CHAPTER-II

REVIEW OF THE RELATED LITERATURE

2.0 Introduction

Constructivism is considered to be an approach to facilitate learning. Under approach to learning, it is possible to bring several relevant premises of learning. It creates authentic process of learning in a composite way. Constructivism in pedagogy, therefore, is a constructivist approach to learning in which the learner is the main actor; and he creates for himself meaning making situation and constructs knowledge. The learner is the creator of knowledge for himself. Research studies (Jonassen, 1994, cited in Deryakulu, 2001) asserted that learning is the process of interpretation of the reality. The learner constructs knowledge when he interacts with the environment with his own activities. Therefore, learning is the learner's construction of his own reality in his mind related to an event (Andrew and Issacs, 1995 cited in Fardouly, 2001). The learner's interaction with the social environment, social nature and event is the main concern towards meaning making. What are the ways and how sharing and cooperation within the social community takes place are interesting to understand through the constructivist approach of learning? Most studies (Phillips, 1997, cited in Erdem, 2001) have shown how the teacher encourages, facilitate students to search, solve problems and make their interpretation and decision.

Content needs to be enriched on the dimension of affective domain in a rational way. It is for this purpose multi-disciplinary contents are of more important. So, mathematics and science contents integrated in a problem scenario have come in vogue in constructivist pedagogy. Learner is enabled through problem based scenario towards meaning making with active engagement in learning process. The learners develop a set of skills not only for decision making and/or problem solving, but also for self direction. So, it is important to find out how PBL can adequately address the content and social skill development issues. The initiatives of PBL greatly enhance comprehension, social skill development. So, the ground success of initiatives of PBL towards enhancing such qualities in *social context* should be examined. Studies (Bonwell, 2001) focused that PBL facilitates conceptual understandings of learners. Similarly, other studies by Gijbels, Bossche and Segers (2005) have well demonstrated the understandings of concept. But studies have ignored the success of PBL in respect of cognitive and affective development of learner in a concurrent way.

Further, teachers' facilitating role is intended to create appropriate conditions for situated learning. Marlowe and Page (1998) reiterated that the teacher needs to recognise the appropriate activities, present them suitably, engaging the learner in interacting with the social situation created. With regard to this responsibility the teacher needs to develop himself fast during teacher training and later through self efforts. The teacher education program in India has no constructivist pedagogical practice either for pre-service teacher trainees or in-service teachers. Therefore, to develop pedagogical process of constructivism, active role by teachers should be understood. But no research studies in India are available to reflect in such vision of educational development.

With regard to active participation of learner in learning acts, it is less observed the inhibitive influence of socialization during problem solving in many research studies. Subject related knowledge and understandings are possible in learning which contribute mainly towards mental development of students. Other developmental aspects like social skill and competence and value orientation are concurrently promoted during learning. Therefore, it is worthwhile to identify social skills and value orientation obtained in subject knowledge through Constructivist Approach of Learning.

2.1 Areas of Review

Keeping in view the objectives of the present study, a total of **41 reviews** have been included. An attempt has been made to give a holistic picture of the nature and findings of these studies. In addition to this research gaps in relation to previous studies were identified. According to the variables focused during review of studies, they have been categorised under the following aspects:

1. **Constructivism**
2. **Constructivist Mathematics and Science Education**
3. **Constructivist Pedagogy**
4. **Problem Based Learning**
5. **Social Skill**
6. **Constructivism and Teacher Education**

Reviews with regard to *Focus, Methodology and findings* have been discussed separately. The specifications of the studies are given in **Table 2.1.**

Table-2.1:

Areas of review

Sl. No.	Areas of Review	Number of studies
1	Constructivism	06
2	Constructivist Mathematics And Science Education	05
3	Constructivist Pedagogy	15
4	Problem Based Learning	05
5	Social Skill	05
6	Constructivism And Teacher Education	05
		Total=41

2.1.1. Constructivism

Anthony (1996) inquired into *active learning* in a constructivist framework. Case-studies of two student groups contrasting passive and active learning behaviours were undertaken. Examples of their strategic learning behaviours illustrate that having students involved in activities such as discussions, question answering and seat work problems does not automatically guarantee successful knowledge construction but the quality of their learning strategies are seen to be critical factors in successful learning outcomes.

Evans (2002) explored the *perception* of Fifth-grade students' experiences participating in peer-led literature discussion group using a social constructivist framework to guide the study. Data were collected over the course of an entire school year and involved observing peer-led literature discussions and leading students in reflective debriefing of their discussion group experience. Primary data sources

included transcribed literature, discussions and transcriptions of each group's reflection in their discussion. Secondary data sources were field notes, student work and an end-of-the year sociometry measure. Three major themes emerged from data analysis. Students have a clear notion of the conditions that are conducive to effective discussions. Students perceived the gender make-up of their group to influence how they participated in and experienced their discussions. Students found the presence of a bossy group to influence their participation in discussion.

