A STUDY ON EFFECTIVENESS OF TEACHING LEARNING SYSTEM IN LIFE SCIENCE IN RELATION TO COMPONENTS AND MECHANISM OF THE SYSTEM AT THE SECONDARY LEVEL SCHOOLS IN WEST BENGAL

A THESIS SUBMITTED TO THE UNIVERSITY OF KALYANI FOR THE FULFILMENT OF DOCTOR OF PHILOSOPHY IN EDUCATION

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CERTIFICATE

This is to certify that the research work entitled **"A STUDY ON EFFECTIVENESS OF TEACHING LEARNING SYSTEM IN LIFE SCIENCE IN RELATION TO COMPONENTS AND MECHANISM OF THE SYSTEM AT THE SECONDARY LEVEL SCHOOLS IN WEST BENGAL"** submitted by Smt. Nandini Banerjee for the fulfilment of the requirements of the award of Ph. D. degree in Education is based on the results of research work accomplished by her. No part of this work has been submitted for any other degree. She has completed the research work under my guidance.

Date :

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Date :

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Nandini Banerjee

Researcher

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I N T R O D U C T I O N

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INTRODUCTION

1.1 Introduction

System : Meaning and Concept

- A system has certain functions to perform A system has many components / parts each of these may have a different function to perform but all of these contribute to the function(s) of the system.
- The components of a system are interrelated and interdependent.

Thus a system may be defined as an entity which consists of interrelated and interdependent components, and works towards the attainment of certain functions.

"As deliberately designed synthetic organisms comprised of interrelated and interacting components which are employed to function in an integrated fashion to attain predetermined purposes".

Longman's Dictionary of Contemporary English edited by Paul Proeter defines System as a group of related parts working together : an ordered set of ideas, methods.

According to Oxford dictionary compiled by Betty Kirk Patrick (2002) System refers to structure, organization, order and arrangement of a particular dimension.

The Advanced Learner's Dictionary of Current English defines that "Group of things or parts working together in a regular relation".

Banghart (1969) defines system as "an integrated assembly of interacting elements, designed to carry out Co-operatively a predator mined function".

R. L. Coif (1971) defines "A system is the set often interrelated and interdependent elements".

Crawlford Robb (1973) : "System is a systematic organization of the

elements that operates in a unique way".

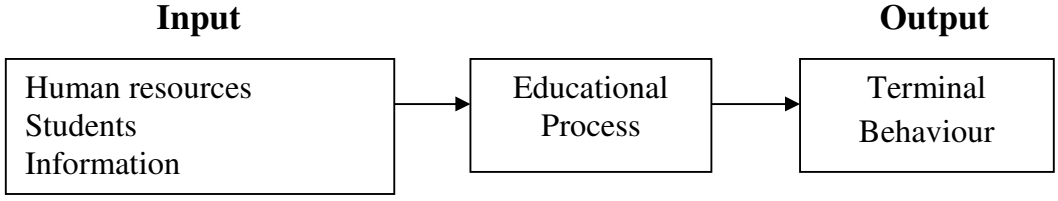
Robert Davis defines as "A learning system is an original combination of people, materials, facilities, equipment and procedures which interact to achieve the goal".

Hickey (1960) defines "A system is an assemblage of objects united by some form of regular interaction or interdependence, which collectively contribute towards an important and complex function".

Johnson, Kast, Rosenzweigh (1964) define a system as "an organized or complex whole, an assemblage or combination of things or parts for many a complex or unitary whole".

A. K. Jalaluddin (1981) : "A system may be defined as a dynamic, complex, integrated whole consisting of self-regulating pattern of interrelated and interdependent elements organized to achieve the predetermined and specified objectives".

The 'System' model of the educational process :



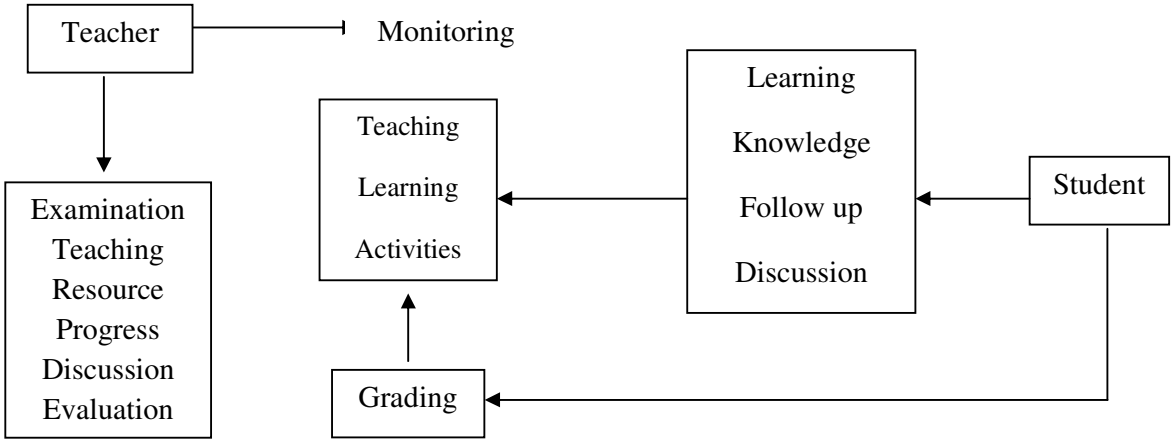
The problem is originated on the demand of the situation in present day context with viewing the global platform of education. Education is a tool which produces effectiveness and also effectiveness is the criteria through which educational systems may be scaled. In our country educational sector is completely subsidized by the state where reverse picture is the reality in present developed countries. Almost 15 to 30% amount of their budget is supported by the educational sector. But that can not be possible without having enough potentiality. That is why we are interested to find out the effective teaching learning system in the present research project so that we can have a better way for realizing education to make it productive.

A pilot study has been conducted regarding effective teaching learning system involving almost sixty factors out of which only some factors have been identified as satisfactory. It needs a detail investigation about the system and its mechanism for having a better output.

1.2 Emergence of the Problem

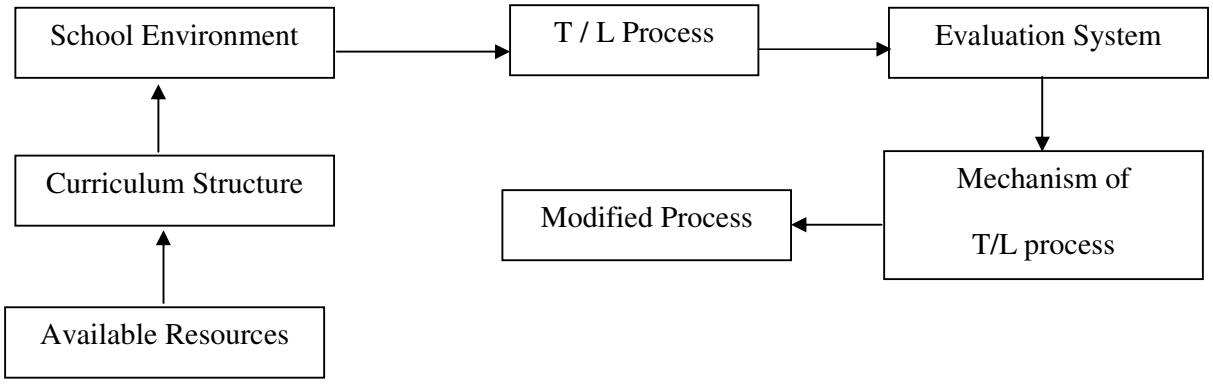
Problem is emerged from the following studies :

Model at the Interactive Teaching-Learning System by Young-shen-chen (2004) :



An alternative Indian model looks relevance mentioned below from Dr. Dibyendu Bhattacharyya :

Teaching-Learning System :



Here the process being modified by application of the mechanism of teaching learning process in a classroom situation.

The teaching learning system should be based on situational factors, availability of resources, infrastructural facilities, curriculum structure, teaching learning process and examination pattern is that the different components of a Teaching-Learning system.

Investigation will be conducted through survey on the basis of information taken from various schools in West Bengal including school environment, curriculum structure and availability of resources in secondary schools on the basis of a standardized questionnaire.

Remedial solution has been given on the last chapter by giving a suggested model namely Interest Diversification Model after investigating the input and the output. By comparing the input and the product finally conclusion has been made through mechanism of teaching and learning system.

Four stages of Foley is very much significant for explaining Teaching Learning System and in the present study the prescribed four stages of Foley is being followed.

Teaching Learning System (2002) by Roy Lee Foley :

The process of system dynamics for a teaching-learning system consists of five stages.

- **First stage :** It is the description or mapping of the system. It requires taking various bits of information about teaching-learning systems in the real world and turning them into a unified theory.
- **Second stage :** The formulation and construction of a simulation model is performed. The system description is translated and converted into the level and rate equations of a system dynamics model by providing the requisite parameters. Creating the simulation model requires that the rather general and incomplete description of the first stage be made explicit.

- **Third stage :** Simulation of the model will start after the equations of the previous stage pass the logical criteria of an operable model, such as all variables being defined and consistent units of measures. The first simulation at this stage will raise questions that cause repeated returns to the prior stage until the model becomes adequate for the purpose under consideration.
- **Fourth stage :** Some policy alternatives are chosen for testing.
- **Fifth stage :** Proposal policy changes will be tried to the model to maintain or obtain sustainable improvement in performance while considering the feasibility of implementing these changes in its real world. If the model is relevant and persuasive, then the process can be concluded for the necessary evaluations.

According to N. Eftekhar and D. R. Strong (2008), Dynamic modeling of a Teaching Learning system can be mentioned as follows :

1.3 Description of System Structure

1. The analysis of the dynamic behaviour of a learning process is undertaken using what is termed a "System approach". This approach calls for the consideration of a "Complex" set of relationship as a system. "Complexity" refers to a higher-order, multiple-loop, nonlinear feed back structure. All social systems belong to this class. Educational systems and specifically a learning teaching process that is a complicated set of interrelationships and activities has all the characteristics of a complex system.

2. Application of system analysis to a learning process requires the definition of the structure of interacting functions. The definitions of the structure must identify not only the separate functions but also their methods of interconnection. According to the theory of system structure, the four conceptual hierarchies are the closed boundary, components of the system especially stock level and flow rate variables, feedback loops, and policy structure.

3. The closed boundary defines the higher layer of the model. In fact, it is the control system of our interest. In this study, the boundary encloses a single system for a single student learning process. Interaction between this system and other sub-systems in a learning environment is simplified at this stage. The model structure developed is basically includes a main center-part for a learning process and some arbitrarily supporting infra-structures inside the defined boundary. Parts of the infra-structure represent sub-models and interact with the center-part.

4. The next hierarchy of system structure is the components of the system. These are four basic components of building blocks in the system : the stocks, the flows, the converters and the connectors. Stock levels and low rates relate to the accumulations and activities within the system. Stocks can be referred to as system state variables. They are integrations or accumulations of system flows that represent measurements of the state of the system at any given point in time. Flows are the instantaneous rates of flows that represent the means by which the system is controlled and represent activity points in the system. Converters are auxiliary functions converting states to system activities. They represent the decision process in the system. Finally the connectors are links that connect the components forming are that influence the flows that regulate the system.

5. Feedback loops represent the structural setting which all decisions are made. It is any structure of two or more casually related components that close back or themselves. Thus, the feedback loops provide a format for identifying flows of information and the relevant variables which articulate the system giving rise to cause and effect. For example, information about student achievement can provide an input to decisions concerning degree of student comfort, which in turn, controls the demand of student's effort. Any

system which has a purpose has an internal structure of feedback loops through which the system is controlled. Entire feedback loops, as well as the individual relationships within a loop, are described as either positive or negative. When any variable in a positive loop changes, the resulting interactions cause that variable to change further in the same direction. The positive loop, in other words, characteristically prodness self-reinforcing change (unrestrained growth). By contrast, when any variable in a negative loop is changed, then the loop causes the variable to readjust in the opposite direction. The negative loop produces self-regulating change (controlling and restorative behavior).

6. Implicit in rate equations, therefore, are the actions and policies which reflect the administration of the learning process. For example, the learning rate equation which controls the amount learned by a student reflects the policy of the student regarding the standards required for acquiring knowledge. Thus the last hierarchy in a general system structure can be defined as policy structure. Decisions are made for a purpose which in turn, implies a goal which in turn, implies a goal which the decision process in trying to achieve. Policy structure is mainly reflected in the definition of the rate variables.

1.4 Significance of the Study

- The output of the system is dependent on its effectiveness. Effectiveness of a system is therefore a professionalized pattern relevant to the present day teaching learning scenario.
- In developing countries like India, system approach is very much significant in controlling the quantity and quality ratio; as well it accelerates the quality of education in the present globalized system.
- A holistic approach has been suggested for explaining the Effective Teaching Learning System. Mostly we are talking about the effective

teaching or sometimes effective school or effective management or administration etc. but what is our observation is that one variable is highly related to another or summation of all the variables makes the system. Therefore we are interested to develop the system as a whole and try to prescribe for better school. We should have an effective system not only a single dimension but in the plural way crystallizing the system to produce maximum output

The complexity of Teaching & Learning can not be removed by mere technology as numerable components are interrelated and interdependent on it. Therefore an alternative may be focused through this approach with the help of technology and humanizing the system too.

1.5 International and National Status of the Study

Howard Miller, Associate Professor of Education at Lincoln University, has established 12 steps for the beginning of the year to help teachers promote effective classroom management. These are as follows :-

1. Develop a set of written expectations you can live with and enforce.
2. Be consistent. Be consistent. Be consistent.
3. Be patient with yourself and with your students.
4. Make parents your allies. Call early and often. Use the word “concerned”. When communicating a concern, be specific and descriptive.
5. Don’t talk too much. Use the first 15 minutes of class for lectures or presentations, then get the kids working.
6. Break the class period into two or three different activities. Be sure each activity runs smoothly into the next.
7. Begin at the very beginning of each class period and end at the very end.
8. Don’t roll call. Take the roll with your seating chart while students are working.

9. Keep all students actively involved. For example, while a student does a presentation, involve the other students in evaluating it.
10. Discipline individual students quietly and privately. Never engage in a disciplinary conversation across the room.
11. Keep your sense of perspective and your sense of humor.
12. Know when to ask for help.

According to Center for Teaching Effectiveness at Pennsylvania State University, the following dimensions are adapted for managing the classroom environment :

1. Start class on time, sending a message that being there is important.
2. End class on time.
3. Announce your class hours and keep them faithfully.
4. Set policies at the beginning of the course.
5. Be conscious about ethnographic position in the classroom situation.
6. Refer students with psychological, emotional, academic, or financial trouble to the appropriate counselors. You can be sympathetic and supportive, but becoming a student's counselor can cause problems.
7. Involve yourself only to the extent that you are expected to be involved.

Another way to apply the ideals of a positive classroom climate, according to the Indiana University Center for Adolescent Studies, is to create a peaceful classroom.

The center promotes 7 guidelines :-

1. Have a genuine interest in your students.
2. Communicate classroom rules clearly.
3. Be objective, not judgmental.
4. Show that you are human.
5. Minimize the power differential in everyday communication.
6. Address problem behavior directly and immediately.
7. Adopt a collaborative approach (Hawley, 1997).

Effective Teaching Strategies for Direct Instruction :

- Specify clear lesson objectives.
- Teach directly to those objectives.
- Make learning as concrete and meaningful as possible.
- Provide relevant guided practice.
- Provide transfer practice activities.

Effective teaching should be thought of as helping students to learn and every student encounter should be thought of as a student's opportunity for learning.

Foster a Good Learning Atmosphere :

- Be serious without creating excessive tension.
- Be prepared – have a flexible teaching plan in mind, but be ever on the lookout for the "teachable moment".
- Be positive toward learners – guard against sending unintentional messages.
- Be confident (not arrogant) but comfortable in not knowing everything.

Use of Effective Teaching Techniques :

- State what should be learned here.
- Situate the topic in respect to the adequate context.
- Involve learners in the process by having them, for example, present the problem, respond to questions, summarize the findings and discussion, and research and report on unanswered questions.
- Use questions effectively.
- Summarize at the end of discussion or activity.
- Use follow-up research and reporting to the group in a classroom situation.

Effective teaching is the basis of successful learning. Effective teaching identities and builds on prior knowledge, makes real life connections, develops deep understanding and monitors and reflects on learning.

Observing Effective Teaching Learning System :

1) An effective school is a school in which students achieve high standards that they can use in their fulltime education or the workplace, a school where students feel safe and happy.
2) It promotes those values that will help pupils to become good and responsible citizens, enable them to become involved in their community and become good family members. We all write these sorts of things in our school mission statements and school documents, but we are all too often distracted from them in day-to-day planning.
3) High standards are not the preserve of a few socially advantaged individuals and we should never lower our expectations on the basis of social background. For that reason, contextual data can leave us too easily satisfied with poor performance.
4) Establishing priorities in your own school will necessarily come from a consultation with school stakeholders.

In our country at the end of 20^{th} century we are looking for globalized pattern of education system which seeks to clarify productive nature of education. Most of the schools are in West Bengal are now not in the position to evaluate itself in this way but that does not mean we cannot avoid the reality. Some important aspects of institutional effectiveness are furnished below :

Empowering Leadership :

The key role for a head teacher is that of empowerment, creating a culture in which the vast intellect, ability and talent of the staff is not only solved, but fully utilized. If head teachers do not make it clear that all staff have the authority to make decisions, to be innovative and creative, then they will assume that they do not. If that happens, the vast wealth of knowledge and experience that exists in all schools will remain untapped.

Relying on Collaboration :

Choosing the appropriate networks to work with a matter of personal choice and school context. It is useful to work with local school leaders through local authorities in collaboration. Leadership incentive grants, Excellence in quality practice and so one can develop initiatives that may directly involve students across a locality.

Effective School Leadership :

Although it is recognized that head teachers pay a crucial role in school-wide effort to raise standards of teaching and pupil learning and achievement, evidence-based knowledge of what makes successful leaders remains elusive. The most popular theories are located in the transaction & transformational models identified more than 20 years ago (Burns, 1978) and lately reinvented through such terms as 'liberation' (Tampoe, 1998),'educative' (Duignan & Me Pherson, 1992), 'invitational' (Stoll & Fink, 1996) and 'moral' leadership (Sergiovanni, 1992).

What is clear from these, and from the effective schools literature, is that successful leaders not only set direction but they also model values and practices consistent with those of the school, so that 'purposes which may have initially seemed to be separate become fused' (Sergiovanni, 1995).

Significantly, along with some positive aspects there were also on going problems. Heads of different institutions worked long hours and were enabled to continue to develop partly through the unsung support of external network of colleagues, friends and family. It was however, both their personal values and their abilities to maintain and develop learning & achievement cultures, at the same time they have to manage some on going tensions and dilemmas, which were the main features of their success :

1. Leadership versus management.
2. Development versus maintenance.

3. Internal versus change.
4. Autocracy versus autonomy.
5. Personal time versus professional tasks.
6. Personal values versus institutional imperatives.
7. Leadership in small versus large schools.
8. Develop or dismiss.
9. Power with or power over.
10. Subcontracting or mediation.

According to Sammons, Hillman & Mortimore (1995) the characteristics that help make a school effective are broadly outlined as follows :

1. Focus on teaching and learning.
2. Purposeful teaching.
3. Shared vision and goals.
4. High expectations of all learners.
5. Accountability.
6. Learning Communities.
7. Stimulating and secure learning environment.
8. Professional leadership.

Focus on Teaching and Learning :

Effective schools are focused primarily on teaching and learning. They carefully consider time spent on academic and non-academic learning. Effective schools deploy their resources strategically to enhance teaching and learning. Professional learning activities and programmes are aimed at improving the teaching-learning relationship, paying particular attention to developing the subject and pedagogical knowledge of teachers.

Forming answers to the following questions may help to provide a focus on teaching & learning in a school :

- How well does our school manage the time spent on the there strands ?

- Identify one or two strategies that were implemented in the school to bring about improvement in the teaching-learning relationship. Analyse how effective the strategies have been. What worked well ? What hindered successful or full implementation ? Should the strategies be persevered with ?
- How effective are our professional learning activities that aim to improve student learning ?
- How well does our school manage the workload of staff, in particular the balance between time focused on teaching and learning and time spent on administrative tasks ?

Effectiveness through Student Evaluation :

Research on student evaluation of teaching generally concludes that student ratings tend to be reliable, valid, relatively unbiased and useful (Murray, 1994) with the following measures :

1. Evaluations are generally consistent across raters, rating forms, courses and time periods for a given semester.
2. They correlate moderately too highly with evaluations made of the same instructor by independent observers.
3. They correlate significantly with various objective indicators of student performance such as performance on standardized exams.
4. There are low correlations with extraneous factors such as clam size, severity of grading etc.

In short the research shows that student evaluations of a teacher provide a reliable, valid assessment of that instructor's teaching effectiveness, especially if they reflect the views of many students in several different course offerings (Felder, 2001).

1.6 Objectives of the Study

1. To study the Effective Teaching Learning System in Life Science from some selected secondary level schools in West Bengal.
2. To apply a standardize questionnaire regarding effective Teaching Learning System.
3. To find out the components of Effective Teaching Learning System in Life Science.
4. To determine factors relevant for Effective Teaching Learning System.
5. To find out the mechanism of Effective Teaching Learning System.

1.7 Methodology

The study is survey type descriptive research followed by Experimental research and the approach is mixed type of research. For finding out the components of the Teaching Learning system statistically Factorial analysis has been conducted with other descriptive statistics.

1.8 Tools

A Standardized Questionnaire of Dr. D. Bhattacharyya and A. K. Hazra regarding Effective Teaching Learning System has been used for conducting the Study and it has been locally further standardized before application.

1.9 Population and Sample

Ninth grade students of West Bengal has been considered as population and some selected schools are used as sample for conducting the study. Sampling technique is purposive in nature. Total Sample size is 100 taken from different schools representing different parts of West Bengal.

1.10 Limitations

Effective teaching learning system is a wide range of study for enhancing quality in Education. But not all kinds of schools are included in the study.

Especially selected Bengali medium schools from selected districts are included in the study. English medium schools are not included in the study. Sample size is one hundred out of which purposive sample technique has been used and that sample size may be larger but limited by the researcher.

CHAPTER – II

REVIEW OF

RELATED STUDIES

CHAPTER – II

REVIEW OF RELATED STUDIES

2.1 General Views on School Effectiveness

1) Collaboration between students and teachers.
2) Teachers' characteristics.
3) Management of resources.
4) Students' motivation.
5) Parental involvement.
6) Six-year continuity.

The University of Chicago Press shows that the study described in this article by Charles Teddlie, Peggy C. Kirby & Sam Stringfield (1989) investigated differences at the classroom level in effective and ineffective schools. Teachers in more effective schools scored consistently higher on all identified dimensions of effective teaching. Field notes from observations in one matched pair of schools suggested possible school- level factors contributing to these classroom differences. The authors suggest that an astute, highly visible administrator and clear academic focus facilitate effective teaching, but they recognize that there may also be a reciprocal increase in school-effectiveness variables (such as quality of leadership and academic mission) resulting from the cultivation or appointment of effective teachers.

In 1990, Levine Daineu shows that a synthesis of research on unusually effective schools is presented in this monograph, with a focus on research conducted since 1985. Three major issues are addressed : (i) The viability of the effective school concept in contemporary school reform; (ii) The correlation between recent research and basic findings and (iii) the congruency of school level practices with Research on classroom and district practices and policies.

According to Miller S. K. (1984) the development of research concerning effective schools and provides a critical, synthesizing overview of various research strands. Strands of research included are self-concept, teacher expectations, democratic-authoritarian leadership, various uses of the term "school climate", input-output production models (with particular emphasis on the 1966 Coleman Report), econometric studies, case studies, and status attainment literature. The paper stresses the converging lines of these various research perspectives and discusses methodological issues which were involved in the gradual change in the public's attitudes, from "schools do not make a difference" to "schools can make a difference". The issue of educability is raised with respect to possibilities for large-scale educational improvement based on the effective schools research. Two opposing values, economic efficiency and equity-effectiveness, are related to beliefs about the distribution of ability. It is suggested that educational policy and school improvement are determined more by political and economic choices than by research on state of the art school effectiveness.

Although there is no consistent agreement in the literature on the determinants of Teaching Learning System, several aspects of a school's physical and social set-up comprise its climate. One organization identified the following areas for making it effective :

- Appearance and physical set-up.
- Faculty relations.
- Student interactions.
- Leadership or decision making.

Another study by John Schweitzer of Michigan State University, found that when students in Detroit schools felt a sense of community with one another and a sense of belonging to their schools, they achieved higher scores.

A national study of more than 12,000 seventh to twelfth graders found that connectedness to family and school significantly protects youth from seven

of eight behaviours risky to their health.

In Indian context it has been observed that student teacher relationship and when students are engaging in some organizational activities they perform better.

Improving student behavior and academic performance generally requires changing school climate and school culture and it is specially important for making the Teaching Learning effective.

Different studies showed while making positive changes in school climate motivates staff and students to improve, the leadership of school is essentially very improvement.

In Indian context Teaching Learning system is specially based on humanistic approach and have a servicing attitude but globally that has been changed where it is guided by professional approach reflected from the following study :

1) Teachers and the school are accountable.

2) All children can and must learn.

In the general description of school effectiveness research as per Jaap Schreens it is important to note that school effectiveness is a causal concept. Some authors therefore make an explicit difference between school-effectiveness research on the one hand and school effects research on the other (cf. Purkey and Smith, 1983). In school-effectiveness research not only are differences in overall performance assessed, but the additional question of causality is raised : which school characteristics lead to relatively higher performance, when the characteristics of the student populations are otherwise constant ?

Therefore as per Schreens observation it is important to clarify both qualitative and quantitative approach are to be considered for effectiveness of Teaching Learning System.

In context of West Bengal effective criteria does not mean either school-

effectiveness research or its impact or the economic foundation of Indian Education system rather it is achievement oriented and based on availability of external resources.

The present picture shows the infrastructure of a school building where number of teachers are 37 and number of students are 1600, therefore student and teacher ratio is almost 40 : 1.

2.2 Economic Definitions of Effectiveness (Scheerens)

In economics, effectiveness can be summed up as a 'turnover' or transformation of 'inputs' into 'outputs'. The transformation process or throughput within a school can be understood as all the instruction methods, curriculum choices and organizational preconditions that make it possible for pupils to acquire knowledge.

Effectiveness can now be described as the extent to which the desired level of output is achieved. Efficiency may then be defined as the desired level of output against the lowest possible cost. In other words, efficiency is effectiveness with the additional requirement that this is achieved in the cheapest possible manner.

Cheng (1993) has offered a further elaboration of the definitions of effectiveness and efficiency, incorporating the dimension of short-term output versus long-term outcomes. In his terms : technical effectiveness and efficiency refer to "school outputs limited to those in school or just after schooling (e.g. learning behaviour, skills obtained, attitude change, etc.)", whereas social effectiveness and efficiency are associated with "effects on the society level or the life-long effects on individuals (e.g. social mobility, earnings, work productivity)" (ibid, p. 2). If one combines these two dimensions, four types of school output can be distinguished .

Distinction between School Effectiveness and School Efficiency [Cited from Cheng (1993)] :

	Nature of School Output	
Nature of school input	In school / Just after schooling short-term effects Internal (e.g. learning behaviour, skills obtained)	On the society level long-term effects External (e.g. social mobility, earnings, productivity)
Non-monetary (e.g. teachers, teaching methods, books)	School's societal effectiveness	School's technical effectiveness
Monetary (e.g. cost of books, salary, opportunity costs)	School's technical efficiency (internal economic effectiveness)	School's societal efficiency (external economic effectiveness)

It is vital for the economic analysis of efficiency and effectiveness to be able to express the value of inputs and outputs in terms of money. In order to determine efficiency, it is necessary to know the input costs such as teaching materials and teachers' salaries. When the outputs can also be expressed in financial terms, efficiency determination resembles a cost-benefit analysis (Lockheed, 1988, p. 4). It has to be noted, however, that a strict implementation of the above-mentioned economic characterization of school effectiveness runs up against many problems.

In Indian context efficiency does not mean in terms of economy as it is mostly subsidised either by State Govt. or by Central Govt. and here effectiveness is generally mean imparting quality education and improvement of Teaching Learning System but yes it is true very slowly economic definition is coming to the Education system.

Components of Effective Teaching Learning System :

Teaching Learning System is reflected through organization's atmosphere, myths, and moral code and can be deduced from multiple layers :

Values : The manner in which administrators, principals and staff function and interact.

Assumptions : The beliefs that are taken for granted about human nature. Teaching Learning system is maintained by several practices as reflected from reviews pointed below :

- Common beliefs and values that key individuals communicate and enforce.
- Heroes and heroines whose actions and accomplishments embody these values.
- Rituals and ceremonies that reinforce these values.
- Stories that reflect what the organization stands for.

The following documents show how these components of school culture can support learning for academic betterment :

Teaching Learning System reflects the physical and psychological aspects of the school that are more susceptible to change and that provide the preconditions necessary for teaching and learning take place.

Teaching Learning System, the focus of the, is evident in the feelings and attitudes about a school expressed by students, teachers, staff and parents-the way students and staff "feel" about being at school each day.

Teaching Learning System is a significant element in discussions about improving academic performance and school reform. It is also mentioned in discussions of potential solutions to problems such as bullying, inter-student conflicts, suicide, character education, and moral education.

Most of the Govt. aided schools are running purely subsidised by the State Governments. Students enrolments are being encouraged by serving mid-day meals among the students reflected from the picture of a School in West Bengal. Students are taking mid-day meals.

2.3 Theoretical Views on Organizational Effectiveness

The Organic System Model involves :

1) flexibility,
2) adaptability and
3) school effectiveness may then be measured in terms of yearly intake.

Intake capacity has now been increasing in Govt. Schools at elementary level besides Private Schools.

Following points have detrimental effects on student performance furnished below (Abrams, Pedulla, & Madaus, 2003).

1) Motivation and responsibility of the individual student.
2) Socioeconomic status.
3) Students with high test results are rewarded externally.

1) For students who do not perform well, such as those with test anxiety, language barriers, or special education students who are required to take a grade equivalent test, this extrinsic reward system can be devastating.

2) Research shows that in many cases, classroom instruction is changing to better match the content found on high-stakes tests. Also, instruction focuses on test content or test-taking skills and ignores subject areas that are not on the test. High-stakes tests limit the scope of the classroom instruction and student learning in undesirable ways (Stecher & Barron, as cited in Abrams *et al.*, 2003).

