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Social Sciences & Humanity Research Review

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Pedagogical Challenges Faced by Science Teachers in Teaching General Science at the Elementary Level in Government Schools of District Sanghar

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https://doi.org/10.63468/sshrr.324

ARTICLE INFO

Keywords: Science education, Elementary level, Pedagogical challenges, Instructional resources, Teaching methodologies, Government schools, Pakistan

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Article History

Received: 06-01-2026

Revised: 25-01-2026

Accepted: 07-02-2026

Published: 18-02-2026

ABSTRACT

Science education at the elementary level is very important in developing students' foundational knowledge of scientific concepts and awareness of the natural and environmental world. But the efficiency of science education is greatly dependent on the pedagogical skills of teachers, the use of instructional resources, and the teaching methods used in the classroom. In most government schools, science teachers experience a variety of instructional and methodological challenges that limit effective teaching and significant learning. It is against this background that the current study sought to explore the pedagogical challenges faced by science teachers while teaching General Science at the elementary level in government schools of District Sanghar, Sindh, Pakistan. The study was informed by two major objectives: first, to explore the challenges faced by science teachers in using instructional resources and incorporating environmental concepts in classroom teaching; and second, to explore the pedagogical practices used by teachers and the methodological challenges faced by teachers in teaching General Science. The study used a descriptive survey research design and adopted a mixed-methods approach that combined both quantitative and qualitative data. The study population included science teachers and head teachers of government elementary schools in District Sanghar. A sample of 20 schools was selected randomly from six talukas of the district. The data was collected using structured questionnaires from 318 science teachers and semi-structured interviews from 20 head teachers. The results show that there are serious confines in the use of teaching resources, integration of environmental concepts, and the use of appropriate teaching methodologies. The implications of the study are very important for policymakers, curriculum developers, and institutions involved in

teacher training to improve teaching practices and the quality of science education at the elementary level.

INTRODUCTION

Education is an integral part of shaping people's perceptions of the world and helping them take effective part in society. Modern writers emphasize that education is not only a preparation for life but a continuous process that enables people to acquire the knowledge, skills, and capabilities necessary for effective participation in a rapidly changing world (Ullah, Das, Khoso, & Nawaz, 2024). Among various knowledge domains, science occupies a crucial place in shaping rational thinking, problem-solving abilities, and capabilities that are essential for both individual and social development. Science education has experienced a paradigm shift in modern society due to its influence on technological innovation, economic development, and the overall improvement of the quality of life. In the twenty-first century, science has emerged as a catalyst for innovation and development that not only affects economic development but also societal transformation (UNESCO, 2017). In modern education, science is not a body of facts; instead, it is a process of inquiry, research, and critical thinking (Donnelly & Jenkins, 2001).

Despite the acknowledged significance of science education, the field still encounters a number of pedagogical issues around the world. It has been identified that students tend to view science as a difficult subject owing to the abstract concepts, technical vocabulary, and the continued use of didactic teaching practices in classrooms (Osborne & Collins, 2001). Moreover, resource constraints, a lack of professional development, and examination-centric teaching practices are some factors that impede the successful implementation of hands-on science teaching practices.

In Pakistan, the significance of science education has been acknowledged by the formulation of national education policies that continue to highlight the significance of science education in the development of the country (Government of Pakistan, 2017). However, despite the formulation of various reforms and curriculum changes, public sector schools continue to experience issues such as a lack of infrastructure, a high student-teacher ratio, and a lack of professional support for teachers. At the elementary level, where basic scientific knowledge is developed, teachers remain a crucial component in influencing students' attitudes toward science. For effective science education, it is required that teachers possess good pedagogical content knowledge, which comprises knowledge of students' cognitive development, teaching strategies, and classroom management (Handelsman et al., 2004). However, in most government schools, there are constraints in the application of student-centered and activity-based strategies. It is, therefore, the aim of this study to investigate the pedagogical challenges faced by science teachers in teaching General Science to elementary-level students in government schools of District Sanghar.

