CHAPTER II

REVIEW OF RELATED LITERATURE

2.1.0 INTRODUCTION

Conducting a comprehensive review of the current literature is a fundamental aspect of every research endeavour. A thorough and extensive analysis of significant scholarly works, research papers, articles, journals, books, and other relevant resources, commonly known as a literature review, entails a meticulous and analytical review of the current literature in relation to a specific research topic. This facilitates the researcher in gaining an understanding of the extent of progress made in the relevant field and acquiring knowledge in areas that have not been previously investigated or studied. It is imperative for the researcher to possess an awareness of the existing knowledge that has been generated already in the concerning field. This awareness is crucial in order to enhance clarity regarding the research problem of the present study, and gain insight into the methodological parts as well. Thereby, reviewing relevant literature is an essential step for every researcher as it establishes the foundation for the research problem and aids in developing a comprehensive understanding of the context of the investigation.

Primary objective of this research was to study the effectiveness of Constructivist approach-oriented module (CAM) on the expansion of twenty first century learning abilities among the secondary school schoolchildren, specifically in the domain of English subject. Limited researches pertaining to the current investigation, have been undertaken in India and outside the country as well. This second chapter is devoted to the sole purpose of providing a brief overview of the existing studies that shows relevancy for being related to the current research problem. Furthermore, for the purpose of enhancing the readers' comprehension, a comprehensive compilation of the entire body of relevant literature is succinctly organised into the subsequent thematic categories:

I. Studies on Constructivism as an educational theory
II. Studies on Constructivism in Different Subjects
III. Studies on Constructivism in English Subject
IV. Studies on Constructivist Module
V. Studies on 4Cs/ Twenty first century learning skills
VI. Studies on 4CS in English Subject
VII. Studies on 4Cs within the purview of Constructivism
VIII. Studies on Critical thinking skill concerning 4Cs and English learning
IX. Studies on Creativity skill concerning 4Cs and English learning
X. Studies on Collaboration skill concerning 4Cs and English learning
XI. Studies on Communication skill concerning 4Cs and English learning

I. Studies on Constructivism as an educational theory

Studies Conducted in India

Rout (2020) studied about "Constructivism Approach in Teacher Education" in which he upheld the fact that the utilisation of the constructivism method in Teacher Education facilitates student engagement, fostering a deeper appreciation for the learning process and a heightened enjoyment of the educational experience. This study covered a discussion of the concept of constructivism, the 5E Model constructivism, the characteristics of a constructivist learning environment, the application of constructivism in teacher education, and the benefits associated with the constructivist approach.

Golder (2018) carried out a study titled "Constructivism: A Paradigm for Teaching and Learning" that analysed constructivism as a conceptual learning framework for facilitating teaching & learning process. Constructivism is a theoretical framework in the field of psychology that seeks to elucidate the processes by which individuals gain information and engage in learning activities. Consequently, it possesses a direct relevance to the field of education. The discussion of this research article encompassed an examination of this theoretical learning model and fundamental attributes associated with constructivist learning environment. Constructivist learning settings are characterised by seven pedagogical objectives that aim to foster effective learning experiences and encourage the enhancement of critical thinking and other relevant abilities. Furthermore, essential tenets of constructivism were explicated in the study. It also highlighted that there existed notable disparities between the conventional classroom setting and constructivist classroom. The study thus addressed several implications of constructivism in the context of teaching and learning, and promoted for the application of constructivism in classroom situation by the teachers and the educators.

Kumar & Teotia (2017) carried out study that described constructivism as a theoretical framework placing emphasis on an approach that centres around learners. The study addressed the importance of including constructionist elements in social science curriculum area specially at the upper elementary level. The efficacy and engagement of educational experiences in a social science classroom are crucial, as it encompasses a diverse range of social skills that children at the upper elementary level must acquire and comprehend via innovative ways. Hence, this study centred around knowledge acquisition by employing the constructivism-oriented learning perspective to facilitate students-oriented instruction. This approach, in turn, enhanced academic performance and achievement.

In his doctoral work Gautam (2016) focused on designing an instructional material that applied a constructivist approach to teaching biology at high school, and thereby, on assessing the efficacy of the constructivist pedagogical approach in comparison with typical teaching methods on the level of reaction, academic achievement and retention capacity in the context of Biology learning of secondary level pupils. Furthermore, it attempted to investigate willingness of the educators to utilise the instructional material developed by the researcher. The primary outcomes of this study indicated that the execution of a constructivism in the realm of science education had led to improved academic performance among students. Furthermore, teachers expressed a strong interest in utilising constructivist-based contents and lesson plans to provide constructive instruction.

Studies Conducted Abroad

Shah (2019) studied on "Effective Constructivist Teaching Learning in the Classroom" to illustrate how the constructivist framework has proven to be a highly influential paradigm in elucidating the processes by which knowledge is generated within society, as well as shedding light on the mechanisms by which students acquire knowledge. This research critically examined constructivist teaching methods, emphasising the advantages and potential challenges associated with their implementation. Noticeably, the author delineated different cases where constructivism had been misinterpreted and examined multiple instances of misapplication in constructivist pedagogy. The author moreover provided two instances that exemplified the proficient application of constructivist education and elucidated the factors contributing to their achievement.

The research conducted by Kasapoglu (2010) attempted to examine the potential correlation between the attitude of teachers towards any change and their perception regarding curriculum change based on constructivism, as well as the employment of constructivist learning activities at primary level school. Data was gathered from a total of 236 classroom teachers who were instructing at public primary schools located in Afyonkarahisar, Turkey, using a questionnaire. After the utilisation of Bivariate correlations findings of the research were obtained, indicating that classroom educators exhibited willingness for embracing transformation, and frequently used constructivist educational exercises. However, their opinions regarding the implementation of a constructivist curriculum shift in Turkey during the 2004-2005 academic year were varied. There was a significant although moderate correlation seen between the attitudes of classroom instructors towards change and their

perceptions of constructivist curriculum reform, as well as the execution of constructivist strategies and activities for teaching primary school children.

Price (2008) carried out study titled “Evaluating the Challenges and benefits of Constructivist- based schooling: A case study”. This action research was determined to facilitate dialogue among educators, parents & pupils regarding the advantages and obstacles associated with constructivist-oriented education. Additionally, the study aimed to implement strategies for enhancing classroom practices and to assess whether students in grades 2-8 at the selected school achieved proficiency on the California Standards Test (CST). The research conducted at Coast School, a K-8 educational institution located in California, encompassed several phases, including the development of a constructivist-oriented programme, its implementation within the school, and the subsequent evaluation of its efficacy. The present study utilised qualitative data obtained from focus group conversations involving several stakeholders, including teachers, parents, and students. Additionally, aggregated quantitative data from the California Standards Test (CST) was also incorporated. The findings from the focus group revealed a number of positives that were connected with the constructivist-based approach. These strengths included active parental involvement, a multi-age classroom, the development of meaningful assessments, and the inclusion and education of parents. The statistical findings derived from CST indicated a rise in the percentage of students at Coast School who demonstrated proficiency or achieved better scores in both mathematics and language arts. Thus, the study revealed that although constructivist-based schooling encounters certain difficulties, it also offered significant advantages, with learners achieving comparable academic outcomes to their peers within the district and the state of California.

Kim (2005) carried out research which aimed to examine the impact of a constructivist pedagogical approach on aspects like pupils’ self-concept strategies for learning and academic accomplishment too. The cohort of 76 sixth-grade students was partitioned into 2 distinct categories. While the treatment group received instruction utilising constructivism theory-based techniques, whereas control group received instruction employing the regular approach. The findings indicated that the effectiveness of constructivist pedagogy surpasses that of old-style, regular teaching so far as academic achievement is concerned; while no effectiveness constructivist instruction was observed in terms of pupils’ self-concept and learning strategy, but it had a certain effect on motivation level of students. Additionally,

participants expressed a preference for a constructivist learning environment over a traditional classroom setting.

Marlowe & Page (2005) wrote a book titled “Creating and sustaining the constructivist classroom” that examined the primary concerns expressed by educators regarding the establishment and maintenance of constructivist learning environments. It offered practical suggestions, strategies, and illustrations to facilitate the gradual integration of constructivist principles into teaching practises, as well as the continuous assessment of students' development. It studied the process of transitioning from traditional classroom settings to constructivist educational environments. It upheld the view that learning from a constructivist standpoint entail engaging in the cognitive activities of querying, questioning, information analysis and interpretation. Moreover, it involved utilising this information to foster the development and modification of meaning and understanding.

Gabler & Schroeder’s study (2003) was specifically tailored for educators teaching at the secondary stage of education, and it provided a comprehensive foundation for implementing a constructivist approach through the use of seven distinct teaching methods. These pedagogical approaches prioritising student engagement included various methods like learners' previous experiences (ILPE) method, interactive conversations, mini-lectures that encourage active participation, and opportunities for independent student discovery, and encompass classroom practices such as questioning, heuristics, and role-playing.

Shapiro (2003) offered a collection of 27 practical case studies under the title “Case studies in constructivist leadership and teaching” that provided educators with the necessary tools and strategies to enhance their private as well as professional practices in playing various educational roles in teaching, research supervision, and administration. These case studies were particularly relevant in the context of contemporary schools and school districts, which were characterised by their growing complexity and constant evolution. These strategies had been created and refined over time, resulting in significant improvements in student achievement and satisfaction. The 5th case study incorporated a comprehensive checklist that outlined a model, designed to provide guidance for practical implementation. The cases encompassed a diverse array of contexts, spanning from rural to urban, including both inner city and suburban areas.

Bransford et al., (2000) explained epistemological perspective of constructivism as encompassing a philosophical as well as learning framework which posits individuals as

dynamic beings actively involved in the construction of meaning from existing knowledge systems already, they possess. The process through which a learner comprehends a novel situation involves the utilisation of preexisting personal conceptions, known as schemata. Through learning, these schemata are subject to modification and expansion. It is crucial to note that this endeavour can solely be undertaken by the learner themselves. The students engage in the process of reorganising and restructuring their existing cognitive frameworks. The authors also offered insightful analyses regarding the efficacy of incorporating curricula centred around actual-life problems in educational settings. They also explored the benefits of utilising scaffolding techniques to facilitate learning, fostering interactive dialogues between educators and students, promoting critical thinking and revision skills, cultivating both local and global communities, and expanding professional development opportunities for teachers.

Shepard (2000) studied about the function of innovative assessment techniques in learning culture. His research article addressed the need for changing the current classroom assessment to embrace more constructivist and flexible assessment techniques that could be utilised to facilitate and augment the process of learning. In this context this study thoroughly explored the primary tenet of constructivism that learning entails the active process of constructing, generating, inventing, and cultivating one's own knowledge, and also emphasised on the integration of authentic and real-world connections in school learning that is crucial, as it not only enhances student engagement and motivation, but also fosters the practical application of knowledge in real-life contexts.

Brooks & Brooks (1999) in their study titled “The courage to be Constructivist. Educational Leadership” highlighted that the fundamental essence of the constructivist approach to education lies in the fact that the process of learning is within the control of the learners themselves. Constructivist educators acknowledge the significance of students' pre-existing experiences in relation to their engagement in various school activities. This study concluded that though the task of establishing a constructivist classroom poses challenges for educators, demanding their unwavering dedication and the students' steadfast intellectual engagement, they should strive for adopting constructivist teaching learning strategies to make the educative process up to dated and relevant.

The study conducted by Muller et al., (1998) aimed to investigate the extent to which constructivist processes were involved in the progression of competency acquisition, as well as how these processes evolve in relation to development. The paper's main goal was to offer

a theoretical foundation for advancing cognitive mental representation. It delved into the usefulness of empiricist and constructivist models of mental representation. The present analysis arrived at the conclusion that the constructivist model offers a more robust foundation for the model development pertaining to mental representation.

Glasserfeld (1995) carried out a study concentrating on constructivist approach to the process of teaching. Primary goal of this endeavour was to establish a theoretical framework grounded in constructivism. He thoroughly examined numerous existing research studies and provided a comprehensive explanation of constructivism and its associated concepts. The researcher discovered that the theory of constructivism offers a robust conceptual framework that motivates educators to undertake novel ventures. The study concluded that an educational setting which incorporates several instructional strategies, such as active learning, reflective learning and others that are based on constructivist philosophical tenets, enables the process of teaching and learning to be relevant and productive.

Lebow (1993) conducted study titled “Constructivist values for instructional systems design: Five principles toward a new mindset” that provided a summary of the implications of constructivism on instructional systems design (ISD), highlighting five principles that effectively connect the emotive and cognitive areas of learning. Asper the first principle it is imperative to establish a protective barrier between the learner and the potential adverse consequences that may arise from the implementation of instructional practises. Second principle two is concerned with the establishment of a learning environment that fosters autonomy and connectivity support. Third principle incorporates the rationales for acquiring knowledge inside the learning process itself. Next principle emphasises the need of promoting self-regulated learning by cultivating the necessary abilities and attitudes among learners while the fifth principle stresses on the importance of enhancing the learner's inclination towards purposeful learning processes, with a particular focus on promoting the strategic examination of errors. This study finally claimed that, contrary to prevailing perspectives, the constructivist philosophy presents instructional designers with a different set of principles that could have a substantial impact on the emphasis of instructional systems design methodologies, while yet maintaining the integrity and uniformity of the ISD model.

Besides these aforementioned researches, there are many other studies on constructivism. Such as studies of Phillips, 1995; Duffy & Cunningham,1996 demonstrated that theory of

constructivism holds significant implications for the development of instructional strategies and the creation of curricula.

II. Studies on Constructivism in Different Subjects

Studies Conducted in India

Adak, (2017) conducted an experimental research study to examine the impact of constructivist approach to science on academic accomplishment in the secondary level of science. This study employed a pre-test, post-test, experimental, and control group design, with a total of 58 participants aiming at examining the efficacy of a constructivist approach in enhancing academic attainment in science among pupils at secondary level. On the basis of matching participants' intelligence test scores, they were separated into two groups: experimental group consisting of 29 schoolchildren while control group also comprising 29 schoolchildren. Researchers utilised a self-designed achievement test based on the content of the Class IX Textbook of the WBBSE in India. The research discovered that learners those remained exposed to constructivist-model, demonstrated significantly higher levels of achievement compared to those who were taught using standard techniques. The utilisation of the constructivist method has the potential to enhance students' proficiency in comprehending and applying knowledge at advanced cognitive levels. Hence, it was advisable to employ the constructivist 7E-model technique in science education to enhance students' academic performance in secondary level science.

Achary (2016) investigated on designing as well as execution of an instructional framework rooted in the constructivist approach for teaching physics at the diploma engineering stage. Following data analysis, it was discovered that constructivist approach was more successfully operative in improving post-test scores on physics tests for diploma students. The results obtained from this research revealed that the effectiveness of constructivist method for teaching physics at the diploma stage.

A research investigation conducted by Nair (2014) studied the science education under the effect of a constructivist method for the development of process skills among primary level learners. The study’s chief purpose was to assess and estimate the science proficiency of elementary stage children and also their process skills development with respect to gender, locality and school type. The pedagogical strategy employed to instruct science process skills, foster scientific creativity, and develop metacognitive abilities. Students who were instructed by means of utilizing a constructivist approach have superior learning outcomes compared to

those who were not. It was also observed that there did not exist any significant difference in science process skill among students based on gender, locale and type of the school.

Singh (2011) carried out a doctoral investigation examining the efficacy of constructivist method on sixth-grade learners' academic performance in the field of science. The primary aims of the research were as follows: (i) to develop instructional content that adheres to the fundamentals of the theory of constructivism (ii) to design an achievement assessment in science, and (iii) to conduct a comparative analysis of science accomplishment levels between two distinct cohorts of pupils- experimental group of students who had been exposed to constructivist pedagogical approaches; control group of pupils instructed by the use of typical teaching methods. The research outcomes demonstrated that pupils, imparted knowledge using teaching resources based on constructivist principles demonstrated higher levels of accomplishment in science achievement compared to students instructed through standard teaching methods. Noticeably, the study also observed the impact of constructivist resources over the conventional ones in relation to gender. A significant difference in academic attainment of boys and girls learners in science was found in this study. Again, significant differences were found in science accomplishment among students when considering other factors such as, locality, and economic level, as observed through the juxtaposition of pre-test & post-test outcomes.

Khanna (2008) carried out study to explore the conceptual understanding regarding the constructivist nature and pedagogy of science among prospective science teachers. Additionally, the study aimed to determine the degree to which their perceptions were in line with the tenets of constructivism-oriented philosophy & pedagogy. The participants of this study included 310 student-educators, 30 teacher educators & 110 school teachers who are associated with science teaching in different schools located in Delhi, India. The investigation's conclusions showed that a substantial percentage of the participants did not exhibit informed (constructivist) perspectives towards the nature and pedagogy of science. The Likert Scale scores indicated that the respondents lacked sufficient comprehension regarding the various factors of the nature of science teaching. In conclusion, given disparity between the science offered to learners and the actual practice of science, it is imperative that to relinquish the prevailing conventional and outdated conceptions of science in order to apply constructivist understanding to learn science in effective way.

