CHAPTER III
METHODOLOGY OF THE STUDY

3. 1.0 INTRODUCTION

Adoption of the appropriate methodology is very crucial to the success of any research study. In light of the fact that the nature of all the problems is never similar; rather they differ from each other by nature, it is important to employ the proper methodology in accordance with the nature of the problem. This chapter concerning methodology of the research study serves as the detailed "blue print" for the specific steps entailed in hypothesis testing & data analysis. However, the following points of discussion that comprise the methodological part of the current problem under study are- a) Setting, b) Population, c) Sampling Technique and Sample, d) Research Method, e) Design of the experiment, f) Variables under Study, g) Experimental Procedure, h) Instructional Module, i) Measuring Tools used and j) Techniques of data analysis.

3.2.0 SETTING

The present research investigation concentrated upon the secondary level of education. This study was carried out on class IX students of a rural school, Rajatpur Indranarayan Vidyapith (situated in Raipur Supur-xi, Bolpur Sriniketan block, Dist. Birbhum, West Bengal) and an urban school, Srinanda High School (situated at Bolpur Municipality, Bolpur Sriniketan block, Birbhum District, West Bengal). Both these co-educational schools are affiliated to West Bengal Board of Secondary Education (WBBSE), having students from Grade 5 to Grade 12. The language of instruction at the two schools is Bengali. Students from diverse background get admission in both the schools. Students are provided with all the fundamental amenities as school infrastructure in both schools are sufficiently well equipped to create a generative learning environment. The total number of students are approximately 800 (R.I. V) and 1150 (S.H.S). There is roughly a 6. 6-kilometer distance between these two schools.

Map 3.0: Location of the two Schools in Birbhum District

(Source: https://www.google.com/maps/@23.6489459,87.6657097,14z)
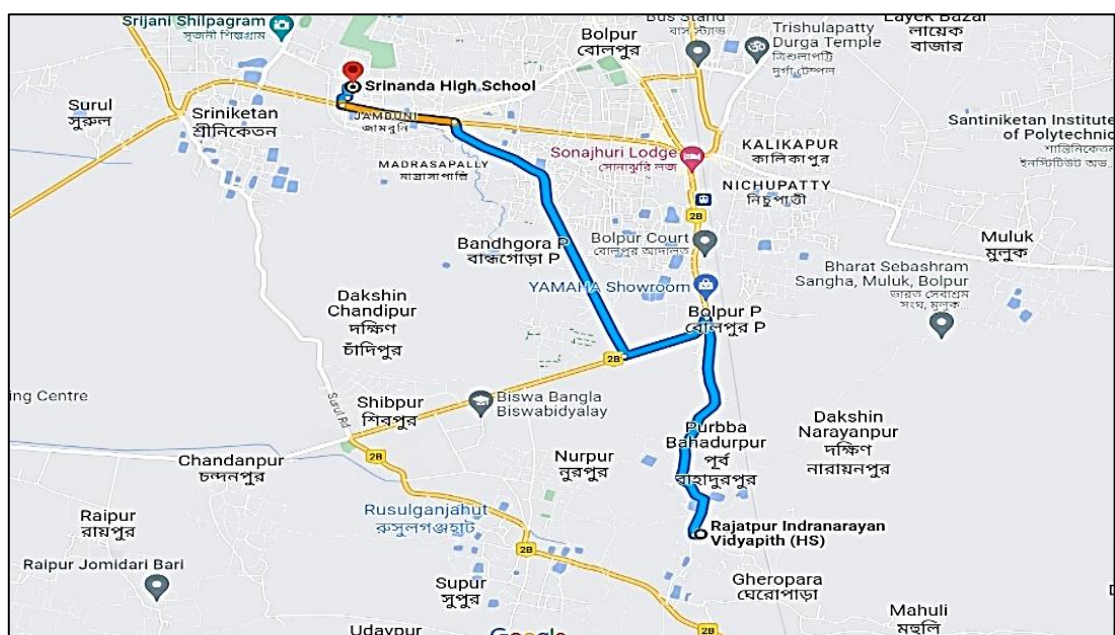
3.3.0 POPULATION

A population is a collection of individuals that share at least one trait that sets them apart from other group of individuals. In other words, population refers to a group of people having one or more characteristics that the investigator is interested in. It is not feasible to examine the entire population due to its large size, diversity, lack of time, and resources too. All learners studying in 9th standard with mean age of fourteen in the Govt. high schools of West Bengal were regarded as the desired population for this current investigation. This was a huge population size as it covered every class IX student studying in various Governmental schools of West Bengal, one of the largest states of India. So, it was not practically possible to reach every student and collect data from them.

3.4.0 SAMPLE AND SAMPLING TECHNIQUE

a) **Sample:** As the entire population cannot be studied because of the time constraint and feasibility issue, the researcher usually examines a representative sample of the entire population and extrapolates the findings to the entire population. The term "sample" refers to the representative subjects on whom the researcher carries out his or her research investigation. For this present study the sample comprised 168 students of class IX, selected from the aforementioned two high schools from the Dist. Birbhum, West Bengal.

b) **Sampling Procedure:** In order to narrow the large population, the researcher needs to use sampling technique. Sampling is the process of choosing a set of people who are typical of that larger population. Sampling technique generates generalizations based on the comparatively small subset of the population. It assists in lowering expenditure, saving time and energy, allowing for precise and accurate scope of measurements. To fulfil the purpose of sample selection it is required to follow certain procedures, rules, approaches, methods, as samples are not chosen arbitrarily. It is possible to classify the various sampling methods into two broad categories: probability sampling & non-probability sampling. When conducting probability (random) sampling, the investigator requires to have the full sampling frame of all people from which sample is selected. So that all the individuals are not deprived of the equal opportunity of being included in the sample. When the sampling frame is incomplete then non-probability (non-random) sampling is used in which some people have no chance of being chosen. Thus, samples are selected either in random way or in other systematic way.

In this research, the investigator employed Stratified random sampling technique in order to select the schools. Stratified Sampling is a probability sampling technique used when the

researcher divides the heterogeneous population into homogeneous subgroups or strata. The population can be stratified by sex, socio economic status, locale etc. to provide guarantee of the equal representation of all the different strata. In this study lottery method of stratified sampling was utilized to select two schools (R.I. V and S.H.S) from two different stratas (Urban & Rural) for conducting the experiment. Then from these selected schools class IX schoolchildren were selected as the sample of this study by using intact group sampling technique. Intact group sampling is the most useful sampling technique in a situation where the researcher cannot randomly assign participants to the groups. An already-constituted group is referred to as an intact group. Examples may include church groups, hospital groups, political organisations, student classrooms. In this case the process of sample selection cannot be used at all. The entire group as it is, needs to be utilised to represent a larger population. Thus, class IX students of Sec.-A, Sec.-B of R.I.V. and Sec.-A, Sec.-B of S.H.S. were taken as the sample of this study with the help of intact group sampling method for the experiment.

Noticeably, out of these four sections two sections (Sec. A of both the schools) were considered as the Experimental Group, and the rest two sections (Sec. B of both the schools) were taken as the Control Group for this current study. At the beginning of the experiment, 204 students from these four sections were present in all in the sampling group. But 168 pupils completed all the formalities of the entire experiment. Thereby, 168 students comprised the sample of the final investigation. Out of 168 students 86 students constituted the members of experimental group while 82 students constituted the members of control group. The number of total male students was 90 and female students was 78. In terms of locality of the school, 86 students belonged to the urban area school whereas 82 students belonged to the rural area school.

The specifics of the sample of this research are provided in Table-3.1.

Table-3.1. Detailed Description of the Sample Under Study

Sl. No.	Name of the Schools	Locale Of Schools	Learning Stage	Category of Sections Taken for the Experiment	No. of Students in Each Section	No of Students Gender Wise	Sections forming the Groups
1	Rajatpur Indranarayan Vidyapith	Rural	Class IX	A	42	25 (Male)	Experimental Group
						17(Female)	
				B	40	22(Male)	Control Group
						18(Female)	
2	Srinanda High School	Urban	Class IX	A	44	23 (Male)	Experimental Group
						21(Female)	
				B	42	20 (Male)	Control Group
						22(Female)	
				Sub -Total	86	48 (Male)	Experimental Group
						38(Female)	
					82	42(Male)	Control Group
						40(Female)	
				Total	168	90 (Male)	Experimental Group
						78(Female)	Control Group

3.5.0 RESEARCH METHOD

Research methods denotes the strategies, tactics or techniques that are used to gather the research data for analysis with the purpose of unearthing new information and thereby, developing a better grasp of a topic under study. The research methods differ according to some factors like nature of the data whether quantitative or qualitative, sources of data whether primary or secondary, and the objective of the study. The present research dealt with quantitative or numerical data collected from primary sources (i.e. experiments), and the objective was to test the cause-and-effect relationship between the independent and the dependent variables, then it adopted appropriate research method namely experimental method. Experimental study offers an orderly and rational approach to addressing the research question, "What will occur if a particular action is undertaken within meticulously regulated circumstances?" The experimental technique encompasses the deliberate

manipulation of stimuli or treatments by researchers, who then proceed to monitor and analyse the resulting effects or changes in the condition or behaviour of the subjects involved. (Best & Kahn, 2006). In this experimental research, the researcher manipulated the treatment, instructional approach to find out whether its manipulation affects or changes the outcome regarding the development of 4Cs.

3.5.1 DESIGN OF THE EXPERIMENT

Usually, researchers attempt to employ randomization in the selection and formation of equivalent groups to meet true experimental conditions to arrive at valid findings and conclusions. But in many research situations it becomes very difficult, in fact impossible to equate the subjects of both the control & the experimental group before treatment-application. This is the case when the researcher carries out applied research in natural setting. To follow the randomization method, it is not allowed to disturb the normal functioning of the existing system. The experimenter, in the domain of educational research, needs to deal with real life classroom situations which cannot be disrupted at the cost of creating two equated groups. In practical situation random assignments of students to two groups would undoubtedly hamper the classroom learning. In such kind of compromising situation, it is worthwhile to provide treatment without hampering the class or the school. Such a study would be benefitted from non-randomized or unequated methods of sample selection where the sample for experimental & control groups would be purposively chosen by the researcher himself or herself. Noticeably, in order control the differences existing between those groups at the start of the experiment, analysis of covariance approach is commonly used to adjust the post-test values of both the groups with their pre-test values. Here the researcher had employed Quasi Experimental research design- Non-equivalent Control Group Design. Quasi Experimental research design is a non-randomized study which is employed for fulfilling the purpose of assessing the effectiveness of an intervention which can be a training programme or any treatment.

Table 3.2: Research Design

Non-equivalent Control Group Design			
	Pre-test	Treatment	Post-test
Experimental group	O	X	O
....			
Control group	O	__	O

The paradigm of design of the current study is specified in **Table-3.3.**

PARADIGM OF THE DESIGN OF THE EXPERIMENT

Groups	Pre-test	Independent Variables	Post-test
EG	P_1CTSTE P_1Creat.STE P_1Collab.STE P_1Com.STE	Teaching through Constructivist Approach Based Module	P_2CTSTE P_2Creat.STE P_2Collab.STE P_2Com.STE
CG	P_1CTSTE P_1Creat.STE P_1Collab.STE P_1Com.STE	Teaching through Traditional Lecture Method	P_2CTSTE P_2Creat.STE P_2Collab.STE P_2Com.STE

The details of the abbreviations used in the above table are given below:

EG - Experimental Group

CG - Control Group

P_1CTSTE - Pre-test on Critical Thinking Skill in English

P_1Creat.STE- Pre-test on Creativity Skill in English

P_1Com.STE - Pre-test on Communication Skill in English

P_1Collab.STE-Pre-test on Collaboration Skill in English

CAM- Constructivist Approach Based Module.