LITERATURE REVIEW

Science education is generally accepted as a foundation of modern education, offering students' knowledge, skills, and critical thinking capabilities essential for comprehending the natural world and making a contribution to the progress of society (Donnelly & Jenkins, 2001). In elementary education, science education is especially important since it influences students' initial attitudes toward learning, inquiry, and problem-solving (Osborne & Collins, 2001). Successful science education requires a set of knowledge, skills, and teaching abilities that enable students to participate in hands-on and minds-on learning activities (Handelsman et al., 2004).

- **Pedagogical Issues in Science Education**

Studies have shown that science teachers experience a range of issues in providing effective instruction. These issues include a lack of teaching resources, the absence of laboratory facilities, large class sizes, and a lack of professional development opportunities (Anderman, Sinatra, & Gray, 2012). Osborne and Collins (2001) pointed out that students generally view science as an abstract subject that is hard to understand due to the use of complex vocabulary and teacher-centered instruction. Science education should focus on practical and inquiry-based learning, as traditional approaches that rely on rote learning

are ineffective in developing students' scientific understanding. The limited use of hands-on activities in the classroom further diminishes the involvement and motivation of students. Practical work, although identified as an important component in bridging theoretical knowledge and practical applications, is often viewed as a supplementary component of science education because of time constraints, pressures of examinations, and the lack of teacher skills in designing inquiry-based activities (Ullah & Almani,2022).

- **Teacher Preparedness and Pedagogical Knowledge**

Pedagogical knowledge is an essential component of science teaching. Teachers need to be aware of how students develop knowledge and how to utilize teaching strategies to promote conceptual understanding (Handelsman et al., 2004). Nevertheless, many science teachers are reluctant to embrace new approaches to teaching, either because of a lack of training or a fear of departing from traditional teaching (Wieman, 2008). Research also indicates that teachers' teaching choices, such as assessment and classroom management, have a substantial impact on students' attitudes toward science and their future interest in scientific disciplines (Dass & Yager, 2009).

- **Challenges in Developing Countries**

In developing nations, the challenges of teaching are further exacerbated by factors such as the rural school context, socio-economic factors, and a lack of administrative support. Research studies undertaken in African and Asian countries have found that teachers in rural schools are faced with low student motivation, indiscipline, and a lack of parental involvement in education (Baloch, Chachar, & Gopang, 2024); Adu-Gyamfi, 2013). These issues have also been observed in Pakistan, where teachers in government schools are faced with infrastructural deficiencies, high student enrollment, and poor staff development programs (Ullah, Nawaz, Khoso, & Ghunio, 2023; Shami, 2008). These issues make it difficult to implement activity-based and student-centric teaching approaches, which are updated in the national curriculum (Iqbal, 2017).

- **Importance of Early Science Education**

Early exposure to science concepts, skills, and experiences has been identified as a crucial factor in developing scientific literacy and a positive attitude towards science (Osborne & Collins, 2001; Donnelly & Jenkins, 2001). At the elementary level, the teacher's ability to provide early exposure to hands-on experiences, inquiry, and contextualization of scientific knowledge has a direct effect on student engagement and learning outcomes (Wallace & Loudon, 2002). Thus, an understanding of the pedagogical contests faced by science teachers is imperative in unearthing teaching practices and enhancing the quality of elementary science education. In consequence, the existing literature emphasizes a number of pedagogical, contextual, and institutional factors that affect the effective teaching of science in elementary schools. The existing literature emphasizes the need for teacher training, resource availability, and student-centric approaches in addressing these factors. However, there is a lack of research studies specifically focusing on government elementary schools in rural Pakistan, specifically the District of Sanghar. This is why the current study proposes to examine the pedagogical factors that science teachers face and make recommendations to improve science education in this development.

STATEMENT OF THE PROBLEM

Science education in elementary schools is a important aspect that assistances in developing students' basic knowledge, inquiry skills, and scientific thinking. In government schools of District Sanghar, science teachers face various pedagogical problems like lack of resources, absence of laboratory facilities, class congestion, lack of training, and examination-oriented teaching. These problems impact the effective teaching of General Science and, consequently, students' performance. Although it is a significant aspect, there is a lack of research on the specific problems faced by elementary science teachers in this context.

