



DIROSAT

Journal of Education, Social Sciences & Humanities

Journal website: <https://dirosat.com/>

ISSN : 2985-5497 (Online)

DOI: <https://doi.org/10.58355/dirosat.v3i2.143>

Vol. 3 No. 2 (2025)

pp. 189-203

Research Article

Key Factors Affecting Chemistry Performance Among High School Students in Kandahar City

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Received : January 15, 2025

Accepted : March 19, 2025

Revised : February 16, 2025

Available online : April 18, 2025

How to Cite: Sarfaraz, M. Y. (2025). Key Factors Affecting Chemistry Performance Among High School Students in Kandahar City. *DIROSAT: Journal of Education, Social Sciences & Humanities*, 3(2), 189–203. <https://doi.org/10.58355/dirosat.v3i2.143>

Abstract. This study aims to investigate the factors that impact students' interest and performance in chemistry in Kandahar City. Utilizing a written questionnaire delivered to high school students through random simple sampling, this study examines various factors, including school resources, the school environment, teacher- and student-related issues, curriculum and study materials, and the lack of practical resources such as chemical labs. The data demonstrate that most students were uninterested in chemistry owing to insufficient effort, incompetent teachers, difficulty in grasping complicated topics, and poor parental support. These difficulties are exacerbated by a lack of active engagement in class, a lack of a strong study culture, and financial constraints of many families. Furthermore, the lack of appropriate chemical laboratories exacerbates these issues. The study emphasizes the critical need for engaging in teaching techniques, enhanced learning settings, better resources, and support systems to increase students' interest, engagement, and comprehension of chemistry.

Keywords: Chemistry, High school, Students, Teachers, Laboratory

INTRODUCTION

Kandahar, located in southern Afghanistan, is the second largest city in the country after Kabul, with a population of approximately 614,118 (Farooqi & Ono, 2024). The city is home to a significant number of both private and public high schools, providing educational opportunities for its residents.

High school courses typically include Islamic Studies; mathematics; sciences such as chemistry, biology, and physics; humanities subjects such as geography and history; language studies such as Pashto, Dari, and English; and specialized fields such as computers (Mubashir, 2023). These courses are intended to provide students with a thorough and balanced education. Chemistry is regarded as an integral component of Afghanistan's secondary and higher education curricula, with high school students and those seeking undergraduate degrees in scientific subjects being required to take the subject.

Chemistry is essential in many fields and businesses, acting as the foundation for understanding the composition, characteristics, and behavior of matter. This knowledge is essential in fields such as medicine and pharmacy for drug development and understanding biochemical processes (Farwell, 1999), engineering and technology for materials science and technological advancements (Rao & Cheetam, 2001), environmental science for studying pollution and climate change (Ali & Khan, 2017), industry and manufacturing for efficient production processes (Cybulski et al., 2001), and agriculture for improving crop yields and sustainability.

As is well known, chemistry is an important topic of study that not only offers several professional opportunities, but also provides students with significant information and skills for everyday life. As a result, chemistry is widely taught in schools and higher education. Several unfavorable aspects influence students' capacity to learn chemical abilities. Student interest, gender, socioeconomic status, health and nutrition levels, teacher expertise, school-entering age, and student attitudes have an impact on students' chemistry learning and performance (Sibomana et al., 2021). It was found that students in Kandahar City are disinterested in chemistry disciplines and courses.

When we asked students about chemistry and related professions, they showed little interest. Furthermore, a large component of the National Entrance Exam (Kankor) is dedicated to scientific disciplines such as chemistry. However, many applicants fail to emphasize their chemistry. Instead, students frequently begin other portions of the exam or select solutions to multiple-choice problems in chemistry, based on estimation and conjecture. This shows that many students lack the necessary abilities and knowledge to address chemical problems adequately. The purpose of this study was to examine the root reasons for students' poor chemistry abilities and understanding.

As a result, this study aimed to investigate the underlying causes of students' inadequate chemical skills. Because chemical principles are interrelated and form a chain with one segment connecting to the next, the foundation is very important. If students are not given adequate hard and soft skills in high school, they will struggle

with university studies. One key reason is that chemistry is taught in many disciplines, including science, medicine, engineering, and agriculture. Students who lack a thorough understanding of chemical concepts struggle to excel in these disciplines.

