



Design of Classroom Climate and Teaching Effectiveness Observation Schedule (CLATEOS) for Classroom interaction and Time Sampling

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Abstract

This paper presents the design of the Classroom Climate and Teaching Effectiveness Observation Schedule (CLATEOS) as an observational instrument for assessing classroom interaction and teaching effectiveness through time sampling. Classroom climate plays a vital role in shaping students' learning experiences and academic achievement. However, many classrooms in Nigerian secondary schools are characterized by inadequate physical facilities and poor environmental conditions, which negatively affect teaching and learning processes. In response to this challenge, the study developed CLATEOS to provide a systematic tool for evaluating both classroom climate and teaching practices. The instrument captures key demographic and contextual information about the school, teacher, and class, including school type, location, teacher qualification, class size, subject, lesson duration, and observation details. CLATEOS focuses particularly on the physical dimensions of classroom climate such as lighting, ventilation, temperature, spatial arrangement, and instructional resources, alongside indicators of teaching effectiveness and classroom interaction. By employing structured observation and time-sampling procedures, the instrument enables objective documentation of teaching-learning activities and environmental conditions in the classroom. The development of CLATEOS is intended to support educational researchers, administrators, and policymakers in diagnosing classroom conditions and improving instructional quality. Ultimately, the instrument provides a practical framework for monitoring classroom practices and facilitating pedagogical improvements that enhance student learning outcomes.

Keywords: Classroom climate, teaching effectiveness, observation schedule, time sampling, classroom interaction, secondary education.

1. Introduction

Classroom climate is a critical part of effective and successful instruction. Effective classroom climate, when initiated with well-organized and efficient lesson planning preparation, teachers' display of knowledge mastery, good learning strategies, helps a teacher to teach and students to learn. Students perform well in an optimistic classroom atmosphere and an environment in which they feel secure, safe, cared for and involved. From a student point of view, effective and successful classroom climate provides students with opportunities to socialize while learning interesting content. From a teacher point of view, effective classroom climate involves preventive discipline and interesting instruction (Lang & Hebert, 2015). To ensure a favourable classroom climate, it should be well equipped and facilitated. The classroom physical arrangement provides students with effective instruction and promotes smooth teaching learning process.

Classroom climates refer to the physical characteristics of the room. Physical classroom characteristics is a combination of different things i.e., lighting, temperature, ventilation system, size of the room, floor, walls, desks, chairs, rugs, whiteboards, amount of work time, its physical climate etc. Teacher and students are considered the main elements of the classroom climate. Favorable classroom climate has a significant positive effect on the efficiency of any organization and acts as catalyzing agent to provide a straight way for achieving predetermined objectives of an organization. But unfortunately, physical climate in our classroom is not conducive for smooth teaching learning process, resulting to fatigue and frustration among the students (Wang, et al., 2020).

Research studies on the classroom climate have revealed that physical arrangement plays a vital role in teaching learning process. It can affect the performance of both teachers and students (Savage, 2009). The learning setting is comprised of different things i.e., learners, teachers and the classroom climate or environment (Lippman, 2010).

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Classroom climate plays a central role in any activity and makes it more conducive, successful and achievable. According to Hallak (2010), physical facilities compose a strategic factor in the operation

and functioning of an organization as they determine the excellent performance of any social organization or system including education. Physical facilities are one of the stimulating factors that play a fundamental role in improving academic achievement in the school system. These include; school buildings, accommodation, classrooms, libraries, ventilation, temperature, furniture, laboratories, recreational equipment, apparatus and other instructional materials. Furthermore, their availability, relevancy and sufficiency affect academic achievement positively. On the other hand, poor school buildings and overcrowded classrooms affect academic achievement negatively. Taylor and Vlastos (2009) found the relationship between environment and design within the classroom from a theoretical perspective. They found that physical environment of the classroom acts as "Silent curriculum". It means that classroom climate design can facilitate and improve the learning process like the overt curriculum.