OBJECTIVES

The primary objective of this research is to identify the pedagogical problems faced by science teachers while teaching General Science in elementary schools in government schools of District Sanghar. To achieve the primary objective, the following specific objectives were formulated:

1. To examine the challenges faced by science teachers in utilizing instructional resources and addressing environmental concepts while teaching General Science at the elementary level.
2. To explore the pedagogical practices adopted by science teachers and the methodological challenges they encounter in teaching General Science at the elementary level.

SIGNIFICANCE OF THE STUDY

The research is important for teachers, administrators, and curriculum developers. The research will help in understanding the issues in science teaching and will provide recommendations to overcome these issues. The research will help in designing professional development programs and will assist in improving the quality of science education in government schools. Moreover, the research will help in improving the existing knowledge base about the issues in science teaching in a rural setting of Pakistan.

RATIONALE OF THE STUDY

Science education at the elementary level provides a foundation for lifelong learning and scientific literacy. In District Sanghar, there are contextual issues that hinder the implementation of student-centered and inquiry-based science teaching.

RESEARCH DESIGN

The research used a descriptive survey design to analyze the pedagogical challenges faced by science teachers in teaching General Science at the elementary level in government schools of District Sanghar. The descriptive study aims to describe the existing conditions and practices as they occur naturally (John W. Creswell, 2009).

The research used a mixed-methods design to provide an insight into the challenges faced by teachers. The research used quantitative data collected from structured questionnaires and qualitative data collected from interviews with head teachers.

The research is non-experimental in nature, mainly focusing on pedagogical challenges faced by science teachers. Furthermore, some demographic variables such as age and gender were analyzed using inferential statistics to determine their relationship with challenges. The study was conducted in District Sanghar, and the target population included science teachers, students, and head teachers from government elementary and secondary schools.

DATA ANALYSIS

Table 1. Mean scores of Teaching Methods Variable

Item No.	Teaching Materials	N	Mean
1.	Teaching aids are not easily available to the science teachers.	318	3.00
2.	Use of aids creates disturbance in the class.	318	2.80
3.	There is no mechanism to prepare teaching aids with the help of the students.	318	3.73
4.	There is no mechanism for teaching science through activity such as excursion, field trip etc.	318	3.33
5.	The authorities do not appreciate use of teaching aids by the teacher.	318	3.08
6.	Charts are not available to science teachers.	317	3.12
7.	Working models are not available to science teachers.	318	3.27
8.	Projected aids are not available to science teachers.	318	3.63

This table detailed the mean ratings of different aspects concerning teaching materials by the responses of the 318 participants. The summary of the finding includes:
Availability of Teaching Aids: The mean of availability of teaching aids to science teacher is 3.00, suggesting a moderate level of dissatisfaction with the accessibility of teaching and learning resources. 2. Disturbance Caused by Use of Aids: The mean disturb in the cause of the use of teaching aid in the class is 2.80, showing the mean that may indicates the dissatisfaction or the level or efficiency of teaching aid to be used or managed accordingly during teaching and learning. 3. Preparation of Teaching Aids: Mean of no preparation mechanism to be prepared by students is 3.73 with a relatively high mean, indicating the significant limit of students' involvement to teaching aid preparation. The mean model the absence of teaching science through activities 3.33, shows the limit being given to the students through practice and "feeling". 4. Appreciation of Teaching Aid Usage: The mean of lack of aid teaching aids by the authority is 3.08, suggesting the use of teaching aid being utilized but not being utilized seriously. 5. Availability of Charts: The mean charts availability to science teacher is 3.12 by suggesting a moderate level of satisfaction of accessibility of visual aids that are used the time of teaching. 6. Availability of Working Models: The working model to science teacher; the mean 3.27 suggesting moderate satisfaction to the availability of tangible instructional aid the teachers used during the teaching and learning. 7. Availability of Projected Aids: availability of projected aid like videos to science teachers is 3.63 suggesting the moderate level of satisfaction to the digital resources available. The rankings identified the availability and the use level of pupils capability, which has a combination of satisfactory and lack of satisfaction. Focusing on area-related to teaching aid and innovation and the accessibility of adequate resources will assist improve the quality of and access to science education.