Additionally, high schools were chosen as the focus of this research because they represent an important stage for students to migrate to bachelor's degrees in chemistry-related fields. This study examines a number of factors that influence students' interest and performance, including access to study resources; teacher-related factors such as qualifications and teaching methods; the learning environment; practical work opportunities; curriculum and study materials; extracurricular resources; and student-related factors such as motivation, participation, and effort. Furthermore, the study considers the influence of students' families' low socioeconomic status, which limits access to educational help, as well as a lack of desire, which further impedes academic success.

OBJECTIVE

The main objective of this research was to identify the primary causes and factors affecting students' interest and performance in chemistry.

LITERATURE REVIEW

Several factors affect students' academic achievement in chemistry, including school environment, instructional techniques, student characteristics, and socioeconomic determinants (Hassan et al., 2017). According to research, the availability of resources, class size, and teaching quality are only a few of the numerous elements that influence high school students' academic achievement in disciplines, such as chemistry. For example, schools with better-equipped laboratories and skilled teachers have better student results (Mulela & Faust, 2015).

Taking care of such delicate issues as socioeconomic variables that provide important grounds for academic accomplishment is much more effective. Gorard and See (2009) discovered that socioeconomic status strongly influences students' engagement and success in scientific education. Students from less fortunate families face several challenges, such as low resources, poor support networks, and fewer opportunities to participate in science activities. As a result, socioeconomic disparities lead to poor performance and unequal access to quality science education. Ratelle et al. (2005) also found a relationship between parental engagement and children's science perseverance. Their findings revealed that children's views on parental support and engagement are strong determinants of scientific education persistence. Higher perceived parental encouragement was linked to greater enthusiasm and commitment to pursue further training in science-related disciplines.

Sarfaraz et al. (2023) discussed the challenges that restrict the success of chemistry teaching in rural areas of Afghanistan. The survey also revealed resource limitations, poor infrastructure, and the need for context-specific pedagogies. These findings are especially noteworthy in Kandahar City, Afghanistan, where comparable socioeconomic circumstances exist, as they provide insight into the greater educational issues of chemistry performance.

A study conducted by Sibomana et al. identified several factors that influence

students' academic performance in chemistry, including the complexity and abstract nature of the content, which frequently leads to misconceptions and the availability of resources, such as laboratory facilities and conducive school environments. This study also underlined the role of teacher qualifications, creative teaching strategies, student motivation, parental socioeconomic status, and leadership styles in shaping academic achievement, with smaller class sizes offering more individual attention (Sibomana et al., 2021).

Chemistry anxiety has been identified as a significant factor that affects students' performance in chemistry courses across a wide range of educational settings. Widanski and McCarthy (2009) stated that admitting the presence of chemical anxiety is a crucial first step toward improving negative attitudes about chemistry. Understanding these anxiety levels enables educators to create strategies to increase student enrollment, achievement, and retention in chemistry classes.

Furthermore, Dood and Watts (2022) studied students' strategies, challenges, and successes in problem solving in organic chemistry. Their research revealed that students frequently struggled to understand response mechanisms. Several strategies, such as step-by-step breakdowns, visual aids, and collaborative problem solving, have been identified to improve their learning. These findings indicate the need for specialized teaching techniques to solve organic chemistry issues and improve overall performance.

METHODOLOGY

This descriptive study was conducted in ten public high schools in Kandahar City. This study focused on high school classes in Afghanistan, which ranged from 10th to 12th grade. The study population included only high school students, and data were obtained via a written questionnaire using simple random selection. Four hundred students were chosen for data collection from various high schools that had received attention from the Ministry of Education. Data were analyzed using IBM SPSS 24th version and frequencies and percentages were calculated.

RESULTS

Chemistry resources are easily available to enhance students' understanding of concepts, experimentation, and developing practical skills. The application of concepts learned in chemistry may be difficult for students when adequate resources are not available to illustrate key principles in their minds. Such concepts become important at a higher level of study and when applying chemistry to real-life situations, such as medicine, industry, and environmental studies.