Unfortunately, in Nigeria, educational institutions lack good classroom climate which results in malfunctioning of these institutions. Sufficient facilities promote academic achievement and ensure to strengthen the overall institutional performance. While unattractive and old school buildings; cracked classroom walls and floors; lack of toilets; lack of desks and benches; lack of proper security system; poor classroom ventilation, lack of drinking water; lack of power supply; lack of playgrounds; lack of teaching staff; lack of sufficient classrooms; overcrowded classrooms; lack of educational technology; lack of first aids facility etc negatively affect academic achievement of the institutions (Hussain, 2012).

However, there are several factors of classroom climate i.e. visual factor, acoustic factor, thermal factor, spatial factor and time factor. Visual factor refers to the quality of lighting in different parts of the classroom. It is determined by the level of natural and artificial light available in the classroom. It also refers to the way by which the classroom climate is arranged i.e. visually interesting, creating a favourable atmosphere and any unwanted disruptions e.g. windows overlooking playgrounds etc. Acoustic factor is an important factor as we mostly depend upon verbal communication in our classroom. Noise level mainly depends upon school design, classroom organization and teaching methodologies applied during a lesson (Basit, 2005). Poor classroom acoustics can adversely affect learning environment for many students. Constant noise exposure can damage cognitive performance and functioning.

Thermal factor refers to the heating and ventilation of the classroom and are generally out of the teachers' control as they are climate variables. It plays a fundamental role in making classroom atmosphere favourable and comfortable and hence affects the behaviour and performance. Spatial factor relates to the space management and has a great impact on

behaviour particularly on communication. Time factor refers to the amount of time a student is participating in learning process i.e., the number of minutes the student is actively participating in teacher directed lessons and activities (Basit, 2005). Therefore, it is concluded that classroom climate comprises of classroom size and structure, furniture, seating arrangement, instructional technologies, room heater, ceiling fans, curtains, cupboard, equipment, lighting, ventilation etc.

Good classroom climates play a remarkable role in making instructional process more effective and establish an atmosphere favourable and encouraging to learning. The quality of the physical classroom setting significantly affects academic achievement of the students. Physical facilities in classrooms ensure effective and successful teaching learning process. Without these facilities, effective and fruitful teaching learning process is not possible. Students get more information from their teachers in well facilitated classrooms and consequently they show good performance. On the other hand, if students feel uncomfortable in classroom, then they will fail to get more information from their teachers. Lyons (2011) stated that poor school climates adversely impact teachers' effectiveness and also their performance, and consequently it negatively affects student achievement. MacAulay (2010) found that a well-structured classroom can enhance students' academic and behavioural outcomes. Haertel (2011) concluded that students' perceptions of classroom climate as an important factor that show some aspects of students' outcomes; that is, achievement, motivation and satisfaction. They further concluded that achievement in cognitive and affective learning outcomes were repeatedly associated with classrooms climate, which were perceived as having greater cohesiveness, satisfaction, goal direction, organization and less friction.

Temperature and ventilation systems inside classroom are crucial factors that affect classroom learning environment. Classrooms too cold or too hot negatively affect students' performance and concentration as they feel uncomfortable in such conditions. According to Halstead (2014) in Lan, et al., 2011, it is generally accepted that high temperature and humidity creates physiological and psychological problems which expedite fatigue, causes people to work more slowly, apply much efforts and causes to make more mistakes and errors. The classroom climate should be cautiously managed not only to provide physical comfort but also to serve as a positive factor in the learning process by stimulating attentiveness and concentration. To maintain such a climate, the atmosphere must be treated to simultaneously controlled temperature, humidity, cleanliness and circulation. Earthman (2004) established that temperature, heating and air quality are the fundamental elements for the educational attainment of students. Phillips (1992, as cited in Suleman et al., 2014) noted that lighting is one of the most important

physical characteristics of classroom. He further stated that visual environment can affect the capability of students to perceive visual stimuli and also affect their mental attitude. Consequently, their academic performance is affected negatively.