3) In a study by Cankoy and Tut (2005), one group of fourth grade students spent 70% of class time on test-taking skills, a second group spent 50% of class time on test-taking skills, and a third group only spent 30% of class time on test-taking skills. Test-taking skills included completing test questions from former tests, giving tests for drill, teaching procedures for answering multiple-choice questions, and memorizing rules. The study found that teaching students standard procedures to solve different types of math problems is not an effective approach to teach problem solving. Also, there was no difference in the three groups' performances on non-routine math story problems, and spending more class time on test-taking skills did not affect the non-routine story problem solving. To conclude, this study feels that tests and classroom instruction should emphasize and foster problem-solving skills more so than test-taking skills.

Students are Silent Spectators followed by Memorization :

Niskanen (1971) demonstrated that public-sector organizations are primarily targeted at maximizing budgets and that there are insufficient external incentives for these organizations – schools included – to encourage effectiveness and efficiency. In this context it is interesting to examine whether canvassing activities of schools mainly consist of the displaying of acquired facilities (inputs) or of the presentation of output data such as the previous years' examination results.

Finally, it should also be mentioned that although the organic system model is inclined towards inputs, this does not necessarily exclude a concern for satisfying outputs. This may be the case in situations where the environment makes the availability of inputs dependent on the quantity and / or quality of previous achievements (output).

In case of Indian context organic system model has been gradually coming to the market and growing privatization of the school system it can be

considered within ten years the structural set-up and merkerization will be hike-up.

Demonstrations in classroom situation are very rare practices in schools mostly theoretical practices are in reality. Library but no students are found in study.

ICT Lab and Students are engaging in Practical Activities :

Numerous studies document that students in schools with a better school climate have higher achievement and better socio-emotional health. Probably the most comprehensive work in this area is being done by the Search Institute, a non-profit organization that encourages schools and communities to develop and empower young people.

In a review of studies on the impact of support in school, the Search Institute found that a caring school culture is associated with Academic Achievement, both in qualitative and quantitative way :

i) Higher grades.
ii) Engagement.
iii) Attendance.
iv) Expectations and aspirations.
v) Sense of scholastic competence.
vi) Fewer school suspensions.
vii) On-time progression through grades (19 studies).
viii) Higher self-esteem and self-concept (5 studies).
ix) Less anxiety, depression and loneliness (3 studies).
x) Less substance abuse (4 studies).

Based on well-known distinctions in organizational science (e.g. Mintzberg, 1979; De Leeuw, 1982), the following categories can be used as a framework to further distinguish elements and aspects of school functioning :

- Goals;

- The structure of positions or sub-units (‘aufbau’);
- The structure of procedures (‘ablauf’);
- Culture;
- The organization’s environment;
- The organization’s primary process.

These antecedent conditions will be referred to as modes of schooling. Modes are considered as conditions that, in principle, may be manipulated by the school itself or by outside agencies that have control over the school. The overall effectiveness equation, consisting of antecedent conditions on the one hand and effects on the other hand.

Among these modes, goals have a specific role. In organizational-effectiveness thinking, goals can be seen as the major defining characteristic of the effectiveness concept itself. In the previous section it was established that different goals, or effectiveness criteria, can be used to assess effectiveness.

Finally, one of the tasks of the organization may be considered to be ensuring that goals or attainment targets are shared among the members of the organization. This is particularly relevant for organizations such as schools, in which teachers traditionally have a lot of autonomy. In control theory the phenomenon of unifying the goals of organizational sub-units (i.e. departments and individual teachers, in the case of schools) is known as ‘goal co-ordination’.

‘Pupil selection’ is a condition that would generally fall outside the definition of school effectiveness, since the specific interest in the value added by schooling, over and above the impact of the innate abilities of pupils, precludes the consideration of this option.

Modes of Schooling :

Goals :

- Goals in terms of various effectiveness criteria.
- Priorities in goal specifications (cognitive – non-cognitive).

- Aspirations in terms of attainment level and distribution of attainment.
- Goal co-ordination.

Aufbau (Position Structure) :

- Management structure.
- Support structure.
- Division of tasks and positions.
- Grouping of teachers and students.

Ablauf (Structure of Procedures) :

- General management.
- Production management.
- Marketing management.
- Personnel management (among which hrm, hrd)
- Financial and administrative management.
- Co-operation.

} planning, co-ordinating controlling, assessing

Culture :

- Indirect measures.
- Direct measures.

Environment :

- Routine exchange (influx of resources, delivery of products).
- Buffering.
- Active manipulation.

Primary Process :

- Curricular choices
- Curriculum alignment.
- Curriculum in terms of prestructuring instructional process.

- Pupil selection.
- Levels of individualization and differentiation.
- Instructional arrangement in terms of teaching strategies and classroom organization.

If effectiveness is recognized as being essentially a causal concept, in which means-to-end relationship are similar to cause-effect relationships, then one may consider that there are three major components in the study of organizational effectiveness :

- The range of effects.
- The avenues of action used to attain particular effects (indicated as modes of schooling).
- Functions and underlying mechanisms that explain why certain actions lead to effect-attainment.

Basic Framework :

- Goals.
- Organizational structure, both with respect to the structure of positions, and the structure of procedures (including management functions).
- Culture.
- Environment.
- Primary process / technology.

The results of the early effective-schools research converged more or less around five factors :

- Strong educational leadership.
- Emphasis on the acquiring of basic skills.
- An orderly and secure environment.
- High expectations of pupil attainment.
- Frequent assessment of pupil progress.

In the literature this is sometimes identified as the 'five-factor model of school effectiveness'. In more recent contributions, effective-schools research has been integrated with education production function and instructional-effectiveness research, this meaning that a mixture of antecedent conditions has been included. Studies have evolved from comparative case studies to surveys, and conceptual and analytical multi-level modelling has been used to analyze and interpret the results. Numerous reviews on school effectiveness have been published since the late seventies. Examples are Purkey and Smith (1983) and Ralph and Fennessey (1983). More recent reviews are those by Levine and Lezotte (1990), Scheerens (1992), Creemers (1994), Reynolds *et al.* (1993), Sammons *et al.* (1995), and Cotton (1995).

2.4 Effectiveness-enhancing conditions of schooling in five review studies (italics in the column of the Cotton study refer to sub-categories)

Purkey and Smith, 1983	**Levine and Lezotte, 1990**	**Scheerens, 1992**	**Cotton, 1995**	**Sammons, Hillman and Mortimore, 1995**
Achievement-oriented policy	Productive climate and culture	Pressure to achieve	Planning and learning goals	Shared vision and goals
Co-operative atmosphere, orderly climate		Consensus, co-operative planning, orderly atmosphere	Curriculum planning and development	A learning environment, positive reinforcement
Clear goals on basic skills	Focus central learning skills		Planning goal learning goals school-wide emphasis on learning	Concentration on teaching and learning

Purkey and Smith, 1983	**Levine and Lezotte, 1990**	**Scheerens, 1992**	**Cotton, 1995**	**Sammons, Hillman and Mortimore, 1995**
Frequent evaluation	Appropriate monitoring	Evaluative potential of the school, monitoring of pupils' progress	Assessment (district, school, classroom level)	Monitoring progress
In-service training / staff development	Practice-oriented staff development		Professional development collegial learning	A learning organization
Strong leadership	Outstanding leadership	Educational leadership	School management and organization, leadership and school improvement, leadership and planning	Professional leadership
	Salient parent involvement	Parent support	Parent community involvement	Home-school partnership
Time on task, reinforcement, streaming	Effective instructional arrangements	Structured teaching, effective learning time, opportunity to learn	Classroom management and organization, instruction	Purposeful teaching

Purkey and Smith, 1983	Levine and Lezotte, 1990	Scheerens, 1992	Cotton, 1995	Sammons, Hillman and Mortimore, 1995
High expectations	High expectations		Teacher student interaction	High expectation
				Pupil rights and responsibilities
			District-school interactions	
			Equity	
			Special programmes	
		External stimuli to make schools effective		
		Physical and material school characteristics		
		Teacher experience		
		School context characteristics		

2.5 Components of 14 Effectiveness-enhancing Factors

Factors	Components
Achievement, orientation high expectations	• clear focus on the mastering of basic subjects • high expectations (school level) • high expectations (teacher level) • records on pupils' achievement

Factors	Components
Educational leadership	• general leadership skills • school leader as information provider • orchestrator or participative decision-making • school leader as co-ordinator • meta-controller of classroom processes • time spent on educational and administrative leadership • counsellor and quality controller of classroom teachers • initiator and facilitator of staff professionalization
Consensus and cohesion among staff	• types and frequency of meetings an consultations • contents of cooperation • satisfaction about co-operation • importance attributed to co-operation • indicators of successful co-operation
Curriculum quality / opportunity to learn	• setting curricular priorities • choice of methods and textbooks • application of methods and textbooks • opportunity to learn • satisfaction with the curriculum
School climate	(a) Orderly atmosphere • the importance given to an orderly climate • rules and regulations • punishment and reward • absenteeism and drop-out • good conduct and behaviour of pupils • satisfaction with orderly school climate

Factors	Components
	(b) Climate in terms of effectiveness orientation and good internal relationships • priorities in an effectiveness-enhancing school climate • perceptions on effectiveness-enhancing conditions • relationships between pupils • relationships between teacher and pupils • relationships between staff • relationships : the role of the head teacher • pupils' engagement. • appraisal of roles and tasks • job appraisal in terms of facilities, conditions of labour, task load and general satisfaction • facilities and building
Evaluative potential	• evaluation emphasis • monitoring pupils' progress. • use of pupil monitoring systems. • school process evaluation. • use of evaluation results • keeping records on pupils' performance • satisfaction with evaluation activities
Parental involvement	• emphasis on parental involvement in school policy • contact with parents • satisfaction with parental involvement
Classroom climate	• relationships within the classroom • order • work attitude • satisfaction

Factors	Components
Effective learning time	• importance of effective learning • time • monitoring of absenteeism • time at school • time at classroom level • classroom management • homework

Ref : Improving School Effectiveness Jaap Scheerens (2000).

Students are Participating in Exhibition in an Orderly Set-up :

This research has been identified in the literature as 'process-product studies'. Variables which emerged 'strongly' in the various studies were the following (Weeda, 1986, p. 68) :

- clarity : clear presentation adapted to suit the cognitive level of pupils;
- flexibility : varying teaching behaviour and teaching aids, organizing different activities etc.;
- enthusiasm : expressed in verbal and non-verbal behaviour of the teacher;
- task related and / or business like behaviour : directing the pupils to complete tasks, duties, exercises etc. in a business like manner;
- criticism : much negative criticism has a negative effect on pupil achievement;
- indirect activity : taking up ideas, accepting pupils' feelings and stimulating individual activity;
- providing the pupils with an opportunity to learn criterion material – that is to say, a clear correspondence between what is taught in class and what is tested in examinations and assessments;
- making use of stimulating comments; directing the thinking of pupils to the question, summarizing a discussion, indicating the beginning or end of a

lesson, emphasizing certain features of the course material.

- varying the level of both cognitive questions and cognitive interaction.

In later studies effective teaching time became a central factor. The theoretical starting points of this can be traced back to Carroll's teaching-learning model (Carroll, 1963). Chief aspects of this model are :

- actual net learning time which is seen as a result of perseverance and opportunity to learn;
- necessary net learning time as a result of pupil aptitude, quality of education and pupil ability to understand instruction.

Doyle (1985) looked at the effectiveness of direct teaching, which he defined as follows :

- teaching goals are clearly formulated;
- the course material to be followed is carefully split into learning tasks and placed in sequence;
- the teacher explains clearly what the pupils must learn;
- the teacher regularly asks questions to gauge what progress pupils are making and whether they have understood;
- pupils have ample time to practise what has been taught, with much use being made of 'prompts' and feedback;
- skills are taught until mastery of them is automatic;
- the teacher regularly tests the pupils and calls on them to be accountable for their work.

The question of whether this type of highly structured teaching works equally well for acquiring complicated cognitive processes in secondary education as for mastering basic skills at the primary-school level has been answered in the affirmative (according to Brophy & Good, 1986). Yet, in such settings, progress through the subject matter can be taken with larger steps, testing need not be so frequent and there should be space left for applying

problem-solving strategies flexibly. Doyle (ibid) emphasized the importance of varying the learning tasks and of creating intellectually challenging learning situations. These can be produced through an evaluative climate in the classroom, where risk-taking is encouraged, even with complicated tasks.

In the domain of classroom organization, Bangert, Kulik and Kulik's meta-analysis (1983) revealed that individualized teaching in secondary education hardly led to higher achievement and had no influence whatsoever on factors such as self-esteem and attitudes of pupils. 'Best-evidence-syntheses' by Slavin (1996) indicated a significantly positive effect of co-operative learning at the primary-school level.

Meta-analyses by Walberg (1984) and Fraser *et al.* (1987) found the most significant effects for the following teaching conditions :

- Reinforcement.
- Special programmes for gifted children.
- Structured learning of reading.
- Cues and feedback.
- Mastery learning of physics.
- Working together in small group.

Committee on plan projects panel for education system in secondary schools, 1964 for suggested and extracting teaching learning system in Life Science (Report on Science Education in Secondary Schools : New Delhi, G. I. Press, 1964)

Main Recommendations :

The following are some of the recommendations made by the panel :

1. The Education Department of each State should frame proposals for the new academic year well in advance of the start of the academic session furnishing full details. This will help schools to complete formalities and procure science equipment in time for the new session.

2. When science teaching is introduced in a high school, a minimum amount of Rs. 10,000 may be earmarked for setting up a reasonably well-equipped laboratory for Physics and Chemistry. In case Biology is also introduced an additional amount of Rs. 300 should be provided.
3. For Middle schools, a sum of Rs. 4,000 for science equipment is considered essential.
4. Each middle and high school should have a workshop attached to it for which a grant of Rs. 1,000 should be sanctioned separately.
5. Adequate facilities should be provided to science teachers and students for working on hobbies during school hours and in spare time. Refresher courses and workshops should be arranged for teachers periodically.
6. The creation of a separate branch of Science Education in each State Department of Education under a Special Officer would strengthen the steps being taken at various levels for improvement of science teaching. The report has six appendices dealing with various aspects of science equipment and apparatus required for High Schools and Middle Schools.

After post independence (1947) to impart science education was rather difficult in India. Because before independence science education was limited in a particular section. But after independence separate educational strategy had been taken where mass education was an emergent need. Therefore a balance had to maintain between the need and demand on science education on that time. In 1964 the report was basically on the above reason specially framed on the basis of socio-economic condition. Science education was encouraged on the secondary schools in India in the above report.

Education Commission, 1964-66 Report (Education and National Development : Delhi, Manager of Publications, 1966) :

Main Recommendations :

The Report makes recommendations about various sectors and aspects of

education, some of which are as follows :

1. Work-experience and social service should be introduced as integral parts of general education at more or less all levels of education.
2. Secondary education should be vocationalised.
3. Mother-tongue has a pre-eminent claim as medium of instruction at school and college stages. Moreover, the medium of education in school and higher education should generally be the same. The regional language should, therefore, be adopted as the media of education in higher education.
4. The teaching and study of English should continue to be promoted right from the school stage. English will serve as a link language in higher education for academic work and intellectual inter-communication.
5. The Central and State Governments should adopt measures to introduce education in moral, social and spiritual values in all institutions under their control.
6. Secondary schools should be of two types – high schools providing a course of 11–12 years.
7. Education, as distinguished from pedagogy, should be recognised as an independent academic discipline.
8. Duration of training courses should be two years for primary teachers who have completed the secondary school course. It should be one year for the graduate students.
9. Science and mathematics should be taught on a compulsory basis to all pupils as a part of general education during the first ten years of schooling.
10. No single stage of education need be designated as basic education, but its essential principles should be retained to guide and shape the educational system at all levels.
11. External examinations should be improved by orienting question papers to objectives rather than to acquisition of knowledge, by improving the nature

of questions, adopting scientific scoring of scripts.

12. Internal assessment should be comprehensive and evaluate all aspects of student growth.
13. Some centres of advanced study and a small number of major universities should be set up with the view to achieving highest international standards.
14. Education for agriculture, and research in agriculture and allied sciences should be given a high priority in the scheme of educational reconstruction.
15. The Ministry of Education, in collaboration with the Asian Institute of Educational Planning, should under. According to Indian Parliamentary & Scientific committee 1961 science education should be imparted on the basis of practical orientation and Vocation based. Science education in Secondary level would be on the general basis.

National Knowledge Commission and Higher Education :

Meaningful reform of the higher education system, with a long-term perspective is both complex and difficult. First, it is essential to reform existing public universities and undergraduate colleges. Second, it is necessary to overhaul the entire regulatory structure governing higher education. Third, every possible source of financing investment in higher education needs to be explored. Fourth, it is important to think about pro-active strategies for enhancement of quality in higher education. Fifth, the time has come to create new institutions in the form of National Universities that would become role models as centres of academic excellence. Sixth, the higher education system must be so designed that it provides access to marginalized and excluded groups. Even so, we believe that reforms in the following spheres, along the lines suggested by us, are not only possible but would also make a difference.

Number and Size : India has about 350 universities. This number is simply not enough with reference to our needs in higher education, or in comparison with

China which has authorized the creation of 1250 new universities in the last three years. Yet, some of our universities are much too large, for ensuring academic standards and providing good governance. We need to create more appropriately scaled and more nimble universities. The moral of the story is not only that we need a much larger number of universities, say 1500 nationwide by 2015, but also that we need smaller universities which are responsive to change and easier to manage.

Curriculum : The syllabi of courses in universities, which remain unchanged for decades, need to be upgraded constantly and revised frequently. The laws of inertia reinforced by resistance to change must be overcome. Universities should be required to revise or restructure curricula at least once in three years. These revisions must be subjected to outside peer review before implementation. The process for such revisions should be streamlined and decentralized, with more autonomy for teachers, through a change in statutes wherever necessary. For existing systems often act as major impediments to a timely or speedy revision of curricula. There should be some mode of censure for departments or universities that do not upgrade their courses regularly. It needs to be recognised that it is very difficult to introduce new courses or innovative courses in universities because of departmental divides. Appropriate institutional mechanisms should be put in place to resolve this problem.

Assessment : The nature of annual examinations at universities in India often stifles the teaching-learning process because they reward selective and uncritical learning. There is an acute need to reform this examination system so that it tests understanding rather than memory. Analytical abilities and creative thinking should be at a premium. Learning by rote should be at a discount. Such reform would become more feasible with decentralized examination and smaller universities. But assessment cannot and should not be based on examinations

alone. There is a clear need for continuous internal assessment which empowers teachers and students alike, just as it breathes life back into the teaching learning process. Such internal assessment would also foster the analytical and creative abilities of students which are often a casualty in university-administered annual examinations. To begin with, internal assessment could have a weight of 25 percent in the total but this should be raised to 50 percent over time.

Course Credits : The present system is characterised by too many rigidities and too few choices for students. Universities that are smaller, or run semester-based systems, are obviously more flexible. Even in large universities, however, it is necessary to introduce greater diversity and more flexibility in course structures. This would be the beginning of a transition to a course credit system, where degrees are granted on the basis of completing a requisite number of credits from different courses. Every student should be required to earn a minimum number of credits in his/ her chosen discipline but should have the freedom to earn the rest from courses in other disciplines. It is essential to provide students with choices instead of keeping them captive.

Research : We attempted to create stand-alone research institutions, pampered with resources, in the belief that research should be moved out of universities. In the process, we forgot an essential principle. There are synergies between teaching and research that enrich each other. And it is universities which are the natural home for research. What is more, for universities, research is essential in the pursuit of academic excellence. It is time to reverse what happened in the past and make universities the hub of research once again. This would need changes in resource-allocation, reward-systems and mindsets. Substantial grants should be allocated for research. The provisions of these grants should be competitive and the criteria for these grants should be different from the usual criteria for non-plan and plan grants.

Faculty : There must be a conscious effort to attract and retain talented faculty members. This is necessary because talented students who are potential faculty members have choices that are far more attractive in other professions in India or in the academic profession outside India. It is necessary to provide working conditions in the form of office space and research support combined with housing. But it may not be sufficient. This must be combined with some incentives and rewards for performance. There is, however, another dimension to the problem. Universities do not always choose the best in part because of native-son/daughter policies which leave them to select their own former students. This tends to lower quality and foster parochialisation in universities. Therefore, cross-pollination between universities should be encouraged. It may be worth introducing a ceiling, say one-half or even one-third, on the proportion of faculty members than can be hired from within the university. This would almost certainly engender greater competition and more transparency in faculty appointments.

Finances : There is a serious resource crunch in universities which leaves them with little financial flexibility. In general, about 75 per cent of maintenance expenditure is on salaries and pensions. Of the remaining 25 per cent, at least 15 per cent is absorbed by pre-emptive claims such as rents, electricity, telephones and examinations. The balance, less than 10 per cent, is not even enough for maintenance let alone development. Laboratories and libraries languish while buildings crumble. But that is not all. In most universities, plan (investment) expenditure is less than 5 per cent of non-plan (maintenance) expenditure. Such a small proportion of investment in total expenditure can only mortgage the future. It is doing so. The time has come for some strategic thinking on the re-allocation of budgets for universities with some allocation for development grants and on needs other than salaries. The criteria for resource allocation should seek to strike a much better balance between providing for salaries/

pensions and providing for maintenance/ development/ investment. These criteria should recognise the importance of a critical minimum to ensure standards and strategic preferences to promote excellence.

Infrastructure : The elements of infrastructure that support the teaching-learning process, most directly, need to be monitored and upgraded on a regular basis. This means attention particular attention to libraries and laboratories, in addition to class rooms, sports facilities and auditoriums. It is imperative that universities provide broadband and connectivity to all students and teachers in campuses. In parallel, information technology systems should be used for admissions, administration and examinations along with other relevant web services for campus communities. And, as soon as possible, a digital infrastructure for networking universities should be put in place.

Governance : There is an acute need for reform in the structures of governance of universities. The present system is flawed. On the one hand, it does not preserve autonomy. On the other, it does not promote accountability. The autonomy of universities is eroded by interventions from governments and intrusions from political processes. This must be stopped. At the same time, there is not enough transparency and accountability in universities. This must be fostered. It is exceedingly difficult to provide generalized prescriptions. Some steps, which would constitute an important beginning, are clear. First, the appointments of Vice-Chancellors should be based on search processes and peer judgment alone. These must be freed from direct or indirect intervention on the part of governments. Once appointed, Vice Chancellors should have a tenure of six years, because the existing tenure of three years in most universities and five years in central universities is not long enough. Second, the size and composition of University Courts, Academic Councils, and Executive Councils slows down decision-making processes and sometimes constitutes an

impediment to change. University Courts, with a size of 500 plus, which are more a ritual than substance, could be dispensed with. Large Academic Councils do not meet often. Even when they meet, decisions are slow to come. Thus, Standing Committees of Academic Councils, which are representative, should be created for frequent meetings and expeditious decisions. The Vice-Chancellor should, then, function as a Chief Executive Officer who has the authority and the flexibility to govern with the advice and consent of the Executive Council which would provide checks and balances to create accountability. Third, experience suggests that implicit politicisation has made governance of universities exceedingly difficult and much more susceptible to entirely non-academic interventions from outside. This problem needs to be recognised and addressed in a systematic manner not only within universities but also outside, particularly in governments, legislatures and political parties.

Undergraduate Colleges :

Undergraduate education, which accounts for about 85 percent of the enrolled students, is the largest component of our higher education system. It is imparted through colleges where students enroll for first degrees in Arts, Science or Commerce. There are a total of about 17,700 undergraduate colleges. Of these, a mere 200 colleges are autonomous. The rest, as many as 17,500 colleges, are affiliated to, or constituent in, 131 universities. On average, each university has more than 100 affiliated colleges, but there are some universities each of which has more than 400 affiliated colleges. This system of affiliated colleges for undergraduate education, which may have been appropriate fifty years ago, is neither adequate nor appropriate at this juncture, let alone for the future. It is cumbersome to manage. And it is difficult to ensure minimal academic standards across the board. The problem has at least three dimensions. First, it imposes an onerous burden on universities which have to regulate admissions, set curricula and conduct examinations for such a large number of

undergraduate colleges. The problem is compounded by uneven standards and geographical dispersion. Second, the undergraduate colleges are constrained by their affiliated status, in terms of autonomy and space, which makes it difficult for them to adapt, to innovate and to evolve. The problem is particularly acute for undergraduate colleges that are good, for both teachers and students are subjected to the 'convoy problem' insofar as they are forced to move at the speed of the slowest. There is also a problem for undergraduate colleges that are not so good, or are poor, because universities cannot address their special needs or unique problems. Third, it is difficult to set curricula and assess performance for such a large number of students where there is such a large dispersion in performance at school before entering college. This reality tends to make courses less demanding and examinations less stringent across the board. In fact the design of courses and examinations needs to be flexible rather than exactly the same for large student communities. There is an urgent need to restructure the system of undergraduate colleges affiliated to universities. In doing so, it is important to make a distinction between undergraduate colleges that already exist and undergraduate colleges that will be established in the future. It is also important to remember that undergraduate colleges are afflicted by problems which are very similar to those that afflict universities. The most obvious solution is to provide autonomy to colleges, either as individual colleges or as clusters of colleges.

Recommendations on School Education Dated 3rd February 2008 :

As you have repeatedly emphasized, ensuring quality school education to all is the foundation upon which any further advances towards a knowledge society must be based. Noting the crucial importance of school education, the National Knowledge Commission (NKC) held a series of workshops and consultations around the country involving a very wide range of stakeholders, to discuss issues of quantity, quality and access in school education. NKC

recognizes that the primary responsibility for school education is borne by the state governments, and therefore any policy changes must be with the full participation and involvement of the States. Nevertheless, NKC believes that positive changes in systems of schooling will require the active involvement of the central government as well state governments, not only in the matter of providing resources but also in promoting organizational and other changes. We have a number of suggestions and recommendations covering the different aspects of school education, but the essential thrust can be summarized as follows by Sam Pitroda, Chairman, National Knowledge Commission.

1. Central Legislation for the Right to Education, backed by Financial Commitment

NKC endorses the speedy enactment of a central legislation that will ensure the right of all children in the country to good quality school education up to Class VIII, supported with financial commitments of the central and state governments. This obviously requires substantially increased public spending for both elementary and secondary school education, which must be seen as a priority area for spending. Currently school education is highly segmented, even in government run institutions, as a result of the parallel track of "education centres" in some states. These separate systems must be integrated to give all children access to schools of acceptable quality, which will obviously require additional spending.

2. More Flexibility in Disbursal of Funds :

However, there is a strong case for changes in the manner in which such expenditure is incurred. The current norms for central government disbursal to states of funds for, including for Sarva Shiksha.

School Education :

National Knowledge Commission Abhiyan (SSA), the planned SUCCESS program for secondary education and other central schemes, are too rigid and must be made more flexible. NKC strongly recommends a system of funds transfer and accounting that will allow for regional and other differences as well as changing requirements over time, and thereby allow state governments to use the resources in the most effective way. There should also be greater flexibility in disbursing funds down to the school level and a greater degree of autonomy of local level management in the use of funds. The norms and rules should allow schools to adapt to local conditions and meet particular requirements of their students.

3. Decentralization and Greater Local Autonomy :

Community participation is an important instrument to ensure accountability and improve the day-to-day functioning of schools. This in turn means that the management of schools, including the use and management of funds, should be decentralized to local authorities as far as possible, whether they be panchayats, Village Education Committees or municipalities, and to School Boards that have representation of all stakeholders including parents.

4. Expansion of Functional Literacy :

NKC would like to stress the continuing importance of a focus on expanding functional literacy among the population. Illiteracy remains a major problem, even among the age-group 15-35 years, and therefore literacy programmes must be expanded rather than reduced, and given a different focus that is directed towards improving life skills and meeting felt needs, especially (but not only) among the youth.

5. Planning for School Infrastructure :

It is important to remember that land is an essential requirement of

schools, and this requirement is likely to increase in the near future given the expansion implied by demographic changes and need to ensure universal schooling. Therefore urban master plans and local development plans must explicitly incorporate the physical requirements for schooling, including provisions for play grounds and other school facilities.

6. Enabling and Regulating Mechanisms for Private Schools :

Since private schools play an important role in the provision of education, there is need for both enabling and regulating mechanisms to be developed and strengthened for them. There should be transparent, norm-based and straightforward procedures for the recognition of private schools, to reduce harassment and bureaucratic delay. There should also be transparent criteria as for the disbursement of aid from the government to some self-financing schools, especially those which cater to underprivileged children, and clear norms with respect to the ability of school managements to raise resources from other sources. The monitoring of private schools, in terms of ensuring a transparent admissions process, regulation of fee structures, as well as meeting minimum set standards for quality of teaching and infrastructure, also requires attention. The possibility of greater exchange between schools, including mentoring of one school by another, should be allowed and encouraged.

7. Database on School Education :

Educational planning and monitoring are made much more difficult because of the lack of comprehensive and accurate data on schools, school-age children and actual attendance of both students and teachers. The collection and speedy dissemination of accurate and current data on schooling must be made a priority. It is necessary to create a complete database on schools and school-age children so as to track the actual coverage and quality of schooling at different levels, and to make it widely available in a timely manner. Such data collection

may be made an essential part of the fund allocation for school education, with appropriate institutional mechanisms.

8. More Co-ordination between Departments :

The multiplicity of management structures and government departments that currently governs schooling creates confusion, unnecessary replication and possibly inconsistent strategies across different schools. There must be greater co-ordination between different departments of government on school education policy, even while ensuring more autonomy to the local management of schools.

9. National Evaluation Body for Monitoring Quality :

Educational administration also needs to be more conscious of actual learning outcomes at different levels, which will determine both policy and functioning. NKC therefore proposes a national evaluation body to monitor the quality of both government and private schools, using a results based monitoring framework based on a short list of monitorable criteria that include both process and outcome indicators.

10. Revamping School Inspection :

The system of school inspection needs to be revamped and revitalized, with a greater role for local stake holders and greater transparency in the system. The solution does not lie in simply expanding the system – rather, we need to develop systems to ensure meaningful monitoring, including provision of greater facilities to school inspectors, a separation of inspection of qualitative and administrative aspects, transparency in the criteria of inspection, and greater involvement of local stakeholders.

11. Teachers and Teacher Training :

Teachers are the single most important element of the school system, and the country is already facing a severe shortage of qualified and motivated school

teachers at different levels. It is urgent to restore the dignity of school teaching as a profession and provide more incentives for qualified and committed teachers. Non-teaching official duties such as electoral activities should not be allowed to interfere with the teaching process. Forums that allow and encourage teachers to exchange ideas, information and experiences, including a web-based portal, should be developed. At the same time, there should be transparent systems for ensuring accountability of school teachers. As far as possible, teachers should be recruited to particular schools. The training of teachers is a major area of concern at present, since both pre-service and in-service training of school teachers is extremely inadequate and also poorly managed in most states. Pre-service training needs to be improved and differently regulated in both public and private institutions, while systems for in-service training require expansion and major reform that allows for greater flexibility system, especially at Board level but also earlier

12. Reforms in the Curriculum and Examination System :

Curriculum reform remains a critically important issue in almost all schools. School education must be made more relevant to the lives of children. There is need to move away from rote-learning to understanding concepts, developing good comprehension and communication skills and learning how to access knowledge independently. This also requires substantial changes in the examination

.