Table 1.1: Access to Resources

S/N	Items	Answers	
		Yes N (%)	No N(%)
1	Do you have chemistry textbooks?	372 (93%)	28 (7%)
2	Were you provided textbooks at the beginning of the academic year?	320(80%)	80 (20%)

3	Does your school have a well-equipped library, and do you have access to it?	344 (86%)	56 (14%)
4	Do you benefit from the school library?	240 (60%)	160 (40%)

Table 1.1 shows the availability of resources in the educational institutions. To begin with, about 93% of the students possess chemistry textbooks, thus proving resource availability, but 7% do not. This means that only a few students faced difficulties while procuring them. Of these, 80% were provided to students when the term began. Without doubt, this emanates from institutional willingness to supply students with books as learning materials, but maybe, late or completely lacking a textbook, which may affect the way they learn by at least 20%. Another aspect is the 86% benefit from a well-equipped library at school, while 14% do not have access to it—a potential area for improvement, because a library is important to individual students for independent learning.

Finally, 60% of students use the library for study, which probably stands as a good measure of utilization of that resource; however, the remaining 40% may fail to benefit from it, possibly due to time constraints, insufficiency of materials, lack of support, or studying culture among students. Overall, the results demonstrate an amazing academic environment, but there is still much potential for improvement to guarantee that all students benefit from the use of textbooks and libraries, which are critical to student success in their studies.

As shown in Table 1.2, factors concerning teachers have a significant effect on the learning outcomes of students concerning chemistry. Most students (88%) affirmed that they were taught by professional teachers, which was important for making the learning process structured and effective. Furthermore, around 77.5% of the respondents believed that their teacher was enthusiastic and passionate about teaching, which contributed to their interest in the subject. Another positive sign is that 73.75% of the students say that unusual chemical ideas are made simple to comprehend, demonstrating the teacher's ability to bring comprehension to difficult topics. Furthermore, 67.5% of students reported that their teachers always assigned homework and provided feedback, reinforcing their comprehension and promoting the establishment of persistent learning habits.

Table 1.2: Teacher related factors

S/N	Items	Answers	
		Yes N (%)	No N(%)
1	Is chemistry taught to you by a professional teacher?	352 (88%)	48 (12%)
2	Does your teacher exhibit enthusiasm and passion for teaching chemistry?	310 (77.5%)	90 (22.5%)
3	Are complex chemical concepts explained in an easy-to-understand manner?	295 (73.75%)	105(26.25%)

4	Does your teacher assign regular homework and provide constructive feedback?	270 (67.5%)	130 (32.5%)
5	Does your teacher use creative teaching methods such as experiments, real-world examples, or multimedia tools to explain chemistry concepts?	194 (48.5%)	206 (51.5%)
6	Are you encouraged to ask questions or seek clarification when you do not understand the topic?	265 (66.25%)	135 (33.75%)
7	Does your teacher relate chemistry topics to everyday life to make the subject more engaged?	290 (72.5%)	110 (27.5%)

However, other indicators show that there is a need for improvement. 48.5% only feel that their teachers engaged them with creative teaching techniques, such as experiments, real-life examples, or using multimedia to teach chemistry concepts. Of the students, 66.25% said they were encouraged to ask questions for clarification, whereas a remarkable number were excluded from this environment. The same is true for 72.5% of students claiming that their teachers relate chemistry topics to daily life; this strategy is said to elicit more interest, bearing in mind that a large percentage still lacks this association. Actions in this regard could greatly improve the overall experience of learning for a better understanding of chemistry.

Table 1.3 shows that 88.75% of students chose classrooms as learning settings. For example, they emphasized that these classrooms are quiet, well-lit, and distraction-free. Such environment improve the concentration and eliminate possible hurdles when studying more complicated chemical topics. Furthermore, 70.5% of students stated that they had enough equipment in their classes, such as whiteboards, projectors, and chemical models, to help them see and interact with scientific subjects more meaningfully. However, almost 30% of students do not have such resources, indicating that there is still much to be done to improve the infrastructure to offer quality education to all students.