Studies Conducted Abroad

Gupta (2021) conducted research entitled "Effectiveness of Constructivist Approach in Teaching Mathematics" that attempted to find out whether constructivist instructional method has the ability to boost the mathematics achievement score of learners if juxtaposed with the regular teaching method of mathematics. The sample for this experimental study consisted of eighth-grade students from Bara District. The researcher chooses two educational institutions. using a simple random sampling method, specifically the lottery method. One of the schools in the schools was treated as the experimental group who were taught through constructivist technique whereas the second school counted as control group, the learners of which were educated through conventional method. The study used a self-designed achievement test focusing on subject of mathematics to be an assessing instrument. In order to gather data, the researcher devised a set of ten questions of an objective kind and an additional set of ten questions of a subjective nature. The statistical analysis involved measures such as mean, SD, variance, and also Z-test. The research outcomes showed that pupils who were instructed using a constructivist teaching technique exhibited much greater improvements in academic achievement compared to those who were instructed with traditional approach. Thus, constructivist approach has been identified as a more successful instructional strategy for teaching mathematics to eighth-grade students when compared to other existing methods.

Khalid & Azeem (2012) conducted a comparative analysis between a teaching module grounded on the theoretical perspectives of constructivism and the conventional method-based instruction both utilised in the field of teacher education. The total sample size of 64 teacher students of SCTT, University of Education, Lahore, were equally divided to form experimental & the control groups, each including 32 participants. Experimental group obtained instruction utilising a constructivist approach through the implementation of a specially designed module. To compare the pre and post-tests outcomes, t-test was conducted for assessing significance of the differences between treatment and control groups. The study revealed that both groups initially exhibited similar levels of accomplishment in English communication teaching. However, significant difference between two groups in academic attainment was noticed. The observed striking performance of the experimental group can be attributed to the utilisation of a constructivist method of teaching.

Sejzi & Bin Aris (2012) studied on "Constructivist approach in virtual universities" that highly recommended for implementing the constructivist method within a virtual university

setting by highlighting the advantageous sides of this approach which aims to cater to learners' individual learning styles, information needs, and skill development, with the ultimate goal of facilitating success in both personal and professional contexts. Constructivist learning together with its incorporation of communication and information technology methodologies, has the potential to facilitate profound and innovative learning experiences and promote the practical application of knowledge. The constructivist approach posits that conventional educational institutions and classrooms lack the necessary conditions for learners to actively construct knowledge. Consequently, virtual universities, equipped with ICT facilities can effectively employ constructivist strategies in the delivery of education, as emphasized in this study.

Tabago (2011) conducted experiments employing a constructivist approach in order to assess its efficacy in the instruction of physics contents. The study adopted a quasi-experimental methodology, and its sample consisted of two sections of second-year Bachelor of Science in Information Technology (BSIT) students from Isabela State University. The researcher executed a comparison between the results obtained in achievement test & the standardised attitude inventory test. Noticeably, statistical significance of the difference between these scores was assessed utilising the t-test. Nevertheless, students who were subjected to the constructivist technique of laboratory instruction exhibited notably superior post-test results compared to the pupils who were subjected to the conventional approach. Furthermore, utilisation of Constructivist Approach Experiments has been found to be efficacious in augmenting students' academic performance and fostering a more favourable disposition towards the subject matter, as compared to the conventional approach.

Bimbola & Daniel (2010) conducted quasi-experimental research to investigate efficacy of a constructivist instructional method on the academic achievement in the subject of integrated science for learners enrolled at junior secondary level of education in South-West Nigeria. The study employed subjects of 120 school children from 4 schools (selected randomly) located in Ogun state which is situated in the South-west region of Nigeria. The outcomes indicated that students who received instruction using a constructivist approach achieved superior scores in both post and delayed post-tests as well, in comparison to pupils, instructed by adopting a simple lecture oriented standard method. Study's findings suggested that the integration of constructivist-based approaches to instruction may lead to enhanced academic attainment among junior secondary learners of integrated science subject.

Brooks & John (2010) performed experimental study to examine the efficacy of constructivist approach towards science subject teaching on achievement and motivation level of class VI learners. The statistical techniques employed in this study to examine quantitative hypotheses were t-tests and analysis of covariance (ANCOVA). The collection of qualitative data was conducted through the utilisation of student reflective notebooks and classroom discussions. The viewpoints of the students were recorded, categorised, and subsequently utilised to enhance the understanding of the quantitative data. Research findings yielded support for the assertions put forth by proponents of science reform, indicating constructivist orientation to teaching of science as the most effective way to enhance science proficiency.

In their research study, Brown-Lopez & Alva (2010) studied the effectiveness of social constructivism-oriented and problem-solving activity based instructional programme in Mathematics subject on academic performance of pupils of class V in Belize. This investigation encompassed 342 children and 8 teachers, who were selected from two schools representing urban as well as rural areas. The students belonging to the experimental groups were trained through the implementation of social constructivist activities. In contrast, the control groups were subjected to traditional instructional practices. The evaluation of pupils' performance was carried out by administrating pre-test, as well as post-tests. The ANOVA result analysis demonstrated significant differences between pre-test and post-test outcomes. In the study, it was observed that control group that received instruction by means of a procedural method, exhibited greater improvements compared to the treatment group. As a consequence of these unforeseen outcomes, the primary objective of this thesis shifted towards elucidating the underlying reasons for the emergence of these results.

In a study conducted Fui (2010) utilisation of the constructivist method by student instructors throughout their pedagogical approaches in the field of chemistry was examined. The formulated six research questions of the study were concerned about the student teacher's comprehension of the constructivist method, and also the level of student instructors' use of the constructivist method throughout their instructional practices; and various issues that cause pupil instructors for employing the constructionist methods. This study also attempted to find out the challenges encountered by pupil teachers when attempting to adopt the constructivist approach in their teaching practices, and also pertained to the identification of potential resolutions for those difficulties experienced by pupil teachers. The procedure of gathering data for this research involved the construction of a group of seventy student instructors specialising in chemistry. Research findings indicated that a major proportion of

chemistry student instructors possessed a strong comprehension of the constructivist approach. However, the implementation of this method in their instructional practices was notably limited. The study also discovered that microteaching class played a significant role in motivating young educators to include the constructivist approach into their teaching practices. Nevertheless, a significant challenge that arose when attempting to implement the constructivist method was the limited availability of time, which necessitated the attention and consideration of faculty members. The majority of student instructors advocated for the implementation of the constructivist approach-based teaching as the most effective and productive teaching practice.

Ritter (2010) carried out mixed methodology-based research employing constructivist learning team model intended for mathematics educators at secondary level. The objective of this research was firstly to develop a learning model grounded on constructivism theory specifically tailored for secondary mathematics teachers. It attempted to offer students various educational experiences and possibilities that would effectively address shortcomings in written and oral communicative skills, logical processing, mathematical operations, self-directed education, collaboration, and also technological application. It investigated the efficacy of the Constructive Learning Team Model (CLTM) in enhancing the mathematical performance of secondary school students. This study adopted non-randomized control group design of quasi-experimental research method with a sample size of 39. as well as utilising qualitative participant observations with a sample size of 19, and a focus group consisting of 4 participants. The analysis of quantifiable data was conducted by ANOVA test whereas the qualitative data underwent analysis through the application of an inductive approach. The findings from the quantitative data demonstrated a notable increase in achievement levels and a partial increase in growth levels among students who utilised the CLTM and inductive analysis techniques. The findings derived from the qualitative data revealed that students demonstrated the needed non-mathematical skills when they were exposed to intensive cooperative instruction.

Vaca et al., (2010) in their quasi-experimental quantitative study focused on investigating the effectiveness of constructivist instructional practices for teaching science on the academic performance of 8th grade science learners. The sample size for this study was 76 students, among them 38 students belonged to the experimental group which was provided with constructivist instruction, and the other 38students were from the control group who got conventional classroom instruction. The results derived from the test of Mann Whitney

indicated no statistically significant difference observed between the distributions of control & experimental groups, which were treated as independent samples. The present study made a valuable contribution to promoting beneficial social changes by examining scientific instructional approaches that have the potential to enhance students' academic performance in science within the context of eighth grade science classrooms.

Oguz (2008) carried out quantitative research to examine the effect of active learning approaches rooted in constructivist perspective on the academic performance, attitudes to the subject, and views of the learning method among potential teachers. The study employed an experimental design. Experimental group remained subjected to the implementation of constructivist approaches, while control group adhered to a traditional learning strategy. The sample for this study comprised 43 second-year students enrolled in the Education Faculty at Dumlupinar University. The findings indicated a statistically significant difference in academic accomplishment between the two groups, with the experimental group exhibiting higher accomplishment levels. However, no statistically significant difference was observed in their attitudes. Based on empirical evidence, it may be posited that the implementation of constructivist learning strategies has facilitated enhanced student achievement and fostered the cultivation of favourable attitudes and perspectives.

Pettitt, (2008) carried out study to provide a comprehensive and comparative analysis of the effect of constructivist instructional strategies over conventional ones on the academic performance of algebra students enrolled at a private institution in Arizona. The assessment of achievement was conducted through the utilisation of two tests that were prepared by the teachers. This study attempted at comparing two groups of students: those who received traditional instruction, and those who received constructivist pedagogy. Data analysis for unpaired independent samples was done utilising a parametric t-test for determining whether there existed any significant difference or not. The results declared that, in general no statistically significant difference existed in mathematical achievement between the treatment group and comparison group. Thus, it indicated that implementation of constructivist approach did not have a detrimental effect on test scores.

In a dual approach based experimental cum case study research conducted by Hanife (2003), the effectiveness of constructivist learning approach on academic performance, level of retention, and attitudes of pre-service educators in classroom management course, was investigated. Participants of this study consisted of 144 pre-service instructors of third year

batch enrolled in the educational programme of learning foreign languages at METU located in Turkey. While experimental group, consisting of seventy-six participants, underwent an innovative instruction based on social constructivism; control group, consisting of sixty-eight participants, received old-style teaching meant for a duration of eleven weeks. Research data were attained using a blend of quantitative as well as qualitative research methodologies. The Independent samples t-test results of students' achievement revealed that there existed no significant difference in post-test results of experimental and control groups. Nevertheless, significant difference was observed in retention results, with the treatment group exhibiting superior performance. However, descriptive data analysis suggested that the promotion of retention was facilitated by the implementation of constructivist activities, which mostly encompassed reflective writing, critical thinking, and problem-solving.

In a study conducted by Ryak (2003) the comparative efficiency of chemistry teaching founded on a constructivist method versus typically adopted chemistry instruction, was examined. The study specifically focused on class IX pupils' comprehension of ideas regarding chemical bond. Furthermore, it aimed to study the bearing of teaching methods on pupils' attitudes towards chemistry as an academic discipline, as well as the effect of gender wise differences on students' command over the topic of chemical bonding. The investigation included a total of 42 learners who were enrolled in two separate classrooms of a chemistry course given by same instructor. The classes were allocated in a random manner to either the control group receiving education in chemistry that followed a traditional design, or experimental groups receiving an instructional style based on constructivism. The Chemical Bonding Concept Test was delivered twice (ai initial and final stage) to both experimental groups for evaluating their comprehension of notions pertaining to chemical bonds. The participants in the study filled the attitude scale at both the commencement and conclusion of the research in order to assess their attitudes towards Chemistry as a school subject. Additionally, their science processing abilities were evaluated through the administration of the Science Process Skill Test. The hypotheses were examined through the utilisation of ANCOVA and ANOVA. The discoveries of the research proved that the implementation of a constructivist instructional approach led to a pointedly greater attainment of scientific knowledge pertaining to chemical bond, as well as a significantly higher level of positive attitudes towards chemistry as an academic discipline, in comparison to the more conventional design of chemistry instruction. Furthermore, the acquisition of science process was found to be a substantial determinant in comprehending the fundamental principles

associated with chemical bonding. However, any significant effect of gender wise differences on the comprehension of the notion of chemical bonding and the attitudes of students towards the subject matter of chemistry, was not observed in the study.

The study by Ibrahim (2001) conducted quasi-experimental approach-based research to investigate the effect of guided constructivist instructional approach on pupils' misapprehensions about notions concerning Newtonian physics. It involved the participation of four cohorts, each consisting of 79 Physics students from the University of Central Florida. Experimental group was laid open to guided constructivist pedagogy, whereas control group received instruction via conventional expository method of instruction. Findings of the study suggested that the guided constructivist group had a significantly higher mean compared to the other group. No statistically significant difference was observed to be existed in the accomplishment of male and female participants when comparing these two strategies.

Kelley (1999) conducted experimental research on utilising the constructivist approach in the instruction of mathematics at the collegiate level for students majoring in liberal arts to fulfil the goal of the study to investigate how this approach could potentially influence the college students' levels of interest, anxiety, and self-perception in relation to the learning and application of mathematics. The course was developed and delivered with this pedagogical style as its guiding principle. Results showed no significant difference observed in the level of anxiety of both groups after the semester-completion. The course evaluation received feedback from the experimental group, wherein a significant number of students expressed that the use of a distinct teaching approach had a beneficial influence on both the course itself and their overall learning experience.

Olivier (1999) studied on constructivist learning theory that effectively encapsulates the constructivist viewpoint regarding the acquisition of mathematical knowledge. The constructivist perspective posits that knowledge is generated through the dynamic interplay between the learner's preexisting ideas and fresh ideas. In this framework, novel concepts are comprehended, then assimilated within the context of pupil's prior information & knowledge. Establishing and maintaining an appropriate classroom mathematical culture is of utmost importance so that learners can effectively involve in activities like problem-solving and idea-sharing. The critical discussion of this study pertained to the perspectives held by both the facilitator and the learner regarding the inherent characteristics of mathematics. Both the facilitator and the students have to embrace the belief that mathematics is not a static and

final set of formal guidelines, rules and instructions that can be simply learned. Instead, they should recognise mathematics as a constantly evolving human endeavour, primarily focused on problem-solving. They should understand that the process of creating mathematical knowledge involves self-exploration and collaborative efforts as well.

The significance of constructivist education had been recognised across multiple academic disciplines, leading to an increased focus on research in this area. For example- constructivist pedagogical approaches were suggested in the field of science by Jenkins (2000), Tobin (1993), Shapiro (1994), Wheatley (1991) in the field of mathematics by Davis et al. (1990), Cobb (1994) in the field of physical education by Chen (1997) and so on.

III. Studies on Constructivism in English Subject

Studies Conducted in India

Dev (2016) conducted a quasi-experimental study entitled "Constructivist Approach Enhances the Learning: A Search of Reality" examined the effectiveness of constructivist approach on English learning of school children studying at primary level of education. Data were collected from sixty pupils at grade VI from a higher secondary school namely Janta Brahmi, located in Sonipat. The study used single group pre-test and post-test research design. Firstly, the pre-test in English subject was carried out, then the experimental intervention of three months took place. English subject was instructed by using constructivist method for the experimental group whereas conventional method was employed to instruct the control group. However, to fulfil the main objective of the study data were analysed by quantitative measures like t- test. The result of pre-test mean score was found to be 30.5 while the post-test mean score was 41.5 which indicated improvement in learners' achievement after the application of the treatment. And finally, the t- value which was 3.89 was observed decidedly significant at 0.01 level of significance. Thus, the findings declared that constructivist techniques help to boost academic attainment and problem-solving capability of students.

Chaudhari (2014) conducted a qualitative study about English language teaching of pre-service primary level school teachers with the help of constructivist strategies, aiming at answering the following research questions like - What methods of teaching the English language employ constructivist strategies? How the constructivist strategies can be implemented in teaching of English language? and how far constructivist strategies are effective or successful in teaching of English language? This study also intended to find out

the difficulties that the pre-service primary teachers met during the process of implementation of strategies, and to find out the opinion of pre-service primary teachers towards constructivist strategies in English language teaching. The study used case study as its research design. Samples for the study consisted of 24 trainees or pre service primary teachers of second year of the batch of 2012-13 from DIET. Data were collected through student profile, observation, field notes, focus group interview and opinionnaire. Data analysis techniques included process of codification, categorization, classification and content analysis. The findings recognised five constructivist strategies Picture Word Inductive Mode, Directed Reading Thinking Activity, Problem Solving, Jigsaw Activity and Project Based Learning to be implemented in English teaching for better learning outcome. The result showed also that teaching of English language through constructivist strategies enhanced the basic objectives of English language teaching like: comprehension, communication, application, expression and creativity. In terms of the challenging experience of the pre-service primary teachers while implementing the constructivist strategies, it was observed that initially they found it very tough and demanding task to carry out but gradually they developed their ability to make it work. Nevertheless, they harboured positive attitude towards the usage of constructive approach to English teaching. They were of the view that constructive strategies offer mammoth opportunity to teach content of English language.