TLM- Traditional Lecture Method

P_2CTSTE - Post-test on Critical Thinking Skill in English

P_2Creat.STE- Post-test on Creativity Skill in English

P_2Com.STE - Post-test on Communication Skill in English

P_2Collab.STE-Post-test on Collaboration Skill in English

3.5.2 DESCRIBING THE VARIABLES USED FOR THE STUDY

A variable refers to a modifiable aspect of an experimental condition that has the capacity to undergo alterations or exhibit diverse attributes across varying settings. In this study two significant types of variables-independent variable and dependent variable were of crucial role.

a) Independent Variables: These are the particular conditions or attributes which the experimenter regulates or manipulates in order to investigate their potential correlation with observed occurrences (Best & Kahn, 2006). In this study control group was instructed through Traditional Lecture Method (TLM), whereas treatment group was instructed through application of Constructivist Approach Based Module (CAM) in English Subject. Both, the TLM and CAM played the role of the independent variables in this study.

b) Dependent Variables: The dependent variables encompass the conditions or traits that manifest, vanish, or undergo modification as the experimenter introduces, eliminates, or alters the variables that are independent (Best & Kahn, 2006). The dependent variables in this study were Twenty first Century Learning Skills in the context of English learning. Thereby, the effect of Constructivist Approach Based Module in English Subject for the enhancement of Twenty first Century Learning Skills in English learning of class IX secondary level school students was studied in this research study.

3.5.3 CONTROLLING THE CONFOUNDING VARIABLES

Confounding variables refer to those unrestrained extraneous variables that are not manipulated by the researcher but they may have significant effect on the dependent variables. Naturally the presence of these kind of variables may have the power to influence the result of the study. It becomes an important task for the researcher to attempt to control such unwelcome variables. It is hardly possible to eliminate such variables entirely, especially in real classroom situation. However, to a certain extent these variables can be controlled either experimentally (by having a sound experimental design) or statistically (by applying statistical methods like partial correlation, ANCOVA and so on). Some extraneous variables like socioeconomic status, gender of the students, learning environment in the classroom, locality of school, teacher's competency, tuition of the students, study habits of the students etc. that might have affected the outcome of the experiment.

Hence, the researcher attentively had taken care for keeping these unwanted variables neutralized as much as possible in the present study. In consort with usage of statistical controlling procedure (use of ANCOVA), the researcher endeavoured some other attempts in order to control the confounding factors. Those attempts were as follows- a) Both the groups-control & experimental ones obtained respective treatments (TLM & CAM) directly from the researcher herself. Usually, a treatment effect is created by the teacher's competency and attitude. Therefore, in order to control the intergroup variance in treating patients with regard

to teacher ability, the researcher herself taught all the groups. As a result, the researcher herself taught each group so that intergroup variance could be regulated while delivering the treatment with regard to teacher competency and attitude towards teaching. B) With the exception of the treatment, every attempt was taken to maintain similarity between the two groups in all experimental circumstances. The researcher was fully aware when it came to other disparities or variations in the experimental setup, excluding the treatment which might have an impact on the groups' outcomes. C) The researcher remained very cautious to consider sample mortality. For the duration of the experiment, subjects of both the groups were expected to be serious about the study and thereby to maintain a high level of attendance. But when the researcher found some respondents who were irregular or not serious were excluded from both the groups. D) The researcher also tried to control the experimental procedure by maintaining the same conditions in the classroom, the experimental setting, the mode of testing, the duration of the experiment, etc. for each group. E) To avoid the social-personal disparities among the participants of both the groups, the researcher provided a warm, understanding, conducive and supportive learning environment in the experimental setting. Thus, the researcher employed all the possible ways to regulate and reduce these undesired factors that might creep into the experiment to create biasness in the result.

3.5.4 OTHER FUNDAMENTAL CONCEPTS IN THE EXPERIMENTAL SITUATION

a) Control and Experimental Groups: In any experimental study two distinct groups are formed for required comparison. These groups are called experimental group & control group. The point that makes these two groups different from each other is that experimental group is exposed to the treatment condition while the control group does not obtain such treatment. For the present study eighty-six students from Sec-A of class IX of both the schools, R.I.V. and S.H.S, Birbhum formed the experimental group who received the treatment namely Constructivist approach-based Module in English subject learning. For four months the students of experimental group were taught English subject through constructivist approach-based module, and were involved in various constructivist learning activities as specified in that module. On the other hand, eighty-two students Sec-B of class IX of both the schools, R.I.V. and S.H.S, Birbhum formed the control group which was spared that treatment/ intervention. The students of control group were taught through traditional method of teaching English.
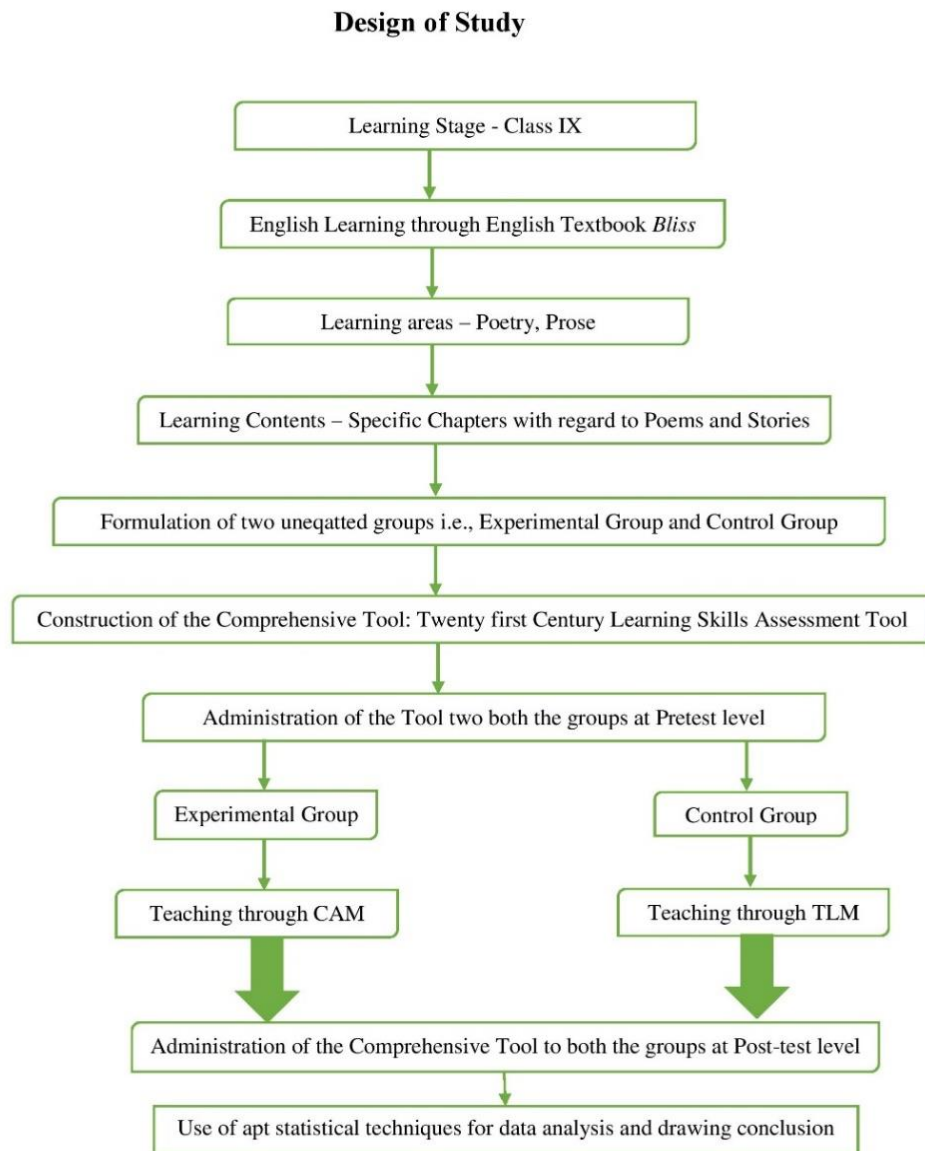
b) Pretests and Posttests: Two kinds of tests, are broadly used in experimental situation in order to determine whether any effects or changes can be attributed to the treatment which is subject to manipulation by the researcher. Pretests can be defined as assessment measures of the outcome of interest prior to administering some treatment. So, students go through pretests before experiencing the treatment condition. On the other hand, Posttests are the same assessment measures of the outcome of interest but provided after the occurrence of the treatment. So, students go through posttests after experiencing the treatment condition. In this study the researcher had also utilized these two types of tests, i.e., pretest and posttest. To be noted she had employed the same test as pretest and posttest in her research study. The four different tests used in this research study are – i) Critical Thinking Skill Test in English ii) Creativity Skill Test in English iii) Collaboration Skill Observation Schedule in English and iv) Communication Skill Test in English. All these four different measures, comprehensively called Twenty first century learning skill assessment tools were utilized as both pretests and posttests.

c) Treatment and the Experimentation: Treatment in experimental research makes reference to the intervention programme set by the investigator with the purpose of altering the conditions of an experiment. Experimental treatment is nothing but the actual application of the independent variable. At the very beginning of the experiment, all the samples of experimental as well as control groups are assessed via pretests, and after that the intervention is given to the treatment group for some specific period of time, while the control group does not receive the same treatment, and finally all subjects of both the groups are measured again with the help of posttests. The treatment in the present study was Constructivist approach-based module in English subject that acted as intervention programme of 4 months for the experimental group whereas this innovative treatment was not allowed for the control group students who learnt the English subject through conventional method. The specific chapters from Class IX English Textbook named *Bliss* i.e., 'Tales of Bhola Grandpa', 'Autumn' (published by WBBSE and being used by Govt. schools of West Bengal) were taught through CAM and TLM to the experimental & the control groups respectively for developing 4Cs among the learners of class IX.

d) Treatment effect analysis: After completing the task of data collection, data concerning to all the participants under control group (Sec. B of class IX of R.I.V. and Sec. B of class IX of S.H.S) were combined together. Likewise, data relating all the participants under experimental group (Sec. A of class IX of R.I.V. and Sec. A of class IX of S.H.S) were

merged together for treatment effect analysis. Then the respective data were pooled together to compare the average difference between the treatment & the control groups.

The details of the design of this study are given in chart - 3.1.

Design of Study

Learning Stage - Class IX

English Learning through English Textbook *Bliss*

Learning areas – Poetry, Prose

Learning Contents – Specific Chapters with regard to Poems and Stories

Formulation of two uneqatted groups i.e., Experimental Group and Control Group

Construction of the Comprehensive Tool: Twenty first Century Learning Skills Assessment Tool

Administration of the Tool two both the groups at Pretest level

Experimental Group	Control Group
Teaching through CAM	Teaching through TLM

Administration of the Comprehensive Tool to both the groups at Post-test level

Use of apt statistical techniques for data analysis and drawing conclusion

3.6.0 INSTRUCTIONAL APPROACHES ADOPTED IN THE STUDY

Teachers need to employ a repertoire of instructional approaches while teaching the lesson. There are various instructional approaches that teachers can utilize in his/her classroom teaching with the objective of fitting the learning demands and styles of learners through a variety of teaching practices. However, in this study the investigator applied two different approaches for imparting instruction to the schoolchildren of experimental & the control groups. They were like so-

   A. Constructivist Approach Based Module (CAM) as an innovative instructional approach

    B. Traditional Lecture Method (TLM) as a conventional instructional approach

3.6.1 DEVELOPMENT OF THE INNOVATIVE INTERVENTION: CONSTRUCTIVIST APPROACH BASED MODULE

Constructivist approach-based module as an intervention was developed by the researcher herself to examine its effects on the outcome of interest. The module was designed to obtain predetermined objectives of the study which was to improve Twenty first century learning skills among the class IX pupils while learning English as their core subject. This constructivist approach-based module was developed from the selected units of the English textbook *Bliss* for students of class IX under West Bengal Board of Secondary Education (WBBSE). The module aimed at creating a constructive learning environment so that students could learn English subject effectively and interestingly while focusing on its primary goal of enhancing students' Twenty first century learning skills during their process of English subject learning.