Table 1.3: Classroom Environment

S/N	Items	Answers	
		Yes N (%)	No N (%)
1	Is your classroom conducive to learning (e.g., quiet, well-lit, and distraction-free)?	355 (88.75%)	45 (11.25%)
2	Are there sufficient resources available in the classroom, such as whiteboards, projectors, and chemistry models, to aid learning?	282 (70.5%)	118 (29.5%)
3	Do you feel comfortable participating in classroom discussions or asking questions	275 (68.75%)	125 (31.25%)

	on chemistry?		
4	Are group activities or collaborative projects encouraged in your chemistry classes?	220 (55%)	180 (45%)

Student engagement and collaboration are other aspects of the classroom environment. While 68.75% of students feel comfortable participating in discussion or asking questions, the remaining 31.25% have challenges that inhibit their having active involvement in the said learning process. Similar to this, only 55% of all students have said that group activities or some collaborative projects are not encouraged in their chemistry class, meaning a significant number are left without the opportunity of developing teamwork and problem-solving skills. Providing those spaces will definitely open up the classroom environment to more inclusivity and dynamism, consequently enhancing the students' learning experience and interest in chemistry.

Table 1.4: Laboratory Work and Practical Knowledge

S/N	Items	Answers	
		Yes N (%)	No N(%)
1	Are chemistry experiments regularly conducted in the laboratory as part of your curriculum?	180 (45%)	220 (55%)
2	Do you feel confident performing experiments in the laboratory?	154 (38.5%)	246 (61.5%)
3	Are you provided with clear instructions and guidance during laboratory sessions?	273 (68.25%)	127 (31.75%)
4	Are the experiments relevant to your curriculum and helpful in understanding theoretical concepts?	292 (73%)	108 (27%)
5	Have you been informed about potential risks and safety precautions in the laboratory?	344 (86%)	56(14%)
6	Do you have opportunities to design or conduct your own experiments to explore chemistry concepts?	116 (29%)	284 (71%)

Experiments and laboratory internships are well-known for their importance in mastering chemical ideas. It bridges the gap between theory and practice by providing students with real-world experience. However, the survey results indicated areas of concern. While 45% of students believed that most chemistry experiments were conducted in the lab, a considerable proportion (55%) disagreed, indicating a potential practical exposure gap. In addition, only 38.5% of students felt competent in performing experiments, which raises the need for further skill aid. However, 68.25% of those who completed it indicated that laboratory sessions were well-instructed, affirming that mentorship could occupy an important place in this regard for desirable learning outcomes.

In fact, 73% of students acknowledged the importance of laboratory experiments in the curriculum framework as well as the reinforcement of theoretical features related to the teaching of critical academic growth. Safety is a priority; 86% of students were taught about potential dangers and safety practices, resulting in safe learning. However, only 29% of the students were given the opportunity to develop or conduct their own examinations; they were unable to show their creativity in chemistry or learn problem-solving abilities. Setting these challenges and scheduling frequent laboratory practice, confidence-building activities, and opportunities for individual inquiry can significantly improve the efficacy of practical instruction in chemistry education.

Table 1.5 shows that most respondents were satisfied with the organization and clarity of the chemistry program. The survey questions received good responses of 80% and 73% for overall satisfaction and syllabus organization, respectively. However, further research is required. Many students find the syllabus simple, although this depends on the contribution of skilled teachers and effective teaching methods. The goal of well-trained educators is to deliver reduced information in such a way that students understand applications drawn from practical situations, emphasizing the importance of pedagogy in augmenting the curriculum.

Table 1.5: Curriculum and Study Materials

S/N	Items	Answers	
		Yes N (%)	No N(%)
1	Are you satisfied with your current chemistry curriculum?	320 (80%)	80 (20%)
2	Is the chemistry syllabus clear, well structured, and easy to follow?	292 (73%)	108 (27%)
3	Do you feel that the chemistry curriculum aligns with your career goals and aspirations?	276 (68%)	124 (32%)
4	Are textbooks and study materials accurate, up-to-date, and easy to understand?	344 (86%)	56 (14%)
5	Are there sufficient examples and exercises in the study materials to help reinforce your understanding of chemistry?	288 (72%)	112 (28%)

However, the study materials are mostly up-to-date and accessible; they are not without flaws. Of all the respondents, 86% indicated that they found the textbooks completely accurate and understandable, leaving behind qualms in some areas with presumed overlooked errors and omission of major topics necessary for logical coherence. On the other hand, whereas 72% of students felt there were plenty of examples and exercises to go through, others felt that this was not enough. Continuous revision of study materials can then close these gaps, make their relevance to career

goals sharper (supported by a 68% agreement), and provide the entire range of learning experiences suited to particular student needs.

