



Cognitive Science and Learning Environment in Rural Areas of Punjab

Ayesha Rehman	Department of Education, Lahore College for Women University, Lahore, Punjab, Pakistan.
Saima Khan	Department of Communication and Media Studies, University of Sargodha, Sargodha, Punjab, Pakistan.
Anjum Zia	Dean, School of Media and Communication Studies, University of Management and Technology, Lahore, Punjab, Pakistan.

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Corresponding Author:

Ayesha Rehman

Email: ayesharehman12@gmail.com

Abstract: There is a difference in the learning environment between rural and urban areas. When compared with rural areas, urban areas are always found to have better facilities with regards to learning. When it comes to academic achievements and career development, science is the most preferred field of study. Especially there has been developed a mindset among the parents and students in rural areas that science is the only way to acquire a successful career in future. This study explores the cognitive sciences and learning environment in rural Punjab. For this purpose, rural areas of Punjab (Sargodha, Mianwali and Rajanpur) have been selected. The current study implies qualitative research methods, i.e., in-depth interviews. While using the purposive sampling technique, a sample size of 12 respondents (4 students, 4 parents, and 4 teachers) has been defined. Findings of the study reveal that students in rural Punjab are highly inclined to study science, but the study environment in rural Punjab is of the transmissive type. Students face challenges while studying science in a transmissive environment. Study suggests that in rural Punjab there is a need to ensure proper facilitation that can help students to study science in more teacher-student friendly environment.

Introduction

Cognitive science is the multidisciplinary, scientific study of the mind and its functions, drawing on knowledge from psychology, linguistics, philosophy, neuroscience, anthropology, computer science, and artificial intelligence. In a broader sense, it explores the characteristics, functions, and processes of cognition. Studying how the nervous system represents, processes, and transforms information is a key component of cognitive science, which also examines behavior and intellect. Perception, attention, memory, language, emotion, and reasoning are among the mental processes that cognitive scientists study. To do so, they focus on psychology, philosophy, linguistics, anthropology, neuroscience, and artificial intelligence (Willingham, 2002).

Therefore, when theoretical and experimental findings on the nature of mind are in agreement, interdisciplinary work becomes much more attractive. Using a variety of techniques, including psychological and neurological studies and computer models, is the best way to understand the complexity of human thought (Beer, 2000).

Cognitive scientists typically examine a wide range of organizational levels; from learning and decision making to reasoning and planning, from neural pathways and brain circuits to the modular organization of the brain. In cognitive science, one of the basic concepts is that “thinking can best be understood in terms of representational structures in the mind and

computational procedures that operate on those structures” (Zalta, 2008).

Philosophical foundations of cognitive science can be dated back to the mid-1950s, when academics from a variety of disciplines started to create theories of mind based on extensive representations and advanced computing techniques. However, the historical perspective of this science can be dated at least from the time of the Ancient Greeks, when renowned philosophers of the time such as Plato and Aristotle attempted to explain the nature of human knowledge, attempts were made to comprehend the mind and how it functions (Favela, 2020).

Among the principal areas that cognitive science is involved in are the processing of language; learning and development; attention; perception and respective action; memory; consciousness; and artificial intelligence (Perconti & Pebe, 2020).

Linguistics and cognitive science share a close relationship in the study of language processing. Historically, linguistics has been studied alongside other subjects like history, art, and literature. Researchers have increasingly focused on language knowledge and usage as a cognitive phenomenon over the past fifty years. The primary issues include how knowledge of language can be learned and used, as well as what exactly it contains. Thus, if there are any norms at all, linguists must use indirect ways to establish what they might be (Isac & Reiss, 2013).

The extent to which specific abilities are innate or learned is a key subject in the study of cognitive development. This is frequently explained in terms of the nature versus nurture controversy. According to the nativist viewpoint, an organism's genetic make-up determines some characteristics that are inherent to it. On the other hand, the empiricist viewpoint highlights how some skills are picked up through experience. There is still a lot of discussion over how genetic information could influence

cognitive development, even though it is obvious that a kid needs both genetic and environmental input for appropriate development (Gibson, et al., 2019).