a)   **Specific Units Covered in the Module is mentioned in Table no 3.4**

Sr. No	Title of the Units	Genre of the Learning Content	Nature of the Learning Content
1	Tales of Bhola Grandpa	Short Story	Hilarious adventurous story
2	All about a Dog	Short Story	Realistic & Moral story
3	Autumn	Poem	Nature Countryside Poem
4	Tom Loses a Tooth	Short Story	Humorous story
5	Mild the Mist upon the Hill	Poem	Nature Poem
6	His First Flight	Short Story	Symbolic story with moral lesson
7	The North Ship	Poem	Symbolic Poem

Thus, the entire module consisted of seven units based on 7 lessons (4 proses and 3 poems) of the textbook, and attempted to teach these learning contents of English subject with the help of innovative strategies derived from the learning theory of constructivism.

b) Structure of the Module

Every unit of the module started with introduction about main idea of the lesson describing major points to be discussed regarding the teaching of that particular lesson through constructivist approach of English teaching. Then the objectives were highlighted precisely accompanied by various constructivist classroom activities along with some exercises for home assignment purpose with the help of which students' progress could be monitored and assessed. Finally, each unit ended with its summary highlighting the crux points of that unit. References were also given so that students became enriched with authentic and valid information concerning the sources of the knowledge. Thus, the researcher followed a systemic and logical structure to construct the desired module.

c) Educational Objectives of the Module

This module aimed at fulfilling certain educational objectives that included acquisition of knowledge of specific facts of the aforementioned lessons, identification of the characteristics of the analytic discussion about the various characters of the lessons, illustration of the dominant themes/ideas of the lessons, enhancement of the capability of using the newly learned words in other writings and also in their daily life as well as of expressing their point of view regarding the suitability of the titles as well as the storylines of those lessons.

d) Specific Objectives of the Module

To enable the students to develop their critical thinking skill, creativity skill, collaboration skill and communication skill (4Cs) through the employment of constructivist learning activities in English classroom. Thus, the module had the purpose to enhance these 4Cs in the context of effective English learning.

e) Constructivist learning elements incorporated in Module

Constructivist learning elements added valuable dimensions to make the classroom environment effective and successful. These innovative elements in the developed module included various constructivist learning strategies as well as learning activities. They were as follows-

1) Mind mapping: Mind mapping is a visual diagram, built around a single focal topic - surrounded by the supported ideas or points which are made through synaptic connections and non-linear relation. The students need to study and analysis the lesson first to make the links between the important ideas of that lesson. A mind map can be of various types in accordance with the genre of the learning content. In the developed module, two kinds of minds maps were observed- story maps and poem maps. Thereby, mind mapping can be regarded as a powerful thinking tool in the field of education. The researcher established the framework for the mind map that the pupils needed to complete. With the help of mind mapping the students would be able to construct new knowledge that helps them to have actual understanding regarding the text. The constructivist module emphasized on how mind mapping could work for the students to be practitioners of critical thinking and creative problem-solving process as well.

2) Spin the Theme Wheel Game: Spinner Wheel is an interesting and enjoyable game technique through which the students can advance their knowledge in a fun way. The researcher created spinner wheels based on the themes of the selected lessons. The theme wheels were divided by some parts having the name of the themes of the text written on them. The researcher used to call students randomly to spin the wheel to select one of the themes. Now the students had to discuss about the themes in their own words. Thus, the students got the opportunity to verbally express their views regarding the main themes of the lessons. This game technique helped to break the monotony of the daily classroom situation and gave a more engaging experience to the students.

3) Interactive Classroom Discussion- Interactive classroom discussion strengthens the dyadic communication between the teachers and the taught with the help of discussion method. This learning strategy had been incorporated by the researcher in a very unique way. It promotes an active dialogue kind of situation that occurs between the teacher and the students to use the acquired information of the text in order to have more elaborate knowledge and solid understanding as well as interpretation of the text. Here it is not the teacher who summarizes and explains the lessons, rather he/she gives some cues or hints in the form of informative statements or thought-provoking questions, and it is the students who respond to those cues and in an organic way completes the discussion over the storyline of those lessons. This type of highly interactive discussions can be conducted at group level to enhance collaborative skills along with speaking skills of the students.

4) Spider Diagram of Characters- Spider diagram is another visual brainstorming tool, very helpful for arranging and generating the concepts in an orderly manner. Making of a spider

diagram calls for exercising critical thinking capacity and also writing abilities to convey the thoughts on behaviour or the personalities of the characters by using proper, precise and relevant words The visual appearance of the diagram having many branches looks like a spider. That is why it is termed as spider diagram. This spider diagram technique was utilized by the researcher for analyzing the characters found in those lessons. It assisted the students to have a concrete understanding regarding the characterizations of the portraits. The researcher followed a fixed format of spider diagram for the purpose of character analysis.

5) Script Writing & Stage Performance - The teacher suggested the students to write a script on a given topic. The script would contain the features of having characters, dialogue, narrative, directional guide (like about the entry, exist, appearance and action of characters) for indicating how to perform in the stage. The structure of the play may include several scenes with those stage directions, and dialogue from the characters. The exercise of writing scripts prompts students to use their imaginative power into writing. Script writing can be carried out by students individually and also by group efforts After the script writing is complete the students can act it out. Performing a play in front of whole class makes the learning process very entertaining.

6) Role Play: Role-play is dramatized activity in which students are involved with real life scenarios that are complicated, not familiar. By carrying out role play students gain the chance to establish an interaction with peers while acting and playing different roles with a sense of responsibility to solve a problem within a structured circumstance. Role play requires students to consider the given situation and express their perspectives and attitudes towards others' situation. To put it in simple words, role play is used when one puts himself/herself into somebody else's shoes. Role play can be performed individually, in pair and also as group activity. For a group performance, the number of the members of a group should be between 4 to 8. Examples of role play included functional roles of interviewer and interviewee, reporter and layman, shopkeeper and customer and doctor, patient and patient's family, administrator, students and parents, guides and tourists etc. Thus, the students assume different roles that are relevant to real-world circumstances. Role-playing games help students to think more critically about difficult and debatable issues and to perceive those issues from different angles.

7) Crossword Puzzles- It is another innovative teaching-learning method in which teachers give the students a puzzle situation with clues for the down and across. Finding out the single word answer that fits into the puzzle box is interesting challenging task for students that requires to think them critically and memorize the information that they have already in their

memory, and to use creativity skill so that they can combine the information to build new idea. The researcher applied the problem-based learning technique of crossword puzzle to make the learning process fun and exciting for her students. The students were given a time limit of 20 minutes to solve the puzzle. While solving the puzzles, students were not allowed to take any help from external sources like textbook, grammar book or internet.

8) Quiz- Quiz can be regarded as a mind game in which students try to give the correct answer. Generally, teachers use quiz for assessing the academic growth of the learners. Multiple choice quizzes are very popular in terms of its effectiveness in any kind of subject learning. The researcher designed multiple choice quizzes (relevant to the lessons) each having 3 alternative options among which the students needed to choose the right option. However, she organized quiz competition among group of learners in an interactive way. The quiz activity allowed the researcher to obtain feedback on her students' progression.

9) Creative Writings: It is an expressive written art form that encourages individuals to express themselves creatively and imaginatively through writing in order to convey a particular idea, feeling, or narrative. It transcends the limitations imposed by conventional writing styles and is wholly based on individual preferences, experiences and subjective interpretation. Examples of creative writing includes composition of imaginative as well as realistic stories, rhymes, poetry, screenplays, novels, dramatization of any fictional writing, riddle making and many more.

10) Sharing Personal Anecdotes/ Similar Case- This is a wonderful learning technique that facilitates classroom communication by narrating and speaking about the personal experiences, or various anecdotes of own life. Both the teacher and the taught describe the small incidents of their life which are relatable to the situations of the lessons. Giving examples of similar case refers to sharing of thoughts on other poem, fictional or non-fictional piece of writing apart from the prescribed texts but having some similarities in terms of plot, qualities of character, theme, style of writing etc. This method also added meaning to the learning situation.

11) Matching the Words- In this exercise the students were instructed to make match between the words in column A with their antonyms, with meanings, synonyms in column B. It involves the abilities of critical thinking & problem-resolving that need to be practiced by learners.

12) Brainstorms: Brainstorming discussion session was arranged by the researcher. Creative Brainstorming can be done at individual level and group level. In this method a critical unsolved issue or problem is posed by the teacher. And the students are asked to discuss over

the problem and to express the probable answers, relevant words and ideas for resolving the problem with a variety of solutions.

13) Utilization of E-resources (TSL): e- resources are of great use to impart Technology Supportive Learning for enhancing students' understanding of the text and helping them in memorizing the facts and information for a long period of time. TSL incorporated characteristics of text, animation, video and sound elements to improve the learning situation for the students. Utilization of audio video aids and multimedia increases the retention rate of the pupils. Tools for technology supportive learning is beneficial for inculcating many important skills like creativity, critical thinking and functional communication among the students of language learning classroom. The researcher also took help of these technologies to support the process of teaching and learning. She showed her students many animated videos which were based on the story or the poem of their prescribed syllabus. The students thoroughly enjoyed the visual presentation (moving pictures) of the lessons and became more interested in learning the literary English contents.

14) Group Projects: PPT Presentation: Students learn a subject more effectively when audio and visual aids are used in the classroom through Power Point Presentation. Projector is usually used to present each slide on the screen. Each slide carries the informative and relevant points of a given topic. It increases class interaction and assists students to be focus on the subject. Additionally, it is advantageous for those who struggle with listening because they can learn by concentrating on written material. Application of this modern technique at group level promotes cooperative learning (peer to peer learning) among the learners along with enhancing their presentation as well as communication skills.

15) Extempore: It is an impromptu speech that the learner needs to deliver on a given topic on the spur of the moment. No permission is granted to the students for prior preparation. Without any preparation the students have to speak about an issue then and there. They are asked to pick a chit from a bowel full of chits having the names of the topic written on them. Each candidate 5 minutes to deliver the speech. Before that they are given 1 o 2 minutes to get a quick understanding about the main points of the topic. They should try to give a comprehensible and well knitted presentation of the topic. The most challenging factor in this technique is to arrange a rapid sequence of ideas. In English teaching classroom the students were instructed by the researcher to strictly speak in English language avoiding any kind of mixing of other language. Thus, this type of spontaneous speeches with no planning at all allowed the learners to better their presentation skill, English speaking skill and analytical as well.

16) Classroom Debates: Students got the chance to work in a collaborative group setting by participating in debates on a stimulating and controversial topic in the classroom. Students expressed their opinion to justify their arguments, and in this process, they learnt new concepts. Debates can be conducted in pair in which two students are involved only, and also as team work having two groups – one in support of the given issue while the other not in favour of the issues. Thereby, the groups presented the pros and the cons of a topic respectively. Classroom debates allowed students to investigate argumentative issues while engaging in friendly competition, and helped them to develop leadership quality, interpersonal interaction, teambuilding, collectively problem-solving, and oral presentation skills.

17) Poster preparation- Poster preparation is about creating a kind of graphic design on a given theme or topic in order to encourage student engagement and active learning. It is also an innovative art in which students are asked to use images, text, tables, and graphs to communicate a concept or convey a message in an interesting and engaging manner. Poster presentations are task-based exercises. It should be kept in mind that the posters need to make a connection with the target audience. The size of the alphabets must be good and balanced so that it is visually appealing, and most importantly, easy to read. In order to create posters, students must not only learn about a particular topic but also analyze it and communicate it to others. Students have the chance to use their creativity to convey knowledge through posters. Poster making learning strategy offered students the opportunity to be creative in the disseminating the information.

f)   Characteristics of Constructivist Approach Oriented Learning

The module champions the value of constructivist approach-based learning to be added to Indian classroom life. This innovative approach towards learning holds the following unique traits. They are as follows- i) This approach strongly adheres to the concepts like learning through action/experience, learning through play, learning through enjoyment, learning through exploration and discovery, ii) This approach is student centered as it places learners at the center of the whole teaching learning process, iii) It provides the learners with a relatable, enjoyable, joyful, fun deriving, innovative, up to date, comfortable, appealing learning environment. iv) It allows to design the learning activities on the basis of the principle of flexibility. Because it encourages for adjusting the classroom activities as per the current necessities of the learners, accessibility of instructional resources, nature of the learning content materials available, demand of the situation etc. v) Active involvement of

learners in the teaching-learning process for the construction of knowledge by themselves is one of the prime features of this approach.vi) It reinforces the relationship between prior experiences and the current learning of the students. Strong connection is established between the preexisted knowledge and the newly acquired knowledge in this approach. vii) This method gives learners more opportunities to use their knowledge and skills in useful ways. viii) In this method of instruction, the instructor serves the role of a friend, motivator, and mentor for the students. ix) It gives value to social interaction, and believes that scope for dialogue in classroom facilitates learning. x)Adoption of this approach demands from the teacher to apply non-conventional constructivist assessment techniques like KWL(H)Chart, Hands-on activities, Mind mapping, Oral Discussion and so on to check his or her students' progress throughout the course of study. The teacher of constructivist classroom has to be a keen observer to utilize checklist and observation for doing assessment of the students' progress. xi)This approach also encourages for the usage of self-assessment and peer assessment techniques. By employing these assessment strategies students are empowered to confidently and independently evaluate their own and their peers' progress, not totally depending on teacher's evaluation. Thus, assessment is integrated with instruction in this constructivist approach towards teaching learning process. xii) It encourages sharing among the students during the teaching-learning process while generating a learning awareness among the students. This approach fosters in the students a sense of self-respect and self-responsibility inculcating a sense of faith in learning among the students.