13. Use of Information and Communication Technology :

Wherever feasible, ICT should be made more accessible to teachers, students and administration for learning, training, research, administration, management, monitoring, etc. This requires the provision of more facilities such as computers as well as connectivity and broadband facilities. Computer-aided learning also requires training of teachers and other staff in order to make the best use of the technology.

14. English Language Teaching :

Proficiency in English is widely perceived as an important avenue for employment and upward mobility, which also greatly facilitates the pursuit of higher education. The incorporation of English into the curriculum through the teaching of English as a language in class I and teaching of one other subject in English medium in later classes requires making pedagogical changes to contextualize language learning, increasing the availability of English language teachers and providing more bilingual and supplementary teaching materials. At the same time, mutlilinguality must be promoted and language issues must be explicitly taken on board in designing school curricula and methods of pedagogy.

15. Interventions to ensure Access of Educationally Deprived Categories :

Special interventions are necessary to ensure greater access to education of educationally deprived categories, and some proposals for this are developed in more detail in the accompanying note.

Quantity and Resources

1. Substantially increased public spending is required for both elementary and secondary education :

As we have already stated in two previous letters, we strongly endorse the speedy enactment of a central legislation that will ensure the right of all children in the country to good quality school education up to Class VIII. We also believe that this should be extended to cover universal schooling up to Class X as soon as possible.

2. Urban planning and local planning must explicitly incorporate the physical requirements for schooling, including provisions for play grounds and other school facilities

It is important to remember that land is an essential requirement of schools,

and this requirement is likely to increase in the near future given the expansion required by demographic changes and the need to ensure universal schooling. In the context of rapid urbanization, it has been found that urban conglomerations often come up without adequate provision for ensuring the physical space required for schools in the vicinity.

3. The norms for central government disbursal to states of Sarva Shiksha Abhiyan (SSA) funds and other central schemes for school education are too rigid and must be made more flexible

- very rigid norms on unit costs and what is allowed in terms of spending, that do not recognize the diverse requirements of different states or particular regions;
- inadequate financial provisions for infrastructure such as buildings etc, especially for some states and cities, which leads to the creation of poor quality infrastructure;
- an inflexible accounting system that does not allow transferring funds across heads to meet particular or changing requirements, and therefore inhibits full utilization and also prevents synergies from developing;
- insufficient allocation for repair and maintenance of infrastructure;
- treating rural and urban schools in the same manner even though the requirements are often very different (for example, urban government schools may require different infrastructure and
- facilities in order to attract students);
- treating all districts and geographical areas in the same manner regardless of the degree of backwardness, topographical conditions, etc. (This is especially a problem for schools in hilly or
- heavily forested areas or those with poor physical connectivity, for which per capita allocations are the same as for other more accessible areas);
- problems in the timing of fund transfer, as well as uncertainties in fund

provision created by the insistence on matching funds and the fact that plan ceilings keep changing every year.

Quality and Management

Currently school education is highly segmented, even in government-run institutions, as a result of the parallel track of "education centres" in some states. These separate systems must be integrated to give all children access to schools of acceptable quality.

2.6 School management must be decentralized as far as possible

Decentralization of the management of schools, combined with community participation, is the most effective instrument for ensuring accountability, improving the day-to-day functioning of schools and allowing for flexible responses to local requirements. Therefore, there should be devolution of authority to local levels, whether to panchayats, village education committees or municipalities. School management committees that include representatives of all stakeholders, including parents and teachers, should be empowered to make many decisions. Social audits of schools should be supported and encouraged.

There is need for a national body to monitor the quality of both government and private schools, to ensure that minimum standards are met in terms of learning outcomes

Currently there is no systematic and continuous feedback on the actual impact and outcome of various educational schemes and initiatives, or the actual quality of education imparted in schools. There is a strong case for a testing body at the national level for quality assessment of schools. A results-based monitoring framework with due process indicators and outcome indicators needs to be evolved. This should be based on a short list of monitorable criteria. These should include fixed infrastructural requirements, enrolment and

attendance, as well as outcome indicators such as learning levels achieved in certain basic areas such as language skills and numeracy, etc. Such a process of assessment needs to be applied to all schools – both public and private. However, the testing of students must not involve topics or questions that provide any incentives for rote learning.

The system of school inspection needs to be revamped and revitalized in most states, with a greater role for local stake holders.

- Local stakeholders should be involved in the monitoring of schools, whether in the form of Village Education Committees, parent associations, or other such bodies.
- The number of inspectors needs to be increased in many states, and they must be provided the facilities to undertake their activities properly, such as transport, communications devices, etc.
- The inspectors themselves must be accountable to the stakeholders of the area, through appropriate checks and balances.
- The criteria for inspection, the dates on which inspection of particular schools has taken place and the results should be made publicly available, including by posting on websites.
- The monitoring and inspection of schools must be separated from school administration, as the two functions require completely different orientations.
- The criteria for inspection should include not only infrastructure, facilities and teacher presence but also minimum standards for quality.

The dignity of school teaching as a profession must be restored, and at the same time there should be transparent systems for ensuring accountability of school teachers

The training of school teachers is extremely inadequate and also poorly managed. Pre-service training needs to be improved and regulated, while

systems for in-service training require expansion and major reform in all states.

Both pre-service and in-service teacher training programs face major problems at present, at the national level and in almost all states. With respect to pre-service training, there is a proliferation of private colleges awarding the B. Ed. degree, and these are inadequately monitored or regulated. A significant proportion of those who receive B.Ed. degrees do so through correspondence or distance learning courses, which involve absolutely no practical exposure. In any case, classroom experience is underplayed in standard B. Ed. courses. At the same time, the employment of *ad hoc* teachers and those without even high school diplomas as teachers in the parallel stream perpetuates the notion that it is not necessary for school teachers to have systematic and prolonged pre-service training. In-service training shows problems of inadequate quantity, uneven quality, outdated syllabi, and poor management.

It is important to develop and nurture leadership for managing schools. Even talented individuals who could be suitable for the tasks of school management need to be trained for this purpose. Such capacity building would create a pool of potential principals or heads. There a several ways in which this can be done. State governments could assign such training to existing institutions such as SCERTs or SIEs, leveraging the expertise available in Navodaya Vidyalayas, Kendriya Vidyalayas, other government schools and private schools. Such training programmes, as well as retraining programmes for existing principals, could also seek the expertise of specialists in management education. Also, individual mentoring programmes for school leaders could be evolved.

The possibility of greater exchange between schools, including mentoring of one school by another should be allowed and encouraged. The current system creates many distinctions and prevents interaction between schools. There is need to constitute mechanisms of exchange and interaction between students and teachers of different schools. In addition, schools that wish to do so should

be allowed to exercise the option of being ‘mentored’ by another school to improve facilities and teaching methods.

Curriculum reform remains an important issue in almost all schools. School education must be made more relevant to the lives of children. There is need to move away from rote-learning to understanding concepts, good comprehension and communication skills and learning how to access knowledge independently

Successive Commissions and Committees set up by the government have emphasized the need to make the curriculum more interesting, relevant, creative and useful for students. The National Curriculum Framework 2005 also clearly articulated such an approach. Nevertheless it appears that in a majority of schools across the country, a significant emphasis on rote-learning and memorizing facts remains the norm. Also, there is evidence of children being overburdened with too much detail and an excess of scholastic requirements at the elementary level.

It is important to orient students towards independent and continuous learning. This makes it essential to make greater efforts to change the attitude to learning and knowledge. It has been noted in several states that learning results have improved considerably upon providing inputs for communication and comprehension in language and basic mathematical skills using activity-based and imaginative pedagogical strategies.

Changes in the examination system are required, especially at Board level but also earlier, to ensure that the pressure for rote-learning is reduced. The current over-emphasis on details, memorizing of facts and similar abilities rather than on understanding and accessing knowledge independently is reflected in the pattern of examinations. Board examinations in which marks are awarded based on the ability to recall lots of details or on rapidity of response or on the ability to do large numbers of sums in a limited period through practice in pattern recognition, are not sufficiently discriminatory and may end up

providing misleading results. They also put pressure on schools to ensure that memory and pattern recognition skills are developed at the expense of genuine understanding.

New technologies, especially but not only ICT, should be used as much as possible to reduce costs, enable more effective use of resources, and provide wider exposure to students and teachers

The use of ICT as a teaching and learning device needs to be more firmly incorporated into the classroom. Both teachers and students need to be far more familiar with ICT, and get practical experience of web based research. Therefore ICT should be made more accessible to teachers, students and administration for learning, training, research, administration, management, monitoring, etc. This requires the provision of more facilities such as computers as well as connectivity and broadband facilities. Computer-aided learning also requires training of teachers and other staff in order to make the best use of the technology.

There is need for a web-based portal for teachers to exchange ideas, information and experiences. A forum for teachers needs to be developed where they may interact, share experiences and ideas. This needs to be incorporated into teacher training programmes, and also provided generally for in-service teachers. A web-based teachers' portal can play an important role as such a networking forum.

Access :

- Financial norms for schools in such locations must be different from those in more accessible areas, as they will require additional resource allocation based on particular conditions.
- Special incentives, including a financial incentive (such as a "hardship bonus") need to be provided for teachers to take up jobs in such areas. Two different models may be considered – one based on recruiting local teachers

on a permanent basis for a job in a particular school without transfer; and another based on a transfer policy that divides locations into hard/ middle/easy categories and allows teachers to rotate among them at specified intervals. Ideally, there should be at least one local teacher and one non-local teacher to ensure some variation, local acceptability and quality.

- Residential arrangements must be made for teachers in such locations, by providing quarters next to or near the school. The cost of building such quarters should be factored into the costs of the school building.
- There are some geographical zones especially in mountainous regions, that are plagued by unique problems due to vast tracts of land, difficult topography, and a sparse and nomadic population. In such areas, well equipped residential schools should be set up instead of insisting on a school in every habitation. These schools must be equipped to look into the needs of very young children living away from their families.

The teaching of English should be introduced along with the first language, starting from Class I in school. Proficiency in English is widely perceived as an important avenue for employment and upward mobility, which also greatly facilitates the pursuit of higher education. The incorporation of English into the curriculum, through the introduction of English as a language in Class I and the teaching of one other subject in English medium in later classes, requires pedagogical changes to contextualize language learning, increasing the availability of English language teachers and those who can teach at least one subject in English, as well as bilingual and supplementary teaching materials. At the same time, school education must commit to promoting multilinguality, given the multilingual nature of our country.

Indian Parliamentary and Scientific Committee, 1961 Report (Delhi, Publications Division, 1964) :

Main Recommendations :

1. Science education in the primary schools should be introduced in the form of nature study. Not less than 25% of the lessons in the different languages readers could be devoted to science subjects in the form of stories, explaining the phenomena in nature as well as the lives of great scientists who have contributed to the making of the modern world. Such lessons should not, however, lack in literary presentation and grace to stimulate creative talent of the pupil. Use of visual aids, visits to botanical and zoological gardens and other methods of instructions have to be employed as far as feasible. Besides, in the reorganisation of syllabus for primary schools some science teaching has to be introduced in an elementary form.

2. General Science courses could be started in the middle schools, i.e. classes VI, VII and VIII.

3. At the High School stage science should be compulsory for all students, but it has to take the form of separate subjects as mathematics, physics, chemistry, biological sciences, etc. along with the other humanistic subjects. Certain guidance in this connection could be offered by the way in which courses have been prescribed in the U.S.S.R. While formulating the courses it should be seen that there is a balance between the courses in science and courses in humanistic subjects and the one does not outweigh the other. This should remove defects of early specialisation. Everyone who leaves the this School should be equipped with elements of science as well as of humanistic culture. Whether he goes into employment or further courses in higher education or junior colleges instruction or in courses of vocational education in the trade schools, polytechnics or various other branches of vocational training which will expand as our economy progresses.

4. A decision will have to be taken regarding the nature of the higher secondary stage. If the trend is to follow the recommendations of the Sampurnanand Committee, it will be possible to have new institution of junior colleges or intermediate colleges attached to the colleges or high schools or independent with a 2-year curriculum consisting of the 11th and 12th classes. In that case, specialisation in science could be started at this stage for those students who would go in for professional courses of medicine, agriculture, engineering or degree courses like B. Sc. and M. Sc. in science itself. The courses will have to be, perhaps, of the same nature as adopted for the VI form in U. K. where boys spend at least 2 years, but very often 3 years in doing courses at advances level for admission to the universities and other institutions of higher training.

5. Specialisation at an early stage of school education should be avoided and courses of instruction should be so framed as to enable those who come out of the high school at the age of 16 plus or 17 after completing 10 years of schooling either to pursue an occupation or train.

In 1961 recommendations on science education was very significant. Reports regarding laboratory and equipments revealed the following facts for improvement of science education :

1) Functional environments for science education.
2) Laboratory and equipment for facilitating science education.
3) Details infrastructural environments for laboratories.
4) Socio-economic condition to be considered for improving practical laboratories.
5) Details about size, shape and other conditions for maintaining a good laboratory.

Committee on Plan Projects : Panel for Science Laboratories and Equipment, 1961 (Report on Science Laboratories and Equipment in High / Higher Secondary Schools : New Delhi, 1962) :

Main Recommendations :

1. Since the main function of a laboratory is to impart scientific education in an efficient way, its design should, therefore, be based on functional requirements.

2. The panel considers that in the interest of economical distribution of lay-out and services, it would be advisable to locate the laboratories for Chemistry and Home Science on the ground floor and those for Physics and Biology on the first floor over these laboratories if the school buildings have a double-storied structure. For a single-storied structure, the grouping of Home Science with Chemistry and of Biology with Physics may still be kept intact. Both Chemistry and Home Science laboratories require special lay-outs for water and drainage which will be best arranged if they are both on the ground floor and adjacent to each other.

3. The panel is of the view that all the four laboratories, viz. Physics, Chemistry, Biology and Home Science could be of the same size, i.e. 10.0 m × 6.0 m = 60 sq. m. (32' × 20' – 640 sq. ft.) with a space of 6.0 m = 60 m × 3.7 m = 22.2 sq. m. (20' × 12' – 240 sq. ft.) provided for ancillaries for each laboratory. The Panel feels that the space requirement of 60 sq. m. for a batch of 24 students is the minimum that could be recommended for each laboratory.

4. The factor of light, apart from affecting visual and physical comfort of students, involves the question of economy also in respect of the size and type of windows and of the disposition of light fittings. The chief purpose of lighting is to provide comfortable visual observation for laboratory work

and the conservation of vision of the young workers. It is desirable to make maximum use of day-light by proper location of doors, windows and skylights. Windows are best placed at a standard height of 1.2 m (4 ft.) from the finished floor level, as this would give a good distribution of light over the work tables whose height may vary between 85 cm. and 90 cm. (2'-9" and 3'). To save on capital as well as recurring expenses artificial lighting needs to be provided only for occasional work. Windows and doors should be so disposed as to provide as evenly distributed illumination as possible. A window area of 20 per cent of the floor area is considered to be adequate for general laboratory work. In terms of lumens per sq. ft. is considered to be adequate. The following reflectance standards are recommended for obtaining a desirable brightness level inside the laboratories :

Ceilings — 85% of the total amount of light received by the surface.

Walls — 60% of the total amount of light received by the surface.

Floors — 15% to 30% of the total amount of light received by the surface.

5. Light and colour are closely inter-related so that in determining a suitable colour scheme inside the laboratory, the reflectance value should always be taken into account. White is not considered suitable for laboratory walls as it causes glare and shows dirt very prominently. Light cream or silver grey be preferable.

6. Work table is the most important item of laboratory furniture and needs careful consideration. The Panel, after careful consideration of the functional requirements, makes the following recommendations :

   a) Size of the work table need not be the same for all the four laboratories since the work carried out differs in each case.

   b) Work tables in the Physics, Chemistry and Home Science laboratories

need not have drawers or closed cupboards. Biology tables, however, may preferably be provided with drawers. In Physics laboratory the work tables may me provided with 2 ft. wide intermediate shelves about I foot above the floor level.

c) Provision for tables should be made for 24 students in each laboratory.

7. The committee strongly recommended that accommodation such as storage and balance room must form an essential part of the laboratory itself and should be well-planned in the same manner as the laboratory.

8. The panel feels that laying down of specifications and standards for equipment and apparatus will greatly improve the quality of instruments at present being supplied to schools and recommends that the necessity for making these specifications may be brought to the notice of the Indian Standard Institution and the Central Scientific Organisation with the request that they may expedite the laying down of standards of at least those items of science apparatus which are already being manufactured in the country.

9. The panel made a detailed study of the cost involved in equipping the various laboratories and recommended that the procurement of equipment and apparatus for a school which was to introduce science subjects afresh may be spread over a period of three to four years. In the case of a school which is already imparting instruction in these subjects, the requirements will vary with reference to the available equipment and need for future development within the limits of the Panel's list.

10. In 1970's the examination situation was not proper. Some malpractices were reported in different parts of India from where West Bengal, is not an exception. But presently in 2005-2006 the situation has been changed

overall. The situation in the examination hall presently is almost fair. Actually we are not interested about the examination situations of the hall but simultaneously we cannot avoid it because in West Bengal in secondary schools evaluation technique is based on summative approach where examination environment and other technical factors are very important.

Committee on Examinations, 1970 (Report : New Delhi, National Council of Educational Research and Training, 1971) :

Summary of Recommendations :

1. Legislation :

The State and Central Governments should immediately take suitable measures to get amending legislation passed in the relevant laws pertaining to the following matters :

a) Empowering the Board / University to grant autonomous status to well established institutions.
b) Empowering the examining authorities to check students and prohibit those with weapons from entering the examination halls.
c) Making the assembly of persons within a certain distance from an examination hall a cognisable offence.
d) Making the indulgence in malpractices by employees and authorities of the universities / boards a cognisable offence.
e) Empowering the examining authorities to take out insurance for the invigilators and examiners.
f) Making the assault on an examiner or an invigilator or other person connected with examination, a cognisable offence.

2. Conduct of Examination :

a) Paper-setters should be appointed at least six months prior to the

commencement of a Public Examination and they should be given at least eight weeks to draft questions. The papers should be finalised at a meeting of the paper-setters.

b) Where the number of candidates in Public Examination is very large, there should be decentralisation with separate examination for each group of 10,000 school students or 1,000 college students.

c) A Public Examination should be conducted in the institution in which the students study. The majority of the invigilators and superintendents should be drawn from the institution concerned.

d) Admission to the centre of a Public Examination should be through one main entrance. Only bona fide candidates with identity cards should be admitted in the examination centre after thorough checking.

e) Model answers should always be prepared and supplied by the paper-setters.

f) Copies of the question papers set should be made available to the teachers in the schools and colleges on the day of the examination but after it is over, so that the teachers could comment on the paper to the authorities quickly.

g) The method of spot evaluation at a central place to which all the examiners are called, should be adopted.

h) The result should be declared subject-wise and furnished in the form of grades. The 'raw' marks given on the candidates passing in the minimum number of subjects.

i) The certificate issues by an examining authority should have two columns, viz. one giving the result of Public Examination and the other giving the result of the internal assessment by the teachers.

j) For the awarding of prizes and scholarships to a candidate who stands first in an examination or in a subject, a separate test should be conducted and admission to the same limited to those who secure the highest grade in the Public Examination.

k) There should not be too many Public Examinations. There should be one at

the end of the upper primary / middle school stage, another at the end of the secondary stage and the third at the first degree stage. All others should be internal assessments only.

3. Use of Examination Results :

a) A recruitment to the services should be made on the basis of tests / examinations conduced by the Public Service Commissions and the maximum age for appointment for clerical posts be reduced to 19 years.

b) Admission to colleges including professional colleges should be on the basis of an entrance test conducted specifically for assessing the aptitude of a student for a particular course. Eligibility to appear at these tests should alone be determined by the results of the Public Examination.

4. Budgeting for Education :

In future, both the Central and State Governments should make funds separately for guidance and studies and research on examinations.

5. Research :

There should be continued study and research on examinations, both at the State and Central levels and in the boards / universities in a coordinated manner. Necessary funds for the same should be provided on a priority basis.

6. Novel Ideas

Novel ideas for the organisation and conduct of Public Examinations should be encouraged.

Examination Committee, 1957 : A Component Of T/L System (Report : New Delhi, U. G. C.) :

Summary of Recommendations :

1. No reform in the system of examinations will reduce the failure rate in our universities and colleges, unless the prevailing admission procedures are

improved. We have therefore, to see that only those candidates are admitted to universities who can profit by higher education. One of the feasible ways by which this could be done is to introduce in the School Leaving Examination two additional papers, one to test competence in the use of the language of the university and one to test intellectual maturity, for those who wish to enter the university.

2. Teaching work should be done not only through lectures but through tutorials, seminars, etc. It will be desirable to hold periodical short tests on the work done in the tutorials and to maintain a record of the assessments made. This should be regularly evaluated. Each university may decide what weightage should be given to this. In order to make room for tutorials, lectures may be cut down (it should be possible to reduce them by 50 per cent) and the teaching work divided between tutorials and lectures.

3. The U. G. C. should encourage seminars, discussions and conferences of university and college teachers for defining the objectives of teaching and examinations in different subjects at various levels. A clear conception of the aims of teaching will facilitate good teaching and bring about a greater conformity between examinations and teaching.

4. Research should be undertaken in regard to both the educational and technical aspects of examinations. Topics which may be taken up for research in this connection are indicated in the report. It should be possible for the departments of education in universities to undertake such work as a part of their normal activities. Perhaps the newly created National Council of Educational Research and Training would also be able to assist in this. There should be arrangement in the University Grants Commission to coordinate the research work of the different universities and to disseminate information and conclusions with regard to the studies undertaken.

Secondary Education Commission, 1952–53 – Search for Development of Science Education :

A. To suggest measures for its reorganization and improvement with particular reference to :

1. The aims, organization and content of secondary education;
2. Its relationship to primary, basic and higher education;
3. The inter-relation of secondary schools of different types; and
4. Other allied problems.

Summary of Recommendations :

1. Aims and Objectives of Secondary Education :

i) The adoption of the goals of democracy and socialism necessitating the development among the people of a broad, national and secular outlook;

ii) The extreme poverty of the country and urgency for promoting its economic growth; and

iii) The absence of educational facilities needed for developing all aspects of the human personality and the neglect of cultural pursuits and activities.

On the basis of this analysis, the Commission recommended that secondary education should be reoriented to the following aims and objects :

(a) Development of qualities essential for creative citizenship : This includes the development in the students of secondary schools of those habits, attitudes and qualities of character which are essential for creative citizenship in a democratic society. Among these qualities, which are to be fostered through curricular and co-curricular activities in secondary schools, are :

i) the capacity for clear thinking (allied which is the capacity for clearness in speech and writing);

ii) the scientific attitude of mind;

iii) a receptivity to new ideas;

iv) a respect for the dignity and worth of every individual;

v) the ability to live harmoniously with one's fellowmen through the cultivation of discipline, cooperation, social sensitiveness tolerance and

vi) a sense of true patriotism.

(b) The promotion of vocational efficiency : This involves not only the creation of a new attitude to work and an appreciation of the dignity of manual labour but also the development of the students' technical skill and efficiency through greater emphasis on craft and productive work and the diversification of courses at the secondary stage.

(c) Development of personality : This implies cultivation of the students' literary, artistic and cultural interests for a fuller development of their personalities. This means the provision of subjects like art, craft, music, dancing and hobbies in the secondary school curricula.

(d) The training for leadership : The training of persons who, on completion of the Secondary stage, would be able to assume the responsibilities of leadership at the intermediate level.

2. Methods of Teaching :

a) Inculcation of values, attitudes and work habits : The methods of teaching in schools should aim not merely at the imparting of knowledge in an efficient manner, but also at inculcating desirable values and proper attitudes and habits of work in the students.

They should, in particular, endeavour to create in the students a genuine attachment to work and a desire to do it as efficiently, honestly and thoroughly as possible.

b) Activity and project methods : The emphasis in teaching should shift from verbalism and memorization to learning through purposeful, concrete and

realistic situations and, for this purpose, the principles of Activity Method and Project Method should be assimilated in school practice.

Teaching methods should provide opportunities for students to learn actively and to apply practically the knowledge that they have acquired in the classroom. Expression Work of different kinds must, therefore, form part of the programme in every school subject.

c) Emphasis on clear thinking and expression : In the teaching of all subjects special stress should be placed on clear thinking and clear expression both in speech and writing.

d) Training pupils in techniques of study : Teaching methods should aim less at imparting the maximum quantum of Knowledge possible, and more on training students in the techniques of study and methods of acquiring knowledge through personal effort and initiative.

e) Instruction to suit different student abilities : Attempt should be made to adopt methods of instruction to the needs of individual students as much as possible so that dull, average and bright students may all have a chance to progress at their own pace.

f) Group projects and activities : Students should be given an adequate opportunity to work in groups and to carry out group projects and activities so as to develop in them the qualities necessary for group life and cooperative work.

3. Examinations and Evaluation :

Reviewing the defects of examinations at the secondary stage, the Education Commission said :

"The examinations today dictate the curriculum instead of following it, prevent any experimentation, hamper the proper treatment of subjects and sound

methods of teaching, foster a dull uniformity rather than originality, encourage the average pupil to concentrate too rigidly upon too narrow a field and thus help him to develop wrong values in education. Pupils assess education in terms of success in examinations. Teachers, recognizing the importance of the external examination to the individual pupils, are constrained to relate their teaching to an examination which can test only a narrow field of the pupil's interests and capacities and so inevitably neglect the qualities which are more important though less tangible".

a) External Examination — Introduction of Objective Type Tests :

The number of external examinations should be reduced and the element of subjectivity in the essay type tests should be minimized by introducing objective tests and also by changing the type of questions.

b) School records for assessment of all-round progress : In order to find out the pupil's all-round progress and to determine his future, a proper system of school records should be maintained for every pupil indicating the work done by him from time to time and his attainments in the different spheres.

c) In the final assessment of the pupils due credit should be given to the internal tests and the school records of the pupils.

d) Symbolic marking to replace numerical marking : The system of symbolic rather than numerical marking should be adopted for evaluating and trading the work of the pupils in external examinations and in maintaining the school records.

e) One public examination – final comprehensive certificate : There should be only one public examination at the completion of the Secondary School course.

f) The certificate awarded should contain, besides the results of the public examination in different subjects, the results of the school tests in subjects not included in the public examination as well as the gift of the school records.

g) The system of compartmental examinations should be introduced at the final public examination.

h) Board of Secondary Education to be set up : There should be a Board of Secondary Education consisting of not more than 25 members with the Director of Education as its chairman to deal with all matters of education at the Secondary stage and to lay down general policies.

A sub-committee of the Board should deal with the conduct of examinations.

4. Buildings and Equipment :

a) School buildings–space per pupil : Normally, in designing buildings for schools, care should be taken to see that an area of not less than 10 sq. ft. is provided per student in the classroom.

b) Optimum strength of class and school : The optimum number of boys to be admitted to any class should be 30 and the maximum should not in any case exceed 40; the optimum number in the whole school should be 500 while the maximum should not exceed 750.

c) Research required on school buildings, furniture and equipment : In the type design of schools as well as the furniture, etc., research should be carried on to improve functional efficiency and to adjust them to Indian conditions.

An expert committee should be appointed to lay down carefully the amount and the kind of equipment required for various types of diversified courses and workshops.

d) Land for educational purposes : The State Governments and the Centre should, wherever possible, assign lands to schools for playgrounds, buildings or agricultural farms and other necessary purposes without any charge.

e) Exemption from customs duty for equipment and books : In order to popularize progressive teaching methods and facilitate their introduction, "Experimental" and "Demonstration" schools should be established and given special encouragement where they exist, so that they may try out new methods freely without being fettered by too many departmental restrictions.

5. Teachers

a) Guide material for teachers : Suitable literature for the guidance and inspiration of teachers should be produced by the Education Departments of all States and either the office of the Director of Education or one of the training colleges should be adequately equipped for the purpose.

b) Special committee to review the scales of pay : A special committee should be set up to review the scales of pay of teachers of all grades and recommend such scales of pay that will meet in a fair and just manner the varying cost of living.

National Policy On Education 1979 suggests that "the present system of education must be reorganized is the light of contemporary Indian realities and requirements".

Secondary education is very important for the continuation among secondary (10^{th} grade), higher secondary (12^{th} grade) and primary education. National Policy on Education 1979 rightly comments, "The entire educational system has to be seem as one chain".

It is true that after independence number of secondary schools have been increased rapidly in India supported by the following information –

- No. of schools in 1950-51 : 7300 (Secondary Level).
- No of schools in 1982-83 : 52, 279.

Ref : Challenge of Education 1986.

Common Elements of A T/L System Curriculum Framework :

Curriculum Studies and Examination System :

Curriculum analysis or studies is necessary by virtue of its centrality to two important tasks performed by teachers and administrators : curriculum selection and curriculum adaptation. When selecting or adapting a curriculum for use in a particular classroom, school or school systems, it is important to determine whether or not it is appropriate for the situation.

Curriculum studies may be looked as one kind of content analysis of the curriculum documents and therefore, you will have to put into actions and steps required in content analysis as a kind of methodology of research.

Finally, with these sorts of activities, thinking, orientations, techniques, etc. when you will be able to internalized, you will be an active team member of a curriculum group.

A curriculum framework refers to a broad map of a curriculum which presents the curriculum work in precise way but does not generally explicitly the all ramifications of the learning tasks to be operated when it will be implemented in the real world of classroom. Every curriculum framework is expected to exhibit some essential elements in the framework documentation.

1. Introduction – Current Context :

It provides a rationale of the curriculum framework.

2. Educational Policy :

It provides a conceptual support of the Governments policy on education, inclusion of ICT, meeting the challenges of global trends, development of skills, improving the universal literacy and to create a productive knowledge society.

3. Learning Objectives :

Describes what students know and be able to do when they complete their curricula. Outcomes should be expressed in different domains, including knowledge, understanding, skills, and competencies, values and attitudes.

4. Structure of the Education System :

Describes the school system within which the curriculum framework is to be applied :

- Number of schooling including compulsory schooling. Stages of schooling and their durations.
- Number of weeks in the school years and hours or teaching periods in the school week.