Table 2. Mean scores of classroom teaching

Item No.	Classroom Teaching	N		Mean
1	Classroom is too small to accommodate the students.	318	89	2.83
2	Furniture is old and uncomfortable that makes students uneasy and tired.	318	89	3.41
3	There is heavy teaching load on teachers.	318	89	3.02
4	Teachers deal with challenges of individual students.	318	89	3.40
5	Students do not give attention to teaching.	318	89	3.01
6	Students have not sufficient books or copies.	318	89	3.27
7	There are large class sizes.	318	89	3.67

In the table the mean ratings of several aspects related to classroom teaching are presented based on 318 responses. The following key findings can be derived from the table: 1. Classroom Size: This aspect received one of the lowest ratings among mentioned factors in the table with a mean of 2.83. Hence, the respondents were unsatisfied with classroom size to fit all students. 2. Condition of Furniture: Condition of the furniture in classes is rated on the average low level with a mean of 3.41. Discomfort and tiredness from old uncomfortable furniture can make students feel uneasy. 3. Teaching Load on Teachers: The average rating for the perceived teaching for a teacher is equal to 3.02. Respondents did not agree with the heavy workload of responsibility placement on teachers. 4. Dealing with Individual Student Challenges: this factor is rated on the average level with a mean of 3.4. Thus, about half of them have the teachers not fully supportive of their situations. 5. Student's Attention: this aspect is rated post-moderately low on average with a mean of 3.01. Hence, they often become distracted. 6. Availability of Books/Copies: The average rating for the availability of books is 3.27 and it is relatively low. Respondents believe that there is a lack of books for reading. 7. Class Size: The rated factor with the highest rating among other with a mean of 3.67 and it is a large class size. Respondents are greatly concerned about the number of students in the class for proper discussion. Overall, the ratings in the table allow for identifying several

areas of concern in the classroom teaching setting. These include classroom size, furniture, the workload for the teacher, student attention, resources, and class size. This data can be used to address and enhance these areas to improve the quality of teaching in classes.

Table 3. Mean scores of School Library variable.

Item No.	School Library	N	Mean
1	Science books are not available in the library.	318	2.61
2	The science teacher has to act as the librarian.	318	2.63
3	The students are not encouraged to come to the library for independent study. ~	318	3.25
4	The time table does not permit the teacher to guide the students during independent study in library.	318	3.25
5	Teachers who borrow science books do not return them in time.	318	2.55
6	The authority is not interested in purchasing science books.	318	4.01

The table indicates the mean ratings on various aspects about the school library based on 318 respondents. Key findings presented include; 1) The mean rating of the availability of Science Books is 2.61. Most of the respondents had dissatisfied about the accessibility of science reading materials; 2) Further, the mean rating that school teacher is being used as the school librarian was 2.63. Thus, there is an expectation mismatch among teachers who are additionally expected to act as old school librarians; 3) Coincidentally, the mean rating that students are not coerced to look for independent studying within school time was 3.25; 4) availability of overall the timetable does not allow teachers to guide students during the sighting study and availability of Science 3.25; 5) the mean rating on the available science books is satisfactory teachers who borrow science books do not return them back in time was 2.55; and 6) the mean rating support authority does not do something to purchase science books is 4.01. Relatively, the last variable has the highest mean indicating uncooperative by the authority to expand their library science resources. In summative consideration, the observed mean does not offer a suggestion but indicates the current rated literature.

