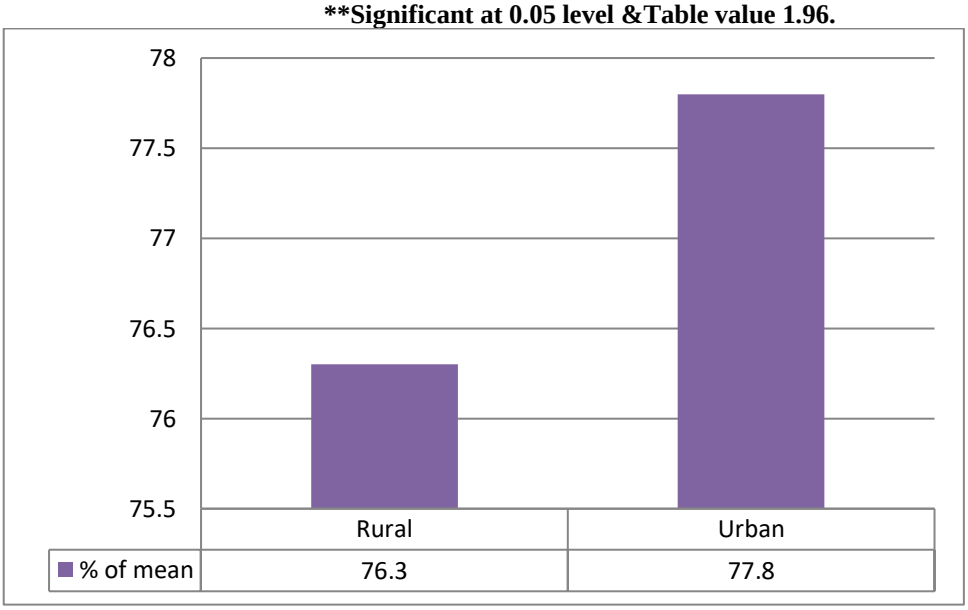

Figure-2 Epistemological Beliefs– Locality analysis

Interpretation and Findings:
The total number of students is 300, with an equal distribution of 150 rural students and 150 urban students. The overall mean for all students is 103.01, with a standard deviation of 17.26. Specifically, the mean for urban secondary school students is 105.04, with a standard deviation of 17.48. The Standard Error of Difference (SED) is 0.88, and the calculated t-value is 1.70. This t-value does not reach the critical value of 1.96 at the 0.05 significance level.

Conclusion:
The t-value of 1.70 is lower than the critical value of 1.96, indicating that the observed difference between rural and urban students is not statistically significant at the 0.05 significance level. Consequently, we fail to reject the null hypothesis for the "Locality" variable. This suggests that the locality (whether rural or urban) does not have a significant effect on the epistemological beliefs. While urban students have a slightly higher mean score (105.04) compared to their rural counterparts (103.01), this difference is not large enough to be deemed statistically significant. Therefore, we conclude that locality does not play a significant role in shaping the epistemological beliefs of secondary school students.

Hypothesis 3: There would be no significant difference in the epistemological beliefs of secondary school students based on the type of school they attend (government vs. private).

Table - 4
Epistemological Beliefs– Type of Management analysis

Type of Management	Sample size	Mean	% of mean	SD	SED	't'

						Value
Government	150	104.82	77.64	17.13	0.89	3.76*
Private	150	101.47	75.12	17.25		