**g)   4C skills Enhancing activities in line with Constructivist learning**

Table No-3.5

Sr. No	Learning activities with Constructivist Approach	Targeted Skills (4Cs)
1	Mind mapping/ Story map/Poem map	Critical Thinking and Creativity
2	Spin the Theme Wheel Game	Critical Thinking, Communication (Speaking Skill)
3	Interactive Classroom Discussion	Collaboration, Communication (Speaking Skill)
4	Spider Diagram of Characters-	Critical Thinking, Communication (Writing Skill)
5	Script Writing & Stage Performance	Creativity, Collaboration, Communication
6	Role Play	Critical Thinking, Creativity and

		Communication
7	Solving Crossword Puzzles	- Critical Thinking
8	Exercising Quiz Game	- Critical Thinking
9	Developing Various Forms of Creative Writing	Creativity, Communication (Writing Skill)
10	Sharing Personal Anecdotes/ Similar Case-	Communication (Speaking Skill)
11	Matching the Columns	Critical Thinking
12	Creative Brainstorms at Individual Level and Group Level	Creativity, Critical Thinking, Collaboration
13	Utilization of E-resources (TSL)	Critical Thinking, Communication
14	Group Project: PPT Presentation	Collaboration, Communication (Speaking Skill and Writing Skill)
15	Extempore,	Communication (Speaking skill), Critical Thinking
16	Classroom Debates	Collaboration, Communication (Speaking Skill)
17	Poster preparation	Creativity, Communication

Noticeably, all the elements of the 4Cs are interconnected. When someone is collaborating, he or she also involves creativity, communication & critical thinking. Among the four, communication & collaboration have a strong relation, while creativity and critical thinking are also closely intertwined. In such context the four components of twenty first century learning skills are inseparable because generally they go hand in hand. Thus, the activities for integrating collaboration into English learning are interwoven with communication integration activities. In other words, learning activities if used for developing one particular skill may facilitate the process of development of other skills of 4Cs. It is not necessary that a single classroom activity would focus on enhancing only one skill totally ignoring other skills. Nevertheless, all these learning strategies and activities boost students to think critically, creatively and develop communicative and collaborative competence while learning English. Inculcation of 4Cs was not viewed as an additional course of study, rather the module took care of incorporating 4Cs into the arena of learning English as core subject. However, the detailed design of the 4Cs enhancing activities in line with constructivist principles of learning is provided in chart no.-3.2.

Chart- 3.2: **Constructivist Approach based Module oriented Teaching- Learning Design**
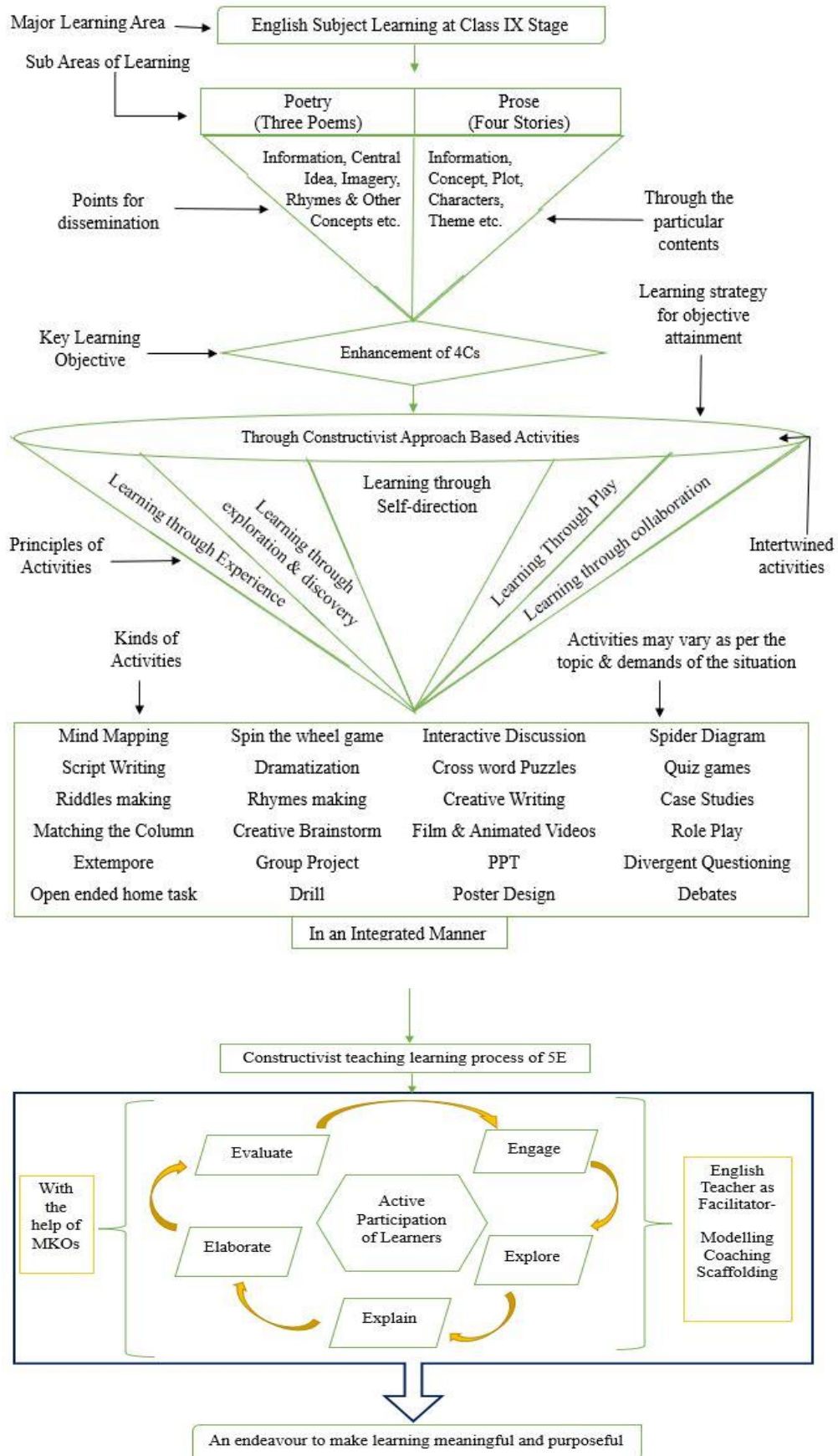
3. 6.2 CONTENT VALIDATION FOR THE MODULE

Content validation was obtained on the basis of expert opinion on the Constructivist approach-based Module in English subject. The researcher sent the self-developed module through online and offline mode to eight evaluators from various academic institutions, and interacted with them for having an interactive discussion over the developed module. Noticeably, all the respected experts had specialization in Pedagogy of English Language or Language Education, Linguistics & English Literature.

Revision of the Module: After receiving the valuable feedback from the experts, the researcher revised her module taking care of the points of modification that were suggested by the experts. Those points were as follows- a) Change was required in the pattern of organising the learning experience, specially concerning the activity of spider diagram and mind map. It was not found appropriate to provide the students with the complete picture of the mind map or spider diagram with all hints and short answers. The researcher accordingly left the structure of mind map and spider diagram completely blank to be filled up by her students, and provided the complete picture of the spider diagram and mind map in the answer key section. b) Repetition of same type of questions in the quiz section should be avoided. The researcher, thereby, eliminated the repetitive quiz questions. c) Some other fun activities could be included in the module to make the classroom learning more joyful and constructivist one. So, activities like solving riddles, and word search, word scrambles etc. were added to the implementation stage to promote critical thinking & creativity. d) Merely mentioning the constructivism model utilised in this module would be insufficient; thereby a brief description regarding its stages and how this particular model fitted into the context of learning English subject, was needed. The researcher tried to describe about the specific model of the constructivism and how does it work in the developed module very briefly and precisely. e) Correction of certain major grammatical errors (inappropriate verb, tense, as well as punctuation mistakes, misspelled words, overuse of adverbs, misplacing apostrophes etc.) was necessary. The researcher rectified all the identified grammatical mistakes found in the module. f) More stress should be given on socio cultural constructivist approach as the developed module was designed in such way that it seemed to focus mainly on cognitive constructivism. To give almost an equal weightage to both the cognitive and the socio-cultural dimensions of constructivist approach the researcher incorporated some collaborative learning activities like classroom debate, usage of simulation, group projects of various kinds into the classroom learning experience.

3.6.3 IMPLEMENTATION OF THE DESIGNED MODULE

This module was constructed within constructivist framework to attain primary goal of developing the twenty first century learning competencies among the class IX schoolchildren of the experimental group (A sections of both the school). This module was meant to be delivered to the treatment group students within a specific period of 4 months. So, the intervention programme continued for 4 months (from August to November,2022) and practiced in the A sections of both the schools. The researcher herself took the English classes of grade IX and endeavoured her best to follow the designed module to apply the innovative and constructivist methods of teaching English subject. Before implementing the module, the researcher took every possible care to ensure that the students were prepared to experience their English class in some new and unconventional way. For this purpose, the researcher attempted to create a generative, conducive, democratic, friendly learning environment where the students would feel encouraged and excited to explore the 'newness' while learning their English subject. Thereby, it was made confirmed that the English classroom turned into a learner centered classroom in which students were ready to take participation in those constructivist learning activities spontaneously and enthusiastically. So, the researcher consciously minimized her role of a dominating and strict dictating teacher as perceived in general classroom situation, and played the role of a friendly and motivating teacher trying to provide learning aids and emotional supports to so that they were able to find their ways by themselves to construct knowledge.

The schools were used to be open for 6 days weekly as Sunday was considered as holiday. Thereby, the researcher got approximately 90 English classes as per the school routine to execute her module in classroom teaching. Many times, she was also allowed by the cooperative school authority to take some extra classes in the provisional class period in which she made her students engaged more with some learning activities (role play, creative brainstorm, practicing extempore, watching educational films as well as their content related animated videos and so on). These kinds of activities were very time consuming. Fortunately, the researcher got sufficient time to incorporate those constructivist learning strategies into actual classroom condition. However, the four months of teaching through the constructivist approach-based module provided the experimental group students to have an experience of novel and joyful learning.