Table 4. Mean scores of seventh sub-variable Evaluation

Item No.	Evaluation	N	Mean
1	The present method of evaluation does not measure the actual capacity of a learner.	318	3.52
2	There is difficulty in using the scientific methods of evaluation due to large class size.	318	3.43
3	Teachers have no interest for gaining experience in new techniques of evaluation.	318	3.39
4	Less importance is given to objective type of questions.	318	3.59
5	The authorities compel the teacher to use incorrect techniques of evaluation.	318	2.15

Table portrays the mean for the various evaluation-related aspects, including 318 respondents. In detail, the following characteristics can be observed from this consideration: the mean of the perception of the present method of evaluation is 3.52, while the mean of the difficulty of the using scientific methods of evaluation is 3.43. Simultaneously, the mean of the teachers who are not interested in gaining experience in new techniques of evaluation is 3.37, and the mean of less importance to objective type questions is 3.59. Lastly, the mean of the authorities' force teachers to use wrong technique is only 2.15. Therefore, the observed ratios decline, and after analyzing them, the alignment with the learners' capacity has the sum 3.52. Moreover, the challenge associated with the size of the class is 3.43. Teachers who are interested in additional opportunities and objective technique receive 3.39 and 3.59, respectively. Finally, the

authorities'-imposed manipulation of the system has a mean of 2.15. Generally, they frame the necessity for additional evaluation considering multiple variables.

Null Hypothesis

There is no significant difference between mean scores of male and female science teachers on issues of teaching methods.

Table 5.

		Gender	Teaching method
Gender	Pearson Correlation	1	-.209**
	Sig. (2-tailed)		.000
	N	317	317
Teaching method	Pearson Correlation	-.209**	1
	Sig. (2-tailed)	.000	
	N	317	318
**. Correlation is significant at the 0.01 level (2-tailed).			

Concerning teaching method variables, the null hypothesis, stating that there is no significant relationship between gender and teaching methods, is **rejected**. The Pearson correlation coefficient of -0.209 indicates a statistically significant, although only moderate in magnitude, negative correlation between gender and perceptions of teaching methods of the respondents at a level of significance. This means that there is a moderate tendency for teaching methods to vary according to gender, characterized by female respondents having differing perceptions of teaching methods relative to male respondents.

Null Hypothesis

There is no significant difference between mean scores of male and female science teachers on issues of classroom teaching.

Table 6.

		Gender	Classroom teaching
Gender	Pearson Correlation	1	-.128*
	Sig. (2-tailed)		.023
	N	317	317
Classroom teaching	Pearson Correlation	-.128*	1
	Sig. (2-tailed)	.023	
	N	317	318
*. Correlation is significant at the 0.05 level (2-tailed).			

The findings of the correlation analysis of gender and the classroom teaching variables show that the null hypothesis, stating that there is no significant relationship between gender and classroom teaching, is **rejected**. The Pearson correlation coefficient of -0.128 reveals a statistically significant, although weak, negative correlation between gender and classroom teaching perceptions of the respondents at a level of significance of 0.05 . This indicates that respondents' perceptions of classroom teaching have a very weak tendency to vary according to gender. It is important, however, that the magnitude of the correlation is small, which means that gender explains only a small amount of the variance in respondents' perceptions of classroom teaching.

Challenges Encountered by Science Teachers as Reported by Head teachers

Data obtained through interviews with head teachers revealed several pedagogical challenges faced by science teachers in delivering effective instruction. Despite these difficulties, teachers continue to demonstrate commitment and adaptability in supporting students' learning.

The findings identified key challenges, including professional isolation, lack of laboratory materials, student disinterest in science, difficulty in addressing diverse learner needs, limited proficiency in using

modern equipment, challenges in adapting to the revised curriculum, and inadequate administrative support.

The head teachers clarified that science teachers usually work alone, especially if they are the only subject experts in schools. This makes it difficult for them to work together with other professionals, leading to a high workload in terms of planning and preparing teaching materials. In addition, the absence of adequate laboratory facilities makes it difficult for the teachers to perform experiments, hence limiting practical learning experiences that are essential in understanding science concepts.

Another major challenge was the disengagement of students, which made the teachers work extra hard to motivate students and make learning easy. The teachers also find it difficult to deal with the different learning needs, especially in light of the high student population and lack of training.

In addition, the head teachers highlighted the challenges of dealing with the new curriculum, especially when teachers are accustomed to traditional teaching approaches. The lack of familiarity with new subject matter and modern laboratory equipment also makes it difficult for teachers to teach effectively.