Proper arrangement of furniture also plays a vital and crucial role in classroom functioning. Furniture is arranged with the intention that students may feel comfortable and they may be adjusted to the primary sources or different sources of information e.g., the teacher, instructional materials, while at the same time having accessibility to other sources or the activities e.g., work areas, computers without creating disturbance in the classroom. Higgins, (2005) noted that desk arrangement can affect students' achievement and attention. Halstead (2014) states, "A student in the classroom is properly seated if he has a clear view of the instructor, is provided with suitable writing surface and a place for book storage, is reasonably comfortable and is so situated that person going to and from adjacent seats will not disturb him".

Additionally, school climates can be of positive influence on the health of the learning environments as Freiberg (2008) notes "school climate can be a positive influence on the health of the learning environment or a significant barrier to learning. School environment can affect many areas and people within schools. For example, a positive school climate has been associated with fewer behavioural and emotional problems for students. Additionally, specific research on school climate in high-risk urban environment indicates that a positive, supportive and culturally conscious school climate can significantly shape the degree of academic success experienced by urban students

School climates research suggests that positive interpersonal relationships and optional learning opportunities for students in all demographic environments can increase achievement behaviour. Taylor and Tashakkori (2005) for example found that a positive school climate is associated with increased job satisfaction for school personnel. Attending a new school can be frightening for students and this apprehension can adversely affect student's perceptions of their schools climate and learning outcomes. Therefore, providing a positive and supportive school climate for students is important for a smooth and easy transition to a new school.

Furthermore, school climate can play a significant role in improving a healthy and positive school atmosphere, Freiberg (2008) notes "the interaction of various school and classroom climate factors can create a fabric of support that enables all members of the school community to teach and learn at optimum levels". A positive school climate can yield positive educational and psychological outcome for students and school personnel. Similarly, a negative climate can prevent optimal learning and development. In view of the foregoing, this study therefore becomes imperative and

therefore sought to developed an observational instrument suitable for measuring teaching effectiveness and classroom climate in secondary schools with the soul aim in providing stakeholders in education on the status of teaching effectiveness and classroom climate in our schools for positive pedagogical improvement.

2. Classroom Climate, Components and Importance on Students' Academic Performance

Classroom is an important place in the operation of a school. It holds students together and offers them the opportunities of achieving the purpose of education. A greater part of educational activities of any school occurs in this room. Learning experience is coordinated and various types of instructional efforts are housed here. Akubue, (2001) described the classroom as a base for all types of activities. In addition, the classroom is a place for interaction among teachers, materials and students. These interactions create an environment known as classroom climate.

A classroom climate refers to a composite of variables working together to promote learning in a comfortable environment in a classroom. Every classroom is unique because there is a wide range of variables that have an impact on the climate in a classroom. However, a number of elements are required for the establishment of a successful learning environment. The most important thing for a classroom is to create an atmosphere promoting learning. In order to achieve this atmosphere, every item in the classroom should emphasize learning in some way (Fraser, 2012).

There are two aspects of classroom climate: the physical and social environment. Physical environment refers to the arrangement of chairs, tables, fixtures and pieces of furniture, the painting, lighting, space, acoustics, temperature and ventilation while the social environment refers to the leadership exhibited by the teacher like democratic, authoritarian and laissez-faire and the mode of students' participation such as collaborative, individualistic or competitive (Fraser, 2012). However, the focus of this study is on the physical classroom climate.

The physical classroom environment has to do with the age of the classroom building, colour, level of available furniture, desks and seats, ventilation, lightening, roof, ceiling and smooth floor Akubue, (2011). According to Falses (2010), the learning environment should promote sensory comfort and high auditory and visual activity. The physical layout of such an environment should accommodate scheduled activities, allow for people's sense of personal space and promote desirable patterns of social interaction and communication as well as psychological comfort and stability. Classroom climate consists of so many sub-variables that affect students' achievement in schools. Some of such variables is physical appearance or layout of the classroom, teachers' teaching behaviours and instructional materials utilization which the

researchers considered in this study. According to Strivens (2015), an effective classroom is attributable to its physical appearance or layout because it produces a task-oriented atmosphere and at the same time, it encourages social and emotional needs of the students.