3.6.4 USE OF TRADITIONAL LECTURE METHOD OF TEACHING (TLMT): CONVENTIONAL INSTRUCTIONAL APPROACH

Traditional method of teaching approach in this research study denotes a conventional approach of teaching that largely relies on lecture method. Lecture method is very economical as it saves time and energy as well. This method of teaching is used when the main aim is to make the students acquire the knowledge and thereby, learn the concepts. It helps to present the content before the students in a well-organized manner. It includes characteristics like teacher- directed instruction, whole class lectures, text-book centric/ content-oriented learning, direct instruction, passive participation of students and so on. The teacher gives structured lectures in a very systematic way to teach the preplanned unit. While delivering lecture verbally the teacher may use a writing surface (such as a chalkboard or dry-erase whiteboard). That is why this method is also termed as Chalk and Talk Method. However, this method of teaching is immensely helpful to complete the determined syllabus rapidly with the little time and scarce resources available. Lecture gives the pupils training in listening and taking rapid notes but it creates hurdles if the students are poor in listening skills or if they are not attentive in class. Pronunciation of the teacher also needs to be clear and loud to reach every student otherwise improper pronunciation can lead to generating inaccuracies in learning. This typical teaching method emphasizes on teachers' supreme role dominating the entire educational process by allowing little space for students to be involved. With this method the teacher is the speaker while the students are the passive listeners. Here, the teacher typically showed little interest in finding out whether the students are able to properly hear and comprehend/ grasp the main message of the given the lecture. As this instructional approach has no concern for triggering classroom communication, often the classroom environment turns out to be monotonous and dull. In this regard, traditional teaching can be observed as very limited and inactive, only promoting for spoon feeding education. This traditional lecture method of teaching which is usually followed in most of the Indian classroom situations.

The researcher employed this typical lecture based instructional method to teach the control groups of both the schools. The researcher prepared well organized lectures about the particular topics of study and delivered them to her students in the prescribed period. She used to discuss about the necessary points of the learning content and provided clear, concise explanations of them. Sometimes she used chalk and black board as per the need. More or less, the students remained attentive to her lectures. While giving the content-based lectures

the researcher tried to pronounce every word correctly, clearly and loudly so that it should reach even to the last bench students. Due to the application of conventional lecture-based instruction, the students experienced very less classroom interaction with each other as well as with the researcher cum instructor. The typical pattern of one-way communication was strictly followed in the classroom where the researcher used to provide lectures for imparting knowledge and the students used to simply receive them. For the learners the researcher was the key source for providing all the relevant information. Thereby, the students were totally dependent on their teacher in their process of acquiring knowledge. Thus, the researcher continued to utilise this conventional lecture method for four months while teaching the control group.

3.7.0 MEASURING INSTRUMENTS/TOOLS USED

Tools can be defined as measurement devices designed for the purpose of collecting research data. Twenty first Century Learning Skills Enhancement Assessment in English Subject, a Self- developed tool was employed by the researcher in this study.

Description of the Tool:

Twenty first Century Learning Skills Assessment in English Subject was the comprehensive assessment tool that consisted of four sub tools. Among them 3 were tests- Critical Thinking Skill Test in English Subject, Creativity Skill Test in English Subject, Communication Skill Test in English Subject and one is an observation schedule for assessing Collaborative Skill of students. As these four measuring tools are part of one comprehensive tool, they were given equal weightage in terms of score. The total marks of the entire tool was 240 as individually 60 marks was allotted for each of them. All these assessing tests were based on WBBSE syllabus of English subject for class IX students of academic year 2021-2022. Primarily grounded on the contents of class IX textbook *Bliss* the tool was designed carefully as per the cognitive abilities, needs and interests of class IX students.

> Twenty first Century Learning Skills Assessment in English Subject (Total Marks 240)

CTSTE (Marks: 60)   Collab.STE (Marks: 60)

Creat.STE (Marks: 60)   Com.STE (Marks: 60)

3.7.1 Critical Thinking Skill Test in English (CTSTE)

Basic concept of the Test: Critical thinking can be considered as a higher order, thought process that uses cognitive abilities such as conceptualization, interpretation, analysis, synthesis, and assessment as well as making inference. The Critical Thinking Test in English constructed by the investigator herself was meant to assess learners' critical thinking skills; to be more precise this test attempts to measure students' ability to utilize analytical, interpretative and reasoning capacities while providing answers to the questions in relation to the content area of their English subject.

Dimensions of Critical Thinking in this Test: In this investigation the developed Critical Thinking Test covered the major three dimensions of critical thinking skills within the purview of English subject learning of class IX. They were as follows- (i) Analysis which denotes individual's ability to grasp the core meaning by examining ideas, identifying and critically analysing arguments. It enables the leaners to define and explain terms, to make a comparison of contrasting notions or conflicting statements. Analysis is also about breaking the wholesome problem or issue into their identified component parts, and then finding out the inter relationships of those elements to fully comprehend the issue and thus, making a holistic judgement. (ii) Interpretation- It is the skill of going beyond that the stated problem and probing more deeply so that alternative ways of looking at the problem are made possible. Interpretation also involves the abilities of classifying, determining the relevance, clarifying and elaborating meaning. An individual having good interpretive ability can assess claims and arguments successfully and can frame categories, distinctions by utilizing description or any figurative expression to avoid any kind of ambiguous or confusion situation. (iii)Reasoning denotes the capacity for exercising rational thought process to state the result, justify the procedures, to present arguments logically, and thereby to draw valid conclusions. Good reasoning capacity again helps the individual to assess any information. Making decisions or finding solutions to problems requires the ability to reason, which is the capacity to apply reasoning based on new or existing information. Reasoning capacity can be of three types like inductive reasoning which is useful for making predictions and part-to-whole arguments, deductive reasoning for applying a general theory or law to a specific instance, analogical reasoning which is helpful for finding correspondence and identifying a pattern among different things and cause and effect reasoning which is used to determine how one event can lead to another event being the reason behind the other.

Item Selection: The test was comprised of 5 broad questions/items that consisted of many subitems for assessing learner's critical thinking skill. The maximum score on this test was 60. 60 minutes time was allotted to students to complete the test.

Table 3.6: Dimension wise item distribution

No. of Dimension	Name of Dimension	Item Serial No.	Marks	Percentage (%)
1	Analysis	1.iv)	4	36.66
		3. (i-x)	10	
		4. i) (c) & (e)	4	
		1.i) & ii)	4	
2	Interpretation	5.i)	10	26.66
		4.i) (d)	3	
		4.i) (a) & (b)	3	
3	Reasoning	1.iii)	2	36.66
		2.(i-x)	10	
		4.ii)	10	
Total			60	~100

Nature of the Items: The nature of the items varied from each other. The total five main items or the questions were of different types. Question no 1 consisted of some thought-provoking sub items, question no 2 consisted of certain fill in the gaps sub items, question no 3 consisted of some matching the pair sub items, question no.4 consisted of two types of sub items including mind map and cause and effect relation sub items, and finally question no.5 consisted of puzzle sub items. All the items tried to engage the students in solving various problems like series completion, evaluating or examining actions; identifying cause and effect relation of events, interpreting the comprehension, providing logic based supporting evidence, making comparison by analogy or point of similarity etc.

Types of test items: The researcher used short answer type questions in which the respondents needed to give their perception-based answers using few words, phrases, and sentences. Item no. 1 which consisted of four sub items were all short answer questions that demanded for non-lengthy but compact precise answers with the most relevant information.

Rest of the questions (Item no. 2,3,4 and 5) were all closed ended objective type questions having fixed answer.

Scoring Procedure: Scoring is a very vital process in the field of assessment. The careful design of assessments should take into account various factors. The process of scoring offers a systematic and impartial approach to assess one's proficiency. The practice should guarantee equity and uniformity when evaluating individuals or collectives. The absence of a scoring system in assessments would result in an over-reliance on subjective judgement, thereby increasing the likelihood of biases and inconsistencies. The scoring of short-answer questions is usually considered to be more objective than that of essay-type tests. The utilisation of short-answer tests may result in challenges when it comes to the process of scoring. Objective tests are defined as assessments in which the examiner scores the items in a manner that precludes subjective judgement. Scoring objective test items are much easier and systemic task as they can only be answered as either correct or incorrect. Unlike subjective tests items such as essays, perception based short answers items, objective questions do not necessitate any interpretation or evaluation on the part of the scorer. The process of evaluating open-ended questions can be susceptible to subjectivity, however, there exist techniques to enhance objectivity and uniformity. One of the effective strategies can be developing a scoring rubric or criteria that sets of standards for evaluating performance. The criteria ought to delineate the fundamental elements or attributes that one seeks in a given response, and then each answer can be assessed based on the predetermined evaluation standards established by the scoring rubric. However, though difficult task it might be, there should be attempt to determine scoring procedure for all type of questions for being evaluated in an objective manner as much as possible. That is why, the researcher developed systematic scoring keys and also prototype answer keys to be followed in the process of assessment. This process helped her to evaluate the responses by allotting scores according to the extent to which they fulfilled each criterion. Utilizing a scoring guide in the form of scoring key and scoring rubric she was able to assign numerical scores in objective and biased free manner.

The scoring key for CTSTE is given in the following table-

Table: 3.7 Scoring Key

Serial No.	Scores		Serial No.	Scores		Serial No.	Scores
1. i)	1+1= 2		**3**. i)	1		**4**. ii) a)	2
ii)	1+1= 2		ii)	1		b)	2
iii)	2		iii)	1		c)	2
iv)	2+2= 4		iv)	1		d)	2
1. Total	**10**		v)	1		e)	2
2. i)	1		vi)	1		**4. ii) Total**	**10**
ii)	1		vii)	1		**5**. i)	1
iii)	1		viii)	1		ii)	1
iv)	1		ix)	1		iii)	1+1
v)	1		x)	1		iv)	1
vi)	1		**3. Total**	**10**		v)	1
vii)	1		**4**. i) a)	1+1		vi)	1
viii)	1		b)	1		vii)	1
ix)	1		c)	1+1+1		viii)	1
x)	1		d)	1+1+1		ix)	1
2. Total	**10**		e)	1			
			4. i) Total	**10**		**5. Total**	**10**
Total: Q 1 + Q 2 + Q 3 + Q 4 + Q 5 = 60							

3.7.2 Creativity Skill Test in English (Creat.STE)

Basic concept of the Test: Creative thinking skill enables an individual to observe and solve complex problems in a very innovative way. It aids to look at the problem from a new, non - conventional perspective, and thereby, allows the individual to use divergent thinking to come with various original, novel ideas for resolving the issue. The creative thinker must believe in discovering and exploring unfamiliar areas and making new observation and generating new conclusion. Creativity as a skill denotes to the ability of an individual to construct something new, unusual. The Creativity Skill Test in English was developed in order to measure the qualities and abilities that constitute creativity of students while providing answers to the questions in relation to the content area of their English subject.

This creativity test was a verbal testing instrument in the sense that it incorporated only those problem-solving tasks that were conducted in verbal domain. This developed tool did not include any kind of non-verbal or figural form of expression, rather it made use of language where the students needed to give written answers to the questions, asked in the test.

Dimensions of Creativity in the Test: In this study the developed Creativity Test covered the three crucial dimensions of creativity skill in the context of English subject learning of class IX. Noticeably, the researcher's understanding regarding these dimensions was primarily based on the theory of Torrance, the father of creativity. The three dimensions of creativity assessed through the self-constructed creativity test were like so- (i) Fluency: Fluency denotes the capacity to rapidly generate large ideas, words/phrases, concepts in relation to a particular object or situation. Fluency is the ability of thinking about many ideas in a given time of period. Generating several ideas for organizing a class party, jotting down many words for presenting a given theme, listing names of many things which have a common characteristic- all these kinds of tasks are used to measure the ideational fluency of learners. (ii) Flexibility: Flexibility refers to the capacity of generating different ideas and approaches. It is the ability of thinking and producing of varied and opposing ideas. Listing different types of peculiar usages of a common object, providing of different solutions to a single problem providing many synonyms or antonyms of given word, or generating substitute titles of any literary work – all these tasks are instances of flexibility measuring testing. While fluency focuses on the response quantity, flexibility focuses on the number of the concepts which are categorically different from each other. (iii) Originality: Originality refers to the capacity to generate unusual and novel responses related to any idea, object or product. Giving one appropriate and innovative title to the story or poem, listing some remote consequences of some peculiar concepts, finding out a novel, unique relation between different objects by identifying a completely new, undiscovered similarity between them. Originality focuses on innovative quality of ideas.

Item Selection: The test was comprised of 6 broad questions/items that consisted of many subitems for assessing learner's creativity skill. The maximum score on this test was 60. 60 minutes time was allotted to students to complete the test.