The selection of crucial information is what attention is. The human mind must have a method for selecting which of the millions of impulses it must process. Sometimes attention is compared to a spotlight, which can only be used to highlight a specific set of facts. Studies on dichotic listening are experiments that lend support to this metaphor (Redlich, Memmert, & Kreitz, 2021). In the dichotic listening test, participants are instructed to concentrate only on one of two messages that are presented to them, one in each ear. When questioned about the substance of the unattended message at the end of the hearing, subjects are unable to do so (Kelley & Littenberg, 2019).

We can store information in memory for subsequent retrieval. It's common to think of memory as having both long-term and short-term stores. We can keep information in our long-term memory for a very long time, like days, weeks, or years. We can store knowledge over brief time periods thanks to short-term memory, such as seconds or minutes. Similar to psychologists, cognitive scientists also investigate memory, although they tend to concentrate more on the certain ways in which memory affects cognitive processes and relation of memory and cognition with one another (Berto, 2005).

The primary method utilized to create and preserve a student's daily life to professional skills is education. A significant amount of knowledge is required throughout academic life to get any degree. In an effort to stay updated in any specialized subject they must maintain their education. The people in charge of educating make an effort to instruct in a way that is reliable, efficient, and successful. A branch of cognitive research called the study of learning and performance is concerned with how people

understand, process, and ultimately acquire mastery of knowledge. Both educators and students can benefit from a deeper understanding of how people learn, since it will enable them to work more effectively together. There are several significant theories about learning and performance that benefit the learners and facilitate educators (Weidman & Baker, 2015)

According to the cognitive load theory, it is relatively simple to exceed a learner's restricted working memory capacity due to the cognitive processing needed to complete a new activity or comprehend a new concept (Sweller, Van Merriënboer, & Paas, 1998). Meaningful learning cannot take place when this happens. Working memory is said to be subject to three main kinds of cognitive loads: relevant, extraneous, and intrinsic (Van Merriënboer & Sweller, 2011).

To improve learning, each of these can be changed. An educator's instructional design can be enhanced by being aware of and comprehending these aspects of cognitive load theory. For instance, teachers who are familiar with cognitive load theory might assist students by breaking up large chunks of material into smaller parts that each have a lower intrinsic burden when the intrinsic load of a learning objective is high (Issa, et al., 2013).

An educational strategy known as the "transmissive approach" concentrates on the way teachers deliver knowledge to the students. There are many teacher-centered activities conducted in the classroom when using transmissive teaching strategies. The lecture method is one of the transmissive ones, where the teacher plays the primary role and the pupils are only passive recipients of information. The environment in the classroom is often characterized as uninspiring and dull, discourages creativity and pragmatism, and stresses rote memorization of information, denying the pupils the chance to think for themselves. Nevertheless, despite these

drawbacks, lecturing has been found to be an effective way for teaching pupils scientific principles (Atomatofa & Ewesor, 2008).

Another educational strategy known as constructivism concentrates on the way students acquire knowledge. According to constructivism, assimilation and accommodation are the two ways in which new knowledge is combined with a learner's preconceptions. When a learner easily integrates new information into an already established conceptual framework, assimilation takes place. When new information is assimilated, it reinforces the learner's preconceptions rather than reshaping them. In turn, a student must redefine her or his mental representation through a process known as adaptation when new information contradicts their beliefs. Accommodation causes misconceptions, which are initially uncomfortable. However, accommodation is the process by which a misconception can eventually lead to learning (Pakdaman-Savoji, Nesbit, & Gajdamaschko, 2019).