Sharma & Poonam (2013) conducted a study entitled "Constructivist Approach for teaching English: Making Sense of Paradigm Shift from the Traditional Approach". As the title of the paper suggests, it tried to delve into the necessity for a change from traditional method of learning to a new one to cope up with the educational demands of today. And for this very purpose it explored the possibility of effectiveness of constructivist approach being the innovative learning stratagem for enhancement of four rudimentary communication skills that are listening, speaking, reading and writing skills that were necessary to communicate in the English language too. It dealt with its historical journey, basic principles of Constructivism. Then it discussed about the two kinds of Constructivism theory: one is Piaget's Cognitive Constructivism, and the other is Vygotsky's Social Constructivism. This study, then, focused on the five elements (5E) of constructivism– Engage, Explore, Explain, Elaborate and Evaluate, and it highlighted and explained how this 5ESConstructive Instruction Model (CIM) play a pivotal role in developing Basic Communication Skill in the English language. This study revealed that change in pedagogical approach from traditional one to the innovative method was a necessary step to be followed for better learning outcome, and it

concluded that constructivism approach is an essential tool in the English language classrooms to find the best ways for both students to learn effectively and teachers to teach efficiently.

Studies Conducted Abroad

AlShareef (2015) conducted a study to find out the effectiveness of utilising Constructivist learning strategies in English language education on developing the accomplishment of Grammar, Translation & Critical Thinking Skills for the Third Grade Intermediate Students. For the fulfilment of this desired goal, the researcher used the semi-experimental method that had four experimental groups. The sample consisted of 99 intermediate third-grade students from four Intermediate schools located in Makkah, Saudi Arabia. Measuring tools of this study remained Grade Assessment for Grammar & Translation, and Critical Thinking Test. Results revealed the observance of statistically substantial differences among the four groups due to the classroom application of the four constructivist strategies, namely KWL, concepts maps, and the learning cycle. The result showed that the application of constructive theory in teaching English language for the development of English Grammar, Translation, and Critical Thinking Skill is very effective.

Gulzar et al. (2013) conducted an experimental study entitled "Constructive Feedback: An Effective Constituent for Eradicating Impediments in Writing Skills". The main objectives of this research were to throw light upon the benefits of Constructive Feedback via Error analysis system at secondary schools and also on examining the conventional feedback approaches which remain as the hindrances on the way of achieving good writing skill, and also to enrich the comprehensive capacity of English educators to well tackle errors in pupils' writing. The sample consisted of 30students of 9th standard in a Govt. situated in Pakistan. As per the research outcomes there existed significant difference between regular feedback method and constructive feedback. In other words, the study proved the usefulness of CFB on improvement of the writing skills like proper use of preposition, articles, punctuation, suitable form of verbs, tense and sentence structure etc. It also revealed that the English teachers in Pakistan neither were not familiar with current theories of error-correction system nor with the constructive approach to learning and evaluative strategies. And naturally they were unable to practise them in the classroom situation.

Mvududu & Burgess (2012) conducted a study entitled "Constructivism in Practice: The Case for English Language Learners". The study threw light into an explorative search on how the

theory of constructivism may facilitate the English Language Learners students in an inclusive classroom setting. The goal was to reaching all students through the adoption of constructivist approach. The theoretical framework for this article was educational constructivism. Then it discussed about the two most widely recognised forms of this theory—personal constructivism, credited to Piaget and social constructivism, associated with Vygotsky. According to the study, adopting constructivism-based pedagogy and adhering to constructivist study could serve as a strategy for rendering content meaningful for students from diverse cultural and language backgrounds. Constructivism and education for learners of English both stressed the need of building on prior knowledge, making information relevant, and encouraging engaged thinking. These principles could help ELL pupils perform better in an inclusive learning environment.

Vannak (2012) wrote a theoretical research article entitled “The Application of Constructivism Approach in the English Language Classroom, Primary Six” in which the principles of constructivism and how to apply them into real classroom situation were explained with specific instances. It also dealt with the characteristics of a constructivist English classroom like the interactive nature of teacher -student relationship, teacher’s major function of being a facilitator, pupils’ most active & engaging role, and lastly, the democratic conducive learning environment of constructive English classroom etc. in a constructivist English classroom. The article provided the readers with a lesson plan on a topic namely Zoo (English Story) written by Anthony Browne, was based on the principles of constructivism. Thus, it elaborated how to implement the constructive lesson plan when instructing a class of primary six pupils in English as a foreign language in order to achieve the greatest results.

Sharon & Trina (2008) penned a book titled "Constructivist Strategies for Teaching English Language Learners," discussing the theoretical underpinnings of various practical pedagogical strategies; and seeking to support educators who deal with English Language Learners (ELLs). Their study presented an introduction of the many views pertaining to second language acquisition and learning, with special regard to constructivist model that had been created and used to meet the evolving dynamics in real classrooms due to the increasing enrolment of ELLs in institutes across United States. In the following chapter, the authors highlighted the comparison between a constructivist teacher and a conventional instructor in order to exemplify the practical application of the constructivist approach. Their study presented diverse range of instructional techniques and educational exercises that prioritise constructivist pedagogy. These included practises such as engaging in read-aloud sessions,

utilising wordless books, including constructive movement activities, and implementing literature circles. This study showcased the implementation of critical pedagogy inside the educational setting. The authors provided a conclusion in the final chapter in which they proposed an instructional approach for English Language Learners that is both constructivist and critical. Furthermore, it emphasised the importance of identity construction and the cultivation of positive self-esteem through Critical Constructivist Education for English Language Learners (ELLs).

Zhang (2008) carried out a quasi-experimental study which attempted to examine the effectiveness of constructivism based pedagogical approaches in strategic reading education on reading performance and development of academic reading proficiency of pupils. 99 ESL students from Republic of China from two groups of 10th Standard were chosen as sample for the study. Whereas the treatment group received a two-month training programme on reading strategies framed under the rubric of constructive approach; the control group was provided only with the typical, instructor-centred teaching. Tools that were used for the data collection were: BELTS, Self-made Questionnaire regarding the Instructional Reading Strategies Effect, videos recordings, field notes and audio-recordings. The result revealed a powerful correlation between reading strategy training based on constructivist approach and reading proficiency improvement of the treatment group. In other words, it noted that Constructivist pedagogy in strategic reading instruction was found be beneficial for expanding second-language reading proficiency.

Altun and Büyükduman (2007) conducted a study entitled “Teacher and Student Beliefs on Constructivist Instructional Design: A Case Study” in Turkey. The study's objectives were to create a design for instruction utilising constructivist principles, and to execute it in real classroom situation, and to evaluate the impact of the developed instructional design on its sample group. The subjects of the study comprised of 26 students and their one teacher at Istanbul Technical University, School of Foreign Languages, and English Preparatory Programme. The findings showed that pupils attended the class with more interest; they became more eager to participate in group learning, more active to complete the class task. Thus, the outcomes of the research declared that constructivist instructional design benefitted both students as well as teachers.

In her study titled "Employing constructivist-based principles in an Applied Language Studies in English course with a focus on ideology and the media," Brokensha (2007)

examined the constructivist approach to learning. This research article aimed to demonstrate the application of a constructivist approach-based model of learning, along with a discourse-based approach to analysing language used in newspapers, within a third-year Applied Language Studies in English Course at a South African institution. This study addressed the importance of deviating from the conventional method of language education, which relies heavily on transmitting information and adopting an instructional approach to learning. Instead, it advocated for the exploration of a new approach to education that is centred around the learner. This study highlighted the significant role of teachers in providing pedagogical scaffolding and explored the utilisation of constructivist learning framework to enhance critical thinking, creativity, and reflective skills in the context of discourse analysis in newspaper editorials.

Dullien (2005) conducted a project which intended to offer the English teachers to provide a constructivist-learning environment (CLE) in ESL classroom situation, and also a constructivist perspective on teacher professional-development programmes. This study also examined the impact of computer-enhanced constructivism in the ESL classroom and assessed of the influence of web-based training for TESOL's professional development. To fulfil the desired purpose, a professional development workshop namely "Applying Semiotic Techniques for ESL" was arranged. Duration of the time for the workshop was two (2) hours. The participants consisted of 20 people (4 groups of 5 people each), and the target audience were teachers of TESOL. Along with the workshop, it also focused on creating two instructional plans, "My Personal Portfolio, emphasizing on metacognition, and "Cultural Elements," fop critical thinking techniques. Both were framed in constructivist and adult learning theories, aiming to use English to communicate in social settings and also to use English to achieve academically in all content areas. The project, thus, aided to build an operative and efficient learning environment with the employment of constructive rubric in which English as a 2nd language can be successfully learnt.

Meredith (2003) while analytically studying about current philosophy & practice in English as second language reading education found that research corpus had reinforced the usefulness of employment of constructivist approach to reading & writing skill-acquisition process of English Language Learners. This study reviewed a small sampling of recent research-supported method studies that dealt with the prominent current philosophical practice in ESL or EFL reading education. It gave emphasis on the Whole Language in ESL/EFL Study, teaching from a constructivist perspective, constructivist reading as an

interactive process etc. The study concluded that there was huge support for a whole language approach or constructivist approach to ESL/EFL reading education, with very few studies disagreeing with that viewpoint.

IV. Studies on Constructivist Module

Studies Conducted in India

Kaur & Singh (2017) carried out comparison-research study in order to assess comparatively the efficacy of self-learning modules and the constructivist approach in achieving learning outcomes in learners' academic attainment in social sciences. This investigation was centred on the development of self-learning modules and constructivist lesson plans in discipline of social sciences, specifically designed for ninth-grade students. Noticeably, a constructivist approach to learning in the module or lesson plans emphasized on active engagement and critical thinking. Modules consisted of three main aspects like objectives, learning experiences and assessment tests; and it covered themes within the discipline of Social Science like The French Revolution, Electoral Politics, Constitutional Rights, Physical Characteristics of India, Natural Plant life and Wild Life, Individuals as Resource, Impoverishment as an obstacle etc. The data were gathered via an academic performance assessment in the field of social science. From both the experimental group-A (implementation of self-learning module) and the other experimental group-B (implementation of constructivist module) each consisting of 30 students. The findings indicated that students who were taught using a constructivist approach beat those who were taught using self-learning modules. Research findings confirmed that constructivism leads to more successful and meaningful learning.

Studies Conducted Abroad

Andika et al. (2023) carried out a study titled "Developing English Grammar Instructional Materials Oriented to Constructivism Theory" which demonstrated how the process of improving or updating teaching resources is crucial for optimising their efficacy as educational tools. This study's major aim was to determine the most effective method for creating an English grammar instructional resource using the constructivist theory, as well as to evaluate its validity. The study utilised a research and development approach incorporating the DDR (Design and Development Research) model. The study encompassed three distinct phases: a needs analysis, the design phase, and the subsequent development phase. In order to gather data pertaining to the requirements of the users, a distributed survey was conducted

among students enrolled in the first and third semesters of the English education programme at PGRI University of Palembang, and after that the researcher developed a module that met the user criteria based on the findings. Next, the module was finalized after drawing upon evaluations conducted by experts, practitioners, and students. The module incorporated many innovative activities, including brainstorming, providing motivation or insight, articulating learning objectives, and delineating the learning phases providing relevant examples or illustrations, along with discussion exercises, formative tests, answer keys – all these prioritising student engagements, while concurrently fostering imaginative, participatory, and inventive cognition, and directing students towards the exploration of information. The outcomes of the study indicated that the module on English grammar subject which consisted of fundamental and straightforward content, was the most appropriate format for creating an instructional resource aligned with the constructivism theory. Furthermore, the module's presentation was characterised by clarity and effective organisation. The language employed, was readily understandable, and the structure of the module was designed to be user-friendly and captivating. Additionally, the validation results provided evidence that the produced module was extremely efficient as an instructional resource for teaching English grammar, hence confirming its overall excellence.

Maisaroh et al. (2022) carried out a study aiming at developing an instructional module for English classroom teaching to enhance schoolchildren' proficiency within a bilingual learning environment in teacher training institution for elementary level of education, located in Indonesia. This designed module afforded students the chance to engage in teaching exercises utilising English language as a bilingual means of classroom teaching, enabling them to cultivate innovation and constructiveness in their pedagogical approaches and integrate English into their students' day-to-day communications. Data was obtained through the utilisation of several methods, including tests, observations and questionnaires. Analysis of research data was done using descriptive statistics & paired sample t-test. As the findings demonstrated, this rise in mean scores from pre-test (77.32) to post test result (87.04) was determined to be statistically significant through the utilisation of a paired sample t-test. The findings of the study indicated that the implementation of the teaching module for English classroom has the great potential to improve students' proficiency in bilingual learning.

Natalia & Kerdid Simbolon (2022) conducted study on “Integers Learning Module with Constructivist Approach” in order to determine the appropriate approach for instructing mathematics using constructivism-based perspective. This study adopted research &

development methodologies, and also focused on developing a module that facilitates independent construction of integer ideas by pupils. The respondents of this study consisted of junior high school students of class VII. The findings of this study were derived from an analysis of the learning effectiveness test scores, specifically by making comparison of the post-test and pretest scores. Results indicated that there was a significant difference between the post-test and pretest scores, with a mean score of 66.86 in the post-test compared to 43.43 in the pretest. Furthermore, the majority of students (83.15%) responded positively to the assessment. Thus, it was concluded that the use of a constructivist approach-oriented learning module successfully facilitates the learning process in the context of integer education for seventh-grade students.

Funa & Talaue (2021) carried out survey research to study the attitudes of learners, enrolled in governmental schools of Philippines, towards the “Biology self-learning modules”. These modules were created aligning with a constructivist learning paradigm. The survey involved the participation of high school Biology learners specifically at 11th (n = 117) & 12^{th} grade (n = 104). The findings, obtained through the use of 3-point Likert-scale questionnaire, demonstrated that a significant proportion of the student population held a good perception of the modules. This suggested that the modules' characteristics that were particularly noticeable to students aligned with fundamental principles of constructivist pedagogical approaches.

Rufii & Rochmawati (2019) conducted an exploratory study "Evaluation of universal design for constructivist-based statistics learning module for students’ increased motivation”. The primary objective of the exploratory research was to perform assessment of the effect of constructivist learning methodologies-based module on boosting students' motivation in the context of Statistics education. The study employed a survey encompassing a sample size of 33 students. The findings from the surveys administered to both students and teachers indicated that the implementation of Universal Design for Learning, which involved the use of diverse methods of representation, action, and engagement, resulted in an increase in students' motivation and satisfaction towards the Statistics course. Additionally, the findings indicated that the module demonstrated effectiveness. The content of this resource was deemed appropriate for the development of a constructivist module on Statistics within the higher educational setting in Indonesia.

Anwar & Rahmawati (2017) studied about the utilisation of constructivist approach in mathematical education in fostering the understanding of algebraic operations. This study

constituted an experimental research design, encompassing a sample of 91 eighth-grade pupils. It utilised a mathematics module grounded in the constructivist approach, which was employed by the students to facilitate their comprehension of algebraic operations. The findings demonstrated that the implementation of a mathematics module grounded in constructivism yielded significant improvements in students' comprehension of algebraic operations.

Loe (2017) studied the implementation of a constructivist-oriented economic module and evaluate its efficacy in enhancing the learning outcomes of Private Senior High Schools in Kupang. In this research the process of data analysis encompassed various methods, like descriptive statistical analysis, feasibility analysis utilising scale scores, and learning outcome test analysis utilising t-tests. The research findings suggested that the constructivist-based economic module was effectively developed, incorporating current learning materials and employing active learning strategies with a constructivist learning approach. This module demonstrated its efficacy in enhancing students' learning outcomes, as evidenced by the statistically significant t-test scores ($p < 0.0005$). Usefulness of constructivist-based economic module was shown with the help of the enhanced the learning results of pupils in private senior high schools in Kupang City.

Nopparatjamjomras (2012) conducted a research study titled “Developing a Social Constructivist Teaching and Learning Module on DNA for High School Students in Thailand” to fulfil its primary objective which was formulation of an educational module rooted in the principles of social constructivism, specifically tailored for high school children of Thailand, with a focus on the subject matter of DNA which holds significant importance in the field of genetics. The initial stage of the investigation into the pedagogy and acquisition of genetics principles was examined, and survey interviews were conducted with high school biology teachers and students from four schools which resulted in the finding that the genetics concepts presented a moderate level of difficulty for students to comprehend. In the second phase, a teaching module on DNA was designed from a social constructivist perspective. Each unit was structured with an initial phase called 'Orientation', followed by a phase called 'Focus', and concluded with a phase called 'Conclusion'. The instructional approach in the class incorporated experiential learning through practical activities, facilitated small group debates or discussions as well as entire class discussions. Thus, it centred on promoting student engagement in biology through small group studies and peer-led debates.

It was developed for enhancing students' genetics learning and empowering them to apply that genetics knowledge in everyday situations.