Dimension wise item distribution of this test is provided in the ensuing table.

Table 3.8: Dimension wise item distribution

No. of Dimension	Name of Dimension	Item Serial No.	Marks	Percentage (%)
1	Originality	3. (i-vi)	12	
		4.	10	
		6.i.(a), (b),	2	41.66
		6.iii	1	
2	Fluency	1. (i-iii)	9	
		6. ii)	6	35
		2.	6	
3	Flexibility	5. (i-iii)	12	
		6. iv	2	23.33
Total			60	~100

Nature of the Items: The nature of the items varied from each other. The total six main items or the questions were of different types. Question no. 1 consisted of alternative uses test sub items, question no. 2 consisted of "What if" consequences test sub items, question no. 3 consisted of Remote Association Test sub items, question no.4 consisted of an acrostic building item, question no.5 consisted of some new word formation sub items and finally question no. 6 consisted of series of sub items on alternative title formation, tree diagram completion and unusual question generation. All these items tried to engage the students in solving various types of problems in imaginative, constructive and innovative ways.

Types of test items: The researcher used short answer type questions in which the respondents needed to give the answers using some words, phrases, and sentences but less in number. This type of questions did not demand lengthy answers with details; rather it demanded compact precise answers with the most relevant information. Most of the questions were restricted open-ended type questions that demands answers as per students' creative potential level as they were not strictly marked by one definite correct answer. Thereby, it was expected that their responses would vary from person to person.

The Scoring Key for Creat.STE is being illustrated in the table no 3.9

Table 3.9: Scoring Key

Serial No.	Scores	Serial No.	Scores
1) i)	1+1+1= 3	5)ii)	
ii)	1+1+1= 3	a)	1
iii)	1+1+1= 3	b)	1
Total	**9**	c)	1
		d)	1
2) i)	3	**Total**	**4**
ii)	3	5)iii)	
		a)	1
Total	**6**	b)	1
3) i)	2	c)	1
ii)	2	d)	1
iii)	2	**Total**	**4**
iv)	2	6)i)	
v)	2	a)	1
vi)	2	b)	1
Total	**12**	**Total**	**2**
		6)ii)	
		a)	1
4)	2+2+2+2+2	b)	1
Total	**10**	c)	1
		d)	1
5) i)		e)	1
a)	1	f)	1
b)	1		
c)	1	**Total**	**6**
d)	1	6)iii)	1
Total	**4**	**Total**	**1**
		6)iv)	
		a)	1
		b)	1
		Total	**2**
Total: Q1 + Q2 + Q3 + Q4 + Q5 + Q6 = 60			

Noticeably, the scoring procedure of Item no 2 which consisted of restricted open ended response items needs special mention to ensure the objectivity of scoring. Its scoring was done examining the responses in terms of fluency, flexibility and originality.

Table: 3.10 Scoring procedure of Item no 2

Dimensions of Creativity	Score
The response having Ideational Fluency only	1
The response having Ideational Fluency along with Flexibility	2
The response includes all the three aspects like Fluency, Flexibility and Originality	3

3.7.3 Collaboration Skill Observation Schedule in English (Collab.SOSE)

Basic concept of the Tool: Collaboration skill can be considered as the collective process to generate a shared creation. It simply denotes the skill of working with others competently so that common goal is achieved. Each participant of the group brings a variety of skill sets, worldviews, and approaches to achieving their shared goal. Collaboration skill enables the individual to work well with others with a group/ 'we' feeling. In this research study the Collaboration skill observation schedule in English subject was designed by the researcher to measure the collaborative skill of the students; to be more precise, this tool attempted to assess students' ability to carry out group activities successfully while performing a collaborative work related to their English subject learning. Observation schedule is an analytical device or coding sheet to transform visual observation into usable quantifiable research data. This is generally designed in the format of an analytical form to be filled up by researcher during the structured observation. There are various kinds of observation schedule among which the researcher had utilized numerical rating scales to convert the opinion about specified categories of behaviors. To sum up, this assessment device was a structured observation schedule meant for assessing the learners' collaboration skill when they were group wise involved in the group project of performing a drama based on the script of a play. The researcher observed them throughout the whole process starting from their planning for the performance, to during their performance and after their performance till they received the verbal feedback from the researcher.

Dimensions of Collaboration in the Tool: In this study the developed Collaboration Skill Observation Schedule covered the four key dimensions of collaborative skill in the context of English subject learning of class IX. They were as follows- (i) Coordination: Coordination plays a significant role in collaboration. Efficiency is the goal of coordination, which also involves guiding the participants on how and when to act with a shared mindset approach. There should be coordination among the group members in terms of understanding of common goal, shared responsibility in terms of distribution of labour, resource management etc. (ii) Group Interaction: Group interaction is very key component of collaboration because communication becomes very important when it comes to the building strong relationships among the group. Group interaction helps to facilitate free exchange of ideas, views, information, and message among the teammates. If group interaction is taken care of, there is

less chance for any kind of doubt, uneasiness, and conflict. Being vocal about the hard work of other group members, actively listening to other's point of view with patience, motivating them when needed, sharing understandings and helpful tips with group members – all these various forms of interaction lead to the improvement of the group work. (iii) Accountability: Accountability can be regarded as the vital practice for making a collaborative work a success. Because without accountable group members, the collaboration is bound to be a total failure. Accountability denotes individuals' capability for recognizing their respective roles & duties to the group. It is about being responsible and accountable for his or her performance. It entails accepting responsibility for the decisions that resulted in action. Effective collaboration can be achieved through the practices of accountability. (iv) Supportive context: It refers to the various supportive factors that help to build an encouraging, peaceful, respectful and inclusive working environment. It includes factors like trusting group members, reciprocity/ mutuality, team spirit/the readiness to work together and having respect for different ideas, worldviews without being judgmental and disrespectful of other's opinion. This is very essential for creating a meaningful context for the students to carry out a collaborative learning activity efficiently.

Item Selection: This assessment tool which was comprised of 15 items helpful for assessing learner's collaboration skill. All these items belonging to four different dimensions were expressed in words, phrases, sentences or ideas. The maximum score on this assessment was 60. The minimum score on this assessment was 15. However, 35 minutes were given to decide about necessary factors like how to deliver the dialogues, how to organize the scenes, assigning of roles, kind of costumes and props etc. and then 20 minutes were given to act the play for each group. So total 55 minutes time was allotted to students to complete the group task "Act it out". Researcher observed them thoroughly throughout the whole process, and also extended her observation for more 5 minutes to see their reaction towards the feedback comment provided by the researcher after the play was over. Thereby, to it was a 60 minutes structured observation for the researcher to employ this assessment tool.

Item distribution of Collab.SOSE in accordance with the dimensions identified, is given in the following table.

Table 3.11: Dimension wise item distribution

No. of Dimension	Name of Dimension	Item No.	Score	Percentage (%)
1	Coordination	1	4	26.66
		2	4	
		3	4	
		4	4	
2	Group Interaction	5	4	33.33
		6	4	
		7	4	
		8	4	
		9	4	
3	Accountability	10	4	20
		11	4	
		12	4	
4	Supportive Context	13	4	20
		14	4	
		15	4	
Total		15	60	~100

Nature of the Items: The items were presented in selective words, phrases, ideas to highlight the specific condition or behaviour of the learners that were targeted as the focal points of the observational scrutiny carried out by the researcher herself. The items were expressed in lucid, clear and precise way.

Table 3.12 Scoring Key

Serial No.	Scores	Serial No.	Scores	Serial No.	Scores
1	4	6	4	11	4
2	4	7	4	12	4
3	4	8	4	13	4
4	4	9	4	14	4
5	4	10	4	15	4
Subtotal	20	Subtotal	20	Subtotal	20
		Total = 60			

➢ The Scoring rubrics for assessing collaboration skill has been provided in the Appendix section.

3.7.4 Communication Skill Test in English (Com.STE)

Basic concept of the Test: Communication skill refers to the ability of individual to share as receive information. In simple terms, communication is about exchanging ideas, thoughts, information, facts, and opinion in an effective way. Effective communication can lead to having productive and fruitful conversation and sound understanding of received information while ineffective communication might lead to uncertainty, confusion, misunderstanding etc. Noticeably, Verbal communication denotes communicative competence to utilise words to convey ideas. The Communication Skill Test in English was developed in order to measure the communicative abilities of students while providing answers to the questions in oral as well as written form which either explicitly or implicitly relate to their English subject's content area. Communication Skill Test in English Subject consisted of two sections- Section A: Writing Skill Test in English Subject and Section B: Speaking Skill Test in English Subject. Broadly, it was a communication skill assessing test was solely restricted to the verbal domain.

Dimensions of Communication in the Test: In this study the developed Communication Skill Test covered two primary dimensions of communication skill in the context of English subject learning of class IX. They were as follows- (i) Oral communication / Speaking skill: Oral communication skill means the capacity to speak in clear, precise terms, and definitely without any misinterpretation. It is about the transmission of information from to another or conveying of ideas and thoughts to others is done through the use of spoken words. Oral communication indicates the speaking ability of an individual in expressing his/her thoughts to others. Delivering lecture/speech, or giving extempore, engaging into conversation with people are the various practices for utilising the speaking skill. (ii)Written communication skill: Written communication skill refers to denote the ability of an individual to communicate his or her ideas through the use of written language. This skill is concerned about the writing capacity of individuals to share necessary information. It is very essential to be efficient in conveying ideas in various kinds of written form. Noticeably, vocabulary, grammar, punctuation and spelling are crucial factors in written communication. Effective written communication demands enriched vocabulary, appropriate punctuation, correct grammar and spelling. Writing emails, personal letters, application letters, online blogs, composing poems, dialogues, novels, stories, essays - all these are important practices for utilising the writing skills.

Item Selection: The test comprised of 5 broad questions or items for assessing learner's verbal communication skill. Each question was of 12 marks. The maximum score on this test was 60. Total time of 60 minutes was allotted to students to complete the communication test.

Nature of the Items: The nature of the items or questions varied from each other. The three questions from Writing Skill Test were focused on dialogue writing task, descriptive writing task and process writing based task. The two questions from Speaking Skill Test were focused on debating and speech delivery tasks. All these items/questions tried to engage the students in expressing their thoughts verbally both in written and orally.

Table 3.13: Dimension wise item distribution

No. of Dimension	Name of Dimension	Item No.	Score	Percentage (%)
1	Writing	1	12	
		2	12	60
		3	12	
2	Speaking	4	12	
		5	12	40
Total		**5**	**60**	**100**

Types of test items: The researcher had used long answer type test items or Essay type questions in which extended written responses were required. This type of questions demands lengthier answers with details. Generally, there are two types of essay type questions- Restricted response question and Extended response question. In this tool the essay type questions were of restricted types. Because the respondents required answering the questions by following the clearly stated instruction of word limitation (i.e., the answer should be within 100 words). These questions were open-ended type questions demanding more descriptive and thoughtful answers. They asked for perception-based answers that could not be restricted to mere yes/no category of responding.

Table 3.14 Scoring Key of Com.STE

Serial No.	Scores	Serial No.	Scores
1	12	4	12
2	12	5	12
3	12		
Sub total	36	Sub total	24
		Total=60	

➤ The Scoring rubrics for assessing communication skill has been provided in the Appendix section.

3.8.0 STANDARDIZATION OF THE TOOL

Psychometric Properties: Knowledge and understanding of the Psychometric Properties are very important for any researcher as it provides with the insight into the quality of the test. Psychometric properties denote to the measurable aspects of the tool that demonstrate information regarding the tool's adequacy, relevance, suitability, usefulness and meaningfulness. Validity, reliability, norming – all these three constitute the essential psychometric properties of test.