Table 1.6: Student-Related Factors

S/N	Items	Answers	
		Yes N (%)	No N(%)
1	Do you regularly attend chemistry classes?	352 (88%)	48(12%)
2	Is the class duration (30–35 minutes) sufficient to cover important chemistry topics?	304 (76%)	96 (24%)
3	Do you think a weekly allocation of three hours for chemistry is sufficient for in-depth learning?	264 (66%)	136 (34%)
4	Do you use additional resources such as videos, online tutorials, or supplementary books to enhance your understanding of chemistry?	72 (18%)	328 (82%)
5	Do you actively participate in classroom discussions, assignments, or group activities?	144 (36%)	256 (64%)

Regular attendance in chemistry lessons is commendable, with 88% of the students continuously attending. However, the restricted period of each academic hour (30-35 minutes) creates considerable obstacles. While 76% of respondents find this time sufficient, it often forces teachers to rush through topics, leaving little room for in-depth explanations or active engagement. This limitation undermines opportunities for students to participate effectively in classroom discussions, assignments, and group activities as lessons are interconnected like chains, requiring a solid understanding of previous topics for meaningful engagement.

Despite the extensive content of chemistry textbooks, 34% of students say that three hours per week is insufficient, and advocate increasing it to four or five hours to enable deeper learning and greater knowledge of the field. Furthermore, 18% of students say they use alternative resources, such as videos and online tutorials, because they lack a decent connection, money, and appropriate materials in their native languages (Pashto and Dari). Weak English proficiency contributes to these problems. They would significantly improve students' comprehension and academic achievement in chemistry if most opportunities were offered based on language understanding parallels.

As previously mentioned, understanding the internal and external elements impacting chemistry learning among students in Afghanistan may be investigated through socioeconomic, familial, and environmental contexts. According to Table 1.7, almost 89% of the students do not have family members to supervise their learning about chemistry, showing that academic support is limited inside the household. As many as 87% of the students reported that the prevalence of bad economic situations or poverty hampered their ability to focus fully on studying in school. Due to

widespread poverty, many students in Afghanistan are sometimes obliged to work to help families gain sustenance, thus leaving insufficient time or ability to study. Surprisingly, about 68% of the students believed that chemistry holds everyday significance, especially in applications in industry, natural resource extraction, medicine, and so forth. This motivates their learning despite hardships.

Table 1.7: Personal and External Factors

S/N	Items	Answers	
		Yes N (%)	No N(%)
1	Is there anyone in your family who can help you to understand your chemistry?	44 (11%)	356 (89%)
2	Has financial hardship or weak economic conditions affected your ability to study chemistry?	348 (87%)	52 (13%)
3	Do you recognize the importance of chemistry and its applications in everyday life?	272 (68%)	128 (32%)
4	Does your health and nutrition level influence your focus and ability to learn chemistry?	216 (54%)	184 (46%)
5	Is your home environment supportive of your studies, providing a quiet space, and sufficient time for learning chemistry?	104 (26%)	296 (74%)
6	Do external responsibilities (e.g., household work and part-time jobs) interfere with your study time?	372 (93%)	28 (7%)

Besides these internal factors, there are external factors, including health, home environment, and responsibilities, which have made students unable to study chemistry. As many as 54% of the respondents believed that poor health and nutrition were markers of less focus and learning ability. Therefore, better nutrition would lead to an understanding of complex topics. Moreover, as many as 74% of the students felt that their home environment was not conducive to learning because there were no quiet spaces and enough time. At the same time, external responsibilities such as household chores or part-time jobs were identified as barriers by 93% of students since they are obligations that essentially minimize time for academics. This indicates that personal as well as external factors need to be considered in order to improve chemistry education in Afghanistan, clearly targeting students on financial, nutritional, and educational support.