Felix (2014) opines that a good school organization must have appropriate physical conditions (aesthetic beauty, availability of instructional materials, location) necessary for effective teaching/learning. According to Subair and Awolere (2016), there should be maximum presence of physical conditions such as lighting, ventilation, good building constructions, location, instructional materials, sufficient windows, doors, vents and fans to cool the heat during hot season. All these improve work and health of both the teachers and the learners.

3. Concept of Academic Achievement.

Academic achievement can be broadly defined as excellence in all academic disciplines, in class as well as extra-curricular activities. It includes excellence in sporting, behaviour, confidence, communication skills, punctuality, assertiveness, Arts, culture and the like. Similarly, academic achievement refers to knowledge and skills accomplished by student(s) in a subject area, designated by score(s) obtained in an appropriate achievement test (Akem, 2016). Accordingly, an achievement test is an instrument administered to an individual or group of persons to draw out certain desired and expected responses, as demanded in the instrument, performance on which the individual or group of persons are assigned scores representing their achievement (Olaitan, 2010). They noted that academic achievement is always represented by scores, which express the amount of learning acquired, knowledge gained or skills and competences imbibed in the subject matter. In a related development, Artherton (2013) upheld that academic achievement is dependent on many factors which include; teaching method, intelligence, background, organization, opportunity, motivation, instructional procedure, techniques aids, learner's interest and other environmental variables. Others include; learner's mental ability, his/her goals and purposes, his/her motivation, and method of guidance, availability of facilities and methods of testing.

4. CLATEOS Demographic Information Description

The CLATEOS Demographic Information is designed to capture relevant specific statistics about the school, the teacher and the class. CLATEOS demography is an adaptation of SPIS developed by Ajayi (2007). The adaptation is in terms of structure and content to a fairly large extent, since the demographic background information required and captured by an average instrument designed to investigate teaching-learning activities in a typical classroom remains fairly constant. The CLATEOS demography consists of 15 items and in-specific terms, they are described as follows:

- 1) **Name of School:** This is the identity of which the school is known. It is normally carried by the signboard of respective schools. This information could therefore be captured directly from the signboard.
- 2) **School Location:** This item describes the status of the settlement where the school is located. The status of a settlement is described in terms of urban and rural using population size, presence and intensity of social amenities. For the purpose this study, the state capital, the local government headquarters apart from those located in the state capital and other notable cities, as well as other towns are classified urban, while villages constitute rural settlements. This information is therefore captured using the sense of judgement of the observer on the basis of the above criteria.
- 3) **School Type:** It is a description of the ownership status of the school. Is it government owned? If then, a public school, or privately owned by an individual or group of individuals? If so, a private school. The observer can collect this information from the school authority.
- 4) **Teacher Number:** It describes the statistical identity given to each teacher that is observed. It is done for the purpose of identification of the number of teachers observed. The recording is done in terms of ascribing 01 to the first teacher observed followed by 02, 03 and so on to other teachers in that order.
- 5) **Teacher's Qualification:** Both academic and professional qualification of the teacher are essentially important here. This information could be obtained from the school authority or directly from the teacher. Effort should be made to record all relevant qualifications possessed by the teacher accurately.
- 6) **Teacher's Sex:** Sex is a description "of biological characteristics by which humans are defined as ranging from male to female. The observer can capture this information by mere eye assessment of the observed.
- 7) **Class Observed:** This item is interested in the class level and. The information could be collected from the doorpost leading into the classroom or from the back of students' notebooks.
- 8) **Class Size:** This is the description of the total number of students seating in the classroom/laboratory as at the time of observation. The class size is obtained by counting and recording number of males and females separately.
- 9) **Subject:** This is obtained from the chalkboard or the class timetable
- 10) **Topic:** This is obtained from the chalkboard while the teaching is teaching
- 11) **Time Started and Time ended:** This information the' observer captures directly suing his/her time piece immediately the class begins and ends respectively.
- 12) **Lesson Duration:** This is the duration allotted for the lesson. It is best captured from the "class

timetable.