Our constructivism scenario demonstrates that direct lectures on complicated topics can occasionally produce unsatisfactory educational outcomes, particularly when such lectures are given without continuous assessment of the learner's background knowledge. By offering a pre-test that would reveal any gaps in understanding that need improvement, the teacher can serve as a diagnostician. As an alternative, the instructor can pause the presentation and ask the class a question to see if they can come up with the right response. Constructivist instructors can identify misconceptions among students with the help of anonymous polling. Inappropriate responses can then be discussed and rectified by the instructor during the actual lecture (Olson, 2015; Fabris, Rathner, Fong, & Sevigny, 2019).

The practise of applying a previous problem's solution to a new, equivalent issue in a different context is known as "analogous transfer. The

analogous source problem serves as a mental framework for comprehending the new situation. When two problems share the same deep structure, analogous transfer occurs effectively. Even if the deep structure of the problems is the same, their surface structures can vary. For instance, two issues with contrasting surface designs are calculating the current flow through a conventional electric circuit and figuring the rate of water flow in a pipe. But because these two issues have a similar deep structure to Ohm's law, they can be compared. In all situations, flow is inversely related to resistance and directly connected to a gradient. The chances of analogical transfer dramatically improve if a student recognizes that two problems share a deep structure (Malau-Aduli, et al., 2019).

It has been discovered that teaching with abstract examples is more effective at encouraging analogical transfer than teaching with concrete examples (Kaminski, Sloutsky, & Heckler, 2008). Yet, learners are more likely to pay attention to concrete examples. Various examples of the exact same type of problem with different surface features will help students find common deep structures and thereby construct cognitive structures if educators decide to only use concrete examples (La Rochelle, et al., 2011).

The education system in Pakistan is inadequate. Since its independence, neither the overall structure for general education nor the essential training specifically have undergone significant modifications. As a result, the country continues to have the lowest education rate in the world. Pakistan's proficiency rate is less than 50%. Out of this, the male proficiency rate is 68% and the female proficiency rate is only 57%, which is the lowest rate among other countries in the region, including Sri Lanka and India. Punjab is one of Pakistan's most populated regions, accounting for more than 56% of the country's population (Zaman, Zaman, Hussain, Amin, & Rasool, 2019).

Over the past few decades, Pakistan's educational system has drawn interest from all over the world. The Punjab province has served as a test site for numerous national and donor-funded programs, ranging from more radical approaches to enhance the teaching profession to more conventional input-based changes like enhancing learning environments. The policy impression is that educational efficiency in the region and across the nation is still inadequate, despite a surge of improvements. Rural schools in the Punjab province indicate poor academic performance and quality of instruction at both government- and privately-run unacknowledged schools. Even while poor people prefer private schools, which are expanding, there is little proof that they offer higher educational standards or better school facilities. In rural locations where the majority of children are restricted by parental illiteracy, poverty, and inadequate infrastructure, the quality of education is extremely important. The underfunding of public and government-aided schools excludes the already excluded even more (Aslam, Malik, Rawal, Rose, & Vignoles, 2019).

Our understanding of the cognitive science of learning and performance has grown significantly over the last few years. These developments have increased our understanding of conceptions and approaches that can promote more efficient, comprehensive, and long-lasting learning. These techniques can aid educators in improving the educational efficacy of their classes as well as assist students in acquiring and maintaining mastery of their particular fields. It is believed that when teaching and learning are improved, knowledge, which is a learner's ultimate goal, is improved.

Objectives

1. To study the difference in academic achievement of students taught in transmissive learning environment and constructivist learning environment.

2. To explore the effect of mental ability of students on their performance being taught in transmissive or constructive learning environment.

Research Questions

RQ1. *Is there any difference in academic performance of the students exposed to constructivist learning environment and transmissive learning environment?*

RQ2. *Do cognitive abilities of students, learning in constructive and transmissive environment, have any effect on student performance?*

Review of Literature

In the past 30 years, researchers have demonstrated the connection between the social interactions between teachers and students, the learning environments they establish in the classroom, and the instructional tactics they use. It has been discovered that the learning environments teachers create in the classroom significantly affect how well their pupils study science. Researchers have started looking into how a child's learning environment might help or hinder the development of a student's active and creative skills (Wubbel & Levy, 1991).