5. Structures of Curriculum Content, Learning Area and Subjects :

Describes the organization of content within the framework and the extent to which schools and students can make choices.

- The pattern of subjects or learning areas to be studied in each stage or cycle such as core, elective and optional subjects.
- A brief description of each subject or learning areas outlining the rationale for inclusion in the curriculum and the contribution to the achievement of learning outcomes.

6. Standard of Resources required for Implementation :

Teacher's qualification, Teaching load. Students-involvement and activities Materials-textbooks, computers, other equipment, facilities in classroom.

7. Teaching Methodology :

Description in the range of teaching approaches that might be employed in the implementation of the framework.

8. Assessing Student Achievement :

Describing the importance of assessing the extent to which students achieve the outcomes of each subject, and recommends types of assessment strategies such as written, oral, performance, and practical or dissertations.

Teaching Learning System Component : Curriculum National Curriculum Framework – 2005 By NCERT :

- Connecting knowledge to life outside the school,
- Ensuring that learning is shifted away from rote methods,
- Enriching the curriculum to provide for overall development of children rather than remain textbook centric,
- Making examinations more flexible and integrated with classroom life and,
- Nurturing an identity soaked in caring concerns within the democratic polity of the country.

Quality is the first and the last mantra of the national curriculum framework. The late J. P. Naik had described equality, quality and quantity as the 'elusive triangle' of Indian education. Moreover, UNESCO's recently published global monitoring report discusses systematic standards as the appropriate context of the quality debate.

The quality dimension also needs to be examined from the point of view of the experiences designed for the child in terms of knowledge and skills. Assumptions about the nature of knowledge and the child's own nature shape the school ethos and the approaches used by those who prepare the syllabi and textbooks, and by teachers.

Learning and Knowledge – Curriculum

Learning is at the Heart of the Curriculum in Action

The formal processes of learning that school makes possible can open up new possibilities for understanding and relating to the world. The curriculum

framework advocates for child-centered pedagogy. 'Child-centered' pedagogy means giving primacy to children's experiences, their voices, and their active participation. This kind of pedagogy requires us to plan learning in keeping with children's psychological development and interests.

Development and Learning :

- All children are naturally motivated to learn and are capable of learning.
- Making meaning and developing the capacity for abstract thinking, reflection and work are the most important aspects of learning.
- Children learn in a variety of ways – through experience, making and doing things, experimentation, reading, discussion, asking, listening, thinking and reflecting, and expressing oneself in speech, movement or writing – both individually and with others. They require opportunities of all of these kinds of their development.
- Teaching something before the child is cognitively ready takes away from learning it at a later stage. Children may 'remember' many facts but they may not undersigned them or be able to related them in the world around them.
- Learning takes place both within school and outside school. Learning is enriched if the two areas interact with each other. Art and work provide opportunities for holistic learning that is rich in tacit and aesthetic components. Such experiences are essential for linguistically known things, especially in moral and ethical matters, to be learnt through direct experience, and integrated into life.
- Learning must be paced so that it allows learners to engage with concept and deepen understanding, rather than remembering only to forget after examination.
- Learning can take place with or without mediation. In this case the latter, the social context and interactions, especially with those who are capable,

provide avenues for learners to work at cognitive levels above others (NCF-2005, pp. 15 – 16).

Teaching for Construction of Knowledge :

Constructivist Learning Situation Process involves basically two elements – Interpretation, construction and Multiple interpretation.

In this context, teacher is a facilitator who encourages learners to reflect, analyse and interpret in the process of knowledge construction.

Much of our school learning is still individual based (although not individualised!). The teacher is seen as transmitting 'knowledge' which is usually confused with information to children, and organising experiences in order to help children learn. Learning in the company of others is a process of interacting with each other and also through the learning task on hand. This kind of learning gets enriched when schools enrol children from different socio-economic backgrounds.

There are ways in which group learning can be assessed and evaluated. Schools could also consider giving mixed age groups of children projects to do together. In such mixed groups there is much that children can learn from each other such as team work and social values. Group learning tasks, taking responsibility, and contributing to a task on hand are all important facets of not only acquiring knowledge but also in learning of crafts and arts.

Designing Learning Experiences :

Approaches to Planning :

Learning must be focused on activity. The learning experiences should be organized as :

- Observing something happen.
- Participating in an exercise involving body and mind such as planning a role around a theme and presenting it.

- Talking about and reflecting on something the child has experience.
- Making something, say, a system of gear wheel or trying out an experiment in a lift.
- After the experience, the teacher could organize a discussion, an exercise involving, writing, drawing and display, etc.

2.7 Examples of School Process Indicators

Community Involvement :

- The degree of actual involvement of parents in various school activities (the teaching and learning process, extra-curricular activities and supporting activities).
- The percentage of the total annual school budget that is obtained from the local community.
- The amount of discretion local school boards have concerning the working conditions of teachers.

Co curricular Activities including Community Involvement :

Financial and Human Resources :

- Average years of teachers' experience per school.'
- School-level pupil / teacher ratio.
- Average class size per school.
- Proportion of formally qualified teachers per school.
- School managerial 'overhead' (principal and deputy-principal fte per 1,000 students).

Achievement-oriented Policy :

- Whether or not schools set achievement standards.
- The degree to which schools follow the careers of pupils after they have left the school.

- Whether or not schools report achievement / attainment outcomes to local constituencies.

Educational Leadership :

- The amount of time principals spend on educational matters, as compared to administrative and other tasks.
- Whether or not principals appraise the performance of teachers.
- The amount of time dedicated to instructional issues during staff meetings.

Continuity and Consensus among Teachers :

- The amount of changes in staff over a certain period.
- The presence or absence of working groups or departments for different school subjects (secondary schools).
- Frequency and duration of formal and informal staff meetings.

Orderly and Safe Climate :

- Statistics on absenteeism and delinquency.
- Ratings of school discipline given by principals, teachers and pupils.

Efficient Use of Time :

- Total instruction time and time per subject-matter area.
- Average loss of time per teaching hour (due to organization, moving to different rooms, locations, disturbances).
- Percentage of lessons 'not given' on an annual basis.

Opportunity to Learn :

- Teacher or student ratings of whether each item of an achievement test was taught or not.

Evaluation of Pupil's Progress :

- The frequency of curriculum-specific tests at each grade level;
- The frequency of standardized achievement tests;

- The actual use teachers make of test results.

Ratings of Teaching Quality :

- quality of instruction as rated by peers (other teachers);
- quality of instruction as rated by students.

Effectiveness Models :

Additional Factors for Process Indicators generated from the Quinn and Rohrbaugh Framework

Human relations model	**Open system model**
Quality of work life indicators • respect • participation in decision-making • professional interaction • performance feedback • opportunity to use skills • resources • congruence personal / organizational goals	• entrepreneurship • collegiality • capacity for self-evaluation and learning • overt school marketing activities • parental involvement • boundary-spanning positions • external change gents • student enrolment figures • resources (buildings, equipment)
Internal process model	**Rational goal model**
• planning documents • disciplinary rules • management information systems. • formalization of positions • continuity in staffing and leadership • integrated curricula • attendance rates • lessons 'not given'	(School-effectiveness research) • educational leadership • success-oriented ethos • monitoring of student's progress • time on task • content covered (opportunity to learn)

	Broader set of educational goals • non-gradedness • team teaching • individualization, differentiation • continuous learning route • time spent on social, emotional, creative and moral development. • 'learning to learn' activities • diagnostic testing

According to Bill Mulford these following dimensions in the professional development of school leaders (content, delivery mode and measurement of success) can be found in recent reviews of the area. Ribbins (2000), for example, argues for an approach to school leader professional development which :

- is centrally concerned with improving the quality of schooling and the achievement of pupils;
- is systematic, comprehensive and of high quality;
- makes available continuing opportunities for every career phase;
- has a concern for practical skills but also for a more philosophical approach;
- involves a range of providers;
- provides core training, but supports development opportunities that mean more than this and,
- is based on the best available evidence and fosters the research that generates this.

Another example is provided by Bredeson (2003) who proposes a set of design principles for expanding and legitimising learning opportunities for those in schools. Using the metaphor of architecture and building on empirical

research and exemplary practice Bredeson (2003) identifies six design themes :

- professional development is about learning, including teachers and principals being part of its design;
- professional expertise is a journey, not a credential;
- opportunities for professional learning are unbounded;
- student learning, professional development and organisational mission are intimately related; and,
- professional development is about people, not programs and activities.

The proposed stages and dimensions can also be found in two major cross-country studies of the professional development of school leaders. It is to these two studies that we now turn before concluding the paper with some possible implications arising from the material presented.

Academic Achievement and some related views in Teaching Learning System :

As Gallag concurs, most people would argue that teaching requires a variety of proficiencies that can justifiably contribute to teacher evaluation, yet which may only indirectly influence student performance on a given assessment. Teachers need to become familiar with current research on student achievement and network with colleagues to learn more about teaching expertise.

Teachers are responsible for finding ways to educate all children and it is a teacher's duty to participate in professional development activities that foster this responsibility. Practices such as differentiated instruction, data driven instruction and identifying areas of weakness in students are crucial to developing the quality of classroom teachers. Differentiated instruction is vital for increased student performance because it meets the needs of every student. This connects to the notion of schools making improvements based on test data, especially in weak areas. Teachers need to remember that external

characteristics, such as student socioeconomic status and parental educational attainment, impact student achievement in significant ways, but when those differences are controlled for, teachers are the most important determinants of student achievement (Gallagher, 2002). These findings support the views of Bullough *et al.* (2003) that if, as some teacher education detractors argue, academic ability and scores on standardized achievement tests are good measures of teacher quality, these students ought to be outstanding.

2.8 Conditions of Effective teaching According to Anderson, 1999

Teaching Characteristics (Anderson)	**Teaching**
Enacted curriculum • opportunity to learn • academic work : ➢ appropriate selection ➢ regular (home) work ➢ students held accountable ➢ adequate supervision	**Structuring of lessons (sequence)** • orientation • clear purposes • monitoring • independent practice • corrective feedback **Communication teachers / students** • clear explanations • showing & telling • appropriate guiding • providing feedback
Classroom Environment and Climate	**Stimulating Involvement**
Physical environment • classroom arrangement • equipment • seating patterns • class size	• reinforce paying attention • develop learning strategies instruments • success standards • create “holding power” in learning

Climate (psychological environment) • mutual respect • task orientation • structure	• keep students actively involved. • circulate during seatwork • communicate interest

Wang and Walberg, (2001) distinguishes 12 principles of effective teaching. These are the following :

1) **Supportive classroom climate :** Students learn best within cohesive and caring learning communities. The role of the teacher as models and socializers is emphasised.
2) **Opportunity to learn :** Students learn more when most of the available time is allocated to curriculum related activities and the classroom management system emphasises maintaining students' engagement in those activities.
3) **Curricular alignment :** All components of the curriculum are aligned to create a cohesive program for accomplishing instructional purposes and goals.
4) **Establishing learning orientations :** Teachers can prepare students for learning by providing an initial structure to clarify intended outcomes and cue desired learning strategies (e.g., providing advance organisers and cueing the kind of responses that are expected).
5) **Coherent content :** To facilitate meaningful learning and retention, content is explained clearly and developed with an emphasis on its structure and connections. "When making presentations, providing explanations, or giving demonstrations, effective teachers project enthusiasm for the content and organize and sequence it so as to maximise its clarity and “learner friendliness”.
6) **Thoughtful discourse :** Questions are planned to engage students in sustained discourse structured around powerful ideas.

7) **Practice and application activities :** Students need sufficient opportunities to practice and apply what they are learning, and to receive improvement-oriented feedback.

8) **Scaffolding students' task engagement :** The teacher provides whatever assistance students' need to enable them to engage in learning activities productively. Structuring and support can be lessened as the students' expertise develops.

9) **Strategy teaching :** The teacher models and instructs students in learning and self-regulation strategies. Meta-cognitive awareness and self-regulation are sought in context like problem solving and general learning and study skills. An example of teacher modelling is, for example, when a teacher thinks out loud while modelling use of the strategy. Students are stimulated to monitor and reflect on their learning.

10) **Co-operative learning :** Students often benefit from working in pairs or small groups to construct understandings or help one another master skills.

11) **Goal-oriented assessment :** The teacher uses a variety of formal and informal assessment methods to monitor progress toward learning goals. Comprehensive assessment also examines students' reasoning and problem-solving processes.

12) **Achievement expectations :** The teacher establishes and follows through on appropriate expectations for learning outcomes.

2.9. School Values and Norms of behaviour

To be good and effective, a school should have

1. a clear organisation, characterised by stated missions,
2. goals,
3. values and standards of performance,
4. professional environment for teachers,
5. teachers participate in decisions affecting their work,

6. have reasonable autonomy to carry out their work,
7. Share a sense of purpose and
8. community &receive recognition (Chayya, 1997).

Components of School Culture :

Culture is reflected in an organization's atmosphere, myths, and moral code. The characteristics of a school district's culture can be deduced from multiple layers :

- Artefacts and symbols : the way its buildings are decorated and maintained.
- Values : the manner in which administrators, principals and staff function and interact.
- Assumptions : the beliefs that are taken for granted about human nature.

As a school district's culture develops over time, it is maintained by several practices :

- Common beliefs and values that key individuals communicate and enforce.
- Heroes and heroines whose actions and accomplishments embody these values.
- Rituals and ceremonies that reinforce these values.
- Stories that reflect what the organization stands for

The following chart shows how these components of school culture can support or impede learning.

	Supports Learning	**Impedes Learning**
Artifacts and symbols	The building and its arrangements reflect the children, their needs, and their educational accomplishments.	There is little that reflects an emphasis on children and their education.
Values	Administrators, teachers, students and parents participate in decision making.	Decisions are made without participation of teachers and parents.

	Supports Learning	Impedes Learning
Assumptions and beliefs	All students can learn. Parents want their children to succeed. Parents are partners in education.	Some students are incapable of learning or too lazy to learn. Parents don't care. Parents know nothing about education.

School Climate :

School climate reflects the physical and psychological aspects of the school that are more acceptable to change and that provide the preconditions necessary for teaching and learning to take place.

Components of Teaching Learning System :

Although there is no consistent agreement in the literature on the components of school climate or their importance, most writers emphasize caring as a core element. However, some place safety foremost, defining school climate as "an orderly environment in which the school family feels valued and able to pursue the school's mission free from concerns about disruptions and safety".

Several aspects of a school's physical and social environment comprise its climate. One organization identified the following eight areas :

- Appearance and physical plant.
- Faculty relations.
- Student interactions.
- Leadership / decision making.

How does school climate affect school performance ?

Numerous studies document that students in schools with a better school climate have higher achievement and better socio-emotional health. Probably

the most comprehensive work in this area is being done by the Search Institute, a non-profit organization that encourages schools and communities to develop and empower young people.

In a review of studies on the impact of support in school, the Search Institute found that a caring school climate is associated with :

- higher grades, engagement, attendance, expectations and aspirations, a sense of scholastic competence, fewer school suspensions, and on-time progression through grades (19 studies),
- higher self-esteem and self-concept (5 studies),
- less anxiety, depression and loneliness (3 studies) and
- less substance abuse (4 studies).

Another study by John Schweitzer of Michigan State University, found that when students in Detroit schools felt a sense of community with one another and a sense of belonging to their schools, they achieved higher scores on MEAP tests.

A national study of more than 12,000 seventh to twelfth graders found that connectedness to family and school significantly protects youth from seven of eight behaviors risky to their health.

Measuring School Climate :

There are numerous instruments designed to measure what various authors define as school climate. These are listed and rated in the Appendix.

Changing School Climate and School Culture :

Improving student behavior and academic performance generally requires changing school climate and school culture. Change may require moving individuals and organizations along a continuum from “at risk” to “safe” to “thriving”. This process takes time to accomplish.

While making positive changes in school climate motivates staff and students to improve, the district-level school culture must also change if school

reforms are to be sustained for long-term improvement.

Both school climate and school culture require significant attention when a principal or superintendent is new or when major changes are being implemented in the school system. It is worth noting that educational reform under the No School Left Behind act is essentially a long-term effort to change school culture. Note the central mantras of educational reform :

- Teachers and the school are accountable.
- All children can and must learn.

Some Approaches to Change :

Promoting a safe and orderly environment :

- Maintain buildings in good physical condition.'
- Reward students for appropriate behavior.
- Enforce consequences for inappropriate behavior.
- Use contracts with students to reinforce behavioral expectations.
- Post behavioral policies on bulletin boards; periodically announce them over the public address system.
- Initiate anti-building, conflict resolution and peer mediation programs.
- Engage students, staff and parents in planning school safety activities.
- Increase number and accessibility of counselors, social workers, and mentors.
- Create anonymous up lines or suggestion boxes for reporting potentially dangerous situations or providing ideas to improve school climate.
- Provide more in-school options to "blow off steam".
- Develop strategies to ensure safety during lunch periods and between classes, provide more structured activities during lunch hour.
- Provide accommodation on time-out rooms throughout the day.
- Provide in-school suspension programs with academic supports and consistent staffing.

2.10 Some Approaches towards Effective Teaching Learning System

- Promoting a safe and orderly environment.
- Maintain buildings in good physical condition.
- Reward students for appropriate behavior.
- Enforce consequences for inappropriate behavior.
- Use contracts with students to reinforce behavioral expectations.
- Post behavioral policies on bulletin boards; periodically announce them over the public address system.
- Initiate anti-bullying, conflict resolution and peer mediation programs.
- Engage students, staff and parents in planning school safety activities.
- Increase number and accessibility of counselors, social workers, and mentors.
- Create anonymous tip lines or suggestion boxes for reporting potentially dangerous situations or providing ideas to improve school climate.
- Develop strategies to ensure safety during lunch periods and between classes; provide more structured activities during lunch hour.
- Provide accommodation or time-out rooms throughout the day.
- Provide in-school suspension programs with academic supports and consistent staffing

According to Kelli Ballard and Alan Bates Accountability, high-stakes, and student achievement are popular terms among educators. Students' performance on standardized achievement tests is used to a high extent in reflecting the quality of instruction students receive from teachers as an intraculture.

1) Teachers Accountability,

2) Assuring quality and facilitating improvement institutional atmosphere.

It will best be achieved when teachers and their organizations claim the responsibility for developing and implementing methods for assessing their performance that respect the complexity and depth of their professional

knowledge and practice (Kleinhenz & Ingvarson, 2004). In other words, do current teacher evaluation procedures assess all the components that teachers are supposed to possess ?

The majority of educators agree with the fact that holding teachers accountable is imperative for student learning to take place. However, a lively debate surrounds the question of how accountability is established and about the place and value of professionalism in accountability (Bullough, Clark, & Patterson, 2003).

According to Gallagher (2002) schools such as Vaughn Elementary in Los Angeles, California evaluate teachers in ten domain areas, and teachers are not only evaluated by their principal, but by peers and themselves, too. Teachers are rated on a scale of one to four on each standard. This school found that the alignment between taught and tested curriculum, both in terms of content and cognitive demand, is a highly significant predictor of student performance. This study did make it clear, however, that no single measure should be seen as the sole criterion for judging performance rather than combining both the Intra and Inter Cultural Determinants for academic success.

According to Vandevoert, Amrein-Beardsley and Brliner (2004) the quality of a teacher in the classroom is the single most important factor in determining how well a child learns. Throughout the United States, schools are being evaluated based on their students' performance on a state mandated test given every year. Because of the No Child Left Behind [NCLB] Act, schools and teachers are being held accountable in more ways than ever based on student's performance.

Reference : David Ashley, Head teacher, Parrs Wood High School, Manchester.

Empowering Leadership :

It was common to assume that the cultural atmosphere of a school

revolved around the quality of the head teacher. Consequently, the idea of the 'super head' that solve all of its problems and swoop out again was prevalent. It is now generally accepted that such a model so dependent on short-term, top-down management, was nonsense. However, the head teacher does have a crucial role to play.

The key role for a head teacher is that of empowerment, creating a culture in which the vast intellect, ability and talent of the staff is not only solved, but fully utilized. If head teachers do not make it clear that all staff have the authority to make decisions, to be innovative and creative, then they will assume that they do not. If that happens, the vast wealth of knowledge & experience that exists in all schools will remain untapped.

Relying on Collaboration :

Choosing the appropriate networks to work with a matter of personal choice and school context. It is useful to work with local school leaders through local authorities in collaboration. Leadership incentive grants, Excellence in Quality practice and so one can develop initiatives that may directly involve students across a locality.

Reference : David Ashley, Head teacher, Prorswood High School, Manchester.

School Leadership and Cultural Determinants :

Although it is recognized that head of the institution pay a crucial role in school-wide effort to raise standards of teaching and pupil learning and achievement, evidence-based knowledge of what makes successful leaders remains elusive. The most popular theories are located in the transaction & transformational models identified more than 20 years ago (Burns, 1978) and lately reinvented through such terms as 'liberation' (Tampoe, 1998), 'educative' (Duignan & Me Pherson, 1992), 'invitational' (Stoll & Fink, 1996) and 'moral' leadership (Sergiovanni, 1992).

What is clear from these, and from the effective schools literature, is that successful leaders not only set direction but they also model values and practices consistent with those of the school, so that 'purposes which may have initially seemed to be separate become fused' (Sergiovanni, 1995).

Yet relatively few research studies have sought information from heads recognized as effective, and fever still have sought educated opinion from those who know most about them, i.e. their students, staff, governors and parents. In 1998, the National Association of Head teachers, the largest in the UK, Commissioned such a study reveals the following :

- Twelve heads were selected from schools of different sizes, operating within different phases, and located in a range of geographical, economic and socio-cultural settings.
- All the schools had received a positive inspection report by of the above committee particularly with regard to their leadership. All were performing better than average, and the heads all had a good reputation amongst their peers. Gender and experience were also factored in.
- All schools were visited for three days by members of the five research team, a substantial number of interviews were conducted, and local documentation supplemented there.

  Analysis of all the data revealed that the cultural determinants of academic institutions are as follows :

  - Values-led that is a cultural set up to be developed in a school.
  - People centered.
  - Achievement-oriented.
  - Inwards and outwards facing which is equivalent to intra & inter cultural determinants.
- Able to manage a number of ongoing tensions and dilemmas.
- All emphasized that the sets of care personal values of the heads were based upon care, equity, high expectations and achievement, which were clear to

and shared by the overwhelming majority of the school constituencies and which were the drivers for the life of the school.

- All emphasized the importance attached by the heads to monitoring standards in the school, to keeping ahead of the game so that their schools responded rather than reacted to new external demands, testing them against their own standards and minimizing bureaucratic demands on staff.
- All spoke of the improvement-oriented collaborative school cultures which the heads promoted, and the emphasis upon continuing professional development. Which met both organizational and individual needs ?
- All spoke of the time and care which the heads gave enthusiastically to their work : the way in which the heads modeled their values.
- The heads themselves were clearly strategic, reflective practitioners, exercising a range of interpersonal & intrapersonal skills, and able to analyse, evaluate, articulate and communicate with a range of agencies locally and nationally.

Reference : Effective School Leadership, Christopher Day & Alma Harris, School of Education, University of Nottingham.

2.11 Leadership and Classroom Environment

Significantly, alongside their positive there were also ongoing problems. Heads worked long hours and were enabled to continue to develop partly through the unsung support of external network of colleagues, friends and family. It was however, both their personal values and their abilities to maintain and develop learning and achievement cultures. Whilst at the same time manage ongoing tensions and dilemmas, which were the main features of their success.

1. Leadership versus management.
2. Development versus maintenance.
3. Internal versus change.
4. Autocracy versus autonomy.

5. Personal time versus professional tasks.
6. Personal values versus institutional imperatives.
7. Leadership in small versus large schools.
8. Develop or dismiss,
9. Power with or power over.
10. Subcontracting or mediation.

Reference : Effective School Leadership, Christopher Dary & Alma Harris, School of Education, University of Nottingham.

Teaching Learning System according to Weinstein *et al.*, 2004 :

Diversity of our classrooms, basically stands for cast, class and religion influence causing multicultural competence increasing the difficulties of teachers have with classroom management. Definitions and expectations of appropriate behavior are culturally influenced, and conflicts are likely to occur when teachers and students come from different cultural backgrounds ? (Weinstein *et al.*, 2004).

A culturally responsive classroom specially acknowledges the presence of culturally diverse students and the need for these students to find relevant connections among themselves and with the subject matter and the tasks teachers ask them to perform. In such programmes teachers recognize the differing learning styles of their students and develop instructional approaches that will accommodate these styles. (Montgomery, 2001).

So not only do teachers need to be aware and accommodate the learning styles of the different students, but also the classroom management for these students.

Five components essential to culturally responsive classroom management in a Teaching Learning System :

1. Recognition of one's own either centrism or biases.
2. Knowledge of student's cultural backgrounds.

3. Understanding of the broader social economic and political context of our educational system.
4. Ability and willingness to use culturally appropriate classroom management strategies.
5. Commitment to building caring classroom communities.

The Dimensions of Multicultural Education – Application in classrooms and similar settings for better academic achievement (Banks, Wool folk, 1995).

1. Content Integration :

i) Using examples and content from a variety of cultures.

ii) To illustrate key concepts, principles, generalizations.

iii) Theories in their subject area or discipline.

2. An Equity Pedagogy :

Matching teaching styles to student learning styles in order to facilitate the academic achievement of students from diverse racial, cultural and social-class groups.

3. An Empowering School Culture and Social Structure :

Group and labeling practices, sports participation, and the interaction of the staff and the students across ethnic and racial lines are some of the components that must be examined to create a school culture that empowers students from all groups.

4. Prejudice Reduction :

The characteristics of student's attitudes on the basis of socioeconomic status and casteism how they can be modified by teaching.

5. The Knowledge Construction Process :

Helping students to understand how the implicit cultural assumptions within a discipline influence the ways that knowledge is constructed within it.

In order to find out more about the student in one's classroom there one some questions that a teacher could / should ask to get a much clearer picture of the students in his / her classroom –

- Family background and structure.
- Education.
- Interpersonal relationship styles.
- Discipline.
- Time and space.
- Religion.
- Food.
- Health and hygiene.
- History, traditions and holidays.

According to Sammons, Hillman & Mortimer (1995) the characteristics that help make a school effective are broadly outlined as follows –

1. Focus on teaching and learning.
2. Purposeful teaching.
3. Shared vision and goals.
4. High expectations of all learners.
5. Accountability.
6. Learning Communities.
7. Stimulating and secure learning environment.
8. Professional leadership.

The overarching objective of creating and sustaining effective schools underpins all blueprint strategies and initiatives. This provides all schools in the government school system with a shared purpose. The blueprint reform agenda is a coherent strategy which provides school leadership teams with a range of tools and frame works to make their school effective.

Attributes of Transformational Leadership :

Providing Vision : Behaviour on the part of the leader aimed at identifying new opportunities for his or her school and developing articulating and inspiring others with his / her vision of the future.

Modelling Behaviour : Behaviour on the part of the leader that sets an example for staff members to follow, consistent with the values the leader displays.

Fostering Commitment : Behaviour on the part of the leader aimed at promoting cooperation among staff members and assisting them to work together toward achieving common goals.

Providing Individualized Support : Behaviour on the part of the leader that indicates respect for staff members and concern about their personal feelings and needs.

Providing Intellectual Stimulation : Behaviour on the part of the leader that challenges staff members to re-examine some of their assumptions about their work and rethink how it may be performed.

Establishing High Performance Expectations : Behaviour that demonstrates the leader's expectations for excellence, quality, and high performance by staff.

Four Main Qualities of an Instructional Leader :

Resource Provider : Behaviour that demonstrates the principal's effective use of time and resources.

Instructional Provider : Behaviour that demonstrates the principal's ability to evaluate and reinforce appropriate and effective strategies, instructional provider behaviour.

Communicator : Behaviour that demonstrates the principal's ability to evaluate and deal effectively with staff, and others.

Managerial Leadership :

Teacher Relations : The principal develops effective working relationships with teachers through appropriate communication skills, sensitivity to needs, appropriate support and reinforcement.

Student relations : The principal develops effective working relationships with students through appropriate communication skills, encouragement, support and high visibility.

Interactive process : The principal develops effective working relationships with teachers through appropriate communication skills, sensitivity to needs, appropriate support and reinforcement.

Student Relations : The principal develops effective working relationships with students through appropriate communication skills, encouragement, support and high visibility.

Interactive Processes : The principal organizes tasks and personnel for the effective day-to-day management of the school, including providing appropriate information to teachers and students, developing appropriate rules and procedures and setting the overall tone for discipline in the school.

Managerial leadership has been experienced in a collaborative approach in an interactive mode in a seminar on Life Science.

CHAPTER – III

FIRST STAGE : BITS OF INFORMATION COLLECTED FROM THE SURVEY REFLECTED THROUGH NONPARAMETRIC PRESENTATION

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FIRST STAGE : BITS OF INFORMATION COLLECTED FROM THE SURVEY REFLECTED THROUGH NONPARAMETRIC PRESENTATION

3.1 Analysis of Collected Data through Chi- Square Technique

Methodology :

The study is survey type descriptive research followed by experimental research and the approach is mixed type of research. For finding out the components of the Teaching Learning System statistically, Factor analysis has been conducted with other descriptive statistics.

Tools :

A standardized questionnaire of Dr. D. Bhattacharyya and A. K. Hazra regarding Effective Teaching Learning System has been used for conducting the study and it has been locally further standardized before application.

Population and Sample :

Ninth grade students of West Bengal has been considered as population and some selected schools are used as sample for conducting the study. Sampling technique is purposive in nature. Total sample size is 100 taken from different schools representing different parts of West Bengal.

3.2 Calculation & Interpretation :

Table 1 : In effective school, teachers engage students by good teaching

	SA	A	UN
Observed (f_o)	78	32	10
Expected (f_e)	40	40	40
($f_0 - f_e$)	38	-8	-30
$(f_0 - f_e)^2$	1444	64	900
$(f_0 - f_e)^2/f_e$	36.10	1.60	22.50

Table Value = 5.99 $\chi^2 = 60.20$ df =2

Interpretation : Table 1 shows that the value of χ^2 was found to be 60.20 which is greater than the table value. Hence, the result is significant at 0.05 level, Therefore, the statement is accepted.

Table 2 : Class size and student population are small to make a school effective

	SA	A	UN
Observed (f_o)	76	14	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	36	-26	-10
$(f_0 - f_e)^2$	1296	676	100
$(f_0 - f_e)^2/f_e$	32.40	16.90	2.50

Table Value = 5.99 $\chi^2 = 51.80$ df =2

Interpretation : Table 2 shows that the value of χ^2 (calculated) is 51.80 which is greater than the table value. Hence, the result is significant at 0.05 level, Therefore, the statement is accepted.