- 13) **Term:** It is recorded as either 1st, 2nd, 3rd term as the case may be
- 14) **Name of Observer:** It is essential in a situation of many observers using the instrument at the same time.
- 15) **Date:** The date indicates when the observation is recorded and it is appropriately captured using calendar.

5. Detailed Descriptive of Classroom Climate and Teaching Effectiveness Observation Schedule (CLATEOS)

CLATEOS is an instrument adapted in structure from the Child observation checklist, an instrument of African Primary Science' Programme (APSP) developed by Yoloye and-others (Chacko, 1999). The instrument is intended to directly observed the classroom condition prior to classroom instruction and also to capture desirable and undesirable teaching interaction behaviours exhibited during a typical classroom between the teacher and the students. It is a two-segment instrument. The first segment directly captures classroom climate indices prior to classroom instruction, while the section segment captures effective teaching behaviour and acoustic classroom climate. The instrument is made up of 4 categories of behaviours in a column broken down into 20 specific behaviours in another column addressing pertinent areas of classroom climate and teaching effectiveness, while the third column, is the minutes of occurrence were tally of separate instance of behaviour are recorded through the lesson duration. Behaviours includes:

6. Pre-Classroom Climate Condition, Classroom Acoustic, Pre-learning Interaction and Learning Interaction

For the classroom climate segment, classroom climate indices are rated as observe by the researcher using a four-point rating scale. For the teaching effectiveness, each specific behaviour or behaviours, as it occurs are recorded at one minute interval using a tally in the appropriate cell that corresponds to the item. And so, at the end a summary list is prepared to show a still picture of what is obtained in the lesson.

CLATEOS is elaborate and carefully designed, suitable for use in any learning situation and developed specifically for Primary, junior secondary and senior secondary schools. The 20 items that make up CLATEOS are hereby described in details.

Classroom Climate: Classroom climates refer to 4 indices (visual, thermal, acoustic and Spatial factors) of an ideal classroom that tend to influence learning improvement in learner as measured by Classroom Climate and Teaching Effectiveness Observation Schedule (CLATEOS)

Pre- Classroom Climate Condition:

- 1) **Availability of Chairs and Desk:** Here the observer check for adequacy of desks and chairs for children comfort, this can be ascertained through physical observation by the observer.
- 2) **Conducive Classroom Prior to classroom instruction:** Here the researcher look at the noise level and population of the class prior to classroom instruction.
- 3) **Classroom ventilation to Fresh Air/Windows:** Here the research checks the adequacy of fresh air or the windows adequacy to provide comfort for students
- 4) **Air conditioner or Ceiling fan:** Here the observer check if there is presence of air conditioner or ceiling fan as alternative to fresh air during hot weather condition.
- 5) **Classroom Lightening/Sunlight:** Here the observer checks the adequacy of sunlight in the class for visual clarity to learners or availability of electronic lightening to enhance classroom visual conditions during rainy days.
- 6) **Classroom Spatial condition:** Here the researcher check for adequacy of space for learners and teachers to move freely in the class during classroom instruction.