****Significant at 0.05 level &Table value 1.96.**

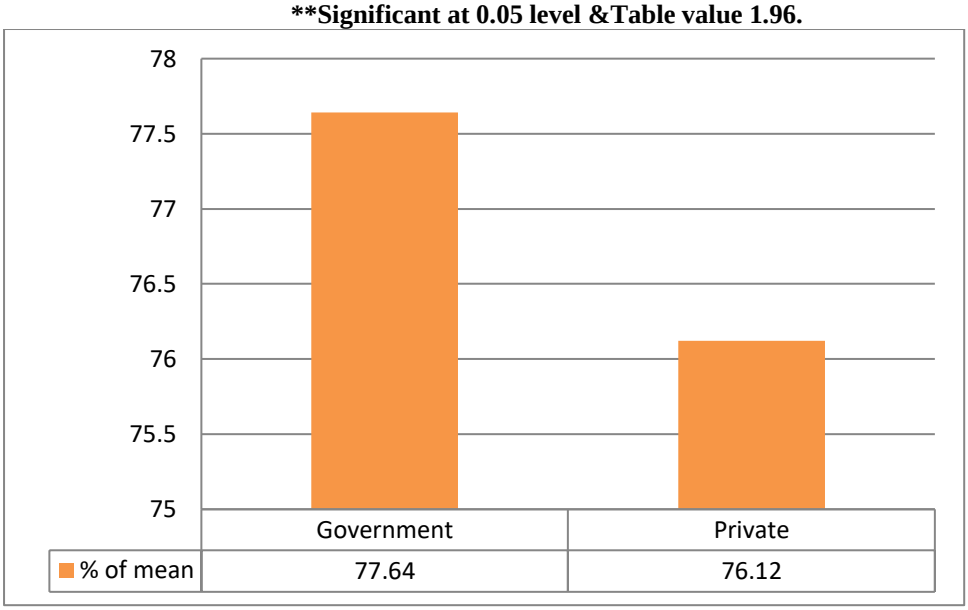

Figure-3 Epistemological Beliefs–Type of Management

Interpretation and Findings:
The data provided highlights the comparison between government and private school students based on their Epistemological Beliefs. The total sample consists of 300 students, with an equal distribution of 150 students from government schools and 150 from private schools. The following are key observations from the analysis:

- **Government School Students**:

Mean Epistemological Beliefs Score: 104.82
Standard Deviation: 17.23

- **Private School Students**:

Mean Epistemological Beliefs Score: 101.47
Standard Deviation: 17.25

- **Standard Error of Difference (SED)**: 0.89
- **t-value**: 3.76, which is significant at the 0.05 level.

Conclusion
The calculated t-value of 3.76 surpasses the critical value of 1.96 at the 0.05 significance level, suggesting that the difference between the two groups is statistically significant. As a result, the null hypothesis, which assumes no difference between the groups, is rejected. The result demonstrates that the type of school management (government vs. private) influences the students' Epistemological Beliefs. Specifically, government school students exhibit better Epistemological Beliefs than their private school counterparts. This suggests that the school management type plays a role in shaping the students' understanding of knowledge and learning processes. The findings confirm that there is a significant difference between government and private school students in their Epistemological Beliefs. Government school students tend to have a higher mean score in these beliefs compared to private school students, indicating that the type of school management may have an impact on students' cognitive development in this domain.

Hypothesis 4: There would be no significant difference in the epistemological beliefs of secondary school students based on the professional status of their parents (professional vs. non-professional).

Table -5
Epistemological Beliefs–Parental Education

Parental education	Sample size	Mean	% of mean	SD	SED	't' Value
Professional	150	103.42	76.60	17.87	0.56	1.50^{NS}
Non Professional	150	104.26	77.22	17.94		

Not significant at 0.05 level &Table value 1.96.