However, Afghan students' motivation and future goals in chemistry education face significant hurdles with glimmers of hope. The motivation to pursue higher education or careers in chemistry-related fields, such as medicine, engineering, and environmental studies, is only 12%. This shows that a very small number of students pursue dreams, such as health, medicine, stomatology, and pharmacy, which are

popular fields because of their good prospects for employment. The lack of interest can be attributed to low levels of chemistry knowledge and a lack of basic foundations for people, demonstrating that the subject is impossible. Most importantly, only 10.75% recognized the important role that chemistry would play in achieving future goals, while most could not relate the subject with future success through the problematic and lack of basic comprehension attached to the subject.

Table 1.8: Motivation and Future Goals

S/N	Items	Answers	
		Yes N (%)	No N(%)
1	Are you motivated to pursue higher education or a career in chemistry-related fields?	48 (12 %)	352 (88%)
2	Do you see chemistry as a subject essential for achieving long-term goals?	43 (10.75%)	357 (89.25%)
3	Have you set specific goals for what you want to achieve by studying chemistry?	56 (14%)	344 (86%)
4	Do you find inspiration from successful chemists or professionals in science-related fields?	112 (28%)	288 (72%)

Establishing explicit targets and motivation are additional factors that construct the attitudes of students toward chemistry. Only 14% of the students have reported having set goals regarding what they will achieve by learning chemistry, like 'Kankor' preparation and going to chemistry-related faculties despite having poorly known it. The percentages are slightly higher for being inspired by peers, teachers, or achievers in chemistry disciplines, with around 28% receiving that motivation through involvement. Unfortunately, external reasons and a general dearth of interaction with some inspirational figures behind such impediments usually deter many of these students from venturing outside into the world of chemistry. This leaves a huge gap in that these studies now highlight the importance of an amalgamation of academic support, mentoring, and goal setting in making students active and maximizing their prospects in chemistry.

DISCUSSION

Mulela and a co-researcher (2015) highlighted that the availability of resources and the quality of teaching are fundamental factors influencing high school students' performance in chemistry. Sufficient resources such as well-equipped laboratories and up-to-date textbooks significantly enhance students' comprehension and engagement. Conversely, a lack of resources hampers learning and limits students' abilities to grasp complex concepts. In addition, smaller class sizes and skilled teachers who employ effective teaching methods foster better understanding and motivation among students. However, large class sizes and poor teaching practices create challenges that negatively affect students' academic success. These findings underscore the critical role of resources and teaching quality in achieving an effective

chemistry education.

Building on this, Gorard and See (2009) examined the impact of socioeconomic status (SES) on students' engagement and success in science education. Their findings revealed that students from higher SES backgrounds benefit from access to better resources, including textbooks, private tutoring, extracurricular programs, and supportive home environments that promote academic achievement. In contrast, students from lower SES backgrounds face barriers, such as limited resources, reduced parental support, and financial pressures. These challenges often lead to diminished motivation, fewer opportunities for hands-on learning, and lower confidence levels, which ultimately contribute to poor academic outcomes. Addressing these disparities is essential to bridge the gap in educational equity and ensure that all students have access to quality science education.

Widanski and McCarthy (2009) highlighted that chemical anxiety is a major factor influencing students' views on chemistry. Anxiety creates mental obstacles that impede participation and academic achievements. By recognizing the underlying reasons for this anxiety, such as negative past experiences or fear of failure, educators can employ specific strategies to reduce it. For example, creating a nurturing educational atmosphere, employing stimulating and participatory teaching strategies, and integrating practical exercises can help to alleviate anxiety. These interventions not only boost students' perceptions of chemistry, but also increase their confidence and academic success.

A connected issue is the intricacy of organic chemistry, especially concerning the reaction mechanisms. Dood and Watts (2022) discovered that learners frequently find it challenging to understand abstract ideas because of the complex characteristics of molecular interactions. To effectively tackle this, it is helpful to break problems into smaller, more manageable steps, utilize visual tools, such as molecular models and reaction diagrams, and encourage collaborative problem-solving meetings. These techniques boost students' comprehension of organic chemistry, enhance their problem-solving abilities, and result in improved overall achievement.