Classroom Acoustics:

- 7) **Internal Classroom Noise interference:** This is period where noise emanated directly from students during classroom instruction
- 8) **Eternal Classroom Noise interference:** This is a period where the observer captured external noise from other classes or local outside the school causing learning interference during classroom instruction

Pre-learning interaction:

- 9) **Lesson notes/aids instructional aid writing materials present:** Teacher come to the class with lesson notes, instructional aid/ writing materials or setup multimedia learning aid before instruction.
- 10) **Teacher activates student's learning readiness:** Teacher utilized good and friendly communication skills to arouse students' interest or curiosity towards the lesson
- 11) **Entry Behaviour:** *Teachers briefly revisit the previous lesson or introduce real-life antecedents to the new topic.*
- 12) **Teacher Perform diagnostic test:** A period when teacher administer diagnostic test to pupils to identify their strength and weakness prior to classroom instruction

Learning interaction:

- 13) **Group /individual activity:** Students working by themselves or by their teachers or discussion involving small group that may include the Teacher

- 14) **Transition:** Periods when teacher is handing out materials/writing on the chalkboard or illustrating lessons contents with instructional aids
- 15) **Whole class discussion:** A question & Answer session involving the teacher, the whole class either every child is participating or not
- 16) **Teacher talk/Lecture:** When teacher is talking to the class not in response to a question and requiring response from the students
- 17) **Teacher brainstorm:** The period when teacher give students exercise to solve or a quiz session involving several groups.
- 18) **Teacher provide remediation:** A period when teacher perform diagnostic test on students to identify their strength and weakness prior to classroom instruction.
- 19) **Others/Silence/Confusion/:** Total silence in class without learning engagement, sudden mishap or noise interference from other class or period when a student sleep or play with friends or doing something not relevant to the subject or topic or a period when teachers attend to guest, goes in/out frequently, chat, make or receive calls while lesson is ongoing.
- 20) **Teacher caution unruly behaviour:** A period were teacher verbally caution unruly behaviour during classroom instruction.

6. Procedure for the Development of CLATEOS Universal Constructs Related to Teaching, Learning, and Climate

In developing the CLATEOS instrument, deliberate actions were taken to align it with universal constructs in teaching, learning, and classroom climate. To address **teaching**, structured observation tools were created to evaluate lesson delivery, instructional methods, and teacher-student interactions, ensuring effective and reflective pedagogy. For learning, strategies were implemented to assess student engagement, participation in group activities, and responsiveness to instructional approaches, providing insight into comprehension and active learning. The classroom climate component was developed by examining physical and environmental factors such as ventilation, noise levels, classroom space, and furniture adequacy, recognizing their impact on student comfort and concentration. By integrating these core areas, CLATEOS was designed as a comprehensive instrument to evaluate and enhance the quality of classroom instruction, support optimal learning environments, and drive continuous educational improvement.

a. Conceptualization and Design

Actions Taken to Develop CLATEOS

- **Defined the Objectives:** The first step involved clearly establishing the purpose of CLATEOS as an assessment instrument designed to evaluate three key areas of

classroom practice; teaching effectiveness, learning interactions, and classroom climate.

- **Reviewed Existing Frameworks:** Foundational instruments such as the **Science Process Skill Instrument (SPIS)** developed by Ajayi (2007) and the **African Primary Science Programme (APSP) Child Observation Checklist** were critically examined. These frameworks served as references to guide the structure, validity, and adaptability of the CLATEOS tool.
- **Developed Universal Constructs:** Based on insights from the literature and observed classroom needs, universal constructs were systematically developed under three domains:
 - **Teaching** – focusing on instructional delivery, methods, and teacher-student interactions.
 - **Learning** – emphasizing student engagement, group work, and response to instruction.
 - **Classroom Climate** – assessing environmental factors such as ventilation, space, noise levels, and furniture adequacy.

b. Structuring of CLATEOS

- Create a two-segment structure: (1) Classroom Climate Indices and (2) Teaching Effectiveness.
- Identify four primary categories of behaviors: Pre-Classroom Climate Condition, Classroom Acoustics, Pre-Learning Interaction, and Learning Interaction.
- Define 20 specific behavioral indicators under these categories.

c. Development of Demographic Information Section

- Adapt demographic elements from SPIS to capture school, teacher, and class details.
- Include 15 key items such as school type, location, teacher's qualifications, and class size.
- Ensure ease of data collection through direct observation, school records, and structured responses.