The research report titled "Constructivist e-learning methodologies: A module development guide" carried out by Beers et al. (2003), presented an overview of the recommended approaches for developing e-learning modules that followed the seven guiding tenets of constructivism. It offered guidance and essential instructions on developing lesson plans that aligned constructivist learning principles. As highlighted in the study, the optimal approaches in constructivist e-learning are: Knowledge is created through a dynamic process rather than as a static end product. Secondly, it discussed situated cognition refers to the theoretical framework that emphasises the role of the environment and context in shaping cognitive processes and knowledge acquisition. In addition, the utilisation of reflexive cognition, cognitive apprenticeship, different perspectives, and process-based evaluation were identified as effective strategies in the context of constructivist e-learning. This inquiry sought to elucidate the supplementary measures that educational programmes must undertake, in addition to course design, in order to effectively utilise online learning.

V. Studies on 4Cs/ Twenty first century learning skills

Studies Conducted in India

Purohit's (2016) qualitative study on various coping skills required for 21st Century life among learners at secondary stage of education aimed at investigating the 21st century coping skills anticipated of secondary school children, and creating activity-based curriculum to investigate 21st-century coping mechanisms as well as implementing those instructional activities that explore 21st-century coping skills with secondary school pupils. The study's participants were selected through the use of purposeful sampling. The sample consisted of forty students of standard IX, six teachers and a principal of Ankur Vidhyalaya, Dasrath (2013-14) & sixteen students, eight teachers and a principal of the Shannen School, Vadodara (2014-15). Tools like semi-structured interviews & interview schedule, brainstorming sessions, 6 focused group discussion, Battery of Tests, Socio-metric, Moodle, Observations, Observation Schedules, Field Notes & Field Diaries were all employed to collect research data. Content analysis was done to reach the conclusions of this study that showed a mixed scenario of students on various Coping Skills for 21st Century. While some were exceptional on some skills some on the others, some were average, some were poor. Rarely a student had been found excelling in all the skills. Through in-depth exploration of 21st century skills the

study concluded that Study Skills, Thinking Skills, Skill of Problem Solving, Reflective Skills, Research Skills, Learning Skills, Self-Directional Skills, Skill of Acceptance, Skill of Adaptability, Skills of Adjustment, Skills of Human Relationship, Skills of Social Responsibility, Skill of Synergy ,Communication Skills, Collaborative Skills, Skills of ICT & Social Networking, Management Skills were imperative enough to be nurtured among the learners to meet the challenges of today's world.

Studies Conducted Abroad

Joynes (2019) conducted a study that presents a comprehensive overview of the available evidence pertaining to the various aspects concerning the definition, demand, and implementation of 21st Century Skills. The study specifically concentrated on examining these issues within the context of low- and middle-income countries (LMICs). This analysis revealed that a comprehensive body of literature exists on the concept of 21st Century Skills, encompassing various significant synthesis studies. It acknowledged the necessity of adopting novel approaches to education in order to effectively address global issues. The results reported in the fourth section of the study indicated that the implementation of strategies for imparting 21st Century Skills is now influenced by ongoing debates surrounding the definition and comprehension of these skills. The fifth section culminated by presenting several recommendations for suggested measures in the advancement of regional and national programming for 21st Century Skills. Additionally, it suggested for future research endeavours aiming at enhancing the array of literature pertaining to the extent of demand and the techniques of implementing 21st Century Skills, with a specific focus on LMICs.

Rangarajan (2017) performed an action research-based study titled "Trialling the 4C framework in an Indian grade 3 Mathematics classroom". This action research endeavour was conducted in a Grade 3 mathematics classroom in a English medium school located in Mumbai, India. The mathematics instructor in the research employed Do Coyle's (2010) 4C paradigm as a framework for implementing Content and Language Integrated Learning (CLIL) in the instruction of mathematics in the English language. This approach was particularly beneficial for students who had limited exposure to English other than the classroom experience. This study endeavoured to get insights from the viewpoint of educators on the impact of the 4C framework within a particular setting, as well as the ways in which collaborative work further augmented the effectiveness of the 4C framework. The

action research study was conducted over a duration of approximately five months, which was divided into three distinct cycles. Throughout the entirety of the action research undertaking, the interaction with the teacher was meticulously documented and subjected to qualitative content analysis. As per the research findings, the application of the 4C framework from the teacher's perspective facilitated the delivery of captivating and academically rigorous lessons, resulting in favourable outcomes for pupils in terms of their spoken skills and understanding over the content knowledge.

Ball et al. (2016) carried out an exploratory research study entitled “Exploring 21st Century Skills and Learning Environments for Middle School Youth” that attempted to prepare two separate assessing tools namely “21st Century Life & Career Skills scale” and “21st Century Skills Classroom Environment scale” to critically study students’ perceptions of their own skills in these areas. Required survey data were collected from 262 middle school students in grades 6, 7, and 8 from one urban middle school in the Midwest. Obtained data were analysed using Exploratory Factor Analysis to examine factorial structure of the measures, and Descriptive Statistics to explore student perceptions. As per the results of the study 21C-LCS and the 21C-CE were proved as brief psychometrically sound measures. Whereas 21C-LCS was meant for the assessment of students’ leadership quality and accountability; cooperative skill; and adaptability, the 21C-CE was an unfailing measurement tool for assessing students’ perceptions of the ways in which their classroom environments support their development of 21st century skills. Students reported moderately high perceptions of their skills in all areas. This study can be deemed as an essential step assessing twenty first century life & career skills and twenty first century learning environment.

Moyer (2016) conducted a mixed method study aiming at assessing students’ engagement in 21st century skills while they took part in a non-formal learning experience of orienteering. The sample of 20 seventh grade students’ ages 12-13 enrolled in a Life Science class at a mid-sized suburban middle school were selected through multiple-case sampling. Case study as a research method was adopted in this study. Data were analysed utilizing a fully integrated mixed method design. Quantitative data were analysed by frequency counts, percentage occurrences and measures of central tendency whereas qualitative data analysis was done with the help of content analysis (coding) & corroborative analysis. Research result demonstrated that the designed non-formal educational experience of orienteering effectively involved learners in developing 21st century skills. Particularly, the highest levels of student involvement were found in critical thinking abilities, initiative, productivity,

collaboration and communication. At the same time the findings also showed that the orienteering experience was not very fruitful to student engagement in creativity and innovation, leadership, responsibility and accountability.

Fatwati (2013) carried out study named "The Implementation of 4C's in the Islamic Studies Learning at Curriculum 2013 Revision in SMP N 1 Purwokerto" was undertaken by Favi Ngiza Fatwati, aiming at ascertaining the utilisation of 21st century skills, specifically the 4C's in the context of Islamic Studies learning. Additionally, this research sought to identify challenges faced by educators when incorporating these skills into the learning process. It employed a qualitative descriptive research methodology. The study's findings revealed that the application of the 4C's in the subject of PAI at SMP N 1 Puwokerto was not executed effectively. Subsequently, challenges were encountered in the use of the 4C abilities in the research subject. However, the study primarily concentrated on the field of English language acquisition, with a specific emphasis on investigating the contributions of English teachers in enhancing students' 4C skills.

Hillman (2012) conducted a study entitled “Learning 21st century Skills: Implementation of Programs and Practices”. Its primary goal was to critically observe and study the programs, practices & culture of school that asserts to fulfil the demands of globalization. This study was done by adopting a qualitative case study of an elementary school for gaining a better holistic understanding of the instructional practice, professional life, and perceived impact on the culture of a school that has encompassed 21st century skills. Data were collected in the following ways: observations, surveys, interviews and document analysis. The collected data were analysed through reflective data analysis starting with coding to categories development to emergence of theme to gain a detailed and comprehensive description of the case. Major findings related to the instructional practice marked a global focused curriculum, inquiry-based instruction, students meeting academic standards, and wide use of technology. Findings related to professional life consisted of a clearly articulated vision with leadership and collaboration around curricular development. Findings related to perceived impact of 21st century skills on the school’s culture involved student behaviour that models teacher learning and collaboration around curriculum development, and significant parent support associated with the vision of the school. From the mentioned findings five themes were emerged that threw light on the best practice for implementing 21st century learning at a school: (1) a clearly articulated vision for global learning and 21st century skills, (2) fidelity of vision with school practice and community support, (3) internal capacity for developing curriculum, (4)

school culture that is centred on both student and adult learning, (5) a dual focus on core academic achievement and 21st century competencies.

Velez (2012) conducted a qualitative research study entitled "Preparing Students for the Future – 21st Century Skills". Its principal objective was identifying educational programs & practices in a school that would stimulate students' acquisition of twenty first century skills. The study intended to answer the following research questions: 1. What is the programs and practices at the school and how are they aligned to twenty first century skills? 2. What is the professional community at the school, and how does it support these practices? And 3. What is the perceived impact of 21st century skills on the school's culture? The subject under this study consisted of 284 pupils, and 10 full time teachers and 2 part time teachers from Saint Andrews School, chosen purposively. The study used the research tools like review of records matrix, observation matrix, close-ended survey, and open-ended interview to collect data from. Utilizing the P21 Framework for the purpose of data organization and analysis, the selected school's programs and practices were examined – review of records, curriculum and instruction, organizational beliefs, practices and supports, and professional development. For data analysis the adopted techniques were document analysis, interviews, surveys and observations. The key findings showed that the school believing in strong principles like integrity, failure leads to success, speak with good purpose, being responsible for honest and direct communication, a sense of commitment, flexibility, had strong programs and practices that support teacher development for a twenty first century pedagogy. Furthermore, the in-depth research study concluded that the school's solid culture of collaboration and self-reflexivity, the provision for a curriculum that prepares students in core subjects, as well as twenty first century skills-all these factors guaranteed that students' effective learning of twenty first century skills.

Gut's (2011) study emphasised the significance of incorporating 21st century skills into the educational curriculum areas. It presented an overview of the integration of 21st century competencies into lessons developed by both preservice and in-service teachers. Additionally, it offered certain suggestions and tools for P-12 teachers for successfully implementing the teaching of these skills, as identified by P21, into their lessons. This study highlighted the need for teaching of contemporary themes while focusing on developing students' learning skills, such as critical-thinking, collaboration, problem-solving, communication, innovation and creativity. Lastly, it promoted to cultivate life and career skills, including adaptability &

flexibility, initiative & autonomy, social and intercultural communication, productivity, and leadership as well as sense of accountability among today's learners.

VI. Studies on 4CS in English Subject

Studies Conducted Abroad

Salybekova et al., (2023) carried out research to analyse the perspectives and personal experiences of qualified EFL instructors and specialists about the suitable preparation of foreign language educators for the effective implementation of 4Cs educational framework in the realm of foreign language instruction. In order to accomplish this purpose, it utilised a mixed-methods strategy, incorporating quantitative as well as qualitative techniques. The researchers employed purposive sampling to carefully choose a group of 12 individuals who possessed extensive knowledge and expertise in the subject matter under investigation. Subsequently, in-depth individual interviews were performed with each of these respondents. The researchers employed thematic analysis as a method to discern significant themes and patterns among the responses provided by the subjects. Furthermore, a survey was undertaken with a cohort of 60 EFL learners for evaluating the influence of the 4C training programme on their educational achievements. The research's outcomes indicated that respondents regarded the 4Cs learning model as a proficient method for instructing foreign languages. Analysis of the survey data revealed the demonstrable positive influence of implementation of the 4C training programme on the academic achievements of the pupils.

Gunawan et al., (2022) conducted study to fulfil its primary objective to investigate the presence of 4C skills in the textbook used for teaching eleventh-grade students of high school. Specifically, it aimed at identifying the prominent 4C skills which were reflected in the textbook and examined the strategies used for incorporating these abilities. The analysed textbook under scrutiny was titled "Bahasa Inggris SMA/MA/SMK/MK Kelas 11,". This investigation employed a document analysis research design. Additionally, the subject area encompasses textual content, visual representations, and teaching tools found in the book. Research data was gathered utilising the checklist approach for assessing the 4Cs inclusion into the activities of the textbook. Subsequently, a comprehensive approach was employed to ascertain the methodology of skill integration within the given task. The manifestation of the 4C skill was observed through the instructional guidance provided in the activities presented in the textbook. In addition, it was also found that the predominant 4C skill emphasised through learning activities prescribed by the textbook was critical thinking & problem

solving, accounting for 41.55 percent, whereas communication, representing 32.39 percent, creativity making up 14.08 percent and lastly collaboration amounting to 11.97 percent. Thus, the study effectively analysed and explored how 4Cs could be embedded in English learning strategies for improving English learning of the students.

Paschal & Gougou (2022) carried out a study titled "Promoting 21st century skills in English language teaching: A pedagogical transformation in Ivory coast". The key objective of this study was to gain insight into the experiences of English teachers as they utilise 21st century abilities within the purview of ELT, with the focused aim of facilitating pedagogical reform. This research employed a qualitative methodology and adopted a case study design to explore the perspectives of English Language instructors in Ivory Coast, located in West Africa. This case study adopted a constructivist framework to semi-structured interviews as a means of assessing the incorporation of two primary pedagogical skills in English Language Teaching (ELT) within the context of Ivory Coast. The study involved educators who were teachers from public and private schools, vocational institutions, and autonomous educational institutions. The research outcomes indicated that 21st Century pedagogy was effective way in the instructional practices of teachers, which in turn leads to increased levels of involvement in the learning process.

Apgrianto (2021) conducted action research study titled "Deploying 4C of 21st Century Learning Based on Authentic Materials for Advanced Grammar Classes". The foremost goal of the research endeavour was to explore the utilisation of authentic resources with a specific focus on enhancing students' proficiency on 21st century learning skills-based approach including the 4C skills within the purview of updated grammar classroom. The research investigation consisted of a sample size of 51 individuals who were learners enrolled in the English Education department. Subsequently, within the pedagogical framework, the usage of genuine resources was implemented in line with the tenets of 4C model. The data underwent both qualitative and quantitative analysis. The researchers employed qualitative methods to examine the observation data, whereas statistical analysis was utilised for assessing the test scores. The research revealed that learners exhibited a greater inclination towards engaging with authentic material for learning, despite perceiving them as more challenging compared to non-authentic materials. Furthermore, learners derived enjoyment from the learning experience due to the contemporary nature of the information contained within the authentic materials. Based on an analysis of the pre-test & post-test outcomes, this study drew

conclusion that implementation of the 4C educational approach, along with the utilisation of authentic resources yielded a substantial enhancement in students' grammatical proficiency.

Another descriptive qualitative research conducted by Azhary & Ratmanida (2021) studied about implementing 4Cs in English Subject based Lesson Plan at MTsN 6 Agam. It examined the incorporation of 21st century skills in the English lesson plans as well as the analysing challenges encountered by teachers when incorporating these abilities into classroom teaching. Research outcomes revealed that the lesson plan successfully incorporated and effectively implemented the 21st century skills. However, it was observed that the full implementation of collaboration skills faced certain challenges. These challenges included limited time for instruction, inadequate educational amenities, the high density of the curriculum, and a lack of proficiency in the English language, particularly among learners from grades VII and VIII.

A research investigation on application of 4C Skills in English teaching learning process, was carried out by Rahmah (2021). The main goal of this study was to examine the execution of 4C skills within the context of English language teaching and learning, as well as the obstacles encountered by educators in implementing these abilities in the English educational process. The study employed a qualitative, descriptive methodology. The findings of this study demonstrated that the integration of 4C skills into the teaching-learning process had been effectively executed by all teachers. However, teachers encountered certain challenges while adopting these skills, and learners too confronted difficulties in various aspects of the 4C skills. Specifically, students encountered challenges in expressing their opinions, demonstrating critical thinking abilities. Additionally, students struggled to employ innovative methods when working in groups, impeding their collaboration skills. Furthermore, students experienced hesitancy in asking questions, hindering their creativity. Lastly, students lacked confidence in interacting in English, affecting their ability to communicate.

Septiyanti. & Fajriah (2021) carried out qualitative case study is to analyse the obstacles encountered by EFL teachers in fostering the inculcation of 4Cs among learners in the context of 21st-century education. The research was conducted in 4 Junior High schools located in Garut. The study utilised semi-structured interviews as the primary research instrument for data collection. The results declared that EFL instructors encounter some hurdles in instilling 4C skills among learners within the framework of 21st-century education.

These challenges encompassed difficulties in comprehending operational learning strategies that facilitate the advancement of 4C skills, obstacles in developing lesson plans for 4C skills, inadequate availability of resources and infrastructure, as well as problems in fostering students' confidence and engagement.

Kozlova & Lavrinenko (2020) conducted a study titled “4 C’s Theory Application at Lessons of English at a Technical University”. The study highlighted the demand for cultivating and enhancing students' skills that align with the demands of the contemporary professional landscape, it is imperative for English teachers to actively implement novel methodological approaches inside the classroom setting. For this purpose, this study proposed a pedagogical strategy that aimed to foster both professional and basic cultural abilities in learners the utilisation of the 4C's Theory. This approach entailed the incorporation of the fundamentals of critical Thinking, creativity, collaboration and communication. This paper focused on the use of this strategy in foreign language classes at a Technical University. The study conducted an analysis of the 4C's model transaction using “Six Thinking Hats” strategy in English classes at Voronezh State Technical University in Russia aiming at improving students' communicative engagement, fostering the development of their communication ability, and strengthening their capacity for concentration. Following a period of two months during which the aforementioned technique was employed, students were subsequently requested to articulate the alterations they observed in their communication and other necessary abilities as a consequence of assignment completion. The students identified several advantages, including the ability to make prompt decisions in professional matters, both within the classroom and in everyday interactions. Additionally, they demonstrated the capacity to articulate and defend their perspectives in public settings, as well as a willingness to collaborate well within a cohesive unit.