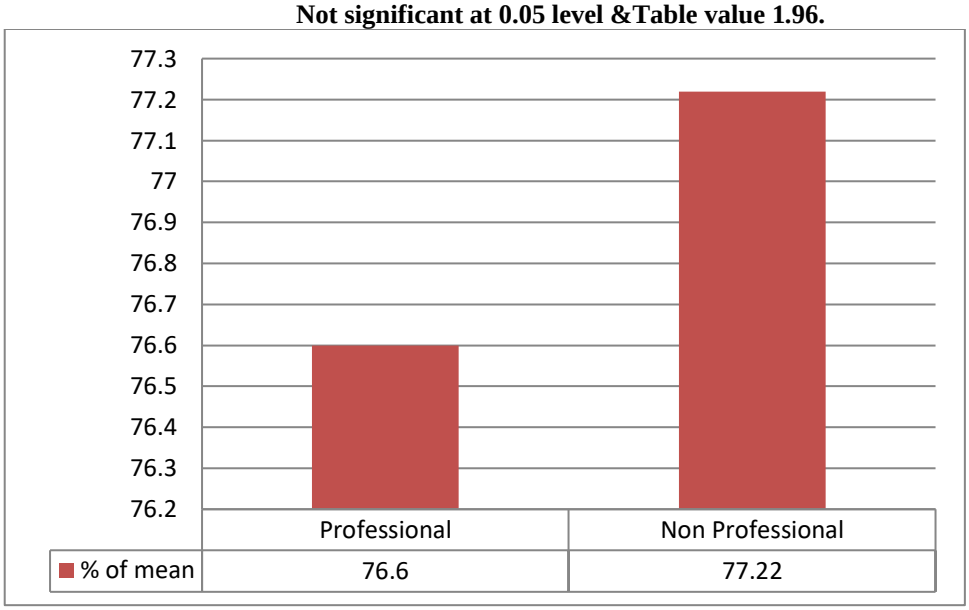

Figure-4 Epistemological Beliefs–Parental education

Interpretation and Findings:
The data presented in Table (5) involves a total of 300 students, equally divided into two groups: 150 students from professional parents and 150 students from non-professional parents. The key statistics are as follows:

- Mean for students from professional parents: 103.42
- Standard Deviation (S.D.) for professional parents: 17.87
- Mean for students from non-professional parents: 104.26
- Standard Deviation (S.D.) for non-professional parents: 17.94
- Standard Error of Difference (SED): 0.56
- Calculated t-value: 1.50

Conclusion
Based on findings, we accept the null hypothesis, which posits that there is no significant difference in the epistemological beliefs of secondary school students based on their parents' profession. The data indicates that the educational background of parents (whether professional or non-professional) does not have a significant impact on the epistemological beliefs of their children. Thus, we conclude that parental education does not influence the epistemological beliefs of secondary school students.

Objective-3: To find out the level of academic achievement of the secondary school students.

Table 4.1
Academic achievement: Whole sample Analysis

Whole Sample	Mean	SD	% of Mean
300	71.78	18.64	71.78

Interpretation and Findings:
From the data provided in Table 1, several key observations can be made about the academic performance of secondary school students in the sample. The total number of students included in the analysis is 300. The mean academic achievement score of these students is 109.78, which accounts for 68.61% of the overall range of the dataset. Additionally, the standard deviation is calculated to be 17.64, indicating a moderate level of variability in academic performance across the sample.

Based on these findings, it can be concluded that the academic achievement of the students in the sample is generally above average, as the mean score surpasses the midpoint of the scale, with a reasonable distribution of scores around this mean.

Conclusion
The analysis of the data in Table 1 shows that all secondary school students in the sample demonstrate above-average academic achievement. As a result, the hypothesis suggesting that the students exhibit lower levels of academic

achievement is rejected. The findings clearly indicate that the students' academic performance is higher than the average level, suggesting positive overall academic outcomes for the group.

Objective-4: "To examine the influence of the following variables on the academic achievement of secondary school students: gender, type of management, locality, and parental education."

Hypothesis 5: There would be no significant difference in the academic achievement of secondary school students based on gender (boys vs. girls).

Table - 6
Academic Achievement–Gender wise Analysis

Gender	Sample size	Mean	% of mean	SD	SED	't' Value
Boys	150	70.41	70.41	8.01	0.51	3.19*
Girl	150	72.04	72.04	7.69		

Significant at 0.05 level&Table value 1.96.

Interpretation and Findings:
Based on the provided data, there are 300 students in total, with 150 boys and 150 girls. The following statistical observations were made:

- The mean academic score of the boys is 70.41, with a standard deviation of 8.01.
- The mean academic score of the girls is 72.04, with a standard deviation of 7.69.
- The Standard Error of Difference (SED) is 0.51.
- The computed "t" value is 3.19.

Conclusion
At the 0.05 significance level, the null hypothesis is rejected because the calculated t-value of 3.19 exceeds the critical value of 1.96. This suggests a statistically significant difference in academic achievement between genders, with the data indicating that girls tend to outperform boys in academic performance.