Validity: After deciding the dimensions and sub dimensions of the entire tool followed by the construction of items on the basis of those identified dimensions, the researcher sent the first draft of the tool to eight evaluators for their expert opinion regarding the research tools. Both Face validity and content Validity of the tools were established based on the expert opinion from professors with education background having specialization in the field of research methodology, educational psychology, language education, English and foreign languages etc. They provided value judgement regarding the appropriateness of the content of the items in order to obtain the predetermined objectives. Their given suggestions were taken care of. For the Critical Thinking Test in English Subject, they suggested to simplify the words used in the questions by using familiar words and try to be more specific and not to use long and ambiguous questions. For the Creativity Test in English Subject, they mainly recommended to use more clear instructions It was also proposed to reduce the number of acrostics making as it demands much time to think imaginatively to build an acrostic. For the Collaboration Observation Schedule in English Subject, almost all the experts opined that it was better to put four-point options instead of three for assessing the collaborative skill. According to them, 3 Point scale (NWO= Not Well Observed, ONEW=Observed Well but Not Executed Well, OEW= Observed Well and Executed Well) should be avoided, and the alternative 4 Point scale: Exemplary (4), Proficient (3), Basic (2), Novice (1) would be more appropriate in this context. For the Communication Skill Test in English Subject, it was suggested to reduce the number of questions. Because expressive answers demand much time from students. It might be very difficult to the students to respond five essay type questions within the specified time. Otherwise, according to them, dimension wise items/contents of the tools were adequate and relevant enough to measure the four skills (4Cs). After incorporating

certain changes as recommended by the experts, the revised tools were found to possess adequate content validity.

Pilot Testing: The pilot study of the research tool was carried out in two stages. The first stage was concerning the trial on small scale. In this stage the researcher tried out her tools only on 12 students of class IX to find out if the items were meaningful, understandable, readable to the class IX students. After administering the tool and thereby getting the feedback from the students' experience, the researcher found out that no such major changes were required except one factor that came into notice. Time for each assessment was 45 minutes within which the students needed to complete the tests. But it was observed that finishing each test within 45 minutes was practically impossible. As per the demand of the situation duration of each test was increased by the researcher. Fifteen minutes were added to each test. Thereby, the duration of sixty minutes for each assessment was finalized. In the second stage, the researcher tried them out on large scale as she administered the tools on a sample of 100 students from two Governmental schools under WBBSE namely Bolpur High School, located in urban area and Barah Sri Gouranga Vidyalaya, located in rural area. Administration of the tool helped the investigator in establishing reliability, performing factor analysis and item analysis and also in developing norms.

Factor Analysis: Factor analysis can be regarded as a multivariate statistical endeavour for identifying fundamental dimensions/ components terms as factors within a set of variables under study. The key objective of factor analysis is to reduce the large number of dimensions leading to data reduction by detecting comparatively fewer number of dimensions or factors. Thus, this statistical procedure helps to explain the basic structure among the observed variables. Three phases are required to conduct EFA, and those phases are-i) Extraction of suitable number of factors on the basis of their eigenvalues, ii) Rotation method by determining the nature of association between the factors. Factors may be found either to be correlated or uncorrelated. The type of rotation method depends upon the nature of relation among the various factors. For instance, for analysing oblique or correlated factors, promax rotation method is useful while for analysing orthogonal or uncorrelated factors, varimax rotation method is appropriate. iii) Interpretation which includes naming the identified dimensions or the factors along with providing a meaningful description of the common characteristics observed among the applicable items. There are certain techniques that are used for carrying out factor analysis. But the most common and popular technique to extract factors is principal component analysis. Noticeably, if the sample size is lesser than 50, then

factor analysis would not be regarded as appropriate at all. The basic requirement for operating factor analysis that sample size should minimum be above 50. With increasing number of sample size, factor analysis would be more appropriate.

In current research Exploratory factor analysis (EFA) was directed for determining the factorial validity of the comprehensive tool by applying the extraction method called principal component analysis accompanied with Promax rotation and kaiser normalization shaping the restricted number of factors for the entire tool with the help of SPSS. In this study total 100 sample size was taken for carrying out the factor analysis. The tables presented below show the rotated factor matrix listing the significant factor loadings (>0.4) for each item.

Table 3.15: Rotated Component Matrix of Critical Thinking Test

Items	Components		
	1	2	3
Item8	0.830		
Item7	0.791		
Item5	0.663		
Item2	0.540		
Item3		0.858	
Item1		0.803	
Item4		0.612	
Item10			0.920
Item6			0.722
Item9			0.554
KMO of sampling adequacy value= 0.696 (>0.5)			

Table 3. 16: Rotated Component Matrix of Creativity Test

Items	Components		
	1	2	3
Item4	0.817		
Item2	0.802		
Item1	0.778		
Item3	0.760		
Item6		0.889	
Item5		0.835	
Item9		0.760	
Item7			0.764
Item8			0.722
KMO of sampling adequacy value= 0.689 (>0.5)			

Table3.17: Rotated Component Matrix Collaboration Skill Observation Schedule

Items	Components			
	1	2	3	4
Item1	0.961			
Item2	0.936			
Item4	0.910			
Item3	0.904			
Item6		0.903		
Item5		0.887		
Item7		0.860		
Item8		0.727		
Item9		0.600		
Item15			0.960	
Item14			0.946	
Item13			0.821	
Item11				0.894
Item10				0.773
Item12				0.760
KMO of sampling adequacy value= 0.778 (>0.5)				

Table 3.18: Rotated Component Matrix of Communication Skill Test

Items	Components	
	1	2
Item2	0.835	
Item1	0.758	
Item3	0.727	
Item4		0.960
Item5		0.898
KMO of sampling adequacy value= 0.660 (>0.5)		

Interpretating the Factor Analysis:

The Kaiser-Meyer-Olkin (KMO) statistic is utilised to assess the adequacy of sampling, which is indicative of the sufficiency of the sample responses. A value of approximately 0.5 is considered adequate for factor analysis to be conducted. Kaiser (1974) recommended that KMO levels of 0.5 can be considered as just accepted, 0.7-0.8 as satisfactorily acceptable, and 0.9 level as excellently acceptable. When KMO value is lower than 0.5, then it suggests poor adequacy of sampling, thereby not suitable for factor analysis. From the above Tables, it can be observed that the KMO measures for critical thinking, creativity, collaboration and

communication exhibited 0.696, 0.689, 0.778 and 0.660 values respectively. So, the KMO values for each tool was found to be greater than 0.5 which indicated very good sampling adequacy. Thereby, the dataset was regarded to be suitable enough for factor analysis.

Total Variance Explained: To explain total variance, restricted number of components or dimensions were extracted based on their eigen value which should be > 1.0 value to be accepted. Thereby, factors having eigenvalues more than 1 were considered significant to be retained. Thus, based on the acceptable eigen value, 3 components for critical thinking, 3 components for creativity, 4 components for collaboration and 2 components for communication were extracted. The correlation matrix revealed that factor loading values lied between -1 to +1. The Rotated Component Matrix tables showed the factor loadings for the rotated solution in which the values for critical thinking, creativity, collaboration and communication were found to be above .5. Thereby they were all included in the analysis. Thus, the utilisation of Promax rotation an oblique rotation technique enabled the establishment of correlations among factors. This method assisted to attain factor loadings that are more straightforward and easier to comprehend and to reduce the intricacy of the loadings by equitably distributing them among the factors.

Item Analysis: After completing the scoring, the researcher conducted item analysis so that she could weed out the weak items. The mechanism of item analysis is generally carried out in two ways-by determining the items' discrimination index and difficulty-level. The researcher performed item analysis for the three individual tests on critical thinking, creativity and communication since empirically item analysis is not possible for observation schedule. It is also necessary to point out that for calculating discrimination value and difficulty value, the students' responses needed to be categorized into right answer and wrong answer. But open ended or perception-based responses cannot be grouped into correct and incorrect responses. Thereby, they are not subject to item analysis in the empirical way. In terms of the nature of the items, the tests were marked by hybridity as it contained both close ended and open-ended questions. That is why, for each test the researcher identified the close ended or fixed answer type questions the responses of which could be assessed as right/wrong to carry out the task of item analysis through calculating discrimination index and difficulty value. For analysing item discrimination of tests having open ended questions or questions scoring of which is more than two data points (0,1), rather having multiple data points (2,3,4,5), an alternative approach (T-test approach to item discrimination) was adopted.

However, for item analysis the scores were organized in descending order (from highest to lowest). Thereafter two groups were formed. One group possessed the high scoring, while the other group had the low scoring. Next step was to select the 27% of the group of high score holders and the 27% of the group of low score holders. Thus, for item analysis out of the total sample of 100 students 54 students' score were considered which included the top scores of 27 students and the bottom scores of 27 students from each group.

Discrimination Index: The formula for Discrimination Index was- $\dfrac{R_U - R_L}{N}$

R_U: *the number of right responses in the upper ability group*

R_L: *the number of right responses in the lower ability group*

N: the number of responses in either group

Discrimination Index was determined for the Critical Thinking Test Part-I (Total marks=30) containing items that had fixed responses thereby were able to be classified into correct and incorrect answers. Those items with DI value found to be greater than or equal to 0.2 were retained. Items with DI between 0.0 to 0.2 indicated poor discrimination and thereby they were rejected or modified.

Alternative T-test Approach: The alternative approach was applied for analyzing the open-ended items of critical thinking, part-II, the creativity and communication tests. Alternative t-test of mean difference was used for every item of those tests to determine the discrimination ability. Only those items were retained in the tests which were found to have Sig.value <0.05, and thereby, implying positively discriminating to be accepted. On the other hand, some items that were found to be discriminating negatively as the Sig.value is > 0.05, were not accepted and thereby they were revised.

Difficulty Value: The formula for measuring item difficulty was $\dfrac{R}{N}$

R- Total number of right responses
N- total number of responses

Calculation of Difficulty value was only applicable to the Critical Thinking Test Part-I (Total marks=30) containing right/wrong response deriving items. The items with DV greater than 0.9 were considered to be very easy item and with DV lesser than 0.2 were considered very difficult item for the students to respond. Thereby those items underwent modifications, and finally items, possessing difficulty value between 0.20 to 0.90, were retained in the tests.

Reliability: Reliability of the tool which concerns about the consistency of measurement was established with the help of two methods- test-retest method and Cronbach alpha method. While test- retest method was employed to determine the consistency of measures over time, Cronbach alpha method was utilized for estimating internal consistency.

TABLE 3.19:

Test-Retest reliability coefficient for stability in scores

Name of School (n= student number)	Name of the Test	Date of conducting Test		Date of conducting Retest
Bolpur High School (n=50)	Critical Thinking Test in English Subject and Verbal Creativity Test in English Subject	28/06/2022	After 20 Days	19/07/2022
	Communication Skill Test in English Subject	29/06/2022		20/07/2022
Barah Sri Gouranga Vidyalaya (High School) (n=50)	Critical Thinking Test in English Subject and Verbal Creativity Test in English Subject	30/06/2022	After 20 Days	21/07/2022
	Communication Skill Test in English Subject	02/07/2022		23/07/2022

TABLE 3.20

Determination of test-retest reliability by computing Pearson Correlation

Descriptive statistics (n=100)	Critical Thinking Test in English Subject		Creativity Test in English Subject		Communication Skill Test in English Subject	
	Test	Retest	Test	Retest	Test	Retest
Mean	36.22	39.57	34.38	38.11	33.63	36.25
Standard Deviation	9.60	9.71	8.83	9.88	8.50	8.20
Pearson correlation Coefficient (r)	0.820		0.765		0.806	

Interpretation: Computation of Pearson- Product Moment correlations was performed to assess the test-retest reliability of three individual tests. As the assessment of collaboration skill was carried out through an observation schedule, this particular tool was not subject to test- retest reliability. However, as shown in the above table, for critical thinking test, r was >o.8, hence it implied good reliability of the tool, for creativity test, r was >0.7, hence it implied acceptable reliability, and for ccommunication test: r was >0.8, hence it implied good reliability of the tool.

Table 3.21: Determination of Cronbach alpha coefficient for determining internal consistency

<u>**Reliability Statistics**</u>

Dimensions	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
1. Critical Thinking	0.723	0.746	10
2. Creativity	0.704	0.712	9
3. Communication Skill	0.747	0.745	5
4. Collaboration	0.790	0.799	15

Interpretation: Cronbach's alpha values of assessment of each skill were found to be >0.7, hence, it indicated acceptable reliability of those tools.