d. Instrument Refinement and Rating System

- Develop a four-point rating scale for classroom climate indices.
- Implement a minute-by-minute tally recording method for effective teaching behaviors.
- Ensure clarity in defining desirable and undesirable teaching-learning interactions.

e. Validation and Pilot Testing

- Conduct expert reviews with educational researchers and practitioners to refine the instrument.
- Pilot test CLATEOS in primary, junior secondary, and senior secondary schools.
- Analyze pilot data to ensure reliability and validity of the observation tool.

f. Implementation and Data Collection

- Train observers on standardized usage of CLATEOS for consistency in data collection.
- Implement observations across diverse classroom settings to assess effectiveness.
- Collect, analyze, and interpret data to identify trends in classroom interactions.

g. Review and Continuous Improvement

- Periodically update CLATEOS based on feedback from users and emerging educational trends.
- Integrate technological tools where necessary to enhance observation accuracy and data analysis.
- Ensure alignment with evolving educational standards and teaching methodologies.

7. Time Allocation and Time Sampling Actions Taken to Develop CLATEOS: Focus on Time Allocation and Time Sampling

- **Recognized the Importance of Time Allocation:** Acknowledging that effective teaching and learning depend on how time is structured within school timetables, CLATEOS was designed to consider the impact of limited instructional periods on lesson delivery and learning outcomes.
- **Integrated Time Sampling as a Tool:** Time sampling techniques were incorporated into the instrument to systematically evaluate how lesson time is utilized. This approach enabled the capture of real-time data on teaching patterns, student engagement, and classroom interactions.
- **Observed Time Spent on Key Activities:** Through structured observation, CLATEOS tracks how time is distributed across different classroom activities—such as teacher explanations, student group work, questioning, and transitions. These insights support targeted improvements.
- **Promoted Effective Time Management:** The instrument emphasizes balanced lesson pacing, encouraging teachers to manage time effectively to ensure that essential concepts are taught within the allotted time frame.
- **Enhanced Classroom Efficiency and Learning Outcomes:** By focusing on time use, CLATEOS supports strategies that foster better student engagement, reduce disruptions, and improve overall instructional quality within the constraints of school schedules.

Classroom Interactions during Each Lesson:

- **Teacher-Student Interaction:** Involves direct engagement through questioning, explanation, feedback, and motivation. A teacher's ability to communicate clearly and respond to students' needs enhances learning outcomes.
- **Student-Student Interaction:** Includes discussions, group work, and peer learning,

fostering collaboration and deeper understanding. It encourages active participation, critical thinking, and social development.

- **Student-Material Interaction:** Occurs when students engage with textbooks, multimedia tools, or hands-on learning materials, reinforcing knowledge through self-directed exploration and practice.
- **Teacher-Material Interaction:** Involves a teacher using instructional aids like charts, digital tools, and experiments to enhance lesson delivery. Effective use of materials makes abstract concepts more tangible and improves comprehension.

Noise Interference during the Observation:

- Unplanned noise in the classroom can significantly disrupt learning and teaching effectiveness. Observing classroom noise requires evaluating internal and external disturbances that interfere with student concentration.
- Internal disruptions include chatter, movement, and other distractions within the classroom, while external sources may include noise from adjacent classrooms, hallways, or outside traffic.
- To manage noise effectively, observers must assess its frequency, intensity, and impact on student engagement.
- Strategies to minimize noise disruptions include rearranging seating, using visual cues, and implementing classroom management techniques.
- While some noise, like student discussions, can be constructive, unplanned noise must be controlled to maintain an effective learning environment.
- By proactively addressing noise, educators create a structured and focused classroom climate where students can engage in meaningful learning without unnecessary distractions.

8. Conclusion

By systematically recording classroom conditions, acoustics, pre-learning behaviors, and learning interactions, CLATEOS helps in evaluating teaching effectiveness, student engagement, and classroom climate. This structured observation method provides data-driven insights that can be used to improve instructional quality and optimize learning environments.

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