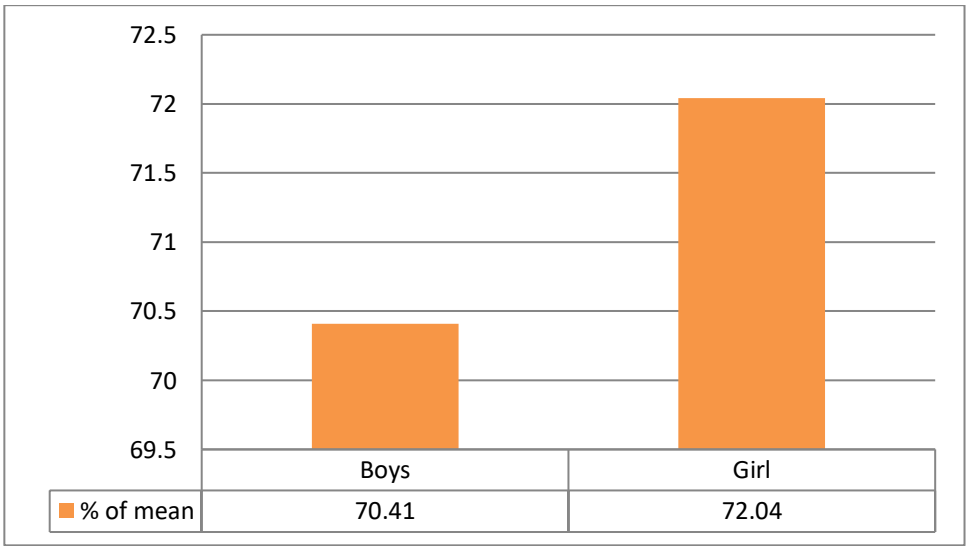

Figure - 5: Academic Achievement–Gender wise Analysis

Hypothesis 6: There would be no significant difference in the academic achievement of secondary school students based on geographical location (rural vs. urban).

Table -7
Academic Achievement– Locality Analysis

Locality	Sample size	Mean	% of mean	SD	SED	't' value
Rural	150	68.10	68.50	8.0	0.50	2.04*
Urban	150	67.08	67.80	7.92		

Significant at 0.05 level & Table value 1.96.

Interpretation and Findings:
The dataset provided includes a total of 300 students, with an equal distribution of 150 rural and 150 urban pupils. The rural students have an average academic score of 68.10, accompanied by a standard deviation of 8.0, while the urban students have a mean score of 67.08 and a standard deviation of 7.92. The Standard Error of the Difference (SED) between the two groups is 0.50, and the calculated "t" value is 2.02. To assess the statistical significance of the difference in academic performance between the two groups, the calculated "t" value is compared to the critical value of 1.96 at the 0.05 significance level. Since the calculated "t" value of 2.02 exceeds the critical value of 1.96, we conclude that the difference in academic performance between rural and urban students is statistically significant at the 0.05 level.

Conclusion
This significant difference leads to the rejection of the null hypothesis, which suggests no difference between the academic achievements of rural and urban students. This suggests that the "locality" factor does have an impact on academic achievement. Specifically, rural pupils perform better academically than their urban counterparts.