Table 3 : In an effective school ground rules are for respectful behaviour

	SA	A	UN
Observed (f_o)	69	12	39
Expected (f_e)	40	40	40
($f_0 - f_e$)	29	-28	-1
$(f_0 - f_e)^2$	841	784	1
$(f_0 - f_e)^2/f_e$	21.03	19.60	0.03

Table Value = 5.99 $\chi^2 = 40.66$ df =2

Interpretation: Table 3 shows that the value of χ^2 (calculated) is 40.66 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 4 : High expectations and clear consequences are articulated to students frequently for effective school

	SA	A	UN
Observed (f_o)	78	22	20
Expected (f_e)	40	40	40
($f_0 - f_e$)	38	-18	-20
$(f_0 - f_e)^2$	1444	324	400
$(f_0 - f_e)^2/f_e$	36.10	8.10	10.00

Table Value = 5.99 $\chi^2 = 54.20$ df =2

Interpretation : Table 4 shows that the value of χ^2 (calculated) is 54.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 5 : Staff is dedicated and caring for effective school

	SA	A	UN
Observed (f_o)	49	12	59
Expected (f_e)	40	40	40
($f_0 - f_e$)	9	-28	19
$(f_0 - f_e)^2$	81	784	361
$(f_0 - f_e)^2/f_e$	2.03	19.60	9.03

Table Value = 5.99 $\chi^2 = 30.66$ df =2

Interpretation : Table 5 shows that the value of χ^2 was found 30.66 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 6 : Structured classroom routines provide stability and direction for effective school

	SA	A	UN
Observed (f_o)	56	10	54
Expected (f_e)	40	40	40
($f_0 - f_e$)	56	10	54
$(f_0 - f_e)^2$	40	40	40
$(f_0 - f_e)^2/f_e$	56	10	54

Table Value = 5.99 $\chi^2 = 33.80$ df =2

Interpretation : Table 6 shows that the value of χ^2 was found 33.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 7 : In effective school size, respect and collaboration create a sense of family and community within its walls

	SA	A	UN
Observed (f_o)	79	21	20
Expected (f_e)	40	40	40
($f_0 - f_e$)	39	-19	-20
$(f_0 - f_e)^2$	1521	361	400
$(f_0 - f_e)^2/f_e$	38.03	9.03	10.00

Table Value = 5.99 $\chi^2 = 57.06$ df =2

Interpretation : Table 7 shows that the value of χ^2 came to 57.06 when calculated which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 8 : Effective schools consider time spent on academic and non-academic learning

	SA	A	UN
Observed (f_o)	57	29	34
Expected (f_e)	40	40	40
($f_0 - f_e$)	17	-11	-6
$(f_0 - f_e)^2$	289	121	36
$(f_0 - f_e)^2/f_e$	7.23	3.03	0.90

Table Value = 5.99 $\chi^2 = 11.16$ df =2

Interpretation: Table 8 shows that the value of χ^2 when calculated came to 11.16 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 9 : Effective schools deploy their resources strategically to enhance teaching and learning

	SA	A	UN
Observed (f_o)	77	23	20
Expected (f_e)	40	40	40
($f_0 - f_e$)	37	-17	-20
$(f_0 - f_e)^2$	1369	289	400
$(f_0 - f_e)^2/f_e$	34.23	7.23	10.00

Table Value = 5.99 $\chi^2 = 51.46$ df =2

Interpretation : Table 9 shows that the value of χ^2 (calculated) was found 51.46 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 10 : Balance of workload i.e. time focused on T/L & time spent on administrative tasks is maintained in effective school

	SA	A	UN
Observed (f_o)	30	22	68
Expected (f_e)	40	40	40
($f_0 - f_e$)	-10	-18	28
$(f_0 - f_e)^2$	100	324	784
$(f_0 - f_e)^2/f_e$	2.50	8.10	19.60

Table Value = 5.99 $\chi^2 = 30.20$ df =2

Interpretation : Table 10 shows that the value of χ^2 (calculated) is 30.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 11 : Strategy for planning and implementing pedagogical change

	SA	A	UN
Observed (f_o)	70	30	20
Expected (f_e)	40	40	40
($f_0 - f_e$)	30	-10	-20
$(f_0 - f_e)^2$	900	100	400
$(f_0 - f_e)^2/f_e$	22.50	2.50	10.00

Table Value = 5.99 $\chi^2 = 35.00$ df =2

Interpretation : Table 11 shows that the value of χ^2 (calculated) is 35.00 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 12 : In effective school provision of knowledge bank with best practices and new ideas are maintained

	SA	A	UN
Observed (f_o)	70	13	34
Expected (f_e)	40	40	40
($f_0 - f_e$)	30	-27	-6
$(f_0 - f_e)^2$	900	729	36
$(f_0 - f_e)^2/f_e$	22.50	18.23	0.90

Table Value = 5.99 $\chi^2 = 41.63$ df =2

Interpretation: Table 12 shows that the value of χ^2 was found to be 41.63 which is greater than the table value and the result is significant at 0.05 level. Therefore the statement is accepted.

Table 13 : Assessment and reporting practices are integral to the T/L process in effective school

	SA	A	UN
Observed (f_o)	69	12	39
Expected (f_e)	40	40	40
($f_0 - f_e$)	29	-28	-1
$(f_0 - f_e)^2$	841	784	1
$(f_0 - f_e)^2/f_e$	21.03	19.60	0.03

Table Value = 5.99 $\chi^2 = 40.66$ df =2

Interpretation : Table 13 shows that the value of χ^2 was found 40.66 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 14 : In effective school, student resource package provides focus on student needs, encourages innovation, targeting funds for them

	SA	A	UN
Observed (f_o)	77	23	20
Expected (f_e)	40	40	40
($f_0 - f_e$)	37	-17	-20
$(f_0 - f_e)^2$	1369	289	400
$(f_0 - f_e)^2/f_e$	34.23	7.23	10.00

Table Value = 5.99 $\chi^2 = 51.46$ df =2

Interpretation : Table 14 shows that the value of χ^2 (calculated) is 51.46 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted. It can be concluded that curriculum do not satisfy the whole objectives.

Table 15 : In effective school, staff, student and parent surveys provide feedback to teachers and school leadership teams on T / L arrangements

	SA	A	UN
Observed (f_o)	64	26	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	24	-14	-10
$(f_0 - f_e)^2$	576	196	100
$(f_0 - f_e)^2/f_e$	14.40	4.90	2.50

Table Value = 5.99 $\chi^2 = 21.80$ df =2

Interpretation : Table 15 shows that the value of χ^2 (calculated) is 21.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 16 : Effective school manages the time spent on interdisciplinary learning – a) physical, personal & social learning and b) discipline-based learning

	SA	A	UN
Observed (f_o)	42	12	66
Expected (f_e)	40	40	40
($f_0 - f_e$)	2	-28	26
$(f_0 - f_e)^2$	4	784	676
$(f_0 - f_e)^2/f_e$	0.10	19.60	16.90

Table Value = 5.99 $\chi^2 = 36.60$ df =2

Interpretation : Table 16 shows that the value of χ^2 (calculated) is 36.60 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 17 : Effective school frames good curriculum planning which support councils, leaders and teachers to work cohesively

	SA	A	UN
Observed (f_o)	76	16	28
Expected (f_e)	40	40	40
($f_0 - f_e$)	36	-24	-12
$(f_0 - f_e)^2$	1296	576	144
$(f_0 - f_e)^2/f_e$	32.40	14.40	3.60

Table Value = 5.99 $\chi^2 = 50.40$ df =2

Interpretation: Table 17 shows that the value of χ^2 (calculated) is 50.40 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 18 : In effective teaching it is necessary to break the class period into two or three different activities

	SA	A	UN
Observed (f_o)	78	15	27
Expected (f_e)	40	40	40
($f_0 - f_e$)	38	-25	-13
$(f_0 - f_e)^2$	1444	625	169
$(f_0 - f_e)^2/f_e$	36.10	15.63	4.23

Table Value = 5.99 $\chi^2 = 55.96$ df =2

Interpretation: Table 18 shows that the value of χ^2 (calculated) is 55.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 19 : Effective teaching specify the class lesson objectives and to teach those objectives directly

	SA	A	UN
Observed (f_o)	60	30	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	20	-10	-10
$(f_0 - f_e)^2$	400	100	100
$(f_0 - f_e)^2/f_e$	10.00	2.50	2.50

Table Value = 5.99 $\chi^2 = 15.00$ df = 2

Interpretation : Table 19 shows that the value of χ^2 (calculated) is 15.00 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 20 : Effective teaching is enhanced by challenging class-room climate but not threatening to students

	SA	A	UN
Observed (f_o)	76	14	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	36	-26	-10
$(f_0 - f_e)^2$	1296	676	100
$(f_0 - f_e)^2/f_e$	32.40	16.90	2.50

Table Value = 5.99 $\chi^2 = 51.80$ df = 2

Interpretation : Table 20 shows that the value of χ^2 (calculated) is 51.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 21 : Effective teaching depends on positive classroom environment that does not allow sleeping, talking, doing other work, phone calls etc.

	SA	A	UN
Observed (f_o)	70	30	20
Expected (f_e)	40	40	40
($f_0 - f_e$)	30	-10	-20
$(f_0 - f_e)^2$	900	100	400
$(f_0 - f_e)^2/f_e$	22.50	2.50	10.00
Table Value = 5.99	$\chi^2 = 35.00$		df = 2

Interpretation : Table 21 shows that the value of χ^2 (calculated) is 35.00 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 22 : Effective teaching depends upon the class-size

	SA	A	UN
Observed (f_o)	70	18	32
Expected (f_e)	40	40	40
($f_0 - f_e$)	30	-22	-8
$(f_0 - f_e)^2$	900	484	64
$(f_0 - f_e)^2/f_e$	22.50	12.10	1.60
Table Value = 5.99	$\chi^2 = 36.20$		df = 2

Interpretation: Table 22 shows that the value of χ^2 (calculated) is 36.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table. 23 : Effective teaching involves all the stakeholders (teachers, support staff, students, parents, governors, partner school and multi-agency groups that work with the school) to establish priorities for improvement

	SA	A	UN
Observed (f_o)	68	18	34
Expected (f_e)	40	40	40
($f_0 - f_e$)	28	-22	-6
$(f_0 - f_e)^2$	784	484	36
$(f_0 - f_e)^2/f_e$	19.60	12.10	0.90

Table Value = 5.99 $\chi^2 = 32.60$ df = 2

Interpretation : Table 23 shows that the value of χ^2 (calculated) is 32.60 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 24 : It is logical to give authority to all the staff to make decision for innovative and creativity of school

	SA	A	UN
Observed (f_o)	61	14	45
Expected (f_e)	40	40	40
($f_0 - f_e$)	21	-26	5
$(f_0 - f_e)^2$	441	676	25
$(f_0 - f_e)^2/f_e$	11.03	16.90	0.63

Table Value = 5.99 $\chi^2 = 28.56$ df = 2

Interpretation : Table 24 shows that the value of χ^2 (calculated) is 28.56 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 25 : Return demonstration by the students is the chance to be creative– promotes learning and as a whole highlights effective teaching

	SA	A	UN
Observed (f_o)	50	18	52
Expected (f_e)	40	40	40
($f_0 – f_e$)	10	-22	12
$(f_0 – f_e)^2$	100	484	144
$(f_0 – f_e)^2/f_e$	2.50	12.10	3.60

Table Value = 5.99 $\chi^2 = 18.20$ df = 2

Interpretation : Table 25 shows that the value of χ^2 (calculated) is 18.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 26 : Effective teaching is a path of evolution from "simple, old known, prior knowledge to complex and new unknown information – the way of quick grasping by the students

	SA	A	UN
Observed (f_o)	48	22	50
Expected (f_e)	40	40	40
($f_0 – f_e$)	8	-18	10
$(f_0 – f_e)^2$	64	324	100
$(f_0 – f_e)^2/f_e$	1.60	8.10	2.50

Table Value = 5.99 $\chi^2 = 12.20$ df = 2

Interpretation : Table 26 shows that the value of χ^2 (calculated) is 12.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement value based education promotes healthy competition

and comparison among the institutions is accepted. The healthy competition and comparison among the institutions which promotes the same of more hard work and labour. It also has an effective impact on the accreditation of institutional results. The institutions utilize maximum available resources in novel ways to increase their credibility.

Table 27 : Plan for periodic rest to avoid mental fatigue is the part of effective teaching

	SA	A	UN
Observed (f_o)	57	33	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	17	-7	-10
$(f_0 - f_e)^2$	289	49	100
$(f_0 - f_e)^2/f_e$	7.23	1.23	2.50

Table Value = 5.99 $\chi^2 = 10.96$ df = 2

Interpretation : Table 27 shows that the value of χ^2 (calculated) is 10.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 28 : Effective teaching is "praising students' success" as it associate the desired learning goal

	SA	A	UN
Observed (f_o)	30	19	71
Expected (f_e)	40	40	40
($f_0 - f_e$)	-10	-21	31
$(f_0 - f_e)^2$	100	441	961
$(f_0 - f_e)^2/f_e$	2.50	11.03	24.03

Table Value = 5.99 $\chi^2 = 37.56$ df = 2

Interpretation : Table 28 shows that the value of χ^2 (calculated) is 37.56 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 29 : Effective teaching depends on students' ratings, peer review, self evaluation, teaching portfolios and student achievement

	SA	A	UN
Observed (f_o)	67	23	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	27	-17	-10
$(f_0 - f_e)^2$	729	289	100
$(f_0 - f_e)^2/f_e$	18.23	7.23	2.50

Table Value = 5.99 $\chi^2 = 27.96$ df = 2

Interpretation : Table 29 shows that the value of χ^2 (calculated) is 27.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 30 : Effective teaching depends on equity pedagogy

	SA	A	UN
Observed (f_o)	72	18	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	32	-22	-10
$(f_0 - f_e)^2$	1024	484	100
$(f_0 - f_e)^2/f_e$	25.60	12.10	2.50

Table Value = 5.99 $\chi^2 = 40.20$ df = 2

Interpretation : Table 30 shows that the value of χ^2 (calculated) is 40.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 31 : Effective teaching depends on teacher's awareness of the cultural differences in the students – to maintain order in the classroom

.	SA	A	UN
Observed (f_o)	67	23	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	27	-17	-10
$(f_0 - f_e)^2$	729	289	100
$(f_0 - f_e)^2/f_e$	18.23	7.23	2.50
Table Value = 5.99	$\chi^2 = 27.96$		df = 2

Interpretation: Table 31 shows that the value of χ^2 (calculated) is 27.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 32 : Effective leadership develops a well defined vision with staff in our school

	SA	A	UN
Observed (f_o)	71	08	41
Expected (f_e)	40	40	40
($f_0 - f_e$)	31	-32	1
$(f_0 - f_e)^2$	961	1024	1
$(f_0 - f_e)^2/f_e$	24.03	25.60	0.03
Table Value = 5.99	$\chi^2 = 49.66$		df = 2

Interpretation : Table 32 shows that the value of χ^2 (calculated) is 49.66 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 33 : Effective leadership focuses on both instructional and facilitative leadership in our T / L situation

	SA	A	UN
Observed (f_o)	56	04	60
Expected (f_e)	40	40	40
($f_0 - f_e$)	16	-36	20
$(f_0 - f_e)^2$	256	1296	400
$(f_0 - f_e)^2/f_e$	6.40	32.40	10.00

Table Value = 5.99 $\chi^2 = 48.80$ df = 2

Interpretation : Table 33 shows that the value of χ^2 (calculated) is 48.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 34 : Emphasis on moral courage (code of ethics / integrity) is given to the students by the management to exhibit honesty

	SA	A	UN
Observed (f_o)	44	08	68
Expected (f_e)	40	40	40
($f_0 - f_e$)	4	-32	28
$(f_0 - f_e)^2$	16	1024	784
$(f_0 - f_e)^2/f_e$	0.40	25.60	19.60

Table Value = 5.99 $\chi^2 = 45.60$ df = 2

Interpretation : Table 34 shows that the value of χ^2 (calculated) is 45.60 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 35 : Effective leadership build a collaborative culture in our school

	SA	A	UN
Observed (f_o)	75	20	25
Expected (f_e)	40	40	40
($f_0 - f_e$)	35	-20	-15
$(f_0 - f_e)^2$	1225	400	225
$(f_0 - f_e)^2/f_e$	30.63	10.00	5.63

Table Value = 5.99 $\chi^2 = 46.26$ df = 2

Interpretation : Table 35 shows that the value of χ^2 (calculated) is 46.26 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 36 : Effective leadership empower teachers in decision making for all round improvement of school

	SA	A	UN
Observed (f_o)	26	16	78
Expected (f_e)	40	40	40
($f_0 - f_e$)	-14	-24	38
$(f_0 - f_e)^2$	196	576	1444
$(f_0 - f_e)^2/f_e$	4.90	14.40	36.10

Table Value = 5.99 $\chi^2 = 55.40$ df = 2

Interpretation : Table 36 shows that the value of χ^2 (calculated) is 55.40 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 37 : Emphasis on culture of teachers' leadership is rare in our school

	SA	A	UN
Observed (f_o)	76	14	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	36	-26	-10
$(f_0 - f_e)^2$	1296	676	100
$(f_0 - f_e)^2/f_e$	32.40	16.90	2.50
Table Value = 5.99	$\chi^2 = 51.80$		df = 2

Interpretation : Table 37 shows that the value of χ^2 (calculated) is 51.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted .

Table 38 : Climate of mutual trust and respect is very common criteria of our school

	SA	A	UN
Observed (f_o)	70	20	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	30	-20	-10
$(f_0 - f_e)^2$	900	400	100
$(f_0 - f_e)^2/f_e$	22.50	10.00	2.50
Table Value = 5.99	$\chi^2 = 35.00$		df = 2

Interpretation : Table 38 shows that the value of χ^2 (calculated) is 35.00 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 39 : Effective leadership change culture of school to invite parent involvement

	SA	A	UN
Observed (f_o)	68	19	32
Expected (f_e)	40	40	40
($f_0 - f_e$)	28	-21	-8
$(f_0 - f_e)^2$	784	441	64
$(f_0 - f_e)^2/f_e$	19.60	11.03	1.60

Table Value = 5.99 $\chi^2 = 32.23$ df = 2

Interpretation : Table 39 shows that the value of χ^2 (calculated) is 32.23 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 40 : Symbol of success is the point of pride – reflected by test-scores in our school

	SA	A	UN
Observed (f_o)	50	16	54
Expected (f_e)	40	40	40
($f_0 - f_e$)	10	-24	14
$(f_0 - f_e)^2$	100	576	196
$(f_0 - f_e)^2/f_e$	2.50	14.40	4.90

Table Value = 5.99 $\chi^2 = 21.80$ df = 2

Interpretation : Table 40 shows that the value of χ^2 (calculated) is 21.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 41 : Effective leadership manage time effectively in our school

	SA	A	UN
Observed (f_o)	88	8	24
Expected (f_e)	40	40	40
($f_0 - f_e$)	48	-32	-16
$(f_0 - f_e)^2$	2304	1024	256
$(f_0 - f_e)^2/f_e$	57.60	25.60	6.40

Table Value = 5.99 $\chi^2 = 89.60$ df = 2

Interpretation : Table 41 shows that the value of χ^2 (calculated) is 89.60 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted. It means that academic achievement measures only cognitive domain.

Table 42 : Effective leadership arrange parent / staff meetings effectively for improvement of our school

	SA	A	UN
Observed (f_o)	20	13	87
Expected (f_e)	40	40	40
($f_0 - f_e$)	-20	-27	47
$(f_0 - f_e)^2$	400	729	2209
$(f_0 - f_e)^2/f_e$	10.00	18.23	55.23

Table Value = 5.99 $\chi^2 = 83.46$ df = 2

Interpretation : Table 42 shows that the value of χ^2 (calculated) is 83.46 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted exposing visual styles.

Table 43 : Effective leadership try to balance the workload among the staff

	SA	A	UN
Observed (f_o)	58	24	38
Expected (f_e)	40	40	40
($f_0 - f_e$)	18	-16	-2
$(f_0 - f_e)^2$	324	256	4
$(f_0 - f_e)^2/f_e$	8.10	6.40	0.10
Table Value = 5.99	$\chi^2 = 14.60$		df = 2

Interpretation : Table 43 shows that the value of χ^2 (calculated) is 14.60 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 44 : Effective leadership develop relations with teachers

	SA	A	UN
Observed (f_o)	78	12	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	38	-28	-10
$(f_0 - f_e)^2$	1444	784	100
$(f_0 - f_e)^2/f_e$	36.10	19.60	2.50
Table Value = 5.99	$\chi^2 = 58.20$		df = 2

Interpretation : Table 44 shows that the value of χ^2 (calculated) is 58.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 45 : Effective leadership create organisational structure that involve all faculty in decision making for collaboration

	SA	A	UN
Observed (f_o)	34	26	60
Expected (f_e)	40	40	40
($f_0 - f_e$)	-6	-14	20
$(f_0 - f_e)^2$	36	196	400
$(f_0 - f_e)^2/f_e$	0.90	4.90	10.00

Table Value = 5.99 $\chi^2 = 15.80$ df = 2

Interpretation : Table 45 shows that the value of χ^2 (calculated) is 15.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 46 : In our school leadership develop safe and trustful relationship with teachers, students and parents

	SA	A	UN
Observed (f_o)	52	18	50
Expected (f_e)	40	40	40
($f_0 - f_e$)	12	-22	10
$(f_0 - f_e)^2$	144	484	100
$(f_0 - f_e)^2/f_e$	3.60	12.10	2.50

Table Value = 5.99 $\chi^2 = 18.20$ df = 2

Interpretation : Table 46 shows that the value of χ^2 (calculated) is 18.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted. In the opinion of the majority is that visual learning style more preferable.

Table 47 : In our school, leadership cultivate the academic field to choose leader from the rank of teacher

.	SA	A	UN
Observed (f_o)	68	12	40
Expected (f_e)	40	40	40
($f_0 - f_e$)	28	-28	0
$(f_0 - f_e)^2$	784	784	0
$(f_0 - f_e)^2/f_e$	19.60	19.60	0.00

Table Value = 5.99 $\chi^2 = 39.20$ df = 2

Interpretation : Table 47 shows that the value of χ^2 (calculated) is 39.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 48 : Leadership help teachers deal with increased parental involvement

	SA	A	UN
Observed (f_o)	46	14	60
Expected (f_e)	40	40	40
($f_0 - f_e$)	6	-26	20
$(f_0 - f_e)^2$	36	676	400
$(f_0 - f_e)^2/f_e$	0.90	16.90	10.00

Table Value = 5.99 $\chi^2 = 27.80$ df = 2

Interpretation : Table 48 shows that the value of χ^2 (calculated) is 27.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 49 : A focus on student learning is always established by leadership in our school

	SA	A	UN
Observed (f_o)	87	14	19
Expected (f_e)	40	40	40
($f_0 - f_e$)	47	-26	-21
$(f_0 - f_e)^2$	2209	676	441
$(f_0 - f_e)^2/f_e$	55.23	16.90	11.03

Table Value = 5.99 $\chi^2 = 83.16$ df = 2

Interpretation : Table 49 shows that the value of χ^2 (calculated) is 83.16 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 50 : Careful monitoring of teacher and pupil progress is encouraged by leadership

	SA	A	UN
Observed (f_o)	80	12	28
Expected (f_e)	40	40	40
($f_0 - f_e$)	40	-28	-12
$(f_0 - f_e)^2$	1600	784	144
$(f_0 - f_e)^2/f_e$	40.00	19.60	3.60

Table Value = 5.99 $\chi^2 = 63.20$ df = 2

Interpretation : Table 50 shows that the value of χ^2 (calculated) is 63.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 51 : Effective leadership develop school improvement plans from results of inquiry and reflection

	SA	A	UN
Observed (f_o)	77	13	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	37	-27	-10
$(f_0 - f_e)^2$	1369	729	100
$(f_0 - f_e)^2/f_e$	34.23	18.23	2.50

Table Value = 5.99 $\chi^2 = 54.96$ df = 2

Interpretation : Table 51 shows that the value of χ^2 (calculated) is 54.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 52 : Communication with all stakeholders is done by leadership with science due to greater vocational opportunity

	SA	A	UN
Observed (f_o)	55	10	55
Expected (f_e)	40	40	40
($f_0 - f_e$)	15	-30	15
$(f_0 - f_e)^2$	225	900	225
$(f_0 - f_e)^2/f_e$	5.63	22.50	5.63

Table Value = 5.99 $\chi^2 = 33.76$ df = 2

Interpretation : Table 52 shows that the value of χ^2 (calculated) is 33.76 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 53 : Our leadership always puts attention to the needs of low-performing students

	SA	A	UN
Observed (f_o)	76	16	28
Expected (f_e)	40	40	40
($f_0 - f_e$)	36	-24	-12
$(f_0 - f_e)^2$	1296	576	144
$(f_0 - f_e)^2/f_e$	32.40	14.40	3.60

Table Value = 5.99 $\chi^2 = 50.40$ df = 2

Interpretation : Table 53 shows that the value of χ^2 (calculated) is 50.40 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 54 : Our leadership always disseminate information widely

	SA	A	UN
Observed (f_o)	66	14	40
Expected (f_e)	40	40	40
($f_0 - f_e$)	26	-26	0
$(f_0 - f_e)^2$	676	676	0
$(f_0 - f_e)^2/f_e$	16.90	16.90	0.00

Table Value = 5.99 $\chi^2 = 33.80$ df = 2

Interpretation : Table 54 shows that the value of χ^2 (calculated) is 33.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted. It suggests that information be provided visually.

Table 55 : Provision of no role model example is the negative point for effective leadership

	SA	A	UN
Observed (f_o)	67	13	40
Expected (f_e)	40	40	40
($f_0 - f_e$)	27	-27	0
$(f_0 - f_e)^2$	729	729	0
$(f_0 - f_e)^2/f_e$	18.23	18.23	0.00

Table Value = 5.99 $\chi^2 = 36.46$ df = 2

Interpretation : Table 55 shows that the value of χ^2 (calculated) is 36.46 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 56 : Effective leadership develop effective co-ordination strategies for betterment of our school

	SA	A	UN
Observed (f_o)	65	17	38
Expected (f_e)	40	40	40
($f_0 - f_e$)	25	-23	-2
$(f_0 - f_e)^2$	625	529	4
$(f_0 - f_e)^2/f_e$	15.63	13.23	0.10

Table Value = 5.99 $\chi^2 = 28.96$ df = 2

Interpretation : Table 56 shows that the value of χ^2 (calculated) is 28.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 57 : Effective leadership created senior management team in our school

	SA	A	UN
Observed (f_o)	76	14	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	36	-26	-10
$(f_0 - f_e)^2$	1296	676	100
$(f_0 - f_e)^2/f_e$	32.40	16.90	2.50

Table Value = 5.99 $\chi^2 = 51.80$ df = 2

Interpretation : Table 57 shows that the value of χ^2 (calculated) is 51.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 58 : Effective leadership act as a community leader in our school

	SA	A	UN
Observed (f_o)	35	35	50
Expected (f_e)	40	40	40
($f_0 - f_e$)	-5	-5	10
$(f_0 - f_e)^2$	25	25	100
$(f_0 - f_e)^2/f_e$	0.63	0.63	2.50

Table Value = 5.99 $\chi^2 = 3.76$ df = 2

Interpretation: Table 58 shows that the value of χ^2 (calculated) is 3.76 which is lesser than the table value and the result is not significant at 0.05 level. Therefore, the statement is rejected.

Table 59 : Our school leadership is sensitive to exam

.	SA	A	UN
Observed (f_o)	76	20	24
Expected (f_e)	40	40	40
($f_0 - f_e$)	36	-20	-16
$(f_0 - f_e)^2$	1296	400	256
$(f_0 - f_e)^2/f_e$	32.40	10.00	6.40

Table Value = 5.99 $\chi^2 = 48.80$ df = 2

Interpretation: Table 59 shows that the value of χ^2 (calculated) is 48.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

Table 60 : Monitoring of students progress is regularly done by our leadership

	SA	A	UN
Observed (f_o)	70	20	30
Expected (f_e)	40	40	40
($f_0 - f_e$)	30	-20	-10
$(f_0 - f_e)^2$	900	400	100
$(f_0 - f_e)^2/f_e$	22.50	10.00	2.50

Table Value = 5.99 $\chi^2 = 35.00$ df = 2

Interpretation: Table 60 shows that the value of χ^2 (calculated) is 35.00 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted..

CHAPTER – IV

STAGE TWO : EFFECTIVE TEACHING LEARNING SYSTEM. IDENTIFICATION OF COMPONENTS OF EFFECTIVE TEACHING LEARNING SYSTEM

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STAGE TWO : EFFECTIVE TEACHING LEARNING SYSTEM. IDENTIFICATION OF COMPONENTS OF EFFECTIVE TEACHING LEARNING SYSTEM

4.1 Methodology

The study is survey type descriptive research. For finding out the components of the Teaching Learning system statistically, Factor Analysis has been conducted with other descriptive statistics.

4.2 Tools

A locally **s**tandardized questionnaire regarding Effective Teaching Learning System has been used for conducting the study.

4.3 Population and Sample

Ninth grade students of West Bengal has been considered as population and some selected schools are used as sample for conducting the study. Sampling technique is purposive in nature. Total Sample size is 100 taken from different schools representing different parts of West Bengal.

4.4 Reliability

The questionnaire is highly reliable. Mainly Test-Retest method is used for calculating reliability. The reliability coefficient is found to be 0.86.

4.5 Validity

Validity is calculated from reliability index and content validity is highly maintained.

Components of Effective Teaching Learning System

4.6 Research Design :

According to the objectives of the present study the present investigator used the under mentioned design for the study.

a) To prepare an Attitude Scale for the assessment of Teaching Learning System.
b) For the extraction of principal component factor of effectiveness the collected data would be organised, enter into the computer data sheet and finally with the application of SPSS package principal component analysis would be performed. After that Varimax rotation of the obtained factor structure, would be perform again with the application of SPSS package for getting a meaningful factor structure.
c) Finally the rotated factor structure would be interpreted logically taking into account test (items) of the Likert type scale as mentioned in (a).

4.7 A Brief Note on Principal Component Factor Analysis :

The researcher is presenting some essentials of principal component factor analysis techniques.

Principal component analysis is one of the simplest of the multivariate methods. The object of the analysis is to take p variables X_1, X_2, ... X_p and find combinations of these to produce indicates Z_1, Z_2, ..., Z_p that are uncorrelated. The lack of correlation is a useful property because it means that the indices are measuring different 'dimensions' in the data. However, the indices are also ordered so that Z_1 displays the largest amount of variation Z_2 displays the second largest amount of variation, and so on. That is, var $(Z_1) \geq$ var $(Z_2) \geq$..... $\geq$ var (Z_p), where var (Z_i) denotes the variance of Z_1 in the data set being considered. The Zi are called the principal components. When doing a principal component analysis there is always the hope that the variances of most of the indices will be so low as to be negligible. In that case the variation in the

data set can be adequately described by the few Z variables with variances that are not negligible. Some degree of economy is then achieved since the variation in the p original X variables is accounted for by a smaller number of Z variables.