It might be said that there are four key components that make up the learning process, which is described as the behavioral changes brought about by an individual's experiences in their environment. These include the person who actively engages in learning and supports learning, the instructor who serves as a mentor to make learning simpler and more meaningful, the lesson plan implemented during the learning process, and the environment, both physical and social, in which learning occurs (Major, 2005).

According to Guzman (2009) the physical, behavioral and physiological attributes that the person at the center of the learning process possesses before the process and the behavior they exhibit during the process have a direct impact on the significance and durability of

learning. Directly in opposition, the credentials of the teacher who directs the process, knowledge of the subject, understanding of instructional technology, pedagogical knowledge etc., and the path the teacher takes in the process are as significant as the person on the impact and stability of learning (Guzman, 2009). Moreover, the social structure and physical conditions of the environment where learning will take place, its suitability for the process of teaching and learning, and the presence of structures and elements in this environment are all important factors that affect the understanding of an effective and permanent learning process.

According to the review of the literature, it is apparent that the learning process, which is made up of the 4 aspects listed above, is divided into distinct categories based on its efficiency, the traits of these key components, and the environment in which learning occurs. One of these categorizations is the categorization of learning environments and whether or not a particular plan is required for the process to take place. According to this methodology, learning can be divided into three categories: structured "formal learning," semi-structured "informal learning," and unstructured "non-formal learning" or non-structured (Taylor, Fraser, & Fisher, 1997).

Formal or organized learning is described as learning activities that take place in a school setting under the guidance of teachers and are guided by a predetermined plan. Informal or semi-structured learning is a process that develops throughout life and along the depth of life that occurs in a way that is similar to itself, where individuals join the process due to their own interests and wishes, without being dependent on a teacher or a plan. While non-formal (non-structured) learning is not entirely planned out for a diploma or certificate program, it is learning that occurs while being supervised by a subject-matter expert or someone with experience in the subject-matter (Toprak & Erdogan, 2012).

The environments for learning outside of school that are located within the boundaries of the province of Zmir in terms of several criteria. In order to achieve this objective, researchers created "the Out-of-School Learning Environments Assessment Survey." They included 13 out of school learning environments like science centers, museums, Arts and archeology, wild life park and botanical gardens. It was discovered that among the intended out-of-school learning environments in the samples, science centres largely met the survey's expectations, while museum centres fell short in terms of the desired attributes and other centres met "acceptable" standards for satisfaction (Kiriktaş & Eslek, 2017).

Serin (2018) compared teacher centered and student centered methods. According to him, recently, teacher-centeredness has been challenged in the classroom by student centred education, which enables students to build their understandings based on their own experiences, observations, and actions. Democracy and constructivism are the foundations of student-centered learning. In a classroom setting where they are encouraged to enhance their critical and reflective thinking as well as a sense of responsibility, pupils make logical sense of what they learn. This is the focus of student centered teaching. On the other hand, teacher-centered training significantly drew upon behaviorist theory, which was founded on the notion that changes in behavior are brought on by outside stimuli. Students in teacher-centered classrooms are more passive and react to outside stimuli than those in student-centered classrooms. Since the teacher is in charge of instruction and has the final say, pupils do not get enough chances to practise critical thinking and problem-solving techniques.

For learning to occur effectively, the characteristics of the learning environments established by teachers in the classroom have been regarded as being extremely crucial. Therefore, Atomatofa, Okoye, and Igwebuike

(2016) studied different levels of science students' performance as affected by constructivist and transmissive learning environments in Nigeria. The outcomes showed that students who were taught in a constructivist atmosphere performed better. And regardless of learning environment, high-ability students outperformed low ability students, showing that learning settings had no bearing on learning ability. Therefore teachers were suggested to create a constructivist environment while paying special attention to the low ability groups in order to close the achievement gaps between high and low ability. This is because the high and low constructivist groups outperformed the high and low transmissive groups, respectively (Atomatofa, Okoye, & Igwebuike, 2016).