According to Pardede (2020) as demonstrated in his study titled “Integrating the 4Cs into EFL Integrated Skills Learning”, it is imperative for EFL classes to not only prioritise the enhancement of students' linguistic abilities, but also incorporate the four essential skills including communication, critical thinking, creativity & collaboration, in order to effectively address the 21st century demands. Within the context of education, the incorporation of various strategies and techniques into the learning process is of paramount importance. This research article provided a comprehensive examination of contemporary concepts and empirical studies pertaining to integrated skills learning. Specifically, it explored the 4Cs model and its significance in the context of blended learning. Additionally, it delved into the

integration of the 4Cs within the framework of integrated skills, while also offering concrete recommendations for effectively incorporating the 4Cs into integrated skills learning.

Ainuningsih's (2018) analytical study about the integration of 4Cs in teaching practice of English student teachers of Teacher Education Department UIN Sunan Ampel Surabaya, employed a descriptive qualitative research methodology for studying the utilisation of 4Cs by student educators in the field of English subject, as well as the difficulties encountered by them throughout their teaching practice. The findings indicated that most of the English student educators demonstrated proficiency in incorporating 4C skills. However, they encountered difficulties in integrating abilities to communicate verbally, abilities in critical thinking encompassing evaluation, identification, and creativity abilities involving the stimulation of the pupils' innovative thinking for the purpose of generating questions.

VII. Studies on 4Cs within the purview of Constructivism

Studies Conducted Abroad

Vafaeikia (2023) conducted a research study titled "Exploring the Role of 5E-Based Online Activities in English Language Students' Critical Thinking and Creativity". which highlighted the concept of 5E Learning Cycle Model, proposed by Bybee (1990) as a model for instructional design that drew upon the principles of inquiry-based learning and the theory of constructivism. It had garnered significant acceptance in non-EFL-related research as a means to enhance 21st-century skills, including critical thinking and creativity, in learners and to equip them for a promising professional trajectory. However, this study aimed to explore the bearing of 5E-grounded online activities on critical thinking & creativity skills of English language students. The research employed a mixed-method technique anchored in the theory of grounded theory. The study involved a cohort of sixty English language learners who were enrolled in a pre-IELTS class at a private language academy. Qualitative data was obtained through the use of student interviews, self-reflections, teacher interviews, self-reflections, and field notes. Additionally, quantitative data was collected by employing student self-assessment checklists. After conducting analysis of quantitative and qualitative data using an independent sample t-test, inductive theme analysis, and grounded theory, the study concluded with the revelation that the utilisation of 5E-based online activities was found beneficial and effective to enhance essential 4Cs like the critical thinking and creativity abilities among the EFL learners.

Orak (2021) carried out a narrative literature review-based study to establish a procedural connection between contemporary expectations in the 21st century and their alignment with the constructivist learning paradigm. The study also presented a proposed framework for using constructivist methods of instruction in English Language Teaching (ELT) classes within the context of the 21st century necessities. It aimed to address two research questions such as a. In what manner does the constructivist theory of learning cater to the demands of 21st century English Language Teaching requirements among learners? b. What is the perception of existing related literature regarding the design of model that adheres to the constructivist perspective in dealing with the English Language Teaching (ELT) needs of the 21st century? This review study described a theoretical framework and model for English Language Teaching (ELT) that was based on constructivist principles and aimed to meet the educational demands of the 21st century.

Van Gompel (2019) carried out a qualitative research study on the cultivation of 21st century skills that emphasised on the utilisation of the design thinking process as a pedagogical tool for facilitating implementation of constructivist methodology within educational settings at elementary level. This exploratory case study investigated the process and results of incorporating design thinking as an educational approach and its impact on the advancement of 21st century abilities, which encompassed the 4C skills. This study concerned the development of an instructional approach within an elementary school setting, specifically targeting a cohort of 25 pupils in the third grade, under the guidance of a single educator. The researcher developed a pedagogical framework for his instructional setting spanning a duration of seven weeks. The design thinking framework was established as the basis, with the design task being incorporated into the curriculum of the third-grade social studies. The data collection methods employed in this study encompassed interviews, student pre-post self-assessments, self-reflections, and researcher observations. The outcomes of this study demonstrated that the design thinking process was such a constructivist approach that was both interesting and effective educational approach to be integrated into the curriculum for facilitating the effective enhancement of 21st century abilities among students. The study encouraged the educators to contemplate the integration of design thinking as a pedagogical approach to supplement their current instructional methods for promoting 21st century learning skills education.

Achzab et al., (2018) studied about “Analysis of the 21st century skills achievement using constructivist learning with Arduino based driverless vehicle technology” that presented

preliminary research results regarding the impact of robotics learning tools, specifically Arduino-based driverless vehicle technology, on students' perception of 21st-century skills relevant to TVET learning environments. The methodology employed in this study was descriptive-qualitative in nature. One hundred participants who were students in a TVET, chosen through purposive sampling, constituted the sample of the study. Interviews, including both open-ended and closed interviews, were employed as data collection instruments that resulted in yielding results that demonstrated a correlation between the achievement of learners on 21st-century abilities and their academic performance.

Anagün (2018) conducted a survey study to investigate the correlations between primary school teachers' perception regarding their competencies in 21st century skills and their perceptions about the management of constructivist learning settings through the utilisation of structural equation modelling (SEM). The subjects under this study consisted of 184 teachers in schools located in the province of Eskişehir. The scales on 21st century skills and TCLES were employed to ascertain instructor perspectives on their levels of proficiency in the utilisation of constructivist methodologies in schools for enhancing 21st century abilities. Obtained research outcomes showed the existence of positive correlation between teachers' abilities and 21st century competencies. Furthermore, careful analysis of the data revealed that one possible implication was that when teachers had robust perceptions in their teaching practices, it could have a significant impact on student learning outcomes.

VIII. Studies on Critical thinking skill concerning 4Cs and English learning

Studies Conducted in India

Ranjana (2022) carried out a study titled “Usage of Constructivist Approach for Critical Thinking”, aiming at offering an all-inclusive analytical study of the several aspects associated with the constructivist approach. This study explored the benefits of utilisation of constructivist learning that enables pupils to surpass habit and practice of rote memorization, instead empowering them to develop a more profound understanding over the subject matter. It emphasised on the need for implementing constructivist approach in pedagogy to facilitate the cultivation of an interactive dynamic between the student and the teacher. Ultimately, it became evident that students exhibited enhanced learning outcomes in terms of critical thinking and comprehension when they were given the autonomy to explore and acquire knowledge, under the guidance of a qualified instructor. As revealed in this study, this

constructivist approach fostered a departure from mere memorization and cultivates a genuine passion for the process of learning.

Joseph (2018) conducted an experimental study to develop Andes intelligent tutoring system-oriented strategy for developing learners' critical thinking, problem solving & academic attainment in physics. Its principal aim was to examine the effectiveness of the developed strategy on the three aforementioned dependent variables to be observed among the pupils studying at higher secondary level. The study firstly used survey method to analyse the present status of Physics teaching at higher secondary stage. For survey purpose the sample included 35 teachers from four districts of Kerala selected through Random Sampling Technique, while sample for experimental purpose consisted of 220 students of standard XII (110 students for each group) from two schools from Kottayam district through random sampling technique. Tools that were used in the study were a Questionnaire on present status of Teaching Physics at Higher Secondary Level, Self-prepared Lesson transcripts on the strategy based on Andes Intelligent Tutoring System for teaching Physics at Higher Secondary Level, Problem Solving Ability Test, Critical Thinking Test, Achievement Test in Physics (Prepared and Standardised by the investigator) and Raven's Standard Progressive Matrices. After applying't' test as the statistical technique for data analysis the study showed that the developed Strategy based on Andes Intelligent Tutoring System was effective in retaining Physics achievement of the schools children.

Tyagi (2017) conducted a study entitled "Impact of Critical Thinking on Mental health, Adjustment and Emotional Maturity of College Students" that attempted to fulfil main objectives as follows- to explore critical thinking of college students; to study the difference in mental health of high level & low level critical thinking of college students; To study the difference in adjustment of high critical thinking and low critical thinking college students; to study the difference in emotional maturity of high level & low level critical thinking. In this study through simple random sampling technique sample of 400 students were selected from two professional and non-professional colleges. Tools used in the study were-Critical Thinking Ability Test, Mental Health Battery, Adjustment Inventory and Emotional Maturity Scale. For analysing data Descriptive statistics like Mean, SD along with 't' test and Pearson's Correlation Coefficient was employed. The result declared the observance of significant difference between professional & non-professional college students on critical thinking. Professional college students were found to have more critical thinking than their counterpart non-professional college students. It was also observed that students having high

critical thinking were found to have better mental health as well as adjustment than their counterpart college students having low critical thinking.

Sheela (2015) carried out a study to examine the effectiveness of social constructivist strategies on academic accomplishment in science, critical thinking & social maturity of learners studying at secondary stage of education. Participants of this study, carefully chosen through simple random sampling, consisted of hundred secondary school pupils from the city of Mysuru. This study adopted survey method in order to fulfil its desired purpose. The self-prepared tools that were employed for data collection, were -Achievement test and Critical thinking test. For analysing and interpreting the collected data statistical techniques like t-test and Pearson Product Moment Correlation Techniques were used. The findings of the study declared no significant difference between boys and girls students in science-achievement score as well as in the score of critical thinking.

Seeja (2012) conducted quasi experimental study for studying the effect of Active Learning Strategies upon thinking styles & critical thinking ability along with the academic attainment in Physics among pupils of secondary school. The samples of 82 students from two Government aided schools situated in Ernakulam districts of Kerala were selected through purposive sampling technique. Instructional materials were designed incorporating active learning strategies like Group Investigation, Think-Pair- Share, K-W-L, Concept mapping and One-minute papers for transacting Physics to the students of class IX and its impact on the variables were observed. The following tools like test on Critical Thinking Skills in Physics, Critical Thinking Dispositions Scale, Thinking Styles Inventory, Achievement Test in Physics and Students Reaction Scale, were utilised to obtain necessary data. Statistical techniques like ANCOVA, ANOVA, t-test, Partial Correlation were employed for analysing gathered data. Findings of this study declared that Active Learning Strategies were effective in improving the critical thinking skills, legislative thinking styles, judicial thinking styles and achievement in Physics of the learners at secondary school level.

Studies Conducted Abroad

Muhammad (2020) conducted qualitative research study investigated the attitudes of social studies educators towards critical thinking as a component of constructivist learning. The primary objective of this study was to boost comprehension regarding the utilisation of instructional methodologies by professional teachers in order to foster critical thinking abilities and promote students' acquisition of knowledge in the field of social studies. The

research was carried out in Erbil, a city located in Iraqi Kurdistan, using a sample of 20 proficient social studies educators from 8 publicly funded secondary schools. The findings of this investigation indicated that educators possessed limited awareness and comprehension regarding instructional methodologies that promote the advance of critical thinking abilities. The educators had firm belief that learners can derive advantages from engaging in self-directed learning, self-evaluation, participating in collaborative learning with peers, engaging in a relevant and logical process of providing feedback, and demonstrating intellectual curiosity by questioning the how and why of things. This study additionally studied the challenges encountered by instructors when using constructivist teaching techniques aimed at promoting critical thinking in the context of social studies education.

Nurjanah (2019) conducted research which intended to study the utilisation of ICT within the context of enhancing critical thinking among students learning English as a foreign language. The cultivation of critical thinking skills is an essential component within the realm of education, serving as a fundamental element in both the facilitation and acquisition of knowledge. Research results showed that utilised ICT served the role of a valuable tool for facilitating successful instruction as well as the development of critical thinking abilities. The utilisation of Information and Communication Technology (ICT) in the field of EFL education effectively fostered critical thinking competencies among learners. Moreover, it suggested that promotion of students' critical thinking skills had advantageous consequences in relation to the implementation of inventive pedagogical approaches.

Topolovčan & Matijević (2017) conducted research for investigating the attributes of constructivist education and its various aspects, such as critical thinking, collaboration as well as the variations in these dimensions based on specific demographic variables. Additionally, this study aimed at exploring the associations between constructivist learning frequency and the utilisation of specific new media tools in the instruction of 703 learners in their last year of lower secondary education in Croatia. The findings indicated that students perceived a much greater prevalence of critical thinking when compared to the other four elements of constructivist learning. Females exhibited a greater tendency to emphasise the personal significance of engaging in academic pursuits, such as studying, exercising critical thinking, and communication etc. However, the heightened prevalence of new media was correlated with the augmented occurrence of all facets of constructivist learning. The findings suggested critical thinking as the predominant aspect of constructivist learning. It was also observed that gender of learners and their overall grade point average appear to play a role, to a certain

degree, in the differences observed in critical thinking as well as other elements of constructivist learning.

Kwan & Wong (2015) conducted a study on the effectiveness of constructivist learning setting on pupils' critical thinking. The study's primary objective was to conduct an empirical investigation into the immediate correlation between constructivist educational setting & critical thinking proficiency. Additionally, it sought to explore the indirect connection between these two variables, specifically examining the potential mediating effects of cognitive strategies & motivational beliefs. Data for this study was obtained by the administration of questionnaires to 967 learners enrolled in either Liberal Studies or Integrated Humanities courses during their third year of secondary education in Hong Kong. Obtained findings determined that both cognitive strategies & goal orientations served as complete mediators in establishing links between the constructivist learning setting & critical thinking capacity.

The quantitative investigation endeavour made by Aliakbari & Sadeghdaghighi (2011) assessed the level of critical thinking among Iranian students enrolled at Ilam University. A total of 84 participants, who were students admitted at Ilam University, was chosen by applying random sampling technique to complete the self-evaluation questionnaire developed by Cottrell (2005). It intended to provide responses to the subsequent research questions-To what degree do learners at Ilam University demonstrate critical thinking skills? Is there a difference in the level of critical thinking between male and female learners at Ilam University? The data were subjected to analysis via descriptive statistics (mean, standard deviation), as well as inferential statistical tests such as the t-test, ANOVA. The findings indicated that students exhibited a limited understanding of critical thinking skills, as evidenced by their failure to exceed the minimal acceptable threshold on the questionnaire. The t-test value (sig=.02) declared the existence of statistically significant difference between males & females in their critical thinking score. It was observed that males exhibited superior critical thinking abilities compared to females.

Iranfar (2009) conducted a quasi- experimental study entitled "A Study of Developing Critical Thinking in the Students of Nursing through Collaborative and Individual Methods of Learning in the Kermanshah Iran". The study was carried out to fulfil its broad aim of enhancing critical thinking disposition in nursing apprentices with the help of cooperative as well as individual learning approaches. Samples of 115 nursing stream undergraduates of

Kermanshah University of medical science were chosen through two stages, firstly purposive sampling and secondly random sampling. The tool CCTDI was used to collect the data. By analysing the data through t-test, the outcome resulted in the acceptance of null hypothesis asserting the nonexistence of any significant difference between the pre-test & post-test scores of critical thinking in both the collaborative learning and the individual learning.

Rumpagaporn (2007) conducted a research endeavour of an exploratory nature, aiming to investigate the degree to which Thai ICT (information and communication technology) schools possessed classroom learning environments that are linked to specific teacher characteristics. The data for this investigation were gathered through the utilisation of questionnaires, interview surveys, and computer-based classroom observations, targeting a sample of 13 Thai ICT model schools. The proposition suggested that students could be facilitated in acquiring critical thinking skills through the provision of certain supportive learning settings. The noteworthy observations presented potential avenues for fostering and enhancing students' capacity for critical thinking by promoting collaboration among students and their peers with the intention of completing their academic activities within cooperative learning settings that incorporate ICT.

The quantitative research yielded findings that indicated the beneficial effect of constructivist-oriented educational settings on developing critical thinking. Ernst & Monroe (2006) conducted a study wherein they observed that the implementation of a constructivist-approach based programme resulted in enhanced critical thinking skills among students in the 9th and 12th grade, as evidenced by increased post-test scores. According to Rumpagaporn's (2007) research, there was observed a consistent finding that constructivist instructional environment incorporating ICT creates a positive effect on students' development of critical thinking skills. Furthermore, a number of qualitative researches had been piloted to study the respondents' experiences in relation to critical thinking-cultivation within a constructivist learning environment. The investigations conducted by Hung (2002), Dill (2003) & Beach (2007), have reported favourable findings that demonstrate the constructivist-principle based learning environment as beneficial for the enhancement of critical thinking skills. Dill (2003), for instance, employed phenomenological research methodology for exploring the advancement of critical thinking skills among students enrolled in an online course. According to the feedback supplied by the undergraduate respondents, the online course offered a highly conducive learning setting for improving their critical thinking abilities.