It must be stressed that a principal analysis does not always work in the sense that a large number of original variables are reduced to a small number of transformed variables. Indeed, if the original variables are uncorrelated then the analysis does absolutely nothing. The best results are obtained when the original variables are very highly correlated, positively or negatively. If that is the case then adequately represented by two or three principal components. If this desirable state of affairs does occur then the important principal components will be of some interest as measures of underlying 'dimensions' in the data. However, it will also be of value to know that there is a good deal of redundancy in the original variables, with most of them measuring similar things.

A principal component analysis starts with data on p variables for n individuals. The first principal component is then the linear combination of the variables X_1, X_2, ..., X_p, $Z_1 = a_{11}X_1 + a_{12}X_2 + ... + a_{1p}X_p$ that varies as much as possible for the individuals, subject to the condition that

$$a_{11}^2 + a_{12}^2 + ... + a_{1p}^2 = 1$$

Thus the variance of Z_1, var (Z_1), is as large as possible given this constraint on the constants a_{1j}. The constraint is introduced because if this is not done then var (Z_1) can be increased by simply increasing any one of the a_{1j} values. The second principal component,

$$Z_2 = a_{21}X_1 + a_{22}X_2 + ... + a_{2p}X_p$$

is such that var (Z_2) is as large as possible subject to the constraint that

$$a_{21}^2 + a_{22}^2 + ... + a_{2p}^2 = 1,$$

and also to the condition that Z_1 and Z_2 are uncorrelated. The third principal

component,

$$Z_3 = a_{31}X_1 + a_{32}X_2 + ... + a_{3p}X_p,$$

is such that var(Z_3) is as large as possible subject to the constraint that

$$a_{31}^2 + a_{32}^2 + ... + a_{3p}^2 = 1,$$

and also that Z_3 is uncorrelated with Z_2 and Z_1. Further principal components are defined by continuing in the same way. If there are p variables then there can be up to p principal components.

In order to use the results of a principal component analysis it is not necessary to know how the equations for the principal components are derived. However, it is useful to understand the nature of the equations themselves. In fact a principal component analysis just involves findings the eigenvalues of the sample covariance matrix.

The matrix is symmetric and has the form

$$C = \begin{bmatrix} c_{11} & c_{13} & \cdots & c_{ip} \\ c_{21} & c_{23} & \cdots & c_{2p} \\ \vdots & \vdots & \cdots & \vdots \\ c_{p1} & c_{p3} & \cdots & c_{pp} \end{bmatrix}$$

where the diagonal element c_{ii} is the variance of X_i and c_{ij} is the covariance of variables X_i and X_j.

The variance of the principal components are the eigenvalues of the matrix C. There are p of these, some of which may be zero. Negative eigenvalues are not possible for a covariance matrix.

4.8 Factor Analysis

EFFECTIVE LEADERSHIP

Communalities

Variables	Initial	Extraction
1	1.00	0.58
2	1.00	0.53
3	1.00	0.63
4	1.00	0.60
5	1.00	0.59
6	1.00	0.75
7	1.00	0.53
8	1.00	0.71
9	1.00	0.51
10	1.00	0.68
11	1.00	0.48
12	1.00	0.60
13	1.00	0.58
14	1.00	0.62
15	1.00	0.68
16	1.00	0.62
17	1.00	0.45
18	1.00	0.57
19	1.00	0.53
20	1.00	0.65
21	1.00	0.53
22	1.00	0.55
23	1.00	0.55
24	1.00	0.60
25	1.00	0.55
26	1.00	0.47
27	1.00	0.71
28	1.00	0.59
29	1.00	0.55

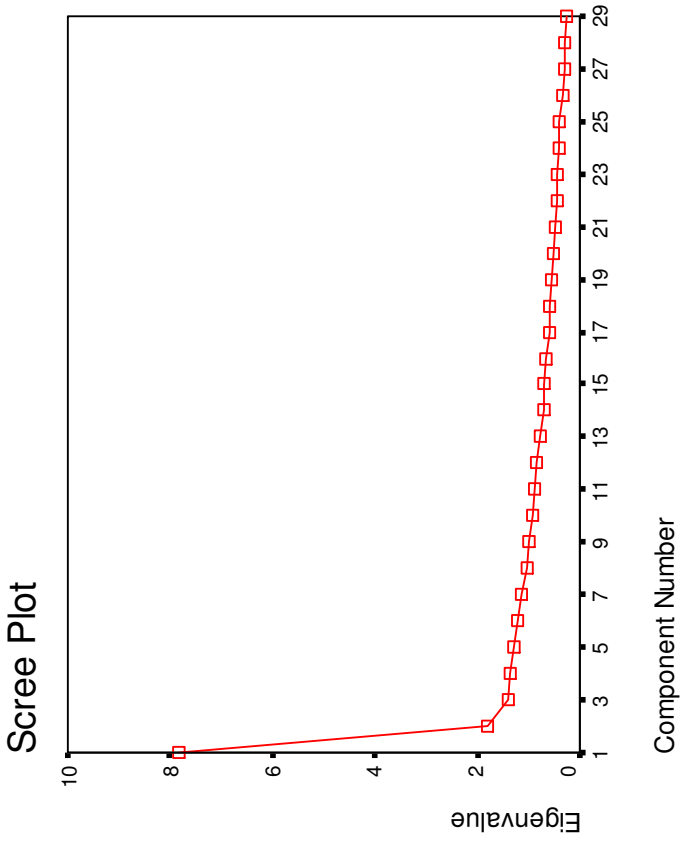
Extraction Method: Principal Component Analysis.

Total Variance Explained (Effective Leadership)

Variables	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
6	7.82	26.95	26.95	7.82	26.95	26.95	3.68	12.70	12.70
8	1.78	6.15	33.10	1.78	6.15	33.10	2.78	9.57	22.27
27	1.38	4.76	37.86	1.38	4.76	37.86	2.36	8.13	30.40
10	1.35	4.65	42.51	1.35	4.65	42.51	2.06	7.09	37.49
15	1.27	4.39	46.90	1.27	4.39	46.90	1.82	6.26	43.75
20	1.20	4.15	51.05	1.20	4.15	51.05	1.58	5.44	49.20
3	1.15	3.96	55.01	1.15	3.96	55.01	1.44	4.97	54.17
14	1.02	3.50	58.52	1.02	3.50	58.52	1.26	4.35	58.52
16	0.99	3.40	61.92						
4	0.93	3.21	65.13						
12	0.90	3.10	68.24						
24	0.84	2.90	71.13						
5	0.78	2.67	73.81						
28	0.72	2.47	76.27						
1	0.69	2.39	78.67						
13	0.65	2.25	80.91						
18	0.60	2.06	82.97						

Variables	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
22	0.58	1.99	84.96						
23	0.54	1.86	86.82						
25	0.53	1.82	88.65						
29	0.48	1.66	90.31						
2	0.43	1.49	91.79						
7	0.43	1.48	93.27						
19	0.40	1.36	94.63						
21	0.39	1.34	95.97						
9	0.34	1.16	97.13						
11	0.30	1.03	98.15						
26	0.28	0.96	99.12						
17	0.26	0.88	100.00						

Extraction Method : Principal Component Analysis.


Scree Plot
Eigenvalue
Component Number
10
8
6
4
2
0
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29

Component Matrix

Variables	Extracted Component							
	6	**8**	**27**	**10**	**15**	**20**	**3**	**14**
1	0.54	0.08	0.21	0.02	-0.28	0.17	0.27	0.24
2	0.61	-0.12	-0.16	-0.10	0.21	0.17	0.09	-0.18
3	0.43	0.07	-0.12	-0.43	0.47	0.08	0.10	0.08
4	0.47	0.11	-0.02	0.31	-0.14	0.46	-0.08	-0.18
5	0.22	-0.55	0.08	0.42	0.14	-0.17	0.07	0.05
6	0.07	0.21	-0.04	0.37	0.37	-0.05	0.64	0.01
7	0.57	-0.06	0.11	0.24	0.04	-0.05	-0.35	0.06
8	0.52	0.13	0.16	-0.23	0.01	0.44	-0.01	0.39
9	0.48	0.24	0.25	-0.02	0.35	-0.17	-0.06	0.07
10	0.64	0.34	0.00	0.32	-0.08	-0.19	0.05	-0.11
11	0.50	-0.27	0.23	-0.25	0.05	-0.04	-0.20	-0.01
12	0.01	0.68	0.07	0.09	-0.11	-0.06	-0.04	0.32
13	0.62	0.10	-0.18	0.09	-0.16	-0.10	0.27	0.18
14	0.58	-0.11	0.26	0.34	0.17	-0.15	-0.15	0.09
15	0.53	0.24	0.51	0.01	0.07	-0.17	-0.22	0.02
16	0.45	-0.07	-0.43	0.03	-0.02	0.05	-0.22	0.42
17	0.50	0.05	0.19	-0.09	0.01	0.08	0.20	-0.33
18	0.37	-0.40	0.32	0.13	-0.29	0.26	0.00	-0.07
19	0.49	-0.30	0.09	-0.17	0.39	-0.02	0.09	0.06
20	0.70	0.13	0.23	-0.13	-0.03	0.12	0.04	-0.24
21	0.61	0.06	-0.30	0.13	0.02	0.08	-0.18	-0.10
22	0.51	-0.10	-0.34	0.19	0.23	0.01	-0.24	0.11
23	0.46	0.04	-0.25	0.14	0.10	0.46	-0.01	-0.19
24	0.63	-0.16	0.04	-0.17	-0.23	-0.05	0.26	0.17
25	0.50	-0.38	-0.12	-0.08	-0.12	-0.29	0.17	0.04
26	0.51	-0.12	-0.14	0.01	-0.37	-0.20	0.05	0.01
27	0.56	0.35	-0.20	-0.11	-0.05	-0.28	-0.16	-0.35
28	0.61	0.02	-0.13	-0.37	-0.16	-0.18	-0.01	-0.08
29	0.69	0.05	-0.18	-0.05	-0.14	-0.14	0.07	-0.04

Extraction Method: Principal Component Analysis.
8 components extracted.

Rotated Component Matrix

Variables	Component							
	6	**8**	**27**	**10**	**15**	**20**	**3**	**14**
1	0.37	0.19	0.16	0.02	0.00	0.61	-0.02	0.11
2	0.30	0.09	0.43	0.46	0.17	0.04	0.08	0.04
3	0.13	0.09	0.08	0.75	-0.11	0.05	0.12	0.06
4	0.09	0.16	0.70	-0.11	0.03	0.23	0.06	0.01
5	0.06	0.17	-0.02	-0.06	0.71	0.00	0.17	0.17
6	-0.01	0.04	0.06	0.10	0.04	0.01	-0.08	0.85
7	0.18	0.54	0.25	0.02	0.19	0.07	0.29	-0.14
8	0.07	0.18	0.23	0.36	-0.17	0.65	0.19	-0.10
9	0.11	0.59	0.03	0.34	-0.08	0.04	0.05	0.13
10	0.48	0.50	0.33	-0.08	-0.09	0.00	0.08	0.27
11	0.23	0.32	0.04	0.34	0.25	0.15	0.00	-0.34
12	0.00	0.27	-0.09	-0.21	-0.62	0.18	0.13	0.20
13	0.59	0.14	0.16	0.08	-0.01	0.25	0.22	0.27
14	0.16	0.63	0.15	0.06	0.33	0.11	0.20	0.09
15	0.16	0.77	0.05	0.11	-0.06	0.18	-0.10	-0.10
16	0.28	0.03	0.13	0.13	-0.01	0.16	0.69	-0.08
17	0.31	0.23	0.34	0.25	0.07	0.11	-0.32	0.06
18	0.15	0.12	0.28	-0.10	0.46	0.41	-0.14	-0.22
19	0.14	0.22	0.04	0.57	0.34	0.11	0.09	0.04
20	0.38	0.40	0.41	0.29	-0.01	0.22	-0.21	-0.07
21	0.34	0.20	0.49	0.13	0.02	-0.06	0.33	-0.03
22	0.18	0.21	0.31	0.20	0.16	-0.10	0.55	0.03
23	0.08	-0.01	0.69	0.19	0.03	0.09	0.17	0.06
24	0.59	0.10	0.05	0.21	0.16	0.41	0.04	0.00
25	0.59	0.04	-0.06	0.17	0.39	0.05	0.11	-0.01
26	0.63	0.09	0.10	-0.07	0.14	0.11	0.12	-0.08
27	0.55	0.34	0.30	0.15	-0.27	-0.32	0.01	-0.07
28	0.64	0.14	0.11	0.32	-0.07	0.04	0.03	-0.22
29	0.63	0.21	0.25	0.17	0.01	0.07	0.15	0.03

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 11 iterations.

Component Transformation Matrix

Components	6	8	27	10	15	20	3	14
6	.609	.470	.420	.339	.136	.248	.193	.004
8	-.011	.279	.130	-.097	-.903	-.039	-.076	.271
27	-.277	.578	-.221	-.056	.153	.407	-.579	-.116
10	-.185	.272	.296	-.630	.326	-.077	.242	.488
15	-.489	.236	-.017	.667	.112	-.313	.150	.356
20	-.445	-.322	.647	.111	-.067	.501	-.009	-.110
3	.268	-.366	-.106	.138	.093	.274	-.395	.725
14	-.095	.027	-.490	.004	-.107	.584	.621	.107

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

EFFECTIVE SCHOOL

Communalities

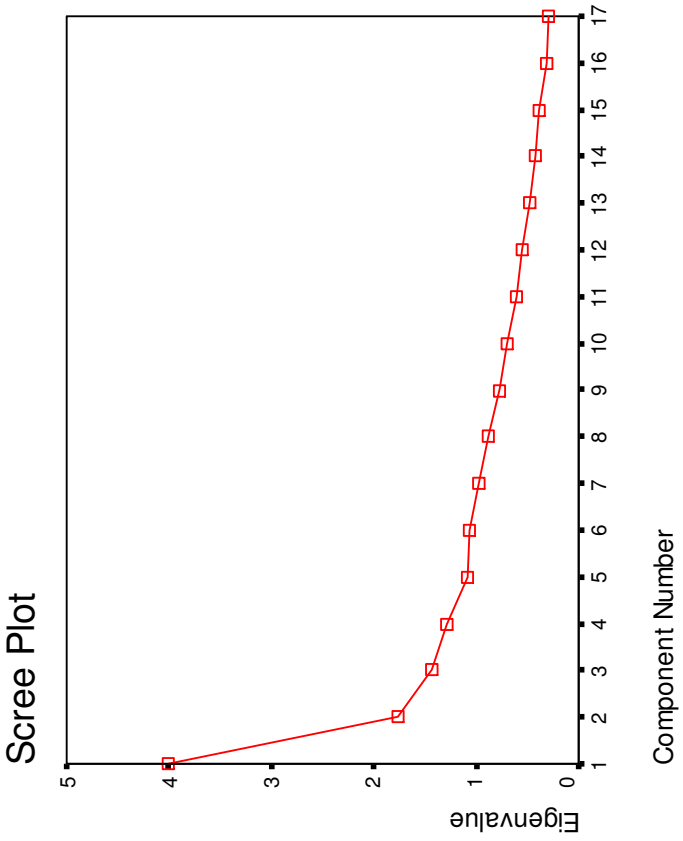
Components	Initial	Extraction
1	1.00	0.71
2	1.00	0.76
3	1.00	0.64
4	1.00	0.80
5	1.00	0.77
6	1.00	0.63
7	1.00	0.71
8	1.00	0.75
9	1.00	0.52
10	1.00	0.40
11	1.00	0.59
12	1.00	0.53
13	1.00	0.62
14	1.00	0.62
15	1.00	0.53
16	1.00	0.59
17	1.00	0.47

Extraction Method: Principal Component Analysis.

Total Variance Explained (Effective School)

Sl. No.	Component	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4	4.01	23.60	23.60	4.01	23.60	23.60	2.82	16.57	16.57
2	5	1.77	10.40	34.00	1.77	10.40	34.00	2.10	12.38	28.95
3	2	1.44	8.44	42.44	1.44	8.44	42.44	1.65	9.68	38.62
4	8	1.29	7.61	50.04	1.29	7.61	50.04	1.42	8.37	46.99
5	1	1.08	6.34	56.38	1.08	6.34	56.38	1.38	8.11	55.10
6	7	1.06	6.25	62.63	1.06	6.25	62.63	1.28	7.53	62.63
7	3	0.98	5.73	68.37						
8	6	0.88	5.16	73.53						
9	13	0.77	4.54	78.07						
10	14	0.69	4.08	82.15						
11	11	0.61	3.56	85.71						
12	16	0.55	3.24	88.94						
13	12	0.47	2.76	91.70						
14	15	0.43	2.52	94.22						
15	9	0.39	2.28	96.50						
16	17	0.31	1.81	98.31						
17	10	0.29	1.70	100.00						

Extraction Method : Principal Component Analysis.


Scree Plot
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Component Matrix

Variables	Extracted Component					
	4	**5**	**2**	**8**	**1**	**7**
1	0.68	-0.34	0.08	0.25	0.18	0.18
2	-0.14	-0.11	0.51	0.60	-0.02	-0.33
3	0.32	-0.41	0.47	-0.21	0.14	0.29
4	0.19	-0.04	-0.65	0.31	0.42	0.25
5	0.44	0.43	0.57	-0.14	0.10	0.21
6	0.51	-0.52	-0.11	0.18	0.02	-0.21
7	0.45	0.25	0.06	-0.41	0.33	-0.42
8	0.16	0.59	-0.12	0.25	-0.34	0.44
9	0.63	-0.12	0.01	-0.15	-0.24	-0.19
10	0.49	0.22	-0.05	0.27	0.07	-0.17
11	0.53	0.32	-0.25	0.02	0.08	-0.37
12	0.42	0.20	0.18	0.04	0.47	0.25
13	0.45	-0.41	-0.20	-0.33	-0.29	0.12
14	0.55	-0.10	0.14	0.39	-0.36	0.03
15	0.53	0.45	-0.02	0.06	-0.17	-0.13
16	0.65	0.03	-0.10	-0.28	-0.26	0.10
17	0.66	-0.11	-0.06	0.09	0.10	0.07

Extraction Method: Principal Component Analysis.
6 components extracted.

Rotated Component Matrix

Variables	Component					
	4	**5**	**2**	**8**	**1**	**7**
1	0.71	0.06	0.38	-0.04	-0.03	0.26
2	0.14	-0.06	-0.03	-0.83	-0.04	-0.20
3	0.40	-0.29	0.55	0.11	-0.23	-0.20
4	0.11	0.07	-0.01	0.11	0.06	0.88
5	0.02	0.25	0.74	0.00	0.26	-0.31
6	0.71	0.14	-0.07	-0.04	-0.27	0.16
7	-0.03	0.68	0.30	0.20	-0.33	-0.12
8	-0.08	0.09	0.08	0.08	0.85	0.08
9	0.54	0.37	0.03	0.23	-0.01	-0.21
10	0.27	0.48	0.12	-0.16	0.17	0.15
11	0.15	0.73	0.00	0.07	0.05	0.14
12	0.07	0.19	0.66	-0.01	0.04	0.24
13	0.55	-0.04	-0.07	0.54	-0.07	-0.09
14	0.66	0.13	0.03	-0.18	0.36	-0.10
15	0.16	0.58	0.12	0.05	0.38	-0.09
16	0.44	0.30	0.14	0.48	0.20	-0.13
17	0.53	0.26	0.27	0.12	0.04	0.20

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 12 iterations.

Component Transformation Matrix

Components	4	5	2	8	1	7
4	.710	.529	.381	.221	.132	.059
5	-.594	.536	.187	-.026	.567	-.047
2	.031	-.175	.569	-.444	-.066	-.665
8	.260	-.058	-.137	-.785	.368	.398
1	-.273	.115	.533	-.153	-.531	.568
7	.009	-.620	.439	.336	.489	.266

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

EFFECTIVE TEACHING

Communalities

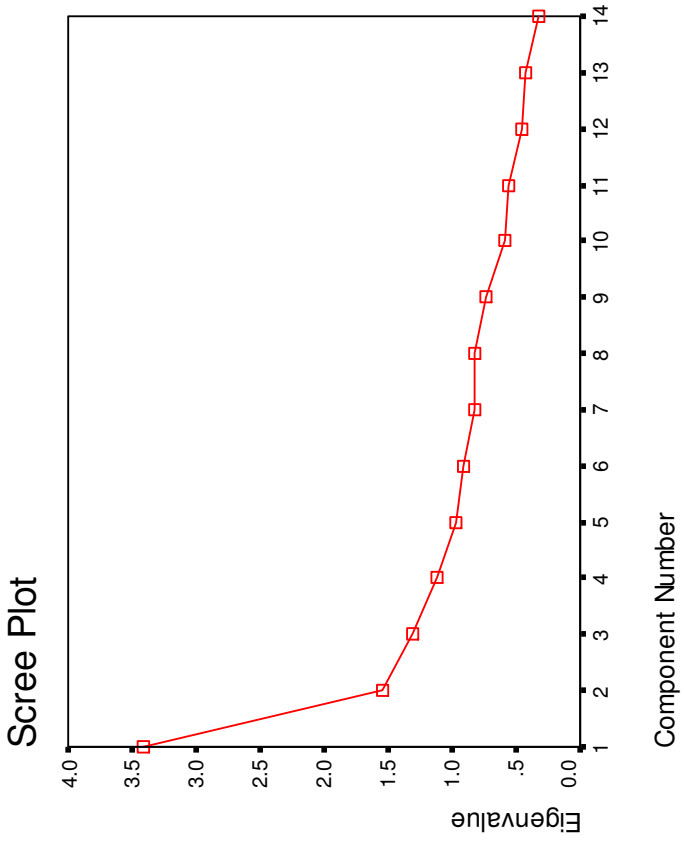
Components	Initial	Extraction
1	1.00	0.60
2	1.00	0.36
3	1.00	0.52
4	1.00	0.69
5	1.00	0.48
6	1.00	0.40
7	1.00	0.47
8	1.00	0.50
9	1.00	0.48
10	1.00	0.62
11	1.00	0.53
12	1.00	0.54
13	1.00	0.65
14	1.00	0.53

Extraction Method: Principal Component Analysis.

Total Variance Explained (Effective Teaching)

Sl. No.	Component	Initial Eigen Values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4	3.405	24.319	24.319	3.405	24.319	24.319	2.272	16.231	16.231
2	13	1.538	10.983	35.302	1.538	10.983	35.302	1.770	12.645	28.876
3	10	1.314	9.383	44.685	1.314	9.383	44.685	1.669	11.921	40.797
4	1	1.120	8.000	52.685	1.120	8.000	52.685	1.664	11.888	52.685
5	12	.977	6.982	59.666						
6	11	.910	6.499	66.165						
7	14	.830	5.926	72.091						
8	3	.816	5.832	77.923						
9	8	.731	5.225	83.148						
10	5	.595	4.250	87.398						
11	9	.557	3.982	91.380						
12	7	.460	3.288	94.668						
13	6	.419	2.994	97.662						
14	2	.327	2.338	100.000						

Extraction Method : Principal Component Analysis.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Component Matrix

Variables	Extracted Component			
	4	**13**	**10**	**1**
1	0.31	0.45	0.55	-0.02
2	0.33	0.31	0.37	-0.16
3	0.68	0.17	-0.14	-0.08
4	0.33	-0.39	0.28	0.59
5	0.60	-0.13	0.32	0.01
6	0.60	-0.18	-0.03	0.07
7	0.47	-0.40	0.21	0.21
8	0.44	0.14	-0.14	0.52
9	0.45	-0.24	0.27	-0.38
10	0.36	0.69	-0.09	0.05
11	0.65	0.02	0.05	-0.33
12	0.49	-0.22	-0.49	-0.09
13	0.52	0.38	-0.43	0.23
14	0.49	-0.32	-0.31	-0.32

Extraction Method: Principal Component Analysis.
4 components extracted.

Rotated Component Matrix

Variables	Component			
	4	**13**	**10**	**1**
1	-0.11	0.12	0.75	0.09
2	0.10	0.07	0.59	0.01
3	0.50	0.44	0.27	0.10
4	-0.05	0.05	-0.02	0.83
5	0.36	0.04	0.39	0.44
6	0.45	0.21	0.09	0.38
7	0.28	-0.03	0.08	0.62
8	0.01	0.58	0.00	0.40
9	0.52	-0.24	0.35	0.17
10	0.00	0.64	0.41	-0.21
11	0.61	0.12	0.37	0.07
12	0.61	0.29	-0.26	0.08
13	0.23	0.77	0.03	0.01
14	0.72	0.04	-0.12	0.05

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 9 iterations.

4.9 Significant Components Extracted from Factor Analysis

Components Extracted	Effective Leadership
6	Emphasis on culture of teachers' leadership is rare in our school.
8	Effective leadership change culture of school to invite parent involvement.
27	Effective leadership act as a community leader in our school.
10	Effective leadership manage time effectively in our school.
15	Effective leadership develop safe and trustful relationship with teachers, students and parents.
20	Effective Leadership develop school improvement plans from results of inquiry and reflection.
3	Emphasis on moral courage (code of ethics / integrity) is given to the students by the management to exhibit honesty.
14	Effective leadership create organisational structure that involve all faculty in decision making for collaboration.

Components Extracted	Effective School
4	High expectations and clear consequences are articulated to students frequently for effective school.
5	Staff is dedicated and caring for effective school.
2	Class size and student population are small to make a school effective.
8	Effective schools deploy their resources strategically to enhance teaching and learning:
1	In effective school, teachers engage students by good teaching
7	In effective school size, respect and collaboration create a sense of family and community within its walls.

Components Extracted	Effective Teaching
4	Effective teaching depends on positive classroom environment that does not allow sleeping, talking, doing other work, phone calls etc.
13	Effective teaching depends on equity pedagogy
10	Plan for periodic rest to avoid mental fatigue is the part of effective teaching.
1	In effective teaching it is necessary to break the class period into two or three different activities.

CHAPTER – V

STAGE THREE : MECHANISM OF EFFECTIVE TEACHING LEARNING SYSTEM

CHAPTER – V

STAGE THREE : MECHANISM OF EFFECTIVE TEACHING LEARNING SYSTEM

5.1 Mechanism of Effective Teaching Learning System

Strategic points of the experimental model extracted from review of related studies.

5.2 Strategies

Following this model, the learning process proceeds through some criteria and strategies as follows:

Size of the Class:

No. of students of control group = 50 (Selected from Experimental School)

No. of students of experimental group = 50

Basic academic standard of each group at entry level = 60% and above score in Life Science

Classes taken / group / week = 2

Class Climate

1. Traditional class environment maintained.
2. Whole class is divided into two groups with 6 rows in each group.
3. Each row provides 5 students.
4. Teachings aids (General requisites charts) are used.

Announcement of the Topic and Sub-topic to be taught :

Topic & Sub-topic is to be announced and then to be written on blackboard.

1st half of the class : Teacher-student Interaction

Duration = 25 minutes. a) Preparatory stage – 5 minutes.

b) Interactive stage – 20 minutes

Steps of Teacher-Student Interaction : Orientation Stage

Step-1 : Teacher will start in announcing the topic and sub-topic to be taught.

Step-2 : Teacher will first clarify the topic.

Step-3 : Now teacher will proceed with the topic.

Step-4 : First teacher will ask the students – What is the meaning of topic ?

Step-5 : Then teacher supports the answer of the students or correct the answer and clarify the meaning.

Step-6 : Then teacher enters into the sub-topic and ask the students to discuss the meaning of sub-topic.

Step-7 : Students answer the meaning of sub-topic.

Step-8 : Teacher expresses his satisfaction.

Step-9 : Through the teacher-student interaction whole content area of the sub-topic is covered.

Step-10 : Teacher asks the students to discuss their difficulty areas with the teacher.

Step-11 : Teacher categorically satisfies each and every students by experienced teaching.

2nd Half of the Class : Student-student Interaction—Multiplication Stage

Duration = 15 minutes

Steps of Student-Student Interaction

Here the students are in active and direct role. They are grouped into (Gr. X & Y). Each group is arranged in 6 rows. Each row provides 3–4 students.

Student-student-interaction is based on 'Quizzing'. Teacher's role is indirect. He is just a scorer and also a corrector – if necessary.

Quizzing Style :

Step-1 : Questions to be asked by any one student of one row (Row-A) of Group-X to the opposite row (Row-A) of opposite Group Y.

Step-2 : Answer to be given by any one student of opposite row A′ of Group-Y.

Step-3 : If answer is wrong or not given properly, then students of Gr. X will answer in correct form and they will get bonus point.

Step-4 : Teacher will write the scores of Quizzing on blackboard and also note the bonus point if applicable.

Step-5 : If any wrong answer of bonus question is placed by any student, then the correct answer is announced by the teacher.

Step-6 : Before answering the question, the students of concerned row will discuss their opinions and will be answered by any one student of the same row.

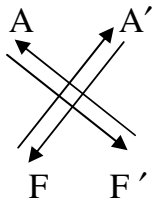
Step-7 : Quizzing style is in between horizontal rows and vice-versa followed by diagonal row and vice-versa.

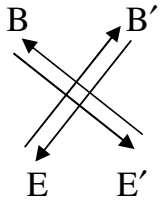
Framing of quizzing style is as follows :

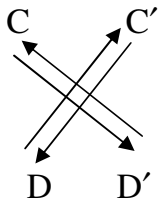
Strategy 1 : Participatory Interaction

	Group – X		**Group – Y**
Horizontal :	Row A	⟷	Row A′
	Row B	⟷	Row B′
	Row C	⟷	Row C′
	Row D	⟷	Row D′
	Row E	⟷	Row E′
	Row F	⟷	Row F′

Diagonal :







Scoring Point :

1. Correct answer for direct question = 10
2. Correct answer for bonus question = 5
3. Answer for Bonus question may be given by any student of the whole group.
4. In no case negative marking is allowed.

Class Management in the 1st Half :

1. Teacher will answer all the questions properly.
2. No avoiding attitude will be shown by the teacher.
3. Pleasant behaviour must be shown by the teacher with the students.
4. Teaching aids must be used properly.
5. General disciplinary rules must be followed by the teachers and the students.
6. By raising hand, any student may appeal to the teacher to discuss and clarify his difficulty level.

7. Teacher will solve the problem and help the students to acquire knowledge.
8. Teacher will satisfy each and every student.