School teachers frequently employ manipulatives to help pupils understand abstract ideas in a concrete way and to link such ideas to prior knowledge. In the past, teachers and students used concrete educational materials, but in many modern classrooms, both teachers and students utilize pictorial and virtual manipulatives. In this regard, Ojo, et al. (2016) demonstrated that manipulatives support focused physics learning experiences. As it provides a solid foundation for the growth of science and technology at the very beginning of education, it is highly recommended for the secondary school system if the nation's goal for technological development is in view. At the start of the term, packages must be distributed to the students. Since the subject is really covered in senior secondary school, pupils should be provided with these resources, and they should be used each time the subject is covered in class to maximize learning. Additionally, it facilitates the transfer and retention of knowledge at that level.

Lancaster (2017) focused on alternative learning environments in addition to the effectiveness of student centered learning environments. In the study, a teacher centered and a student centered learning environment

were used simultaneously to compare the learning outcomes of alternative learning environments among the students of a rural school of Arkansas. Moreover, the way each environment fostered social development, leadership, and independence abilities in the students was also evaluated. Academic achievement showed significant variations, and student opinions of the learning environment were thoroughly documented, which indicated that in alternative learning environments, teachers can create a learning environment that engaged students, fostered independence and leadership abilities, and promoted superior academic accomplishment.

The B. F. Skinner popularized the behaviorist theory which is in favor of teacher centered training. Learning is the modification of actual behavior of an individual. He added that alterations in conduct are the result of a student's reactions to environmental factors (Peyton, Moore, & Young, 2010).

According to Masouleh et al. (2012), "teachers that have students actively participate in the lecture have more academically successful students." It was claimed that students might succeed academically when they receive encouraging feedback from lecturers during teacher-centered teaching methods like lectures. Some teaching and learning methods are consistent with behaviourist theory. Memorization and the encouragement teachers provide their students when they demonstrate proficiency are two examples of these.

Kelly and Veronee (2019) learned that the lecture's steps are straightforward. These few techniques can assist teachers in helping pupils succeed academically. He recommends that teachers should be proficient in the material before presenting it to students, present it in an engaging lecture, and allow pupils to take notes and ask questions, to which the teacher will respond appropriately. The teacher should next

provide feedback after evaluating the student's grasp of the content in a paper-pencil format.

Therefore, Babcock and Mark (2011) evaluated that instructors who prefer teacher centered instruction think that it is critical to be the subject matter experts in the classroom. Such instructors ought to be knowledgeable about the subjects they teach and have expertise teaching them. The caliber of a teacher's instruction and material knowledge definitely determines how well respected they are. Because of their close connection to the material, teachers can provide their pupils with more relevant lessons.

Idris (2016) studied whether students found teacher-centered instruction in a lecture format to be enjoyable and whether they gained anything from the lecture-style of training. He discovered that when lectures were interesting and the presenter was knowledgeable about the subject, students were engaged and actually learned from them. Consequently, he came to the conclusion that a student's capacity to learn via instructional approaches like lectures was truly effective. He concluded that pupils were more likely to succeed academically if they were more engaged in the sessions and the presenter knew more about the subject matter.

According to Carrell & West (2010), student centred instruction is a method of problem solving that can raise a student's self-esteem in relation to academic success. In order to be more academically efficient, student centered instruction places a strong emphasis on students working together to attain a common goal. The classroom, in which pupils fight for grades and awards, is the exact reverse of this. In such an environment, small groups of students participate in cooperative learning, a kind of instruction that focuses on the needs of each individual student, where they collaborate to solve issues, complete tasks, or reach a common objective.

According to a study, "the curriculum design, which incorporates content sequencing and pace

as well as students' personal experiences, promotes student accomplishment". They indicated that the experiences and chances for learning that children have while being guided by their classroom instructor were impacted by the curriculum's design. They also revealed that a teacher who does not pace the curriculum's content in accordance with the decisions made by his or her textbooks simply widens the achievement gap for all students (Espenshade & Radford, 2009).