In their research, King et al. (1990) examined the potential variations in critical thinking scores among undergraduate and graduate students based on their level of education and gender as well. The researchers employed critical thinking assessments that encompassed varying levels of issue structure to analyse this relationship. As per the outcomes of the research, significant main effects were observed for educational level and gender. Specifically, graduate students and male students achieved greater results compared to undergraduate seniors and female students.

Noticeably, research studies examining gender differences in critical thinking assessments have produced inconsistent findings, with the majority of research indicating no significant differences (Burns, 1974; Cooney, 1976; Skinner, 1971), while there are certain studies that have reported gender differences favouring either females (Schafer, 1972) or males (Simon & Ward, 1974).

IX. Studies on Creativity skill concerning 4Cs and English learning

Studies Conducted in India

Singh & Gihar (2020) carried out experimental research study titled “Effect of Constructivist Approach on Achievement in Science, Reasoning Ability and Scientific Creativity among Secondary School Tribal Students”. It attempted to assess and compare the levels of accomplishment in science, reasoning ability, and scientific creativity among 9^{th} grade students of tribal communities in both the experimental and control groups, taking into consideration their gender. The study's sample consisted of 320 tribal pupils who were enrolled in the ninth grade at schools affiliated with the Madhya Pradesh Board of School Education. The investigator implemented the 5E model for establishing a constructivist environment in classroom setting. Based on the primary research findings, gained after the data analysis through independent sample t-tests, it was determined that there was significant difference between treatment group and control group in terms of post-test scores measuring achievement in science, reasoning ability, and scientific creativity. The experimental group, consisting of tribal children who were instructed using the constructivist instructional technique, demonstrated superior performance in science achievement, reasoning ability, and scientific creativity compared to the tribe children who received instruction using the standard teaching method. In addition, it was observed that following the intervention, there was a statistically significant difference observed between boys and girls pupils in the treatment group in relation to their post-test results on measures of scientific creativity.

Females exhibited higher levels of scientific creativity compared to their male counterparts. This research outcome was in consistency with the study done by Kapri (2017), which revealed that female students at the senior secondary level in scientific creativity outperformed their male counterparts.

Sharma (2019) carried out quasi-experimental research study aiming at examining technology -utilization while implementing constructivism-oriented approach, as well as to investigate the combined impact of these factors on creativity. This research studied the application of a technology-grounded constructivist method to enhance learners' creativity and educational advancement among higher secondary students. This research provided an analysis of whether the constructivist method alone might enhance creativity, or if its effectiveness was contingent upon its integration with technology. Prior to and after the intervention, participants were given closed-ended questionnaires for collecting data. The post-test was carried out to observe and compare the impact of both the simple constructivism and technology grounded constructivism. This study consisted of a sample size of 40 students enrolled in higher secondary education. Experimental group got exposure of using a technology-grounded constructivist method, whereas control group only received instruction through simple constructivist approach. After conducting t-test, the findings revealed no existence of any significant difference observed between treatment group and the non-treatment group at the initial level, but significant difference was observed in achievement post-test, with the treatment group showing a favourable outcome. Therefore, this study supported the use of technology in the context of constructivism.

Bam (2006)) conducted a survey cum experimental research on pupil-teachers aimed at the improvement of their creativity ability while involved in teaching practice with the principal aim of finding out processes for being creative teachers. It also intended for investigating the present status regarding creativity in teaching of student teachers from B. Ed. Colleges of University of Pune; thereby focused on preparing a programme for enhancement of creativity in teaching, and assessing the effectiveness of the programme prepared for improving creativity in teaching, and finally it studied about the relationship between exposure and creativity in teaching. The sample of survey included 25% of Marathi medium student teachers admitted in academic year 2004-05 from every B. Ed. College through random sampling. Assessment instruments used for experimental data gathering were-a verbal form of Torrance test of creative thinking (Marathi version), a self-prepared Test of Creativity in Teaching (TCIT), and a Test of EQ prepared by Goleman and others. Data were analysed

through correlation and ANCOVA. The outcomes of this study showed as its result that there was significant and positive correlation between exposure and creativity in teaching. Average performance of experimental group of student teachers in case of creativity in teaching was significantly higher than control group. It proved that a suitable training programme could improve creativity in teaching of student teachers of B. Ed. course. However, no significant difference was revealed in average creativity score in teaching of urban & rural pupil-teachers. Similarly, no significant difference was discovered in average score of creativity in instruction of male & female pupil-teachers.

Pillay (1976) conducted an experimental study entitled "Effects of Patterns of Teaching upon Creative Thinking among Adolescents" to fulfil the objectives like -to examine the effectiveness of Creative Teaching Method upon the general creative thinking of eighth graders, to study CTM's impact upon creative thinking in geography of eighth graders, to find out CTM's efficacy on the achievement in geography of 8th graders. The sample for the study comprised of total 71 eighth grade English medium students of Vellore town. The tools used in the study for collecting the data, were as follows- the Kuppuswamy SES Scale, the Madhookar Patel Intelligence Test, the Passi Tests of Creativity (verbal), and Geography Achievement Test on Structure of Intellect model. The collected data were analysed by multiple analysis of covariance technique & t-test as well. Major discoveries of this research revealed that the treatment called Creative Teaching Method in geography, when compared with the traditional method did not produce significant effect upon general creative thinking of eighth graders, while the Creative Teaching Method compared to the traditional method of teaching geography produced higher mean performance scores on the achievement in geography of eighth graders.

Studies Conducted Abroad

Guaman-Quintanilla et al., (2023) conducted study for analysing the effects of adopting design thinking based on constructivist learning framework on problem solving and creativity skills of learners. An evaluation was conducted on a course in which students utilise design thinking methodologies to analyse authentic challenges and provide viable solutions. The investigation included 910 university students from different fields who worked in teams during the semester. Results of ANOVA revealed a significant increase on students' problem solving and creativity skills, supporting the integration of constructivist design thinking into

higher education curriculum as beneficial for fostering essential skills like problem-solving and creativity.

Jarutkamolpong et al., (2023) conducted a study titled “Designing a Constructivist Mobile Application to Foster Creative Thinking in Undergraduate Students”. This study intended for creating & implementing a smartphone application that utilises a constructivist educational setting in order to foster and improve creative thinking skills among undergraduate students. The study consisted of two distinct segments. The first one involved construction of mobile application components, which was achieved by collecting input from a total of 28 undergraduate learners and nine specialists. This feedback was gathered through a combination of interviews and surveys. The second phase focused on evaluating the impact of mobile applications on students' creativity abilities. This assessment was conducted through a series of tests and interviews. The findings demonstrated the observance of significant enhancement in average scores of undergraduates' creative thinking abilities subsequent to their utilisation of the comprehensive mobile application, hence highlighting the considerable efficacy of the constructivist learning approach.

Sriburin et al. (2022) conducted a study “Development of early childhood children’s creativity and innovation skills through constructivism experience organizing”. The primary aims of this study were twofold: firstly, to devise instructional plans that foster the cultivation of creativity and innovation abilities in young children within the context of early childhood education, utilising the constructivist approach; and secondly, to investigate the impact of these constructivism experience plans on the enhancement of creativity and innovation skills in early childhood children. The group of participants for this research consisted of 20 students enrolled in kindergarten 2 at Ban Huaypao School in Chiangdao district, Chiang Mai province. The research data was subjected to analysis through the calculation of the mean and percentage. The present study involved a comparison of pre- and post-assessment scores on creative and innovative skills among early childhood children who were exposed to constructivist learning experiences using the MTPA model. The research revelations indicated that creative and innovative competencies of the target population exhibited a significant improvement following their engagement with the constructivist framework based instructional interventions.

Yustina et al., (2021) carried out an experimental study which attempted to examine the efficacy of constructivism-oriented STEM approach upon the creative thinking development

of learners. The respondents of this study comprised of 25 learners of class 9 at SMP Purnama Pekanbaru, the learners who voluntarily participated in biotechnology related extracurricular endeavours. The research outcomes indicated that implementation of constructivism-centred STEM approach yielded significant improvements in students' creative thinking abilities within the context of biotechnology education, specifically in the domain of recycling trash for the production of fish pellets.

Ubaidah & Aminudin (2019) carried out a study titled “Development of learning tools: Learning constructivist mathematics to improve creative thinking ability”. This developmental research aimed at investigating the employment of constructivist learning principles within mathematics education, specifically through the implementation of Guided Discovery Learning for enhancing learners' mathematical competence and promoting effective creative thinking skills. The obtained data was subjected to various statistical analyses, including the one-sample t-test, z-proportion test, comparison test, regression analysis, and Gain test. The outcomes of study revealed that the mean score for mathematical creative thinking in the experimental group participants was 81.21, which was significantly higher than the control class average of 70.82. It proved that constructivist mathematical education had a positive impact on learners' creative abilities.

Tan (2018) conducted an action research study entitled “Fostering learner creativity through a constructivist-based creative pedagogy”. The study aimed at improving student creativity by creating an amiable constructivist, project-based learning environment. The study attempted to provide the answer to its research question which is, -To what extent will a creative pedagogic model based on a constructivist approach be effective in fostering learner creativity? A quasi-experiment method was carried out to find out to what extend will a creative pedagogic model based on a constructivist approach be effective in fostering learner creativity. The participants of the study consisted of total 50 students from the diploma course in Digital Media at Republic Polytechnic. The samples were chosen randomly. Noticeably, the treatment class got lessons based on the new constructivist creative pedagogic framework while the control class received the traditional teaching from their instructor. Data were collected from the following tools- An Effective Teaching Evaluation (ETE) questionnaire and focus group interviews. Mixed method measures were employed for analysing data. While the numerical data was analysed through t-test and regression to study the intervention-effect; the recorded verbal data from the focus group interview were analysed by

categorization and coding of data. Derived research findings resulted in showing the effectiveness of constructivist-grounded creative pedagogy in nurturing learner creativity.

Kapri (2017) explored the correlation between scientific temperament and scientific creativity, and studied their impact on the accomplishment in the science field of senior secondary students. Kapri's research study was piloted on 60 science students of 11th class, who were chosen at random from two higher secondary schools located in Faridabad area, Haryana. Required data was gathered utilizing scientific temper and scientific creativity assessments. Data analysis techniques like descriptive statistics, Pearson's correlation & t-tests, were employed. The research findings indicated a statistically significant relationship between the scientific temperament & scientific creativity of the school pupils in the field of science. There was a lack of statistically significant difference observed in the average score of scientific temper between boys and girls learners in senior secondary schools. Noticeably, the female students enrolled in higher secondary schools had a higher level of creativity in science compared to their male counterparts.

Joy (2014) conducted a doctoral research investigation for studying 5E Learning Cycle Model which intended to assess the levels of scientific creativity, scientific interest & academic achievement in the subject of physics. Furthermore, a comparison was drawn between the two groups in terms of scientific creativity, scientific interest & accomplishment in physics. One group of pupils went through learning process using the 5E model while another group received learning through an activity-oriented model. The main finding of the investigation indicated that learners instructed by means of the 5E model exhibited higher levels of scientific creativity, demonstrated greater interest in scientific subjects, and achieved greater accomplishments in physics compared with those who were instructed using the activity-oriented instruction model.

Saggu (2012) conducted her research study that aimed to investigate instructional approach based on socio-constructivism on academic performance in the field of science, fostering scientific creativity along with promoting responsible environmental conduct among 7th grader students of science. The researcher conducted this research with the purpose of fulfilling these objectives that include (i) to examine disparities in academic performance in the domains of science, scientific creativity, and responsible environmental behaviour between groups instructed using a constructivist approach and those taught through conventional methods of instruction, and (ii) to determine the impact of intelligence level on

achievement in science, scientific creativity, and responsible environmental behaviour. The observed results revealed that (i) learners who were instructed using a constructivist approach achieved higher scores in science, exhibited greater scientific creativity, and displayed more responsible environmental behaviour compared to students who were taught using conventional methods of instruction, and (ii) learners who had high intelligence achieved greater scores in science, exhibited greater scientific creativity, and displayed more responsible environmental behaviours compared to learners with average intelligence.

Göktürk (2010) conducted study to examine the efficacy of the constructivist method used in the existing Turkish music curriculum in fostering students' musical creativity within classroom environments. In order to achieve the intended objective, a sample of 10 primary school music instructors and 3 music education professors were selected at random and subsequently interviewed. The data analysis employed the content analysis method. Main findings demonstrated how the application of constructivist approach to music education was unfamiliar to most music instructors in Turkey. These teachers expressed challenges in effectively implementing the newly developed curriculum in their classrooms due to a lack of understanding and acquaintance with this novel approach.

Ubbes et al. (1999) jointly wrote an article entitled “Teaching for Understanding in Health Education: The role of Critical and Creative Thinking Skills within Constructivism Theory”. This study endeavoured to address certain questions like: Why should we construct knowledge for understanding in health education? What is the theoretical basis for critical thinking in health education? And, why should creative thinking be included in health education? This study explored the role of creative thinking and critical thinking within the purview of health education, and it concluded that for better learning outcome, for developing critical as well as creative thinking capacities, constructivist theory should be adopted as a strong foundation for teaching and learning.

X. Studies on Collaborative Skill concerning 4Cs and English learning

Studies Conducted in India

Bansal (2018) studied on “A constructivist perspective towards collaborative learning” which focused on highlighting the crucial need for the integration of collaborative learning environment within the purview of constructivist framework that enabled students to individualise the learning process and diminish the exclusive authoritative role of educators. Consequently, this approach fostered a student-centered learning environment, thereby

reducing the reliance on the teacher in the educational setting. This study's main purpose was to explore constructivist worldview of learners in relation to collaborative learning. The role of the learning environment, constructed according to Jonassen's constructivist learning principles (Jonassen, 1999), was significant in facilitating improved student learning within the constructivist learning framework. Furthermore, collaborative learning offered the advantage of actively involving learners in the process of learning, so fostering their involvement, collaboration, communication, and of course, the utilisation of constructivist principles in the world of teaching & learning.

Mahesha (2014) carried out research that studied effectiveness of the social constructivism-oriented teaching strategies on group cohesiveness & attainment in geography of learners. The sample, selected through random sampling technique, comprised 120 male and female class 8^{th} pupils studying from two Mysore city-based schools. For data collection two tools were used- (1) Achievement test in Geography, and (2) Group Cohesiveness. For data analysis independent sample t- test, two ways ANOVA & Product Moment Correlation were used. Derived study outcomes showed that social constructivist instructional methods had a prominent contribution to the improvement of achievement in geography subject and also to the promotion and enhancement of collective cohesion of schoolchildren studying at secondary level. However, it was found that there was no significant effect of the intervention in achievement in geography & group cohesiveness on the basis of gender. The research findings also declared the observance of high positive correlation existing between group cohesiveness & accomplishment in geography subject.

Studies Conducted Abroad

Zhang (2023) highlighted in his study that the practice of collaborative learning, which is regarded as an effective way of facilitating social relations, is grounded in the theoretical frameworks of Vygotsky's socio-cultural constructivism. The main motto of this study was to study the application of collaborative classroom strategies within the English learning context. Collaborative learning is a pedagogical approach that fosters motivation and analytical skills among students. This approach includes involving students in group assignments and promoting mutual assistance, hence yielding several benefits.

The study by Jin et al., (2020) attempted to validate the efficacy of constructivism in fostering collaboration in information modelling (BIM) and integrated project delivery (IPD) education. It presented a novel BIM training approach aimed at augmenting students'

satisfaction level and fostering collaboration within the classroom setting. The objective of this study was to analyse the connections between BIM collaboration education and constructivism theories. A theoretical framework, known as the Constructivism Collaboration Process (CCP), was developed to guide BIM/IPD collaboration education. Subsequently, a curriculum was designed based on this model. Subsequently, assessments were conducted to measure levels of satisfaction and collaboration before and after the BIM and IPD classes. The results obtained from the evaluation and analysis showed that the "Constructivism Collaboration Process (CCP)" might contribute favourably and constructively to BIM/IPD education.

Ramsook (2018) conducted qualitative research titled "Cooperative learning as a constructivist strategy in tertiary education" which explored the adoption of cooperative learning as a constructivist teaching strategy in a higher education institution, specifically in the University of Trinidad and Tobago. The research investigation centred on analysing the experiences of individuals aspiring to become teachers in the context of cooperative learning activities. The study comprised a total of 78 part-time undergraduate students who were enrolled in a Bachelor of Education programme. The findings suggested that individuals aspiring to become teachers reported numerous advantages resulting from their engagement in cooperative learning. One of the prominent themes that surfaced during the analysis was the "Promotion of Creative Thinking." The results indicated that cooperative learning is a highly valuable constructivist approach for facilitating teaching and learning.