Another challenge that was repeatedly cited was the lack of support from the administration, especially in terms of resource provision and training. This has adverse effects on teaching quality and the implementation of new teaching approaches. In general, the results emphasize the importance of institutional support in improving science teaching. Overcoming resource limitations, improving teacher education, and encouraging collaborative and technology-enhanced approaches to teaching may have a profoundly positive impact on science education.

RESULTS AND DISCUSSION

The qualitative information gathered from semi-structured interviews with head teachers indicated a number of interrelated teaching issues in science classes when teaching General Science at the elementary level. Thematic analysis of the information gathered from the interviews identified seven key areas of concern: professional isolation, laboratory resource issues, lack of student interest, issues with catering to diverse learning needs, lack of expertise in the use of modern equipment, issues with adjusting to the new curriculum, and lack of administrative support. The head teachers indicated that science teachers in many cases work in conditions of professional isolation, especially in schools where they are the only subject specialists. One of the important issues raised was the lack of laboratory materials and equipment, which greatly limits the capacity of teachers to engage in practical work. Consequently, science education in schools becomes theoretical rather than practical, which is a setback in the development of conceptual knowledge and skills among learners.

Lack of student engagement in science education was also identified as a critical issue. The head teachers noted that students often view science as a subject that is abstract and difficult to understand, which requires teachers to invest extra time in motivating learners. This is a challenge that is associated with teacher-centered approaches to instruction and a lack of opportunities for practical learning.

Teachers also experience challenges in meeting the academic needs of learners, especially in classes that are overcrowded. The adoption of new curricula has also exacerbated these challenges, as most teachers lack the necessary training to adopt student-centered and inquiry-based approaches to instruction. A lack of familiarity with contemporary laboratory equipment and new content also limits the effectiveness of instruction. In addition, a lack of administrative support, particularly in terms of resource allocation and professional development, was also found to be a major constraint to effective science teaching. Lack of administrative support limits the capacity of teachers to apply innovative approaches and implement curriculum change effectively.

However, despite the challenges, the head teachers reported that teachers have applied adaptive approaches like collaborative learning, do-it-yourself experimental equipment, and the use of information technology to improve student engagement. While the efforts by teachers are a clear indication of their resilience and commitment, the approaches are not sufficient to bring about improvement.

The results obtained from the study clearly indicate that the pedagogical issues in the elementary science education are complex in nature and involve a number of instructional, institutional, and contextual factors.

CONCLUSION

The present study examined the pedagogical issues faced by science teachers in teaching General Science to elementary-level students, as perceived by the headteachers. The findings of the study reveal that the science teachers are faced with a number of issues, including isolation, poor laboratory facilities, disengagement of students, difficulty in meeting the diverse needs of the students, lack of knowledge about modern equipment, difficulty in coping with changes in the curriculum, and lack of administrative support. These issues, taken together, impede the effective delivery of activity-based and inquiry-based science education, leading to a prevalence of theoretical approaches to science teaching. The lack of infrastructural and administrative support also affects the ability of the teachers to design engaging and useful learning experiences for the students.

However, the teachers are able to demonstrate some level of resilience by using adaptive strategies for learning, such as collaborative learning, make-do strategies for teaching, and information technology. The conclusion that can be drawn from this study is that in order to improve the quality of elementary science education, what is required is systemic interventions in terms of resource allocation and administrative support. It is imperative to overcome these challenges to ensure effective science learning and further improvement in educational outcomes in government schools.