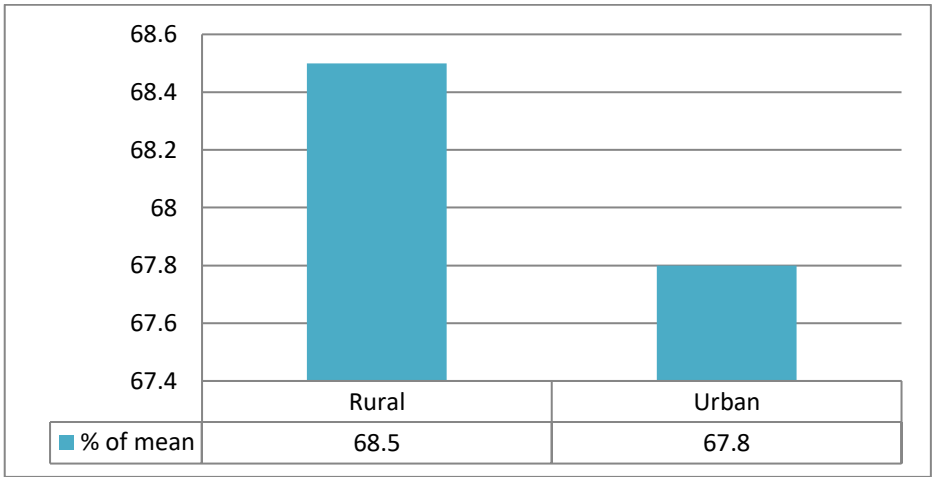

Figure - 4.6: Academic Achievement– Locality Analysis

Hypothesis 7: There would be no significant difference in the academic achievement of secondary school students based on the type of school they attend (government vs. private).

Table -8
Academic Achievement– Type of Management wise Analysis

Type of Management	Sample size	Mean	% of Mean	SD	SED	't' value
Government	300	77.52	77.52	8.02	0.49	2.02*
Private	300	76.33	76.33	8.0		

Significant at 0.05 level&Table value 1.96.

Interpretation and Findings:
Based on the data presented in Table 8, several key observations can be made. The total number of students in the study is 300, with an equal distribution between boys from government schools and students from private schools, each group comprising 300 students. The mean academic score for government school students is 77.52, with a standard deviation of 8.02. In contrast, the mean score for private school students is slightly lower at 76.33, and the standard deviation is 8.0. To assess whether the differences in academic achievement between government and private school students are statistically significant, the Standard Error of Difference (SED) was calculated to be 0.49. The calculated t-value is 2.02.

Conclusion
Based on the analysis, the calculated t-value of 2.02 exceeds the critical t-value of 1.96 at the 0.05 significance level, indicating that the result is statistically significant. Consequently, the null hypothesis, which posited no difference in academic achievement between students from government and private schools, is rejected. This suggests that the type of school management whether government or private does have an impact on students' academic performance. Specifically, the findings reveal that students in government schools outperform those in private schools academically.

European Economic Letters
ISSN 2323-5233
Vol 15, Issue 1 (2025)
http://eelet.org.uk

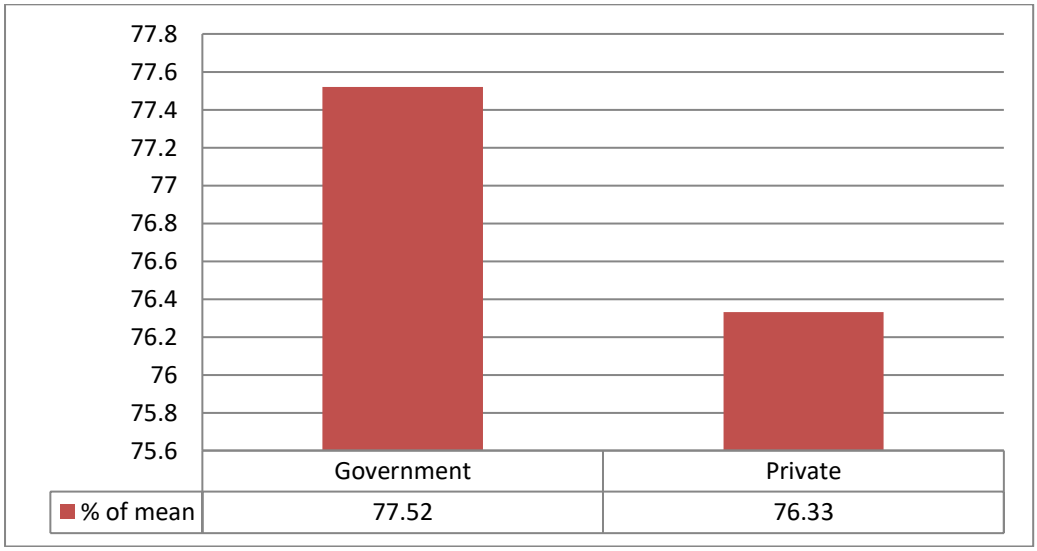

Figure - 7: Academic Achievement– Type of Management wise Analysis

Hypothesis 8: There would be no significant difference in the academic achievement of secondary school students based on the professional status of their parents (professional vs. non-professional).