Behera (2014) conducted a qualitative case study entitled "A Study of Construction of Social Skills among the Pre-service Teacher Trainees through Vygotsky's Approach of Learning" aiming at answering the following research questions- How social skill behaviours develop during problem-based learning? How does sharing of knowledge occur to create learning environment? How do teacher trainees use the constructivist components like sharing, socialization during Problem Based Learning strategy? And, how far is Vygotsky Approach Learning effective for successful class-room learning, and for the process of construction of social skill behaviours of pre-service teacher trainees during sharing of knowledge. In the study social skill behaviours included problem – co-operation interpersonal behaviour, interpersonal behaviour. self – presentation, problem solving behaviour, awareness of social norms, positive communication skill, ability to resolve conflicts, leadership and establishment of common relationship between oneself & other. The subjects of this study carefully chosen through convenient sampling, consisted of all the Science and Mathematics education teacher

trainees of B.Ed course during 2009-2010 academic years from a colleges located in Adipur, Kutch, and Gujarat. Data collection procedures included observation through video-tapes, questionnaires, field notes, focus group and check-list of Social Skill behaviours. For codifying and analysing the qualitative data, unit analysis, content analysis and factor analysis were done. The findings revealed that the teacher trainees showed social skill behaviours. The Vygotsky's Social constructivist approach was operative for constructing and developing social skills.

Alzahrani & Woollard (2013) studied about the correlation between social constructivist learning theory and collaborative learning context. The identification of the nature of this association might be facilitated by providing a demonstrative illustration of the learning environment. The association between the phrases "wiki characteristics" and "Wiki technology" can be observed through the prominent role of Wiki technology as a renowned learning environment. This study provided multiple pieces of evidence to substantiate the notion that utilising the wiki platform was a viable approach for investigating the connection between social constructivist theory and collaborative learning, as well as their respective roles in the learning process. Furthermore, this study explored various educational activities conducted in a wiki classroom environment in order to determine the outcomes of learner interaction within classroom groups.

The study conducted by Bofill (2013) explored the process of merging the two-constructivism and Web 2.0 technologies by creating a language learning lesson centred around constructivist principles as well as instructional design model. The lesson was specifically designed for an online course called Teaching English as a Second Language, and utilised Web 2.0 technologies to facilitate collaborative learning among students. The lesson incorporated the utilisation of the ID model at all stages of the process, namely needs assessment, content development, implementation, and assessment.

Ashcraft et al., (2008) carried out a study titled "Collaborative online learning: A constructivist example". It began with acknowledging that in contrast to several other academic disciplines, the field of psychology had exhibited a comparatively slower pace in adopting constructivist pedagogical modifications within its educational practices. This research article presented a constructivist methodology for instructing group operations. The analysis of pretest/post-test data revealed that this particular learning experience yielded noteworthy improvements in students' subject understanding across four specific domains.

According to the data obtained from student perceptions, it could be inferred that pupils acquired knowledge successfully as the online collaborative course based on constructivist approach incorporated both "content" and "process" information.

Hornback (1999) conducted qualitative research titled "Teacher discussion group: A constructivist process for school-wide change and renewal." Its main goal was to offer a comprehensive depiction & elucidation of a constructivist method for implementing school-wide transformation, as perceived by the participants. The study involved the participation of 13 elementary and middle school teachers who engaged in interactive debate within teacher discussion groups over a period of eight months. The purpose behind these discussions was exploration of various viewpoints of the educators regarding school-wide transformation. The research findings revealed that the teachers participated in discussions regarding student behaviour issues inside their educational institution. Moreover, through extensive opportunities for collective dialogue, they identified additional elements that were linked to the reported problems. concerning students' behaviour. The acknowledgment of these expanded aspects has resulted in a redefinition of the problem, shifting the focus from solely student behaviours to include the fulfilment of students' needs. This recognition has also provided teachers with supplementary choices for problem resolution.

Nyikos & Hashimoto (1997) conducted a qualitative study about the application of the theory of constructivism to collaborative learning within the purview of teacher education. This study aimed at answering the following research questions- How far does constructivist theory go towards explaining the kinds of conversations that arose naturally during group work on the ultimate project? In each of the three cooperative, multicultural groups, to what extent do learners perform in an individual or group ZPD? What variables affect students' written speech regarding self-regulation? The sample for the study consisted of 16 graduate apprentices from Indiana University. In the study to achieve the desired goal constructive framework was adopted to examine written accounts of students doing activities cooperatively at graduate class level. Data were gathered from pupils' statements in different written assignments, such as, dialogue journal, self-report on group work & self-report on individual role of every learner in the group. The study used Content analysis to critically examine and interpret the collected data. Major findings of this investigation concluded that certain factors like dissection of labour, role taking and switching, desire for encountering challenging situation & exploring power relations, and of course languages were needed to be involved, and also the requirement of social communication to put constructivism-based

approach into action is of tremendous value. The study concluded that implementation of constructivist lens to the teaching-learning process is vital & indispensable for successful knowledge construction.

XI. Studies on Communication Skill concerning 4Cs and English learning

Studies Conducted in India

Gaikwad (2017) conducted a survey-study entitled “Constructivist Approach to Develop Communicative Competence at Secondary Level”. The research aimed at improving the communicative competence of the learners by the introduction of constructivist approach. The study attempted to analyse how far constructivist approach was beneficial for the development of communicative proficiency of the learners at the secondary level. Objectives of the study were-To examine the interest of English teachers and students in the contents of the Course book; and To develop Communicative Competence with the help of textual activities. Data were collected through both open ended and close ended Questionnaire, and analysed by applying Chi. Sq. test and Z-tests. The results of the study showed 99.38% teachers are fascinated by New English course books and new approach of constructivism, though 58.02% teachers were not positive about applying communicative activities like role play, dialogues, conversation and debates in the classroom due to lack of knowledge and enough time. It supported the advantageous side of Constructivist learning techniques to improve communication competence. The study also located certain weaknesses of students while obtaining Communicating skills; and found out the difficulties that the teachers faced in implementing suitable methods in teaching Communicative Competence.

Shubhangi (2017) conducted a theoretical study that begins with emphasising on the significant role that communication plays in individuals' daily existence. It highlighted that successful functioning in a professional environment necessitates the presence of effective communication. Communication is a fundamental process that enables individuals to transmit messages, thoughts, feelings, cognitive processes, imagination, and beliefs. Therefore, it is imperative for every student to possess proficient and impactful communication abilities. Consequently, educational institutions are increasingly expected to meet the demands of the professional environment. One of the primary concerns that necessitates attention pertains to the appropriate strategies that ought to be implemented for increasing the preparedness of pupils for the workforce. From this standpoint, educators possess a significant responsibility in augmenting the communication abilities of students. Given the presence of diverse student

populations inside the classroom, a growing need is felt for the employment of novel approaches, original & creative strategies like the development of high-quality instructional resources, in order to increase the various sub-skills of communication among the learners. This paper endeavoured to provide a contribution to the continuing discourse surrounding the evolving landscape of communication skills, with a specific focus on equipping our students to confront forthcoming difficulties. It also offered strategies for improving the four fundamental components of communication (LSRW) with the aim of gaining a competitive advantage in the job field.

Divya (2013) carried out a study on developing and applying a strategy for the enhancement of communicative ability in English for the undergraduates who were studying commerce. The study's goals were to: 1) examine the foundational level of English communication competence; and 2) create a plan for improving such skills; 3) to put the devised strategy into practice, and 4) to assess the strategy's efficacy. Purposively selected participants of this study included 54 students from the First Year. B. Com class. Data were collected through Tools like Information sheet, Achievement test, Structured Interview, Group Discussion, Questionnaire. Collected Data were analysed quantitatively (mean, median, mode and t test) as well as qualitatively (content analysis). It was made clear from the interpretation of the study results that the developed instructional strategy was effective for enhancing the communication skill in English.

Studies Conducted Abroad

Selim (2022) carried out a research study titled “A Constructivism-Based Program to Develop the Writing Skills of EFL Preparatory Stage Students”. The primary goal of this quasi-experimental approach-based research was to study constructivist-oriented curriculum’s efficacy on enhancing the writing abilities of EFL students at the preparatory stage. This investigation included a sample of 60 students in their third year of the elementary stage at a preparatory school located in Egypt. This study employed several instruments that were developed and validated. These instruments were: (1) questionnaire designed to assess the writing skills of the EFL participants, (2) a pre-post EFL writing skills test, and (3) an analytical rubric utilised to evaluate and score the academic attainment of the learners. In this study the treatment group gained instruction by means of a constructivist programme while the control group obtained instruction using conventional instruction-based approach. The findings demonstrated that there existed significant difference between the mean scores of the

treatment group & the non- treatment group on assessing the EFL writing abilities, with the experimental group outperforming the control group. Therefore, this study proposed the utilisation of a constructivist instructional approach as a valuable framework for facilitating the development of English writing skill as the essential component of communication skill among the learners.

Boeriswati et al. (2021) conducted quantitative approach-based research to comparatively study the impact of constructivism approaches & modelling methods on pupils' poetry writing skills. It employed experimental methodology analysing the application of a treatment administered through a 2 x 2 design. Sample of this investigation was obtained using the cluster random sampling procedure. Various data procedures including interviews, observation, documentation, and tests were employed to collect data. The findings derived from the utilisation of ANOVA, declared the observance of a statistically significant difference between the implementation of constructivism learning methods & modelling methods in relation to students' poetry writing skills. Specifically, the treatment group achieved higher average score in comparison to the control group. On the basis of the statistical results, it was inferred that students who received instruction using the constructivism approach exhibited higher levels of creativity compared to students who were instructed using modelling methods.

Sakti et al. (2020) carried out a development research study titled “The Development of Learning Models of Speaking Skills Based on Integrative-Constructivist Approach on Elementary Students” that aimed at designing a reliable learning model built on Integrative-Constructivist Approach for enhancing speaking skills among third-grade children studying in elementary schools located in Gowa Regency, South Sulawesi. The findings indicated that the model being appropriately orientated towards integrative-constructivist principles, was an efficient learning model that can be utilised for the purpose of enhancing speaking abilities of the students.

Umida et al. (2020) conducted a study to focus on the significance of Constructivism in education, specifically its practice in the background of foreign language acquisition. The conventional approaches utilised in English language instruction possess certain limitations, as opined in this research article. In light of this matter, the implementation of constructivist pedagogical approaches could potentially address the existing deficiencies. Based on the results, it was inferred that the treatment group exhibited superior performance in the reading

skill, grammar and writing component of English communication skills at the BED level, as compared to the control group during the post-test assessment. Furthermore, the results of this study demonstrated clearly that implementation of the constructivist teaching approach in the instruction of English communication skills at BED yielded superior outcomes as compared to the standard teaching technique.

In their study “Use of the Social Constructivist Approach in Teaching Oral Skill to First Year BA Students of English”, Youcefbeghoul & Chelghoum (2020) presented the current scenario that resulted in a large number of pupils experiencing limited or negligible engagement within the educational setting. Consequently, educators face a significant undertaking in facilitating students' development of verbal communication skills and the ability to articulate their ideas effectively during classroom instruction. This study highlighted a potential approach for addressing this difficulty which involves employing the social constructivist method to instructing oral skills, drawing upon the theoretical framework developed by Vygotsky. This study attempted to provide a concise overview of social constructivism; a widely acclaimed theoretical framework that has been effectively utilised in numerous EFL settings. Their investigation additionally sought to explore the potential use of the aforementioned approach inside oral instruction settings, with the objective of addressing the prevalent reluctance among first-year Bachelor of Arts students to engage in communicative activities. Replacing the traditional mundane methodology with a more engaging approach that stimulates students' interests and improves their learning skills can significantly aid in developing their proficiency in spoken English both within and outside of the educational setting.

Rao (2019) conducted study aiming at exploring strategies for improving oral communication skills among ESL & EFL learners. This study initially examined the significance of the English language in contemporary society, followed by an exploration of the relevance of language proficiency in the twenty-first century. Moreover, this study discussed the significance of communication skills in a broader context, and subsequently focused on their relevance within the domain of English learning. This study primarily discussed different ways for improving the oral communication abilities of ESL/EFL learners, which could be beneficial for them to effectively demonstrate these abilities in their future professional endeavours. With the intention of improving the communication capabilities of ESL/EFL students, English educators employ several innovative strategies, including learning through projects, Table Talk, simulations, group debates, game-based learning, collective discussion,

presentations, working together in pairs, group activities and similar approaches. This approach would facilitate the development of their communication abilities of the learners studying English subject.

Hadijah (2018) conducted quasi-experimental research for analysing the effect of constructivist methods on the enhancement of mathematical communication abilities among the junior high school learners. The tools utilised in this investigation encompassed pre-post-tests, pre-post questionnaires & observations. Collected data underwent examination utilising descriptive statistical analysis, t-tests, ANOVA. The research outcomes indicated at the statistically significant differences found in mathematical communication skills of high school students across all achievement levels (high, moderate, and low) when comparing the constructivism approach to conventional approaches. It was determined that experimental group students, taught with the help of constructivist pedagogy were found more proficient mathematical communication abilities. in comparison to the control group students.

Bodie & Jones (2015) studied how constructivism as a theoretical meta framework could be used for the study of human communication. The study opined that constructivism had been used to better understand the process of improving the social cognitive and communication abilities in children & adolescents; the impression formation process and its influence on interpersonal interaction; and the production and processing of comforting, persuasive, informative, and regulatory messages. The main focus of the study revealed that constructivist framework was capable of creating and strengthening human communication.

Saidalvi & Mansor (2012) carried out a study on the utilisation of constructivists learning environment for pupils to assist them in attaining public speaking skills. To achieve its purpose this study primarily provided a description of a recently created and advanced prototype, which had been designed on the basis of three fundamental constituents of CLE: pedagogical, social, and technological. Next it aimed at conducting an analysis of students' perceptions regarding the effectiveness of this environment in improving their public speaking abilities. The study involved a sample of 26 students studying engineering, from whom data was obtained through the use of a questionnaire. Additionally, interviews were conducted to further support the findings. The obtained outcomes indicated that the implementation of this prototype holds considerable potential in facilitating the development of public speaking abilities among students and aspiring professionals within the institution and various businesses.

Kalina & Powell (2009) in their study “Cognitive and social constructivism: Developing tools for an effective classroom” highlighted that the setting up of an efficient learning environment in the classroom, characterised by optimal communication between teachers and students, relied on the use of constructivist techniques, tools, and practises. They proposed that classroom should encompasses two primary forms of constructivism: (1) Individual constructivism, which draws upon Piaget's theoretical framework, and (2) Social constructivism, which is rooted in Vygotsky's theoretical perspective. The comprehension of communicative techniques and instruments enables educators to cultivate individualised learning approaches, for instance discovery-based education & socially interactive activities, in order to foster collaboration among peers.

Reich (2007) studied on Interactive Constructivism in Education to explore the nature of Interactive constructivism, and to find out its implications in education. For this purpose, it highlighted the following steps one by one. It started with discussing the context of the approach and its relation to other constructivist developments, and then it observed the crucial pragmatic criteria in the tradition of John Dewey necessary for interactive constructivism. Furthermore, it showed communication as a chief dimension of education can be analysed out of three perspectives: the symbolic, the imaginative, and the real. Educators must recognize that their interaction with learners includes great demands not only in theoretical field but also in practical application. This study revealed that interactive constructivism offers many reflections and instruments for creating perspectives on constructivist education. Thereby, educators and teachers must have to realize that interaction among learners and others can do justice to the better learning experiences.

Burleson (2006) studied about constructivism as a general theory of communication skill in the book entitled Explaining Communication: Contemporary Theories and Exemplars. It dealt with communication skills and one particular theory of these skills—constructivism. This study emphasized the fact that to meet today’s challenges as well as to cope up with today’s demand and expectation, to fit into this world of rapid progress, it was imperative to have the ability to communicate skilfully, to voice own idea, perspectives in an effective way. To be an effective communicator, one should possess different kinds of communication competencies-functional communication competence, linguistic competence, then sociolinguistic competence, rhetorical competence. Then it attempted to relate constructivism to the field of human communication, and outlined how the theory of constructivism can guide the desired exploration of different kinds of communication competence.

Constructivism had been viewed in the study as a theory of communication that aims towards clarifying variations in communication proficiency. It opined that constructivism aims to provide descriptions and explanations of individual differences in communication skill. This study concluded that today, constructivist theory should be refined and applied in new settings, leading to improved understandings of many communication behaviours.

Loy (2006) conducted survey research titled “Effective teacher communication skills and teacher quality” aiming at acquiring comprehensive insights on the correlation between communication skills and academic performance among students. The theoretical framework was grounded in Lev Vygotsky's social constructivist theory of learning. The existing body of literature demonstrated the significance of good communication within the framework of the learning theory of social constructivism. The study revealed that educators with less experience exhibited slightly greater levels of reported communication abilities compared to their more tenured counterparts. This investigation also discovered no existence of any significant difference in self-reported communication skills between female and male professors.