Recommendations on the Basis of Research Findings

On the basis of the findings of the study, which showed that poverty, parental attitudes, distance to schools, early marriages, home chores, and the absence of gender-sensitive infrastructure in schools are some of the major factors that contribute to female dropout, the following recommendations are made:

- **Financial Incentives:** Since poverty was identified as one of the major factors that contribute to female dropout, financial incentives in the form of stipends, free textbooks, and uniforms should be provided to girls from poor families to encourage them to continue their education.
- **Community Awareness and Parental Involvement:** Since parental attitudes and socio-cultural factors are found to play an important role in influencing girls' education, awareness programs should be conducted to create a sense of urgency regarding the need for girls to complete secondary education and prevent early school dropout.
- **Improvement of School Accessibility:** Since the result showed that distance and safety concerns are factors that influence girls' school attendance, it is important to establish more secondary schools in rural areas or provide safe transport facilities.
- **Solution to Early Marriage Practices: Because** there is a significant relationship between early marriage and school dropout, an initiative by the education department and the local authority is necessary to persuade girls to marry early and pursue their education.
- **Gender-Sensitive School Infrastructure: Because** the absence of sanitation and privacy is a retention factor, girls need separate functional toilets and a safe environment in secondary schools.
- **Support for Girls with Domestic Responsibilities:** Afternoon classes or bridge courses should be provided to girls who are under pressure due to household responsibilities.
- **Recruitment of Female Teachers:** Hiring more female teachers can help create a positive environment and enhance parents' confidence in sending girls to secondary schools.

REFERENCES

Anderman, E. M., Sinatra, G. M., & Gray, D. (2012). Educational psychology: *A century of contributions*. Routledge.

Baloch, N. U., Chachar, Z. A., & Gopang, A. S. (2024). The Influence of Educated Mothers on the Reading Proficiency of Their Children in Government Primary Schools in District Kech, Balochistan. *Sukkur IBA Journal of Educational Sciences and Technologies, 4*(2), 14-25.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). SAGE Publications.

Donnelly, J., & Jenkins, E. (2001). Science education in schools: Issues, perspectives and practices. RoutledgeFalmer.

Dass, P., & Yager, R. E. (2009). Developing scientific literacy in the classroom. *Journal of Research in Science Teaching, 46*(4), 365–380. https://doi.org/10.1002/tea.20300

Donnelly, J., & Jenkins, E. (2001). *Teaching and learning science*. Routledge Falmer.

Government of Pakistan. (2017). National education policy 2017. Ministry of Federal Education and Professional Training, Government of Pakistan.

Handelsman, J., Ebert-May, D., Beichner, R., Bruns, P., Chang, A., DeHaan, R., Gentile, J., Lauffer, S., Stewart, J., Tilghman, S., & Wood, W. B. (2004). *Scientific teaching. Science, 304*(5670), 521–522. https://doi.org/10.1126/science.1096022

Iqbal, M. (2017). Importance of science education for national development. *Pakistan Journal of Educational Research, 20*(2), 45–57.

Osborne, J., & Collins, S. (2001). Pupils' views of the role and value of science. *International Journal of Science Education, 23*(5), 441–467. https://doi.org/10.1080/09500690116919

Osborne, J., & Collins, S. (2001). Pupils' views of the nature of science. *International Journal of Science Education, 23*(9), 941–967. https://doi.org/10.1080/09500690110048627

Shami, P. (2008). Science education reforms in Pakistan: Challenges and opportunities. *Asia-Pacific Journal of Education, 28*(3), 325–336. https://doi.org/10.1080/02188790802300587

Ullah, N., Das, A., Khoso, F. J., & Nawaz, K. (2024). Identification the Educational Challenges in Secondary Schools of Balochistan, Pakistan: A Comprehensive, *Pakistan Journal of Social Sciences, 44*(1), 155-163. DOI: 10.5281/zenodo.10935960

Ullah, N., & Almani, A. S. (2022). Factors Affecting Students' Academic Performance: A Case Study of Secondary Schools of Makran Division Balochistan, Pakistan. *Webology, 19*(2), 2749

Ullah, N., Nawaz, K., Khoso, F. J., & Ghunio, A. (2023). Evaluating the Influence of School Leadership on Cultivating a Positive Educational Environment in Secondary Education in Balochistan, Pakistan. *Journal of Arts & Social Sciences, 10*(1), 219-227.

UNESCO. (2017). Science report: Towards 2030. United Nations Educational, Scientific and Cultural Organization

Wallace, J., & Loudon, G. (2002). Practical work in science: Bridging the gap between classroom and real science. *School Science Review, 83*(303), 69–75.