Table -9
Academic Achievement– Parental Education Analysis

Parental Education	Sample size	Mean	% of mean	SD	SED	't' Value
Professional	150	70.24	70.24	8.01	0.55	3.92*
Non Professional	150	68.08	68.08	8.03		

Significant at 0.05 level & Table value 1.96.

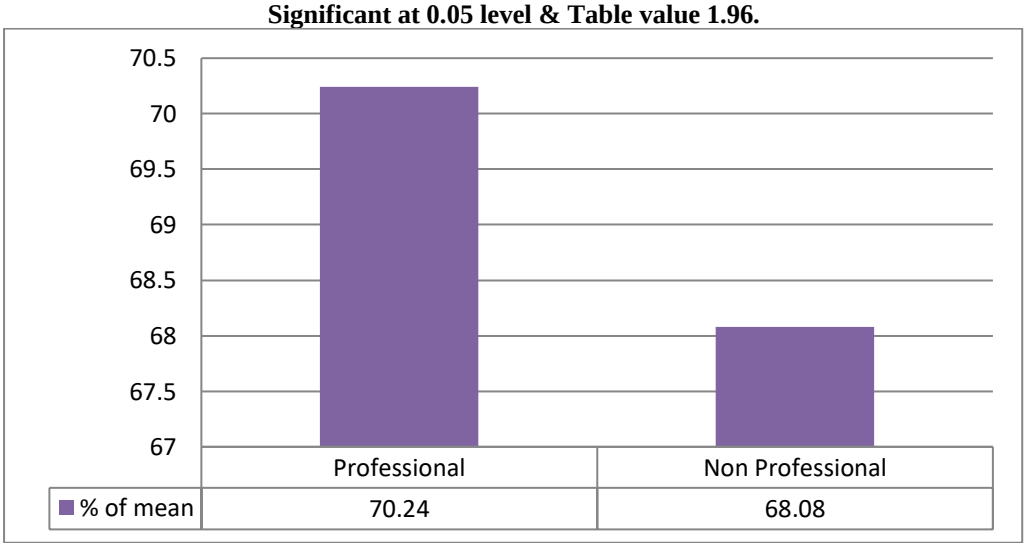

Figure - 8: Academic Achievement– Type of Management Wise Analysis

Interpretation and Findings:
The study involves a total sample of 300 secondary school students, with an equal distribution between two family types: 150 students from joint families and 150 students from nuclear families. The overall mean academic performance percentage for the entire sample is 70.24%, with a standard deviation (S.D.) of 8.01%. For students from nuclear families, the mean academic score is 68.08%, with a standard deviation of 8.03%. The Standard Error of Difference (SED) between the two groups is 3.23, and the computed 't' value is 3.92. Given that this t-value is statistically significant at the 0.05 level, it suggests a meaningful difference in academic performance between students from joint families and those from nuclear families.

Conclusion

The calculated t-value of 3.92 exceeds the critical value of 1.96 at the 0.05 significance level, indicating that the observed difference in academic achievements between students from joint and nuclear families is statistically significant. The variable "Parental Education" rejects the null hypothesis at the 0.05 significance level. These findings suggest that parental education has a notable impact on the academic performance of secondary school students. Specifically, students with parents from professional backgrounds tend to perform better academically than those whose parents are from non-professional backgrounds. This supports the notion that parents' educational attainment significantly influences their children's academic success.

SECTION- B

ANALYSIS OF CORRELATION

Objective – 3: To find out the relationship between Epistemological Beliefs and Academic achievement of secondary school students.

Hypotheses – 9: There would be no significant relationship between Epistemological Beliefs and Academic achievement of secondary school students.

Table –10
Correlation between Epistemological Beliefs and Academic achievement

Variable	No	df	'r' value
Academic stress	300	298	0.20*
Academic achievement	300		

Significant at 0.05 level &Table value 0.06.