Norms Development: It is very crucial to develop norms to provide a uniform criteria for comparing the performance levels of the students in an objective way. Without developing norms, standardization of the tool remains incomplete. Based on the raw scores of 100 students chosen for the pilot study, the dimension- wise and for the entire assessment tool grade norms were developed. Firstly, the raw scores were converted into derived scores and then z- score norms were developed based on the statistical results that are provided in the table below.

Table 3.22: Statistical Results

Sr. No	Dimensions	N	Mean	SD	Number of Items
I	Critical Thinking	100	39.57	9.71	10
II	Creativity	100	38.11	9.88	9
III	Communication	100	36.25	8.20	5
IV	Collaboration	100	34.44	8.44	15
	Full Test	**100**	**148.37**	**36.23**	**39**

Further, norms were developed for interpretating the level of 4Cs (dimension wise and also in its entirety). This is shown in the table presented below-

Table: 3.23 Norms for Interpretation

Critical Thinking	Creativity	Communication	Collaboration	Full Test	Z-Score Range	Grade	Levels
54 & Above	54 & Above	51 & Above	50 & Above	209 & Above	+1.65 & Above	A	Extremely High
50 to 53	49 to 53	47 to 50	44 to 49	190 to 208	+1.10 to +1.64	B	Moderately High
41 to 49	39 to 48	35 to 46	35 to 43	167 to 189	+0.51 to +1.09	C	Slightly High
35 to 40	34 to 38	31 to 34	31 to 34	131 to 166	-0.50 to +0.50	D	Average
31 to 34	27 to 33	28 to 30	26 to 30	112 to 130	-0.51 to -1.09	E	Slightly Low
22 to 30	22 to 26	24 to 27	21 to 25	86 to 111	-1.64 to -1.10	F	Moderately Low
21 & Below	21 & Below	23 & Below	20 & Below	85 & Below	-1.65 & Below	G	Extremely Low

3.9.0 PROCEDURE OF FINAL DATA COLLECTION

The investigator first of all took the consent from the Human Resource Development Department (HRDD), Government of West Bengal for data collection. After receiving the official approval from the respective authority, she met the Headmaster and the Headmistress of the two schools and intimate them too. She fixed the time period of four months to implement constructivist approach-based module in a section of class IX students while applying conventional English teaching method in another section of Class IX, and also set dates for administering the tools for data collection. She visited the subjects first and built rapport with them by interacting with them and took them into confidence during taking their classes to conduct her experiment and then gathered the required data from them. By administering Twenty first Century Learning Skills Test in English which included four individual measuring instruments for assessing Critical Thinking, Creativity, Collaboration and Communication in English subject, quantitative data were gathered by the researcher. While the data related to the critical thinking, creativity & communication abilities of

students were obtained from their respective test scores, the data concerning students'
collaboration skill was collected on the basis of structured observations done by the
researcher herself. Thus, the needed research data was collected to be analyzed and
interpreted.

3.10.0 DATA ANALYSIS

The investigator analyzed the quantitative data by the means of appropriate statistical
techniques depending on its need and relevancy to the study and the nature of collected data.
Descriptive statistics like mean, standard deviation, standard error of mean, graphic
representation of data and inferential statistics such as ANOVA, ANCOVA of parametric
family were employed by the researcher to analyse the obtained data. The thorough
description of analysis & interpretation of obtained data is given in the next chapter.
However, the factorial designs for data analysis utilized in the present study are given in
Chart no. 3.3, 3.4 and 3.5.

Factorial Design for Data Analysis Concerning to the Objectives and Methods of Teaching and the Performance Tests
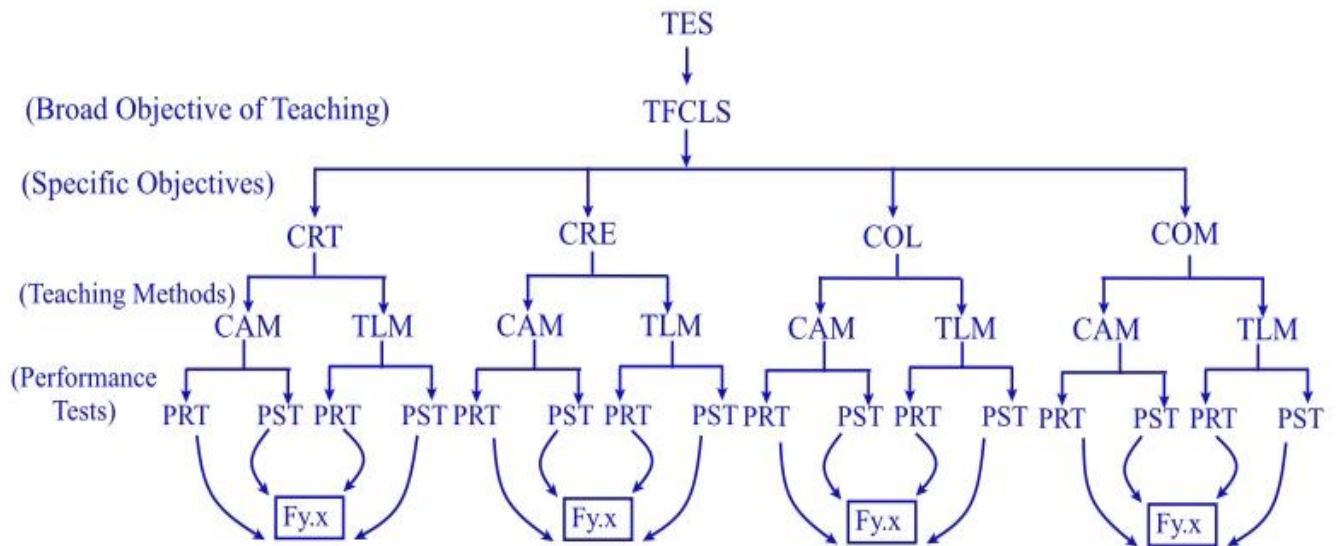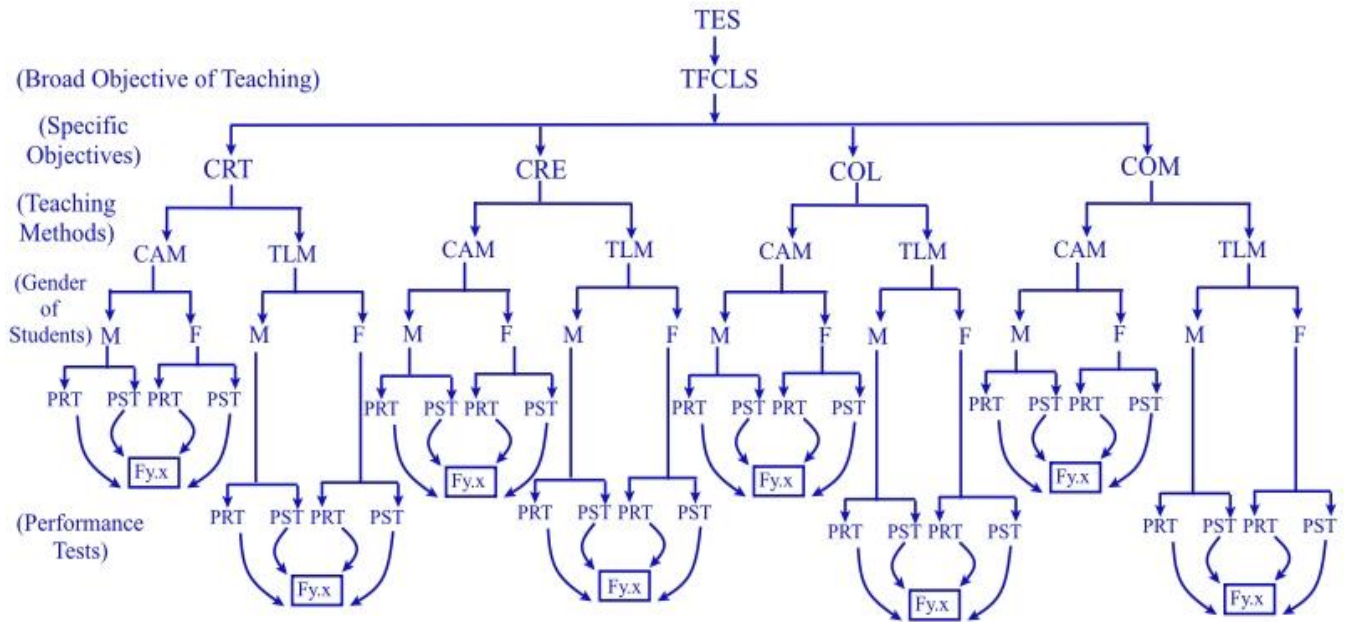

Abridged Words

TES: Teaching English Subject
TFCLS: Twenty First Century Learning Skills
CRT: Critical Thinking
CRE: Creativity
COL: Collaboration
COM: Communication
CAM: Constructivist Approach Based Module

TLM: Traditional Lecture Method
PRT: Pre-test
PST: Post-test
x: Pre- test score
y: Post-test score
Fy.x: ANCOVA result by adjusting post test scores with pre-test score

Factorial Design for Data Analysis Concerning to the Objectives and Methods of Teaching, Gender of Students and their Performance Tests

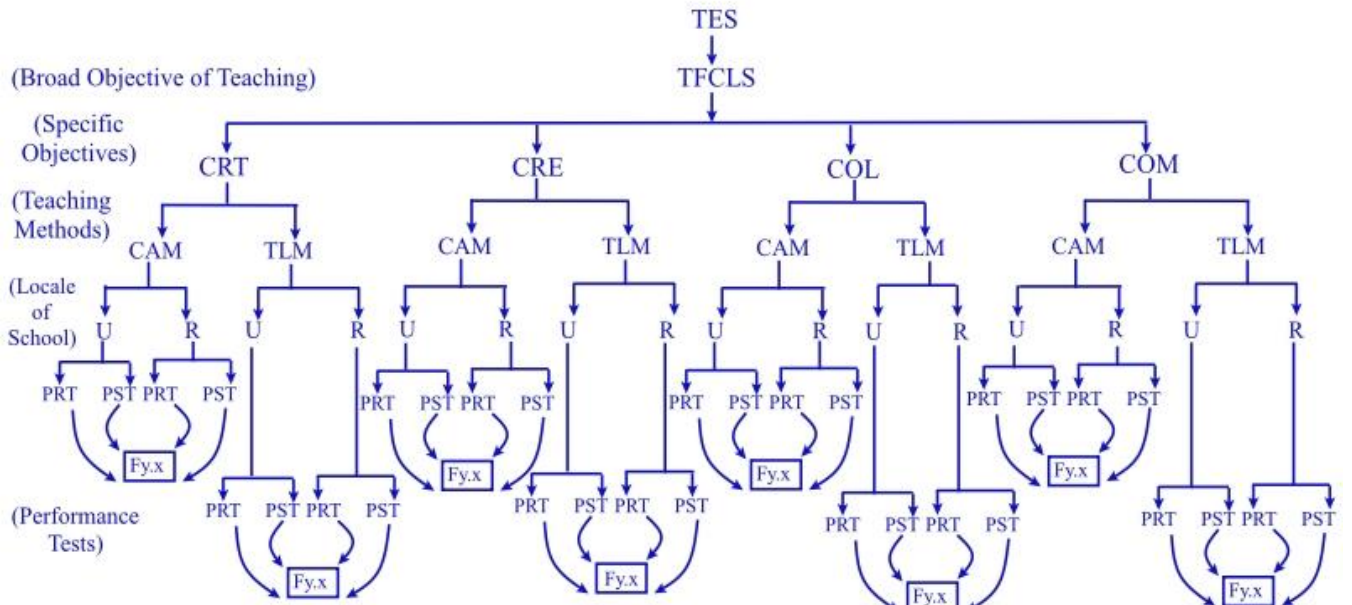**Abridged Words**

M: Male   F: Female

**Factorial Design for Data Analysis Concerning to the Objectives and Methods
of Teaching, Locale of School and the Performance Tests**

Abridged Words

U: Urban   R: Rural