Teachers' factors also significantly influence students' learning results in chemistry. Sibomana et al. (2021) emphasized that knowledgeable and proficient teachers are more capable of providing engaging lessons, explaining intricate subjects, and fostering a supportive classroom atmosphere. These traits greatly improved students' comprehension and enthusiasm. Conversely, educators without adequate training or subject expertise may find it challenging to clearly convey concepts, leading to diminished student engagement and understanding. Thus, focusing on teacher training and professional development is crucial for enhancing the educational results in chemistry.

Classroom setting is another important element that impacts students' learning experiences. Hasan et al. (2017) showed that a well-organized and equipped classroom encourages attention, involvement, and teamwork among students, consequently enhancing their understanding of intricate concepts. Conversely, chaotic or poorly administered classrooms can adversely influence students' focus and involvement. Sarfaraz et al. (2023) underscored the significance of laboratory work, stressing that practical experiments bolster theoretical understanding, cultivate critical thinking,

and enhance problem-solving abilities. Without adequate hands-on experience, students might find it difficult to remember and utilize key chemistry concepts, which can hinder their academic development.

In addition to classroom elements, curriculum design and the quality of educational materials are crucial for influencing students' learning experiences. An effectively designed curriculum aligned with students' developmental levels, along with high-quality textbooks and additional resources, will facilitate enhanced comprehension and involvement. In contrast, inadequately structured programs or obsolete materials may result in confusion and a lack of engagement. Additionally, personal factors such as motivation, study practices, and previous knowledge combined with external elements such as family support, socioeconomic status, and resource availability greatly affect academic achievement. Students who are highly motivated and have well-defined future objectives tend to immerse themselves more in chemistry; however, the absence of these factors frequently leads to disinterest and decreased success. Tackling these interrelated elements is crucial to creating a supportive and efficient learning atmosphere for students.

CONCLUSION

This study examined the numerous factors that influence students' chemistry performance in Kandahar's high schools. The primary problems highlighted were teacher credentials and instructional approaches, the existence of unprofessional teachers, the complexity of the chemistry curriculum, restricted utilization of co-curricular resources, insufficient student practice time, and a lack of consistent homework review. Furthermore, the survey revealed that many students' families had little or no knowledge of chemistry, limiting their capacity to assist their children's education. These issues, together with the obstacles given by limited laboratory facilities and the budgetary limits experienced by many families, contribute to the difficulty of boosting chemistry performance among high school students in Kandahar City.

Suggestions for Chemistry Quality Education in Afghanistan

1. The following recommendations were made to achieve quality performance in chemistry education:
2. Textbooks should be distributed to all high schools at the start of the year for effective and consistent chemistry learning. Encourage students to self-study to improve their academic performance.
3. Teachers should use new technologies and pedagogical strategies to engage students and promote active involvement through conversations, questions, and cooperation. Teachers should also review students' assignments frequently to provide timely feedback and encouragement, which will help them grasp and enjoy the topic more.
4. Chemistry teachers and lab workers should perform experiments based on the syllabus and encourage student participation. This hands-on experience will help

students grasp chemical principles and improve their practical knowledge, generating stronger enthusiasm for the topic.

5. Students should foster a culture of self-study and time management by actively engaging with course content outside class. Students may improve their comprehension and information retention by revisiting courses regularly, practicing problem-solving skills, and accessing additional resources as needed.

6. To ensure equal access to chemistry materials and educational opportunities, schools and educational institutions in Afghanistan should collaborate with local communities and organizations to provide financial support. Furthermore, it is critical to promote awareness among parents and guardians about the importance of chemistry education, encouraging them to support their children's learning despite limited resources, and creating an atmosphere that values education within the family and community.

7. Teachers and school officials seek to establish clear career paths for chemistry and science. Students can better comprehend the value of chemistry in their future jobs by arranging career counseling sessions, mentorship programs, and connecting chemistry instruction with real-world applications. This will increase the involvement and dedication of attaining academic achievement on the topic.

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