Gruba & Sondergaard (2001) in their study on constructivist perspective to communication skills education in the field of computer science”, developed a course on communicative abilities in computer science based on the certain ideas that align with the tenets of social constructivism and it was devised and implemented. In this paper the researchers had presented their observations and reflections on the use of a student-led conference as an instructional tool for enhancing communication abilities. In the present methodology, students were assigned the responsibility of strategizing and coordinating a conference, encompassing activities such as peer review, publicity, budgeting, sponsorship acquisition, website creation, conference programme development, presentation scheduling, speaker assistance, and food arrangements. This study elucidated the underlying ideas and expounds upon their practical application, thereafter engaging in a critical analysis of the resultant outcomes. It highlighted that according to the social constructivist approach to the discipline of education, optimal learning outcomes are attained when students are presented with intricate, authentic challenges that lack definitive solutions. When presented with a substantial shared objective, students engage in collaborative efforts to achieve desired outcomes while retaining autonomy in making crucial judgements.

Gruba & Lynch (2000) in their study namely “Constructivist Approaches to Communication Skills Instruction” revealed how the popularity of constructivist instructional approaches has increased due to the growing prevalence of technology-rich learning environments. This study presented findings on the application of constructivist principles in the instruction of a communication skills course at the tertiary level, inside a technologically advanced learning environment. This paper began by presenting an overview of typical techniques used in teaching communication skills, followed by an examination of how constructivist concepts might be applied to three different communication skills courses at the university level. The paper ended with a discussion on the impact of employing a constructivist approach in a technology-rich setting on the role of teachers, evaluation procedures, and student learning experiences.

2.1.1 SUMMARY AND SYNTHESIS OF REVIEWS

Several studies in the form of research articles, research papers, journals, books, theses, dissertations had been conducted on constructivism and 4Cs. Numerous researchers still endeavour to persist in their investigation about the impact of constructivism and twenty first century learning skills across diverse educational areas. The present study attempted to examine the cause- effect relation between constructivist approach to English subject learning and the development of 4Cs among the class IX learners. Therefore, the review of relevant literature can be broadly categorised into two groups– first one dealing with studies connected with constructivism, and second one, dealing with prior studies on 21st century learning skills. It was found that out of the total 161 selective reviews highlighted in this second chapter, 72 reviews belonged to the previous studies on constructivism in relation to English learning, 4Cs development and education in general, while the rest of the 89 reviews pertained to the previous literature about twenty first century skills comprehensively as well as individually in relation to English learning and constructivist approach to education. The details are provided in the following tables -

Table: 2.1 Prior Studies related to Constructivism

Publication year	Number of studies
2023	3
2022	2
2021	3
2020	2
2019	3
2018	3
2017	5
2016	3
2015	1
2014	2
2013	2
2012	4
2011	2
2010	6
2008	6
2007	2
2005	3
2003	6
2001	1
2000	2
1999	2
1997	1
1998	1
1996	1
1995	2
1994	2
1993	1
1991	1
Total	72

Table: 2.2 Prior Studies related to 4Cs

Publication year	Number of studies
2023	5
2022	5
2021	7
2020	8
2019	6
2018	8
2017	7
2016	3
2015	3
2014	3
2013	4
2012	5
2011	2
2010	1
2009	2
2008	1
2007	2
2006	3
2003	1
2002	1
2001	1
2000	1
1999	2
1997	1
1990	1
1976	2
1974	2
1972	1
1971	1
Total	89

It becomes evident from these tables that the discourse of constructivism started to rise in the 1991, and it gradually started to gain attention, and 2003 onwards it became a popular researchable problem to the investigators, and currently it is much explored topic in academic; while the twenty first century learning skills as the comprehensive theory is gaining popularity rapidly 2017 onwards, and now a days, it is a pressing issue, the various facets of which are largely getting explored in contemporary studies of 2021-2023. Noticeably, the majority of the researchers chose students to be the study's core sample cohort while others investigations were done on teachers and educators. With respect to research method, qualitative method was chosen in most of the studies on constructivism and 21st century learning skills while researchers selected the experimental method of quantitative approach as the second-largest research methodology. As majority of the researches were conducted in a qualitative manner; as a result, data were collected through student profile, observation, field notes, focus group interview and opinionnaire, and the researchers were naturally encouraged to use codification, categorization, classification and content analysis and triangulation as their primary data analysis techniques. However, a small portion of the research utilised both the experimental and descriptive methods by applying mixed research methodology. But when the reviews on the four Cs were being carried out distinctly, then it was observed that in the case of studies on critical thinking skill, creativity skill specially in relation to constructivist approach, the number of qualitative studies including case studies, explorative studies are huge, and quantitative approach-based studies are very less. But in the case of studies on collaboration and communication skill in relation to constructivism, the situation is opposite since here it was found that most of the studies are of qualitative methodology, while very few studies were of quantitative method.

Intensive reviews of these relevant literature had provided the researcher with the theoretical aspects of both constructivism and 21st century learning skills. It consisted of the very conceptualization of constructivism and twenty first century learning skills, their learning models, the characteristics of a constructivist and 21st century learning skills education, their application in school education and teacher education across different subject areas etc. A number of studies noted that practitioners have been increasingly drawn to constructivist approaches, especially in the science education, and also revealed that the constructivist approach works effectively for disseminating knowledge across several fields. The reviews highlighted that constructivism is an approach to education that emphasises action and requires students to construct concepts on prior knowledge in order to comprehend and apply new ideas. In the teaching and learning process, the constructivist paradigm places the

student at the centre. Students can study in accordance with their motivation and areas of interest. Educators are supposed to guide pupils through their cognitive development and create meaningful learning activities for the classroom. They largely upheld the view that learning from a constructivist standpoint entail engaging in the cognitive activities of querying, questioning, information analysis and interpretation. Further, these innovative pedagogical approaches prioritising student involvement include various methods like learners' previous experiences method, interactive conversations, mini-lectures that encourage active participation, and opportunities for independent student discovery, and encompass classroom practices such as questioning, heuristics, and role-playing, task assignments, role plays, graphic organizers, etc. Constructivism has several implications for instruction, but its most important contribution to pedagogy is to shift the emphasis from traditional instruction to the creation of learner-centred, knowledge-centred, assessment-centred, and community-centred learning environments. Thus, it becomes evident from those reviews that constructivism is far more useful in the realm of education. The constructivist framework is also positively successful in teaching-learning circumstances in a variety of educational fields, according to the examined studies mentioned above. Moreover, students' science performance skills, knowledge retention, their understanding and application abilities had been greatly improved when taught in a constructivist learning setting. Constructivist models had been the focus of countless research studies. Results pertaining to constructivist models showed that pupils outperformed the traditional technique using the constructivist 7E-model in terms of the scores they acquired across all intellect levels. Certain reviews also pointed out that use of constructivism's 5E approach to education can raise student achievement in science subjects whereas constructivist instruction model given by Gagnon and Collay, is fruitful to be followed in the study of language and literature. Efficacy and engagement of constructivist educational experiences in social science classroom are also found to be useful. Students who were taught using the constructivist method exhibited intrinsic motivation and did significantly better than those taught using any other method. Additionally, it had been observed thar students developed their ability to solve problems, think flexibly, think reflectively, reason critically, and learn to draw connections and analogies by connecting the content to their own life experiences, express their thoughts with clarity, and share their insights with others. Many reviews revealed that students favoured constructivist learning environments over regular classrooms. Furthermore, when compared to traditional teaching methods, a great deal of research findings showed that constructivist learning was equally successful for enhancing student accomplishment for both boys and

girls. A great deal of study on teachers with respect to constructivist method had been conducted. The results showed that although the pre-service teachers' understanding of constructivism was found to be general, theoretical, and constrained, but they had highly favourable viewpoints on constructivist approach as a relevant method of instruction. The task-based constructivist method enhanced teachers' metacognitive capabilities and problem-solving abilities. It also positively impacted teachers' knowledge and skill development. Contemporary studies had also demonstrated that researchers, curriculum makers, educators of today are becoming more interested in 21st century skills education, especially in the development of 4Cs among the learners. Studies had been conducted on various coping skills required for 21st Century life among students who must possess the abilities to meet the challenges of today‘s world. Exploration of teachers’ and students’ perceptions on the various ways for creating appropriate classroom environments that support in the enhancement of 21st century skills provided guidelines regarding how to build solid culture of collaboration, autonomy and self-reflexivity in the schools. The reviews were helpful to identifying the innovative strategies to incorporate critical thinking, creativity, communication and collaboration skills in textbook and curriculum design. Educators may employ several innovative strategies, including learning through projects, table talk, simulations, group debates, game-based learning, collective discussion, presentations, working together in pairs, group activities etc. that would facilitate the development 4C abilities of the learners. Further, some of the reviews focused on analysing the challenges encountered by teachers when incorporating these abilities into classroom teaching. It was observed that the full implementation of such important skills faced certain challenges like limited time for instruction, inadequate educational amenities, the high density of the curriculum, and a lack of proficiency in the English language etc. However, the studies mostly concluded that 4Cs learning model is a proficient method for instruction, specially instructing foreign languages. They also revealed the demonstrable positive influence of implementation of the 4C training programme on the academic achievements of the pupils. Most of the reviews supported 21st century skills pedagogy as an effective way in the instructional practices of teachers, which in turn leads to increased levels of pupils-involvement in the learning process. Lastly, it might be said that the previous studies on constructivism as well as 21st century have shown the relevancy of addressing the importance of these research topics; and academics are still exhibiting a keen interest in constructivism in relation to 21st century skills development in order to explore the unexplored facets of these theories.

2.1.2 INSIGHTS FROM THE REVIEW

It was found after reviewing the previous studies related to the variables under study that they had recognised that the implementation of constructive approach to learning in classroom situations as beneficial for yielding better leaning outcome as a whole. Numerous studies had been carried out that showed how constructivist strategies for teaching English subject are effective one to improve academic achievement in English as well as to develop the four rudimentary communication abilities that are listening, speaking, reading & writing skills while exploring the characteristics of constructivist English classroom. Similarly, there were many studies on the twenty first century learning skills stressing on identification of educational programmes and practices and activities facilitating learners' acquisition of twenty first century learning skills. Again, various studies had been carried out on critical thinking, creative thinking, collaboration, and communication- these skills separately. It was observed from the review that each of these skills was better nurtured within the constructive framework of learning. Though many investigations had been piloted with the purpose of examining the effectiveness of constructivist strategies on skills like critical thinking & creativity, there were fewer studies on the development of collaboration skill, and communication skill through constructivist approach. So, enhancement of these four skills together through the implementation of constructivist approach was less explored, especially in the field of English subject. In fact, it might be said that the efficacy of constructivist approach to English subject learning so as to inculcate and develop twenty first Century learning skills, had not been studied with critical emphasis. Therefore, the researcher decided to undertake this study in the area of school education, English pedagogical knowledge and educational psychology, bearing the title as "Effectiveness of Constructivist Approach Based Module on the Enhancement of Twenty first Century Learning Skills in English Subject among the Secondary School Students in West Bengal".

2.1.3 CONCEPTUAL FRAMEWORK OF THE STUDY

Conceptual framework can be deemed as an important instrument that is designed to help in the comprehension of the connections between concepts or variables in relation to the research problem of the study. It is synthetization of interrelated components and variables which helps in solving a problem under study (Imenda, 2014). The researcher can build the conceptual framework of the study in two ways- narrative way and visually. Whether in graphic or narrative form, it explains the key concepts relevant to the research topic including the connections between the various constructs or variables of the study. In quantitative

studies, the conceptual framework also assists in generating the research hypotheses properly. It plays the role of a roadmap for guiding the entire research study. For both the researcher and the reader, it is a means to recognise and build an epistemological perspective and a functional worldview approach to the identified problem (Grant & Osanloo, 2014).

While addressing the research problem of the current study, the discourse revolves around two major concepts- constructivism and twenty first century learning skills in the realm of English subject learning of class 9 students of West Bengal. The innovative constructivist approach has emerged as an urgent concern in the teaching-learning paradigm of the twenty-first century world. Constructivism is a philosophy of knowledge that holds that humans are capable of producing knowledge and giving it relevant meaning. Thus, it is a field of epistemology under philosophy and learning theory that explains the essence of knowledge and reveals how individuals acquire learning. Constructivism, from this perspective, is predicated on the notion that knowledge is context-dependent, personal, and fundamentally partial (S. Chandi, 2020). Constructivism's psychological foundations were initially laid by Jean Piaget (1896-1980), and then flourished by most important educationists like Dewey, Montessori, Vygotsky and Bruner. The central concept that underlies constructivism is that knowledge cannot be instructed by a teacher, it is only the learners who are able to construct it. This implies that learning is a process that involves more than merely listening to the instructor. What learners read and hear must be arranged and developed by themselves only. Since the main stakeholders in constructivist learning world are the students. Here, the student generates their own knowledge, and the teacher acts as a facilitator (Ozcan, Gunduz, Danju, 2013). According to Tobias and Duffy (2009), the constructivist pedagogical approach essentially is learner- centred where the pupils actively participate in the learning process, while the instructor serves as a facilitator, guide, and aider for the learners. Constructivism asserts that individuals build their knowledge and comprehension of various events and actions by interacting with preexisting ideas, beliefs, and knowledge (Canella & Reiff, 1994). Acquiring knowledge involves engaging with the content, not just copying it for content recurrence (Kroll & La Boskey, 1996). However, the learners' existing knowledge is a crucial component of the constructivist approach without the help of which learners cannot solve any given challenge. Constructivism believes that active construction of knowledge and meaning can lead to more effective learning. The major aspects of constructivist education are as follows- (a) Real-world environments and "authentic tasks" should be used to facilitate learning. (b) Social negotiation and mediation should be a part of the learning process. (c) Only the contents and skills that show relevancy and usefulness to the learners should be

selected in the curriculum. (d) In light of the learner's existing knowledge, content and skills should be interpreted. (e) Teachers are not didactic teachers; rather, they are mentors and coordinators of learning. (f) It is important to support students in developing their self-awareness, self-control, and self-mediation. (g) Formative assessments of students should be conducted in order to guide future educational initiatives. (h) It emphasises on conceptual interrelatedness and transdisciplinary learning. (i) Students' initiative and autonomy are valued and promoted. (j)Applications based education is encouraged for improving learners' problem-solving skills-solving abilities and practical understanding ability. (k) Inclusive classroom practices foster an atmosphere where all students feel appreciated and motivated by accommodating a broad spectrum of learning styles and abilities. Further, in constructivist education students are given meaningful tasks to accomplish and are encouraged to reflect, investigate, utilise their creativity and initiative skills. Thus, the creative methods of instruction promoted by constructivism support the learner's development of his/her sense of self, independent thinking, and advancement within the group for interpersonal growth (Dagar. et al., 2016). In countless prior studies this novel educational approach has been proved useful for improving the academic attainment of students across various subjects belonging to different disciplines like science, language, social science. But the emerging question remains- How far this constructivist approach to education is beneficial for the development of today's relevant skills like 4Cs (critical thinking, creativity, collaboration and communication)? Enhancement of needed competencies to think analytically, critically, imaginatively and creatively, to collaborate with different people to achieve common goal, to communicate with others effectively, is vital for making the young generation properly prepared for the dynamic, competitive, modern, demanding world of today. The goal of the 21st Century Skills venture was to improve the school curriculum in order to better prepare students for success in both their academic and professional life. In fact, it was an advocacy movement centred primarily in the United States with the objective of enhancing the standards of education. Noticeably, it is a requirement of students to acquire these skills and comprehend these concepts while studying fundamental subjects in an integrated, multidisciplinary manner. The P21 Framework by Partnership for 21st Century Skills becomes the source of guidance for being the foundation of developing curriculum, assessments, and standards that are deemed to be appropriate for their students (P21, 2011). However, skill enhancement integrated with academic subject teaching should be the major concern of the policy makers, curriculum developer, textbook designer, educators and teachers so that no learner is deprived of the contemporary societal needs and aspirations.

However, the present study had tried to mark the probable connection between these two wide constructs -constructivism and 4Cs. This purely quantitative research focused on studying the effect of constructivist approach to English subject teaching on the development of 4Cs among the secondary educational level learners. In this experimental study attempt had been made to establish the cause-and-effect relation between the independent variable (Constructivist approach-based module in English subject) and the dependent variables (Twenty first century learning skills) that helped in developing the hypotheses of this research. Because this work endeavoured to examine how Constructivist Module in English subject effects the enhancement of the four Cs. Thereby, it was the constructivism based English Module that got manipulated by the researcher herself to observe its influence on the Twenty-first century learning skills development. To study the measured outcome on 4Cs as a result of the manipulation of the constructivist intervention was the main objective of this study. Noticeably, the efficacy of constructivism in English education for the development of twenty first century learning skills had been further observed by studying their connection with two demographic variables -Gender of the students and the Locale of the schools. It intended to find out whether the intervention (Constructivist module) caused any significant difference between the girls and the boys students; also between the rural school and the urban school students in respect to their 4Cs development.

Figure No. 2.1: The Visual Representation of the Expected Relation between the Variables of the Study