A study found that by evaluating nursing students' perspectives of clinical learning environments at Beni-Suef University, the essential elements for fostering a responsive and efficient learning environment were identified, such as actual and expected. The concepts can then be used by teachers to keep their students

interested in and inspired by their lessons. It was determined that nursing students did not have a favorable perception of their real clinical teaching environment, and that this perception was very different from what they anticipated their setting to be (Mostafa, 2017).

Methodology

This study implies a qualitative method. The purposeful sampling method has been used to draw a sample of 12 respondents (4 students, 4 teachers, and 4 parents) to conduct in-depth interviews. To collect the responses of the participants, a well-planned questionnaire was created. The respondents have been selected from rural Punjab (Sargodha, Mianwali and Rajanpur).

Table 1

Themes and sub-themes of the Interview

Themes	Sub themes
1. The scope of studying science in rural Punjab	Students' intention Parents' expectations Teaching abilities and skills
2. Challenges faced by the students while studying science in rural Punjab.	Lack of science books/equipment Family pressures Distance from schools Availability of teachers
3. The study environment in the rural Punjab.	Transmissive learning approach Constrictive learning approach
4. Individual ability of the students in rural Punjab.	High ability students Low ability students
5. The comparison of learning environment between rural and urban Punjab.	Comparison of facilities Qualification of teachers Teacher-student relationship Teaching Approaches

Findings

Interviews of the respondents were conducted and recoded for analysis. 5 themes were defined

and further sub-themes were also formulated in order to get a clear picture of stance of each respondent.

The scope of studying science in rural Punjab

Most of the respondents suggested that there is a high scope for studying science among the students in rural areas like Sargodha, Mianwali, and Rajanpur. Students, and in particular their parents, have high career expectations as a consequence of choosing science as a field of study at the secondary level. Teachers also agreed that they find students more inclined towards science than other subjects. Students from rural Punjab are often found with high scores in exams. Despite the limited facilities in this regard, students prove themselves to be of great potential while studying science as a subject. Respondents believed that in annual examinations, students from these areas often manage to score the maximum, beating urban areas. Rural Punjab is adding a number of students who prove themselves in remarkable ways. Teachers also believed that they found it challenging to convince students that studying other subjects could also lead to successful careers. In rural Punjab, the mind set has developed in such a way that science is thought to only mean a future career.

Challenges faced by the students while studying science in rural Punjab

The majority of the respondents believe that, despite huge inclinations, there are a number of challenges to studying science that students have to face. Students noted that sometimes there is a shortage of text books for science subjects. Similarly, the availability of proper equipment and learning material is also lacking. Students and teachers believed that in most cases, science choices accompanied family pressures. High expectations from parents put huge pressure on students, resulting in mental stress. Other than that, students have to struggle with the distance from schools. Limited numbers of science teachers are also among the challenges faced by students in rural areas of Punjab. Miles of distance and poor transport services add to the troubles of the students.

The study environment in the rural Punjab

The study environment in rural Punjab, according to the sampled respondents, is suspect. Learning and teaching approaches in practise are crucial in this regard. Students and parents suggested that most of the rural areas of Punjab have transmissive learning environments. They opined that in this way, the teacher or the instructor shows limited flexibility towards the abilities and skills of the students. Consequently, students are deprived of exploring their abilities and skills. On the other hand, they suggested that a constructive learning environment can be of greater advantage. Students can get more chances at determining their abilities and polishing their skills. When asked by the teachers included in the sample, they believed that the ability of the students was more important than the learning approaches used while teaching. Depending on the students' individual learning abilities, either technique can be successful.

Individual ability of the students in rural Punjab

Individual ability refers to the students' learning potential and cognitive skills. The individual ability of the students has been divided into two categories: high-ability students and low-ability students. As described earlier, the individual abilities of the students play an important part in learning, and participants in the interview believed that students who have high learning ability are quick to learn science. Their cognitive abilities help them learn lessons faster than those with low ability. Students with low learning ability also show an inclination towards studying science, but they take longer to learn the lessons. Thus, the individual ability of the students also plays an important part in learning science in rural areas of Punjab.