Class Management in the 2nd Half :

1. Teacher will direct, which row will start the quizzing and to whom.
2. Planning of quizzing will be well informed before quizzing.
3. Quizzing will proceed in disciplined way as the sequence is known earlier.
4. As there is student-student interaction, there lies sound competition.
5. Student-student interaction is attention of the functional unity and co-ordination of behaviour – it indicates the direction of activity.

Declaration of Final Score of Quizzing & Praising :

Assessment of Horizontal Quizzing & Diagonal Quizzing was done by teacher on blackboard. Total score compared between two groups and announced by the teacher. Both winner group and runner group were praised for their success through direct participation and involvement.

Unit Test :

Unit Test was held after the completion of each unit. Evaluation was done and a score sheet was prepared.

Comparison of Result of Different Unit Tests : Shifting Stage

Result of unit tests of both traditional and experimental group was compared. Traditional group is always lagging behind. Student-student interaction is of immense importance – as it plays the role of motivation.

Conclusion :

1. All knowledge, memory and learning involve attention.
2. Teachers put so much premium on attention and attach so much importance to those incentives and devices which induce pupils to give their best attention.
3. Attention is the preparatory stage for effective activity and indicates a degree of readiness of the individual.
4. Attention facilitates responses to some stimuli and inhibits responses to others.
5. Attention makes for greater efficiency, understanding and intellectual achievement.
6. Attention is the functional unity and coordination of behaviour – indicates the direction of activity.
7. Attention to teaching grows interest – the inherent power in the student himself.
8. Fluctuating attention turns into persistent interest.
9. Persistent interest gives learning output.
10. Interest increases through student-student interaction – which is reflected in the learning scores.
11. Enriched Learning Scores motivate the students.
12. Students feel comfort by higher test result.
13. Increased comfort reinforces and more motivation helps increased rate of learning.
14. Learning flow depends on learning styles, quality of instruction, environmental factors and study skills.
15. Through effective humanistic learning total amount learned is maximum, i.e., the maximum productivity is achieved.

LESSON PLAN (1)

EXPERIMENTAL GROUP

School –

Class – IX

No. of Students – 47

Age – 14 years

Time – 40 minutes

Date –

Teacher –

Subject – Life Science

Topic – Photosynthesis

Today's Lesson – Environmental $O_2 - CO_2$ balance through Photosynthesis

Lesson plan of 'Experimental Group' was framed in a different way than that of 'Traditional Group'. I followed some strategies to run the teaching-learning process.

Strategies are as follows :

A. Strategy-1 Time – 5 mins.

Preparatory Stage

Previous knowledge testing questions are as follows :

1. What is the meaning of the term 'Photosynthesis' ?
2. In which plant or animal, photosynthesis occurs ?
3. What are the raw materials needed in photosynthesis ?
4. What are the significances of photosynthesis ?
5. How does $O_2 - CO_2$ balance is maintained in atmosphere ?

From the students' responses teacher realises, what lesson should be taught and thus teacher announces the lesson to be taught today and also written on the blackboard.

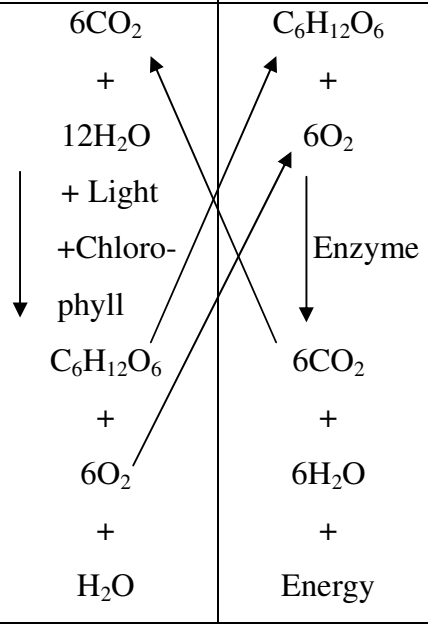
B. Strategy – II **Time - 20 minutes**

Interactive Stage (Teacher-Student)

Whole content area was discussed through teacher-student interaction. Difficult portions were solved carefully. As a result functional unity and coordination of behaviour take place. This unity and coordination grows interest in student himself.

Teaching Unit	**Teacher's Role**	**Students Response**
Environmental O_2 – CO_2 balance through photosynthesis	What is photosynthesis ?	The physiological process in which synthesis of glucose takes place in the chlorophyllous cells of green plants in the presence of light, CO_2 and H_2O & solar energy is trapped in glucose and converted into chemical energy and releases H_2O & O_2 – equal to that of CO_2 intake.
	Which components are necessary in photosynthesis ?	• CO_2 • H_2O • Chlorophyll • Light
	What are the end-products in photosynthesis ?	• Glucose ($C_6H_{12}O_6$) • Water (H_2O) • Oxygen (O_2)
	What is the necessity of glucose ?	Glucose is needed for growth & nutrition.
	Why oxygen is needed ?	It is needed for respiration.
	What is respiration ?	The physiological process in which respiratory

Teaching Unit	**Teacher's Role**	**Students Response**
		substrate is oxidised completely or incompletely (by O_2 & enzyme or only by enzymes) to form CO_2 and H_2O and to release energy.
	What are the components necessary for respiration ?	• Glucose • Oxygen (Presence / Absence)
	What are the end products of aerobic respiration ?	• CO_2 • H_2O • Energy
	What is the necessity of CO_2, formed in respiration ?	CO_2 is used in photosynthesis as raw-material to form glucose.
	Why use of glucose (formed in photosynthesis) is dependent on respiration ?	Glucose is energy rich compound. It is oxidised in presence of O_2 to release energy. As O_2 is evolved in photosynthesis, it depends on that process.
	"Photosynthesis & respiration, are opposite reactions"–Why ?	Silence
	Reasons for being opposite reactions – i) Energy is trapped in photosynthesis but released in respiration. ii) Dry wt. is increased in	

<table>
<tr><th>Teaching Unit</th><th>Teacher's Role</th><th>Students Response</th></tr>
<tr><td></td><td>photosynthesis but decreased in respiration as glucose is synthesized in photosynthesis & glucose is oxidised to form CO_2 & H_2O in respiration.</td><td></td></tr>
<tr><td></td><td>Explain the interdependence of photosynthesis & respiration with the help of chemical equation</td><td>Silence</td></tr>
<tr><td></td><td>Teacher will explain with the help of chart –</td><td></td></tr>
<tr><td></td><td>Photosynthesis | Respiration</td><td></td></tr>
<tr><td></td><td> 
</td><td></td></tr>
<tr><td></td><td>How O_2 – CO_2 balance is maintained through photosynthesis ?</td><td>Amount of CO_2 intake (6 molecules) in photosynthesis is equal to that of amount of CO_2 released in respiration.</td></tr>
</table>

Teaching Unit	Teacher's Role	Students Response
		On the contrary, amount of O_2 (6 molecules) released in photosynthesis is equal to that of O_2 intake in respiration. Thus in the environment $O_2 – CO_2$ exchange maintains the $O_2– CO_2$ balance.

C. Strategy – III **Time – 15 minutes**

Participative Stage (Student-Student Interaction)

In this stage, the students are in active and direct role. They are grouped into two – Group-X and Group-Y. Each group is arranged in 6 rows. Each row provides 3 to 4 students.

Participative stage (student-student interaction) is based on 'Quizzing'. Teacher's role is indirect. He is just a scorer and also a corrector – if necessary.

Quizzing Style :

Quizzing Style :

Step-1 : Questions to be asked by any one student of one row (Row-A) of Group-X to the opposite row (Row-A) of opposite Group Y.

Step-2 : Answer to be given by any one student of opposite row A′ of Group-Y.

Step-3 : If answer is wrong or not given properly, then students of Gr. X will answer in correct form and they will get bonus point.

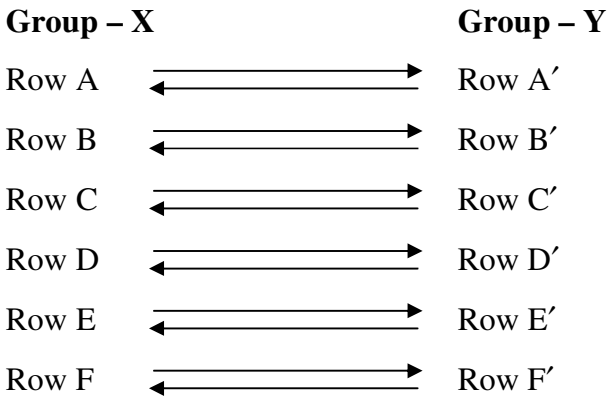
Step-4 : Teacher will write the scores of Quizzing on blackboard and also note the bonus point if applicable.

Step-5 : If any wrong answer of bonus question is placed by any student, then the correct answer is announced by the teacher.

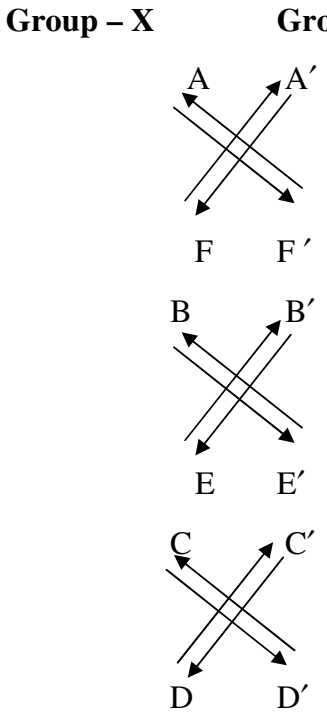
Step-6 : Before answering the question, the students of concerned row will discuss their opinions and will be answered by any one student of the same row.

Step-7 : Quizzing style is in between horizontal rows and vice-versa followed by diagonal row and vice-versa.

Horizontal Quizzing :



Diagonal Quizzing :



Student-Student Interaction

Step – I : Horizontal Quizzing

	Question	**Answer**
A to A′	Which type of reaction is photosynthesis ?	Type of reaction is synthetic
A′ to A	Which type of food is synthesized in photosynthesis ?	Carbohydrate
B to B′	Name the carbohydrate food synthesized in photosynthesis.	Glucose
B′ to B	Which is the source of O_2 evolved in photosynthesis ?	Water
C to C′	Which gaseous component is necessary in photosynthesis ?	CO_2
C′ to C	Which gaseous component is released in photosynthesis ?	O_2
D to D′	What is the chemical formula of glucose ?	$C_6H_{12}O_6$
D′ to D	Which type of Carbohydrate is glucose ?	Monosaccharide
E to E′	What are the end-products after oxidation of glucose ?	CO_2, H_2O & energy
E′ to E	What are the significances of glucose ?	Helps in growth and nutrition of plants and animals
F to F′	What is the normal% of O_2 in air ?	20.94%
F′ to F	What is the normal % of CO_2 in air ?	0.03%

Student-Student Interaction

Step – II : Diagonal Quizzing

	Question	Answer
A to F′	Which is the source of O_2 present in glucose ?	CO_2
F′ to A	Which plant intakes CO_2 from atmosphere at night ?	Bryophyllum
A′ to F	Why photosynthesis does not occur in root ?	Due to absence of chlorophyll.
F to A′	How many molecules of CO_2 are needed to synthesize one molecule of glucose in photosynthesis ?	6 molecules
B to E′	Photosynthesis is dependent on which process to maintain the $O_2 – CO_2$ balance ?	Respiration
E′ to B	How living beings are benefited by $O_2 – CO_2$ balance ?	Photosynthesis & respiration will not be hampered
B′ to E	What is the necessity of CO_2, evolved in respiration ?	Needed to synthesize glucose in photosynthesis.
E to B′	Are photosynthesis & respiration opposite in nature ?	Yes
C to D′	What happens in photosynthesis regarding energy when it is released in respiration ?	It is trapped in chemical compound as potential energy.
D′ to C	What is the value of PQ, when $O_2 – CO_2$ is maintained through photosynthesis ?	PQ = 1
C′ to D	Name the gaseous product evolved in photosynthesis.	O_2
D to C′	In which plants root O_2 is released through photosynthesis ?	Orchid

D. Strategy – IV (Evaluation)

Scoring Point :

1) Correct answer for direct question = 10 marks
2) Correct answer for bonus question = 5 marks
3) Answer for bonus question may be given by any student of the whole group.
4) In no case negative marking is allowed.

Score Sheet on Black Board

Sl. No.	Group – X		Group – Y	
	Score	Bonus	Score	Bonus
1	10		10	
	10		10	
	10		10	
	10	+ 5	0	
	10		10	
	10		10	+ 5
	10		10	
	10		10	
	10		10	
	10		10	
	10	Teacher answered	0	
	10		10	
	115		105	

Scores of both the groups are more or less same. This result reflects the outcomes of the students' learning activated by motivation.

LESSON PLAN (2)

EXPERIMENTAL GROUP

School –

Class – IX

No. of Students – 47

Age – 14 years

Time – 40 minutes

Date –

Teacher –

Subject – Life Science

Topic – Locomotion & Movements

A. Strategy – 1 **Time – 5 mins.**

Preparatory Stage :

Previous knowledge testing questions are as follows :

1. What is locomotion ?
2. What is movement ?
3. Which plants can move ?
4. Which animals can not move ?
5. What are the purposes of Locomotion & movement ?
6. What are the differences between locomotion and movement ?
7. Name some locomotory organs in animals.
8. Name some organs in plants which helps in movement.

Announcement of Today's Lesson – Phototropic & Geotropic movements in plants

B. Strategy – II **Time – 20 mins.**

Interactive Stage (Teacher-Student)

Teaching Unit	Teacher's Role	Students' Response
Phototropic & Geotropic movements in plants	What are the types of movements in plants ?	Three types – a) Tactic b) Tropic c) Nastic
	What is tropic movement ?	It is a movement of plant parts towards or away from the source of stimulus
	What is the stimulus in phototropic movement ?	Light
	What are the types of phototropic movements ?	• positive phototropism • negative phototropism • Diaheliotropism
	Give one example of positive phototropism	Growth of stem towards the light source
	Give one example of negative phototropism	Growth of root away from the light source.
	Give one example of transverse of dia-heliotropism	Growth of leaf to a right angle to the direction of light.
	What are the types of geotropic movements ?	• positive geotropism • negative geotropism • transverse geotrism
	Give one example of positive geotropism	Growth of root towards the centre of gravity
	Give an example of negative geotropism	Growth of stem away from the centre of gravity
	Give an example of	Growth of secondary &

Teaching Unit	Teacher's Role	Students' Response
	transverse geotripsm	tertiary roots to a right angle to the centre of gravity
	Which roots show positive phototropism ?	Pneumatophores of halophytes show positive phototropism ?
	Which phytohormone controls phototropism and geotropism ?	Auxin
	Mention three characteristic features of Auxin	Features – a) flows downwards b) In stem it is deposited more in the opposite area to the source of light. c) In root less auxin stimulates root growth towards the centre of gravity.
	Does change of place occur in tropic movement ?	No
	Name two plants which have locomotary organs.	• Volvox (flagella) • Diatome (Cilia)
	• How do you prove positive phototropic movement in plant experimentally ?	Silence
	Experiment : a) Keep a living seedling (potted) in a dark room on	

Teaching Unit	Teacher's Role	Students' Response
	a table near window. b) Open the window so that sunlight falls on the seedling. **Observation :** a) Branches of the seedling grows up. b) After a few days the branches bends and grows towards the light source. **Inference :** Shoot portion of the seedling locomotes towards light proves positive phototropism.	
	• How do you prove positive geotropism in plant experimentally ?	Silence
	Experiment a) Keep a germinated gram seed with plumule and radicle. b) Place the germinated seed on wet blotting paper and keep it horizontally by the help of alpin. c) Put the set up in dark and in erect position.	

Teaching Unit	Teacher's Role	Students' Response
	Observation : a) After 4 to 5 days it is observed that plumule grows downwardly. **Inference :** Radicle grows downwards and proves positive geotropism and plumule grows upwards and proves negative geotropism.	

C. Strategy – III **Time – 15 mins.**

Participative Stage (Student-Student Interaction)

Participative stage is base on 'Quizzing' Teacher's role is indirect. He is just a scorer and also a corrector – if necessary.

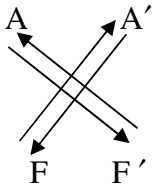
Quizzing Style :

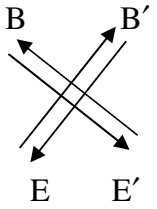
Horizontal Quizzing :

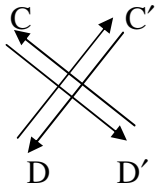
Group – X		**Group – Y**
Row A	⟶ ⟵	Row A′
Row B	⟶ ⟵	Row B′
Row C	⟶ ⟵	Row C′
Row D	⟶ ⟵	Row D′
Row E	⟶ ⟵	Row E′
Row F	⟶ ⟵	Row F′

Diagonal Quizzing :

Group – X **Group – Y**







Student-Student Interaction

Step – I : Horizontal Quizzing

	Question	**Answer**
A to A′	What are the types of movements in plants ?	Tactic, Tropic and Nastic movements.
A′ to A	What is the alternative naming of phototropism ?	Heliotropism
B to B′	What is the stimulus in phototropism ?	Source of Light
B′ to B	What is the stimulus in geotropism ?	Centre of gravity
C to C′	What is Diaheliotropism ?	Growth of leaf to a right angle to the direction of light
C′ to C	What is Diageotropism ?	Growth of secondary and tertiary roots to a right angle to the centre of gravity.
D to D′	What happens when more conc. of auxin is present in stem ?	Stem bends to grow towards the source of light.
D′ to D	What happens when less conc. of auxin is present in root ?	Root grows towards the centre of gravity.

	Question	Answer
E to E′	Give an example of negative phototropism.	Growth of root away from light source.
E′ to E	Give an example of positive phototropism in root.	Growth of pneumatophores away from centre of gravity.
F to F′	Which plant locomotes by flagella ?	Volvox
F′ to F	Which plant locomotes by cilia ?	Diatone

Student-Student Interaction

Step – II : Diagonal Quizzing

	Question	Answer
A to F′	Where does found the negative phototropism ?	In root
F′ to A	Where does found the positive phototropism ?	In stem
A′ to F	"Growth of leaf to a right angle to the direction of light" – which type of movement ?	Diaheliotropism
F to A′	"Growth of secondary and tertiary roots to a right angle to the centre of gravity" – which type of movement ?	Diageotropism
B to E′	Which type of plants show positive phototropism in pneumatophore ?	Halophytes
E′ to B	Where does found ciliary movement in plant ?	Diatone
B′ to E	Which hormone stimulates stem growth towards the source of light ?	Auxin
E to B′	Which hormone accumulates opposite to the source of light in stem ?	Auxin
C to D′	Which type of movement is proved when plumule grows upward ?	Positive phototropism

	Question	Answer
D′ to C	Which type of movement is proved when radicle grows downward ?	Positive geotropism
C′ to D	In which type of movement, source of light is the stimulus ?	Phototropism
D to C′	In which type of movement centre of gravity is the stimulus ?	Geotropism

D. Strategy – IV (Evaluation)

Scoring Point :

1) Correct answer for direct question = 10 marks.
2) Correct answer for bonus question = 5 marks.
3) Answer for bonus question may be given by any student of the whole group.
4) In no case negative marking is allowed.
5) Any question once asked can not be repeated.

Score Sheet on Black Board

Horizontal Quizzing → Q1 to 6

Diagonal Quizzing → Q7 to 12

Sl. No.	Group – X		Group – Y	
	Score	Bonus	Score	Bonus
1.	10		10	
2.	10		10	
3.	0	+ 5	0	+ 5
4.	10		10	
5.	10		10	
6.	10		10	
7.	10		10	
8.	10		10	
9.	10		10	
10.	10	Teacher	10	
11.	10	answered	10	
12.	10		10	
Total Marks	115		105	

LESSON PLAN (3)

EXPERIMENTAL GROUP

School – Subject – Life Science

Class – IX Topic – Respiration

No. of Students – 47

Age – 14 years

Time – 40 minutes

Date –

Teacher –

A. Strategy – 1 **Time – 5 mins.**

Preparatory Stage :

Previous knowledge testing questions are as follows :

1. Name the Primary respiratory organ of human.
2. What are the stages of respiration ?
3. What is inspiration ?
4. What is expiration ?
5. Where are lungs situated ?
6. What secondary are the respiratory organs in man ?
7. What is the respiratory rate in man ?

Announcement of Today's Lesson – Respiratory Mechanism in man

B. Strategy – II **Time – 20 mins.**

Interactive Stage (Teacher-Student)

Teaching Unit	Teacher's Role	Students' Response
Respiratory mechanism in man	What is the primary respiratory organ in man ?	Lungs
	What are the secondary respiratory organs in man ?	Nose, nasopharynx, Glottis, Larynx, Trachea, Bronchus, Bronchiole, Pleura, Ribs, Diaphragm, Intercostal muscles.
	Where are the lungs situated ?	In thoracic cavity, at the ventral surface of the body.
	What is the outer covering of Lungs ?	Pleura
	Name the layers of Pleura • Parietal Pleura (outer layer) • Visceral Pleura (Inner layer)	Silence
	Name the structural unit of lungs.	Alveolus
	How many alveoli are present in each lung	About 35 crores
	Name the stages of human respiration.	Inspiration and Expiration
	What is inspiration ?	Inhaling of air from atmosphere to lungs is inspiration.
	How air is inhaled from atmosphere to lungs ?	Silence
	Sequence of inhaling of air are – a) Diaphragm contracts and lowers downward	

Teaching Unit	Teacher's Role	Students' Response
	b) External intercostals muscle contracts and thoracic cage lifts upward. c) Volume of intrathroacic cavity and intrapulmonary cavity increases. d) Intra pulmonary pressure rises. e) Atmospheric air enters from outer atmosphere to lungs.	
	Mention the route of inhaling air in inspiration.	Atmospheric air → External nostril → Nasal passage → Nasopharynx → Internal nostril → Gleatis Larynx → Trachea → Bronchus → Bronchiole → Alveolar duct → Alveoli → Lungs
	What is expiration ?	Exhaling of alveolar air from lungs to atmosphere is expiration ?
	How air is exhaled from lungs to atmosphere ? Sequence of exhaling of air are – a) Alveoli are filled with expired air b) Diaphragm and external intercostal muscle relax. c) Abdominal muscles and	Silence

Teaching Unit	Teacher's Role	Students' Response
	internal internal intercostal muscle contract. d) Thoracic cage comes back to its previous position. e) Volume of intrathoracic and intrapulmonary cavity decreases. f) Alveolai air exhaled from lungs to atmosphere.	
	Mention the route of exhaling air in expiration ?	Alveoli → Alveolar duct → Bronchiole → Bronchus → Trachea → Larynx → Glottis → Internal nostril → Nasopharynx → nasal passage → External nostril → Atmosphere.
	Mention the respiratory rate in adult man and in baby	12 – 18 / min. (in adult) 45 – 50 / min (in baby)
	Which organ controls the process of respiration in man ?	Pons

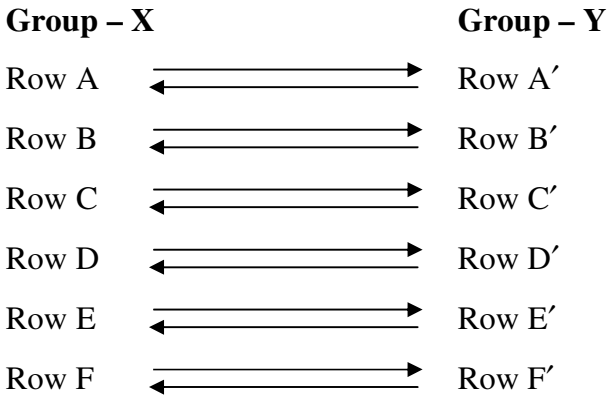
C. Strategy – III **Time – 15 mins.**

Participative Stage (Student-Student Interaction)

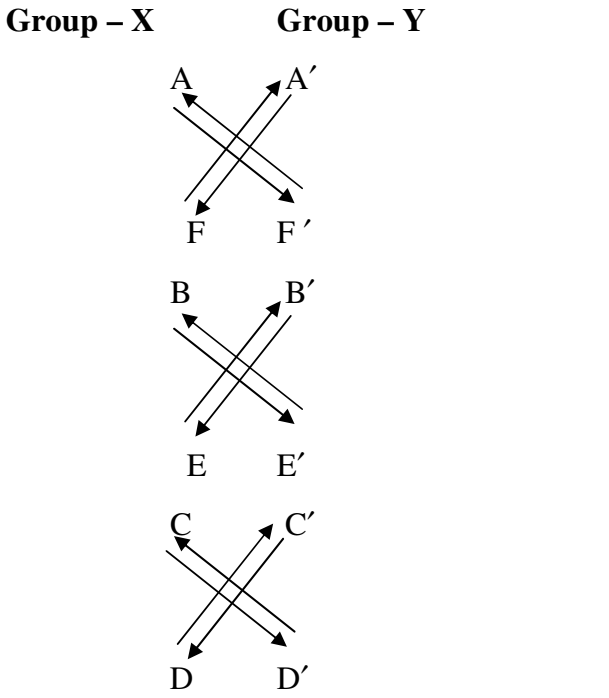
Participative stage is base on 'Quizzing' Teacher's role is indirect. He is just a scorer and also a corrector – if necessary.

Quizzing Style :

Horizontal Quizzing :



Diagonal Quizzing :



Student-Student Interaction

Step – I : Horizontal Quizzing

	Question	Answer
A to A′	What are the phases of human respiration ?	Inspiration and Expiration.
A′ to A	What is Pleura ?	Outer covering of Lungs
B to B′	Name the inner covering of Pleura.	Visceral Pleura
B′ to B	Name the outer covering of Pleura.	Pairetal Pleura
C to C′	What is the O_2 content in inspired air ?	20.94%
C′ to C	What is the CO_2 content in inspired air ?	0.03%
D to D′	What is the O_2 content in expired air ?	16.4%
D′ to D	What is the CO_2 content in expired air ?	4.0%
E to E′	Which muscles contract during inspiration ?	Diaphragm and external intercostal muscle.
E′ to E	Which muscles contract during expiration ?	Abdominal muscles and internal intercostal muscle
F to F′	Who acts as traffic police during inspiration ?	Epiglottis
F′ to F	When diaphragm contracts and when relaxes ?	Contracts during inspiration and relaxes during expiration.

Student-Student Interaction

Step – II : Diagonal Quizzing

	Question	Answer
A to F′	The mechanism of respiration in man ?	Pons
F′ to A	Indicate the location of Pons.	Hind brain
A′ to F	Mention the number of lobes present in right lung	Three
F to A′	Mention the number of lobes present in left lung.	Two

	Question	Answer
B to E′	Mention the respiratory rte in a human baby	45 – 50 / min.
E′ to B	Mention the respiratory rate in adult man	12 – 18 / min.
B′ to E	During inspiration what is the intrapulmonary air pressure ?	758 mm of Hg.
E to B′	During expiration what is the intrapulmonary air pressure ?	763 mm. of Hg.
C to D′	Which respiratory muscle contracts during inspiration ?	Diaphragm.
D′ to C	Which respiratory muscle relaxes during expiration ?	Diaphragm.
C′ to D	Which type of receptor is stimulated during inspiration ?	Stretch-receptor
D to C′	Which nerve is stimulated to initiate inspiration ?	Vagus nerve.

D. Strategy – IV (Evaluation)

Scoring Point :

1) Correct answer for direct question = 10 marks
2) Correct answer for bonus question = 5 marks
3) Answer for bonus question may be given by any student of the whole group.
4) In no case negative marking is allowed.
5) Any question once asked can not be repeated.

Score Sheet on Black Board

Horizontal Quizzing → Q1 to 6

Diagonal Quizzing → Q7 to 12

Sl. No.	Group – X		Group – Y	
	Score	**Bonus**	**Score**	**Bonus**
1.	10		10	
2.	10		10	
3.	10		10	+ 5
4.	0	Teacher answered	0	
5.	10		10	
6.	10		10	
7.	10	+5	10	
8.	10		10	
9.	10		10	+5
10.	10		10	
11.	10		10	
12.	0	Teacher answered	0	
Total Marks	95		95	

LESSON PLAN (4)

School – Subject – Life Science

Class – IX Topic – Digestion

No. of Students – 47

Age – 14 years

Time – 40 minutes

Date –

Teacher –

A. Strategy – 1 **Time – 5 mins.**

Preparatory Stage :

Previous knowledge testing questions are as follows :

1. What is digestion ?
2. Mention different parts of digestive system in man.
3. Mention different parts of digestive canal.
4. Mention the digestive glands in man.
5. What are proximate principles of food ?
6. What is protein ?
7. Which type of enzyme is needed to digest protein ?

Announcement of Today's Lesson – Digestion of Protein in human digestive canal.

B. Strategy – II **Time – 20 mins.**

Interactive Stage (Teacher-Student)

Teaching Unit	**Teacher's Role**	**Students' Response**
Digestion of protein in human digestive canal.	What is digestion ?	The process of degradation of complex food into simple one by the help of enzymes of digestive juices for absorption and assimilation is termed as digestion.
	What are the proximate principles of food ?	• Carbohydrate • Protein • Fat
	Name the different parts of human digestive canal.	• Oral aperture • Buccal cavity • Pharynx • Oesophagus • Stomach • Small Intestine. • Large Intestine
	Name the different digestive glands in man.	• Salivary gland. • Liver. • Pancreas • Gastric gland. • Intestinal gland
	What is Protein ?	Organic compound composed of amino acid binded by peptide bond and made up of mainly carbon, hydrogen, oxygen,

Teaching Unit	Teacher's Role	Students' Response
		nitrogen and sometimes sulphur and phosphorus is termed as protein.
	Mention the locations of digestion of protein in digestive canal.	1) Stomach 2) Small Intestine.
	Which digestive juices are responsible for digestion of protein ? Directly – 1) Gastric juice. 2) Pancreatic juice. Indirectly 1) Bile	Silence
	Which type of enzyme helps in digestion of protein ?	Proteolytic Enzyme.
	Why in buccal cavity digestion of protein does not take place ?	Saliva does not possess any proteolytic enzyme.
	How digestion of protein takes place in stomach ? Steps in digestion – 1. Mucous layer of stomach possesses oxyntic gland which secretes HCl and peptic gland which secretes pepsin. 2. HCl maintains acidic medium in stomach. 3. Protein $\xrightarrow{\text{Pepsin}}$ Peptone	Silence

Teaching Unit	Teacher's Role	Students' Response
	What is chyme ?	The mixed digested and undigested food mass which passes from stomach by peristalsis is termed as chyme.
	How digestion of protein takes place in small intestine ? Steps of digestion of protein – 1) Bile salt of bile from liver and pancreatic juice from pancreas comes in duodenum to create alkaline medium. 2) Trypsin and Chymotrypsin from pancreas and Erepsin from small intestine help to digest protein. Trypsin ↓ 3) Peptone Peptide ⟶ Erepsin ↓ 4) Peptide Amino acid ⟶	Silence
	What is the fate of amino acid ?	Simple food amino acids are absorbed in small intestine by villi.