Interpretation and Findings:

a study involving 600 secondary school students, 300 were identified as experiencing academic stress, while the remaining 300 were categorized based on their academic achievement. The analysis, which included 298 degrees of freedom (df), revealed a statistically significant correlation of r = 0.20 between academic stress and academic achievement. This indicates a weak but significant relationship between the two variables, suggesting that academic stress may be associated with variations in academic performance among the students.

Conclusion

As presented in Table 4.32, the computed correlation coefficient (r = 0.20) is compared to the critical r-value at the 0.05 significance level. Since the calculated r-value is smaller than the critical value from the table, we fail to reject the null hypothesis. This indicates that there is no statistically significant correlation between academic stress and academic achievement among the secondary school students in this sample. As a result, Hypothesis 5 is upheld, suggesting that academic stress does not have a significant impact on academic achievement in this group of students.

Discussion of Findings

In the present study, beliefs regarding the stability of knowledge and the pace of learning were identified as negative predictors of academic achievement. Specifically, students who view knowledge as fixed, objective, and unchanging tend to perform less well academically. Similarly, those who believe that learning is a rapid process that does not require sustained effort are also more likely to exhibit lower academic achievement. These findings suggest that students who perceive knowledge as evolving and learning as a continuous, effortful process are more likely to engage actively in their studies and employ effective self-regulation strategies, ultimately enhancing their academic performance.

CONCLUSIONS

The study also highlighted notable gender-based differences in the epistemological beliefs of secondary school students. Specifically, female students demonstrated more developed epistemological beliefs compared to their male peers. This disparity might be attributed to the fact that female students often view knowledge as a set of discrete, isolated facts, whereas male students are more inclined to conceptualize knowledge as an interconnected web of ideas and concepts. These differing perspectives on knowledge could influence the learning strategies each gender employs and the way they approach academic tasks, potentially shaping their problem-solving and study habits in distinct ways.

Regarding certain epistemological dimensions, both male and female students tended to agree that knowledge is dynamic and evolving. They perceive truth as something that is subject to change, with new scientific knowledge emerging over time. This reflects a belief in the malleability of knowledge, which aligns with contemporary views of science as an evolving field. On the dimension of the speed of learning, both male and female students similarly agreed that learning is a gradual process. They do not perceive learning as something that occurs quickly or effortlessly, which may reflect a realistic understanding of the time and effort required for academic success.

These findings highlight the importance of addressing students' epistemological beliefs in educational practices. By fostering more sophisticated, adaptive beliefs about knowledge and learning, educators can help students develop better strategies for self-regulation and enhance their academic achievement. Additionally, gender differences in epistemological beliefs may warrant further exploration, particularly to understand how these differences influence learning outcomes and how they can be leveraged to support students in more personalized and effective ways.

REFERENCES

1. Singh Siddhu, K. (1985). Methodology of research in education. Sterling Publishers Pvt. Ltd.
2. Aggarwal, Y. P. (1988). Statistical methods (2nd ed.). Sterling Publishers.
3. Rathod, A., & Agarwal, H. (2015). Research methodology.
4. Sandoval, W. A., & Brew, K. (2019). Epistemological beliefs and metacognition in science education. In Handbook of metacognition in science education (pp. 265–291). Routledge.
5. Padmanabhan, V. (2007). Constructivism and reflective teaching in teacher education. Edutracks, 7(4), 42–48.
6. Yang, X., Zhang, M., & Kong, L. (2020). The effects of scientific self-efficacy and cognitive anxiety on science engagement with the "question-observation-doing-explanation" model during school disruption in the COVID-19 pandemic. Journal of Science Education and Technology, 29(1), 12–22. https://doi.org/10.1007/s10956-020-09802-4
7. Ahmed, A., & Hasan, M. (2021). A comparative study on scientific epistemological views of postgraduate students of different disciplines. Worldwide Journal of Multidisciplinary Research and Development, 7(4), 104–111.
8. Ahmed, S., & Alshumaili, N. (2023). The role of epistemological beliefs and metacognition in Emirati high school students' problem-solving performance. International Journal of Engineering Education, 39(3), 543–556.