The comparison of learning environment between rural and urban Punjab

According to the responses of the interviews recorded, there is a huge difference between the learning environments of rural and urban Punjab.

The major difference is in the approach towards learning science. In rural areas, students and their parents consider science to be the means of success. Rural Punjab has a higher concentration of doctors and engineers than urban Punjab. Contrary to this, the environment in urban Punjab is more supportive of learning science than that in rural Punjab. Proper facilities in schools, qualified teachers, extra learning classes, and proper transport in urban Punjab are the things that prove to have an edge over the environment in rural Punjab. The major difference is in the student-teacher relationship. In rural Punjab, there exists a friction between teacher and student that puts learning at a disadvantage. On the other hand, in urban Punjab, student and teacher can be found in a more cooperative relationship with an active learning environment.

Discussion

This study inspects the differences in academic achievement among students in secondary school in rural areas of Punjab (Sargodha, Mianwali, Rajanpur) while learning science. This study stressed that the learning environment affects the academic achievement of students. The learning environment in rural Punjab is mainly of the transmissive sort. Though the students in rural Punjab are more inclined towards studying science, they are exposed to certain challenges. Findings of the interview reveal that in rural Punjab, students and their parents are more likely to choose science at the secondary school level. This is because they find it supportive of their future success. The scope of studying science is considerable among the students in rural Punjab. Lack of facilities hinders students from smoothly continuing their study of science. Similarly, family pressure, unavailability of textbooks, limited staff, and distance from schools are among other challenges faced by the students in rural Punjab. The learning environment also plays an important part, but the individual ability of the student is also

irrefutable in this regard. Students with a high cognitive ability level are more active learners than those with a lower cognitive ability level. The attitude towards science is also very important. Students who take science with a future career orientation are more likely to learn and understand science in a proper way. In a relevant context, Ozorio (2014) studied students' social and emotional requirements in order to create a healthy learning environment. Classroom behavior is challenging for teachers to manage. There are numerous methods for managing behavior, but the majority of them place more emphasis on teacher control than internal control and student accountability. In order to connect with their pupils, teachers must comprehend their requirements and adopt their perspective. In order to create a supportive and constructive learning environment, it is crucial to comprehend the social and emotional factors that influence student behavior. The findings revealed that in order to influence children to behave positively, teachers must emphasize their strengths. In order to create a productive and positive learning environment, teachers must consciously meet the social and emotional needs of the students.

Conclusion

The result of the study has shown that the development of an active learning environment can aid in the proper learning of science among the students in rural Punjab. For this purpose, a student-friendly learning environment, such as a constructive learning environment, is more likely to improve the academic achievement of students. Aside from the learning environment, individual student ability is also important in rural Punjab students learning science. Teachers need to try their best to minimise the divide on the basis of ability as well as the learning environment. By reducing the existing gap of this sort, we can help the students from rural Punjab to a greater extent. The availability of well-qualified teaching staff in rural Punjab is also

required. Similarly, it has been observed that the study environment in urban Punjab is more student-friendly. In urban areas of Punjab, student-teacher relationships are less strained than in rural areas. It allows students to interact more freely with their teachers in order to learn. A study suggests that since students and parents in rural Punjab are inclined to study science, eradicating challenges faced by them can help to improve the standards of learning in the country as well. Study contributes to knowledge in such a way that, though there are traditional and teacher centered techniques being applied in most of rural Punjab, implementing modern techniques like active learning methods can solve the problems of students. Students believe that a constructive study environment in the classroom motivates them to explore their abilities more than being instructed in a transmissive study environment. The current study also attempts to fill the gap while focusing on the cognitive abilities of the students in rural Punjab in particular. Science education in rural areas is frequently prejudiced by various educational systems. as there are limited resources and practised primitive instruction techniques. The study's findings conclude that when combined with constructive teaching techniques, students' cognitive skills can prove to be more yieldin.

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