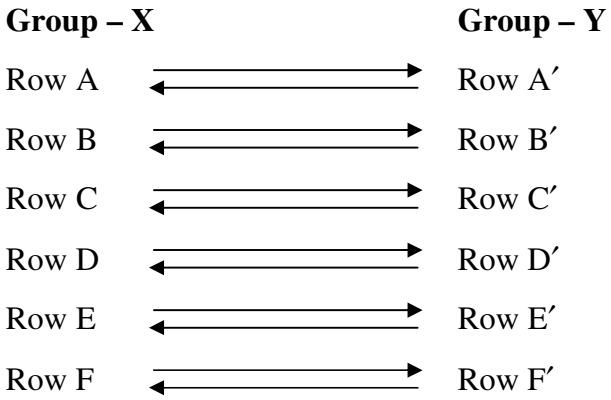
C. Strategy – III **Time – 15 mins.**

Participative Stage (Student-Student Interaction)

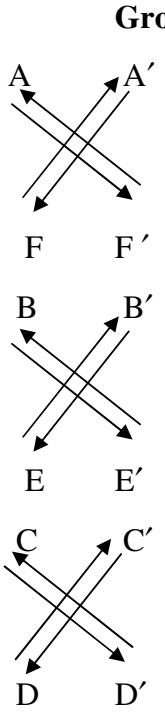
Participative stage is base on 'Quizzing' Teacher's role is indirect. He is just a scorer and also a corrector – if necessary.

Quizzing Style :

Horizontal Quizzing :



Diagonal Quizzing :



Student-Student Interaction

Step – I : Horizontal Quizzing

	Question	**Answer**
A to A′	How many type of food are there ?	Two types
A′ to A	Which type of food is protein ?	Proximate principle of food.
B to B′	Why saliva can not digest protein ?	Saliva has no proteolytic enzyme
B′ to B	What are the uses of saliva ?	i) Digests carbohydrate ii) Destroys microbes
C to C′	Which is the source of HCl ?	Oxyntic gland.
C′ to C	Which is the source of Pepsin ?	Peptic gland
D to D′	In which medium pepsin digests ?	Acidic medium
D′ to D	What is the optimum pH of pepsin ?	1.5 to 2
E to E′	What is chyme ?	The mixed digested and undigested food mass – which comes from stomach to duodenum.
E′ to E	How chyme comes to duodenum ?	By peristaltic movement/
F to F′	In which part of small intestine, digestion does not take place ?	Illium
F′ to F	In which medium Trypsin digests ?	Alkaline medium.

Student-Student Interaction

Step – II : Diagonal Quizzing

	Question	**Answer**
A to F′	Which is the unit of protein ?	Amino Acid
F′ to A	What are the components of protein ?	C, H, O, N, S & P
A′ to F	Name the source of Trypsin.	Pancreatic juice of pancreas
F to A′	Name the source of Erepsin.	Succus Entericus of small intestine
B to E′	Through which path pancreatic juice comes into duodesnum ?	Ampula of Vater
E′ to B	What is the need of bile – although it has no enzyme ?	Bile salt helps to maintain alkaline medium in small intestine
B′ to E	Which organ is the source of bile ?	Liver
E to B′	Which parts of small intestine digest protein ?	1) Duodenum 2) Jejunum.
C to D′	What is Succus Entericus ?	It is intestinal juice.
D′ to C	Which hormone stimulates to secrete gastric juice ?	Gastrin
C′ to D	Which type of peristalsis is found in small intestine ?	Normal Peristalsis
D to C′	Where villi are located ?	On the inner wall of small intestine.

D. Strategy – IV (Evaluation)

Scoring Point :

6) Correct answer for direct question = 10 marks
7) Correct answer for bonus question = 5 marks
8) Answer for bonus question may be given by any student of the whole group.
9) In no case negative marking is allowed.
10) Any question once asked can not be repeated.

Score Sheet on Black Board

Sl. No.	Group – X		Group – Y	
	Score	Bonus	Score	Bonus
1	10		10	
	10		10	
	10		10	
	10	+ 5	0	
	10		10	
	10		10	+ 5
	10		10	
	10		10	
	10		10	
	10		10	
	10	Teacher answered	0	
	10		10	
	115		105	

Scores of both the groups are more or less same. This result reflects the outcomes of the students' learning activated by motivation

OBJECTIVES : ENTRY LEVEL TEST

1. Learner states the unit of life.
2. He identifies unicellular and multicellular organism
3. He defines “cell”.
4. He distinguishes prokaryotic and eukaryotic cells.
5. He draws the eukaryotic and prokaryotic cells and labels this different parts.
6. He distinguishes plant cells and animal cells.
7. He distinguishes cell wall and cell membrane.
8. He explains the functions of cell wall and cell membrane.
9. He identifies protoplasm and divides it into nucleus and cytoplasm.
10. He explains cytoplasmic organelles and ergastic materials / metaplastic bodies.
11. He explains each and every organelle, mentions their functions and draws their microscopic structure.
12. He explains power house of cell, suicidal bag, factory for protein synthesis, kitchen of green plants.
13. He defines tissue.
14. He correlates

    cell → tissue → organ → system → living → body
15. He explains meristematic tissue and classifies meristem on the basis of location and origin.
16. He explains permanent tissue.
17. He describes complex permanent tissues (xylem and phloem) with the help of diagram.
18. He identifies Dicot root, Dicot stem and Dicot leaf with the help of compound microscope.
19. He classifies plant tissues.
20. He defines and describes epithelial tissue, connective tissue, muscular tissue and nervous tissue.
21. He explains how nerve impulse is transmitted.
22. He gives an idea about the 10 systems of human body.
23. He describes digestive system in two groups

    a) Digestive canal b) Digestive glands
24. He explains how food is digested in digestive system

Objectives : Terminal Test

1. To define photosynthesis.
2. To mention the components of photosynthesis.
3. To locate the sites of photosynthesis.
4. To explain the entrapping of solar energy and its conversion to potential energy in food.
5. To mention the significance of photosynthesis.
6. To explain the conversion glucose to starch and its transport to storage organs.
7. To mention the maintenance of $Co_2 – O_2$ balance.
8. To define respiration.
9. To locate the site of respiration.
10. To differentiate respiration and combustion.
11. To distinguish aerobic and anaerobic respiration.
12. To define fermentation.
13. To mention respiratory organs in animals.
14. To mention the significance of respiration with special emphasis on release of energy and $O_2 – Co_2$ balance.
15. To define nutrition
16. To signify nutrition and its importance
17. To mention the sources of carbohydrate, protein and fat and their importance.
18. To mention the differences between micro- and macro elements.
19. To mention the sources of Vitamin A, B-complex, D, E, K and their deficiency symptoms in man.
20. To state the role of water in nutrition.
21. To differentiate autotrophs and heterotrophs.
22. To state the different phases of nutrition and organs concerned with each phase in man.
23. To define enzyme.
24. To describe the sources of different digestive enzymes and their role in digestion.

Pre test		Post test	
Experimental	**Control**	**Experimental**	**Control**
89	83.5	66.00	45.75
90	89	63.00	58.50
76	90	68.63	58.50
82	72	58.50	51.75
83.5	86	65.25	45.75
81	62	60.75	50.63
83.5	67	55.50	54.00
80	58	60.75	41.63
82	82	72.00	47.25
83.5	81	22.50	39.38
77	81	60.75	45.00
64	83.5	69.75	47.25
82	67	55.50	54.00
67	85	51.75	45.00
81	82	57.75	47.25
73	54	64.13	45.00
64	65.5	61.88	28.13
85	64	53.25	31.50
77	68	39.38	36.00
67	64	60.75	56.25
72	68	48.38	22.50
67	59	56.25	27.00
63	77	39.38	45.00
71	67	60.75	31.50
71	58	42.75	43.88
65.5	71	55.50	50.63
62	71	45.00	38.25
67	46	34.88	32.63
56.5	69	61.88	30.00
67	58	60.75	36.00

Pre test		Post test	
Experimental	**Control**	**Experimental**	**Control**
76	53	45.00	13.50
68	72	50.25	56.25
69	37	51.75	49.50
63	35	24.75	41.63
77	38.5	38.25	39.38
46	24	31.50	28.13
32	77	21.38	36.00
40	40	27.00	31.50
28	28	49.50	22.50
35	32	31.50	41.63
22	33	34.88	40.50
28	28	45.75	13.50
31	31	42.75	31.50
23	37	22.50	29.25
38.5	27	33.75	16.50
23	15	21.38	13.50
27	28	36.75	39.38

5.3 Analysis of Covariance of Pre-test and Post-test of Experimental and Control Groups

Pretest (X)

Groups	Count	Sum	Average	Variance	SD
Experimental	50	3055	61.10	451.29	21.24
Control	50	2880	57.60	443.51	21.06
	100	5935			

ANOVA

Source of Variation	SS	df	MS	F	P-value	F at 0.05	F at 0.01
Between Groups	306.25	1	306.25	0.68	0.41	3.94	6.90
Within Groups	43845	98	447.40				
Total	44151.3	99					

F is not significant at both levels

Post Test (Y)

Groups	Count	Sum	Average	Variance	SD
Experimental	50	2412.60	48.25	202.09	14.22
Control	50	1982.45	39.65	151.96	12.33
	100	4395.05			

ANOVA

Source of Variation	SS	df	MS	F	P-value	F at 0.05	F at 0.01
Between Groups	1850.25	1	1850.25	10.45	0.00	3.94	6.90
Within Groups	17348.6	98	177.03				
Total	19198.8	99					

F is significant at 0.01 level

Correction Term C_{xy} = 260845.92

Analysis of Covariance

Source of Variation	df	$SS_{x.y}$	$SS_{y\cdot x}$	$Ms_{y.x}(V_{y.x})$	$F_{y\cdot x}$	F at 0.05	F at 0.01	$SD_{y\cdot x}$
Among Group Means	1	752.75	1360.77	1360.77	10.82	3.92	6.86	
Within Group SS	97	15025.71	12199.26	125.77				11.21
Total	98	15778.46	13560.03					

F is significant at 0.01 levels

Regression (b_{within})	0.34			
Calculation of Adjusted Y Means				
Groups	N	M_x	M_y	$M_{y.x}$(adj.)
Experimental	50	61.10	48.25	47.65
Control	50	57.60	39.65	40.25
General Means		59.35	43.95	43.95

Significant of differences among adjusted Y means		
SE_D	2.24	
df	97	
$t_{.05}$	1.99	
$t_{.01}$	2.63	
Sig. diff. at 0.05 level	4.46	
Sig. diff. at 0.01 level	5.90	
Mean Diff Exp.vs. Control	7.40	**

* is Sig. at 0.05 level, ** is Sig. at 0.01 level, NS is Non-Significant

CHAPTER – VI

FINDINGS AND CONCLUSIONS

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FINDINGS AND CONCLUSIONS

6.1 Introduction

Teaching Learning System is a complex procedure. The present study reveals to highlight different aspects of teaching learning system with the following dimensions :

1) Gathering information by collecting data for understanding the present situation of teaching learning system of West Bengal.
2) Suggested model of Teaching Learning System from reviews.
3) Find out components of Teaching Learning System.
4) Experimentation to finalize the Teaching Learning Model.

A holistic approach has been used to identify the effectiveness of the system to investigate the components and the mechanism of the system to have its better results. We consider three compartments namely effective teaching, effective school, and effective leadership for ensuring effectiveness in teaching learning system. The study is interdisciplinary relevant as because the present output based education system is rooted from the components from various discipline mentioned above involving professionalized educational system and human rights in education too reflected through the following teaching learning model.

6.2 Objectives of the Study

1. To study the Effective Teaching Learning System in Life Science from some selected secondary level schools in West Bengal.
2. To apply a standardize questionnaire regarding effective Teaching Learning System.
3. To find out the components of Effective Teaching Learning System in Life Science.
4. To determine factors relevant for Effective Teaching Learning System.
5. To find out the mechanism of Effective Teaching Learning System.

6.3 Methodology

The study is survey type descriptive research followed by Experimental research and the approach is mixed type of research. For finding out the components of the Teaching Learning system statistically Factorial analysis has been conducted with other descriptive statistics.

6.4 Tools

A standardized Questionnaire of Dr. D. Bhattacharyya and A. K. Hazra regarding Effective Teaching Learning System has been used for conducting the study and it has been locally further standardized before application.

6.5 Population and Sample

Ninth grade students of West Bengal have been considered as population and some selected schools are used as sample for conducting the study. Sampling technique is purposive in nature. Total sample size is 100 taken from different schools representing different parts of West Bengal.

6.6 Significance of the Study

A holistic approach has been suggested for explaining the Effective Teaching Learning System. Mostly we are talking about the effective teaching or sometimes effective school or effective management or administration etc. but what is our observation is that one variable is highly related to another or summation of all the variables makes the system. Therefore we are interested to develop the system as a whole and try to prescribe for better school. We should have an effective system not only a single dimension but in the plural way crystallizing the system to produce maximum output.

- The output of the system is dependent on its effectiveness. Effectiveness of a system is therefore a professionalized pattern relevant to the present day teaching learning scenario.
- In developing countries like India, system approach is very much significant in

controlling the quantity and quality ratio; as well it accelerates the quality of education in the present globalized system.

The complexity of Teaching & Learning cannot be removed by mere technology as numerable components are interrelated and interdependent on it. Therefore an alternative may be focused through this approach with the help of technology and humanizing the system too.

6.7 Significant Components Extracted From Factor Analysis

Components Extracted	Effective Leadership
6	Emphasis on culture of teachers' leadership is rare in our school.
8	Effective leadership change culture of school to invite parent involvement.
27	Effective leadership act as a community leader in our school.
10	Effective leadership manage time effectively in our school.
15	Effective leadership develop safe and trustful relationship with teachers, students and parents.
20	Effective Leadership develop school improvement plans from results of inquiry and reflection.
3	Emphasis on moral courage (code of ethics / integrity) is given to the students by the management to exhibit honesty.
14	Effective leadership create organisational structure that involve all faculty in decision making for collaboration.

Components Extracted	Effective School
4	High expectations and clear consequences are articulated to students frequently for effective school.
5	Staff is dedicated and caring for effective school.
2	Class size and student population are small to make a school effective.
8	Effective schools deploy their resources strategically to enhance teaching and learning:
1	In effective school, teachers engage students by good teaching
7	In effective school size, respect and collaboration create a sense of family and community within its walls.

Components Extracted	Effective Teaching
4	Effective teaching depends on positive classroom environment that does not allow sleeping, talking, doing other work, phone calls etc.
13	Effective teaching depends on equity pedagogy
10	Plan for periodic rest to avoid mental fatigue is the part of effective teaching.
1	In effective teaching it is necessary to break the class period into two or three different activities.

6.8 Findings

1. In effective school, teachers engage students by good teaching

Interpretation : Table 1 shows that the value of χ^2 was found to be 60.20 which is greater than the table value. Hence, the result is significant at 0.05 level, Therefore, the statement is accepted.

2. Class size and student population are small to make a school effective

Interpretation : Table 2 shows that the value of χ^2 (calculated) is 51.80 which is

greater than the table value. Hence, the result is significant at 0.05 level, Therefore, the statement is accepted. It means that System improves the teaching learning process.

3. In an effective school ground rules are for respectful behaviour

Interpretation : Table 3 shows that the value of χ^2 (calculated) is 40.66 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

4. High expectations and clear consequences are articulated to students frequently for effective school

Interpretation : Table 4 shows that the value of χ^2 (calculated) is 54.20 which is greater than the table value and the result is significant at 0.05 level.

5. Staff is dedicated and caring for effective school

Interpretation : Table 5 shows that the value of χ^2 was found 30.66 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

6. Structured classroom routines provide stability and direction for effective school

Interpretation : Table 6 shows that the value of χ^2 was found 33.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

7. In effective school size, respect and collaboration create a sense of family and community within its walls

Interpretation : Table 7 shows that the value of χ^2 came to 57.06 when calculated which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

8. Effective schools consider time spent on academic and non-academic learning

Interpretation: Table 8 shows that the value of χ^2 when calculated came to 11.16 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

9. Effective schools deploy their resources strategically to enhance teaching and learning

Interpretation : Table 9 shows that the value of χ^2(calculated) was found 51.46 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

10. Balance of workload i.e. time focused on T/L & time spent on administrative tasks is maintained in effective school

Interpretation : Table 10 shows that the value of χ^2 (calculated) is 30.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

11. Strategy for planning and implementing pedagogical change

Interpretation : Table 11 shows that the value of χ^2 (calculated) is 35.00 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

12. In effective school provision of knowledge bank with best practices and new ideas are maintained

Interpretation : Table 12 shows that the value of χ^2 was found to be 40.30 which is greater than the table value and the result is significant at 0.05 level. Therefore the statement is accepted.

13. Assessment and Reporting practices are integral to the T/L process in effective school

Interpretation : Table 13 shows that the value of χ^2 was found 40.66 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

14. In effective school, student resource package provides focus on student needs, encourages innovation, targeting funds for them

Interpretation : Table 14 shows that the value of χ^2 (calculated) is 51.46 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted. It can be concluded that curriculum do not satisfy the whole objectives.

15. In effective school, staff, student and parent surveys provide feedback to teachers and school leadership teams on T / L arrangements

Interpretation : Table 15 shows that the value of χ^2 (calculated) is 21.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

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16. Effective school manages the time spent on interdisciplinary learning – a) physical, personal & social learning and b) discipline-based learning

Interpretation : Table 16 shows that the value of χ^2 (calculated) is 40.30 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

17. Effective school frames good curriculum planning which support councils, leaders and teachers to work cohesively

Interpretation : Table 17 shows that the value of χ^2 (calculated) is 50.40 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

18. In effective teaching it is necessary to break the class period into two or three different activities

Interpretation : Table 18 shows that the value of χ^2 (calculated) is 55.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

19. Effective teaching specify the class lesson objectives and to teach those objectives directly

Interpretation : Table 19 shows that the value of χ^2 (calculated) is 15.00 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

20. Effective teaching is enhanced by challenging class-room climate but not threatening to students

Interpretation : Table 20 shows that the value of χ^2 (calculated) is 51.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

21. Effective teaching depends on positive classroom environment that does not allow sleeping, talking, doing other work, phone calls etc.

Interpretation : Table 21 shows that the value of χ^2 (calculated) is 35.00 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

22. Effective teaching depends upon the class-size

Interpretation : Table 22 shows that the value of χ^2 (calculated) is 36.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

23. Effective teaching involves all the stakeholders (teachers, support staff, students, parents, governors, partner school and multi-agency groups that work with the school) to establish priorities for improvement

Interpretation : Table 23 shows that the value of χ^2 (calculated) is 32.60 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

24. It is logical to give authority to all the staff to make decision for innovative and creativity of school

Interpretation : Table 24 shows that the value of χ^2 (calculated) is 28.56 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

25. Return demonstration by the students is the chance to be creative – promotes learning and as a whole highlights effective teaching

Interpretation : Table 25 shows that the value of χ^2 (calculated) is 24.56 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

26. Effective teaching is a path of evolution from "simple, old known, prior knowledge to complex and new unknown information – the way of quick grasping by the students

Interpretation : Table 26 shows that the value of χ^2 (calculated) is 12.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement. is accepted.

27. Plan for periodic rest to avoid mental fatigue is the part of effective teaching

Interpretation : Table 27 shows that the value of χ^2 (calculated) is 10.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

28. Effective teaching is "praising students' success" as it associate the desired learning goal

Interpretation : Table 28 shows that the value of χ^2 (calculated) is 37.56 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

29. Effective teaching depends on students' ratings, peer review, self evaluation, teaching portfolios and student achievement

Interpretation : Table 29 shows that the value of χ^2 (calculated) is 27.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

30. Effective teaching depends on equity pedagogy

Interpretation : Table 30 shows that the value of χ^2 (calculated) is 40.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

31. Effective teaching depends on teacher's awareness of the cultural differences in the students – to maintain order in the classroom

Interpretation : Table 31 shows that the value of χ^2 (calculated) is 27.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

32. Effective leadership develops a well defined vision with staff in our school

Interpretation : Table 32 shows that the value of χ^2 (calculated) is 49.66 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

33. Effective Leadership focuses on both instructional and facilitative leadership in our T / L situation

Interpretation : Table 33 shows that the value of χ^2 (calculated) is 48.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

34. Emphasis on moral courage (code of ethics / integrity) is given to the students by the management to exhibit honesty

Interpretation : Table 34 shows that the value of χ^2 (calculated) is 45.60 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

35. Effective Leadership build a collaborative culture in our school

Interpretation : Table 35 shows that the value of χ^2 (calculated) is 46.26 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

36. Effective Leadership empower teachers in decision making for all round improvement of school

Interpretation : Table 36 shows that the value of χ^2 (calculated) is 55.40 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

37. Emphasis on culture of teachers' leadership is rare in our school

Interpretation : Table 37 shows that the value of χ^2 (calculated) is 51.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted .

38. Climate of mutual trust and respect is very common criteria of our school

Interpretation : Table 38 shows that the value of χ^2 (calculated) is 35.00 which is

greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

39. Effective leadership change culture of school to invite parent involvement

Interpretation : Table 39 shows that the value of χ^2 (calculated) is 31.93 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

40. Symbol of success is the point of pride – reflected by test-scores in our school

Interpretation : Table 40 shows that the value of χ^2 (calculated) is 21.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

41. Effective leadership manage time effectively in our school

Interpretation : Table 41 shows that the value of χ^2 (calculated) is 89.60 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted. It means that academic achievement measures only cognitive domain.

42. Effective Leadership arrange parent / staff meetings effectively for improvement of our school

Interpretation : Table 42 shows that the value of χ^2 (calculated) is 83.46 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted exposing visual styles.

43. Effective Leadership try to balance the workload among the staff

Interpretation : Table 43 shows that the value of χ^2 (calculated) is 14.60 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

44. Effective Leadership develop relations with teachers

Interpretation : Table 44 shows that the value of χ^2 (calculated) is 58.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

45. Effective Leadership create organisational structure that involve all faculty in decision making for collaboration

Interpretation : Table 45 shows that the value of χ^2 (calculated) is 15.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

46. In our school leadership develop safe & trustful relationship with teacher, students and parents

Interpretation : Table 46 shows that the value of χ^2 (calculated) is 18.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted. In the opinion of the majority is that visual learning style more preferable.

47. In our school, leadership cultivate the academic field to choose leader from the rank of teacher

Interpretation : Table 47 shows that the value of χ^2 (calculated) is 39.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

48. Leadership help teachers deal with increased parental involvement

Interpretation : Table 48 shows that the value of χ^2 (calculated) is 27.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

49. A focus on student learning is always established by leadership in our school

Interpretation : Table 49 shows that the value of χ^2 (calculated) is 83.16 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

50. Careful monitoring of teacher and pupil progress is encouraged by leadership

Interpretation : Table 50 shows that the value of χ^2 (calculated) is 63.20 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

51. Effective Leadership develop school improvement plans from results of inquiry and reflection

Interpretation : Table 51 shows that the value of χ^2 (calculated) is 54.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

52. Communication with all stakeholders is done by leadership with science due to greater vocational opportunity

Interpretation : Table 52 shows that the value of χ^2 (calculated) is 33.76 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

53. Our leadership always puts attention to the needs of low-performing students

Interpretation : Table 53 shows that the value of χ^2 (calculated) is 58.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

54. Our leadership always disseminate information widely

Interpretation : Table 54 shows that the value of χ^2 (calculated) is 33.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted. It suggests that information be provided visually.

55. Provision of no role model example is the negative point for effective leadership

Interpretation : Table 55 shows that the value of χ^2 (calculated) is 36.46 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

56. Effective leadership develop effective co-ordination strategies for betterment of our school

Interpretation : Table 56 shows that the value of χ^2 (calculated) is 28.96 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

57. Effective leadership created senior management team in our school

Interpretation : Table 57 shows that the value of χ^2 (calculated) is 51.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

58. Effective leadership act as a community leader in our school

Interpretation : Table 58 shows that the value of χ^2 (calculated) is 3.76 which is lesser than the table value and the result is not significant at 0.05 level. Therefore, the statement is rejected.

59. Our school leadership is sensitive to exam

Interpretation : Table 59 shows that the value of χ^2 (calculated) is 48.80 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted.

60. Monitoring of students progress is regularly done by our leadership

Interpretation : Table 60 shows that the value of χ^2 (calculated) is 35.00 which is greater than the table value and the result is significant at 0.05 level. Therefore, the statement is accepted..

It is observed that all the information regarding effectiveness of Teaching Learning System are looking positive and satisfying the respondents but simultaneously the Chi-square analysis reveals that the education system of Indian context is to be more potential for modernization and global demands for quality education.

6.9 Mechanism of Effective Teaching Learning System

In Indian context it has been understood from the realistic situation Teaching Learning System should be based on affective domain. Therefore finally for realising Teaching Learning System a humanistic model based on development of Interest has been suggested for Indian context and it was observed that students are performed better in this model than traditional model.

6.10 Conclusion

With the passage of time Indian Teaching Learning System is gradually leading to multidimensional. So it is not very easy to predict which one is the better way. The present research gives a high light which are the ways reflected through its findings.

The research expressed a great difference of Teaching Learning System actually what should be and the reality. Therefore a Teaching Learning Model has been suggested combining affective domain and the humanistic approach for realising students in a better way and anticipating some better output from the Teaching Learning System.

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APPENDICES

APPENDIX – I

QUESTIONNAIRE

A STUDY ON EFFECTIVENESS OF TEACHING LEARNING SYSTEM IN LIFE SCIENCE IN RELATION TO COMPONENTS AND MECHANISM OF THE SYSTEM AT THE SECONDARY LEVEL SCHOOLS IN WEST BENGAL

Nandini Banerjee

Department of Education, University of Kalyani

Name of the student : .....

Name of the school : .....

	Agree	Undecided	Disagree
1. In effective school, teachers engage students by good teaching			
2. Class size and student population are small to make a school effective.			
3. In an effective school ground rules are for respectful behaviour			
4. High expectations and clear consequences are articulated to students frequently for effective school.			
5. Staff is dedicated and caring for effective school.			
6. Structured classroom routines provide stability and direction for effective school			
7. In effective school size, respect and collaboration create a sense of family and community within its walls.			
8. Effective schools consider time spent on academic and non-academic learning			
9. Effective schools deploy their resources strategically to enhance teaching and learning:			
10. Balance of workload i.e. time focused on T/L and time spent on administrative tasks is maintained in effective school.			
11. Strategy for planning and implementing pedagogical change.			
12. In effective school provision of knowledge bank with best practices and new ideas are maintained			
13. Assessment and reporting practices are integral to the T/L process in effective school.			

	Agree	Undecided	Disagree
14. In effective school, student resource package provides focus on student needs, encourages innovation, targeting funds for them.			
15. In effective school, staff, student and parent surveys provide feedback to teachers and school leadership teams on T / L arrangements.			
16. Effective school manages the time spent on interdisciplinary learning – a) physical, personal & social learning and b) discipline-based learning.			
17. Effective school frames good curriculum planning which support councils, leaders and teachers to work cohesively.			
18. In effective teaching it is necessary to break the class period into two or three different activities.			
19. Effective teaching specify the class lesson objectives and to teach those objectives directly.			
20. Effective teaching is enhanced by challenging class-room climate but not threatening to students.			
21. Effective teaching depends on positive classroom environment that does not allow sleeping, talking, doing other work, phone calls etc.			
22. Effective teaching depends upon the class-size.			
23. Effective teaching involves all the stakeholders (teachers, support staff, students, parents, governors, partner school and multi-agency groups that work with the school) to establish priorities for improvement.			

	Agree	Undecided	Disagree
24. It is logical to give authority to all the staff to make decision for innovative and creativity of school.			
25. Return demonstration by the students is the chance to be creative – promotes learning and as a whole highlights effective teaching.			
26. Effective teaching is a path of evolution from "simple, old known, prior knowledge to complex and new unknown information – the way of quick grasping by the students.			
27. Plan for periodic rest to avoid mental fatigue is the part of effective teaching.			
28. Effective teaching is "praising students' success" as it associates the desired learning goal.			
29. Effective teaching depends on students' ratings, peer review, self evaluation, teaching portfolios and student achievement.			
30. Effective teaching depends on equity pedagogy.			
31. Effective teaching depends on teacher's awareness of the cultural differences in the students – to maintain order in the classroom.			
32. Effective leadership develops a well defined vision with staff in our school.			
33. Effective Leadership focuses on both instructional and facilitative leadership in our T / L situation.			
34. Emphasis on moral courage (code of ethics / integrity) is given to the students by the management to exhibit honesty.			

	Agree	Undecided	Disagree
35. Effective Leadership build a collaborative culture in our school.			
36. Effective Leadership empower teachers in decision making for all round improvement of school.			
37. Emphasis on culture of teachers' leadership is rare in our school.			
38. Climate of mutual trust and respect is very common criteria of our school.			
39. Effective leadership change culture of school to invite parent involvement.			
40. Symbol of success is the point of pride – reflected by test-scores in our school.			
41. Effective leadership manage time effectively in our school.			
42. Effective Leadership arrange parent / staff meetings effectively for improvement of our school.			
43. Effective Leadership try to balance the workload among the staff.			
44. Effective Leadership develop relations with teachers.			
45. Effective Leadership create organisational structure that involve all faculty in decision making for collaboration.			
46. In our school leadership develop safe and trustful relationship with teachers, students and parents.			
47. In our school, leadership cultivate the academic field to choose leader from the rank of teacher.			

	Agree	Undecided	Disagree
48. Leadership help teachers deal with increased parental involvement.			
49. A focus on student learning is always established by leadership in our school.			
50. Careful monitoring of teacher and pupil progress is encouraged by leadership.			
51. Effective Leadership develop school improvement plans from results of inquiry and reflection.			
52. Communication with all stakeholders is done by leadership with science due to greater vocational opportunity.			
53. Our leadership always puts attention to the needs of low-performing students.			
54. Our leadership always disseminate information widely.			
55. Provision of no role model example is the negative point for effective leadership.			
56. Effective leadership develop effective co-ordination strategies for betterment of our school.			
57. Effective leadership created senior management team in our school.			
58. Effective leadership act as a community leader in our school.			
59. Our school leadership is sensitive to exam.			
60. Monitoring of students progress is regularly done by our leadership.			