Bliss, Askew and Sheila, Macrae (1996) investigated *Scaffolding*. They examined scaffolding in schooling contexts rather than those of every day life. It was concluded that Education was embedded the concept of scaffolding within a psycho-social model of teaching –learning.

Nguyen, C. N. (2003) studied the *construction of teacher's knowledge*. The purpose of the study was to know how the knowledge was constructed. Data were collected by interviews, field notes, personal communication via Email and Telephone and a Focus–group meeting. Cross–case analysis compared similarities and differences among the participants. The finding of the study was that the teachers utilise common sources of knowledge, yet construct their knowledge uniquely.

Gray, Wade (1994) undertook a study of the effects of a *constructivist based* mathematics problem-solving instructional programme on the attitude, self-confidence and achievement of post-fifth grade students. This study implemented a mathematics problem-solving instructional programme based on constructivism theory that individuals construct meaning through experiences. It was found that constructivist–based instructional programme emphasised the use of reading and writing strategies in a social context that allowed peer collaboration to solve problems.

Beth, Miller's (2000) studied the nature of *constructivist* statistics class room. The practice was viewed through constructivist theory. It allowed students to develop and construct their understanding of the material based upon their own knowledge and beliefs and experiences in a concert with new knowledge presented in the class room. It was found that participants supported student construction of knowledge to some degree. Multiple instructional strategies were employed to involve the students in the learning process.

Implication for the present study

Education is embedded to the concept of scaffolding and peer collaboration within a psycho-social model of teaching-learning (Bliss, 1996 and Hray, 1994). Seminal psychologist Vygotsky has theorised that social interaction is a key mechanism in the process of learning. Because teaching and learning are highly social activities. An important tenet of constructivism is that Learning is an idiosyncratic, active and evolving process. Learning is a process of knowledge construction and not of knowledge recording or absorption. It was found that participants supported student construction of knowledge to some degree (Beth, 2000). Multiple instructional strategies are to be employed to involve the students in the learning process. The quality of the learning strategies are seen to be critical factors in successful learning outcomes (Anthony, 1996). So, active learning strategy is necessary for students to effectively cope with the demands placed on the learner in a constructivist learning environment. The constructivist approach of learning has an influence in the knowledge construction within the domain of teacher education. Teachers utilise common sources of knowledge, yet construct their knowledge uniquely. The primary source from which a teacher sought knowledge differed depending upon the experience of the teacher (Nguyen, 2003).

Thus, the implication gave new direction to use social constructivist based instructional programme to allow students to develop and construct knowledge through social experiences. This includes *Vygotsky's Approach of Learning.*

2.1.2. Constructivist Mathematics and Science Education

A case-study by **Enyey, N (2003)** on knowledge construction and collective practices in mathematics classroom investigated how student's mathematical activities and there by their mathematics understandings change as a function of their participation in different *social configurations*. The investigation was based on how discourse practices propagate across the classroom and are adopted by individual students. The study suggested that classroom mathematics practices are developed in part, for the social and communicative purpose and not purely for cognitive value to individuals.

Terrywood, cob and Yakel (1993) conducted a study on the nature of whole-class discussion in mathematics class room. Qualitative methodology extending from clinical interviews of individual children's mathematics constructions to video recordings of classroom lessons was adopted. The study suggested that social interaction that occurred in the class room was grounded 'social constructivist philosophical base which viewed learning as '*construction of knowledge' within social context.*

Debora, K.L (2002) studied the effect of a constructivist mathematics method course on the level of mathematics anxiety in pre-service early childhood teachers. The result suggested that constructivist mathematics method course can be designed to build *confidence* and promote effective teaching and learning.

Ann, Jenny (1994) in a study inquired mathematics culture of a primary constructivist class room through an ethnographic description. It explained that in the formation of constructivist philosophies compromises were made by the teacher and cultural structures. The result showed that it promoted the construction of mathematical knowledge. A *constructivist culture* was found to be constructed as meaningful to the construction of knowledge.

Baughman, Owen (1993) studied the ways an elementary teacher fostered constructivism in the mathematics class room. The result suggested that a teacher must develop a safe, secure environment if constructivism is to be fostered. With this environment, the teacher can provide various problem situations that promote students' *active reflection.*

Implication for the present study

Vygotsky's approach of learning emphasise making students aware of their own role in constructing knowledge. Ann, J (1994) in a study inquired mathematics culture and found meaningful to the construction of knowledge. In order to foster constructivism, the teacher can provide various problem situations that can provide students' active reflection (Baughman, 1993). Further, mathematics and science method course can be designed to build confidence (Debora (2002). On the above reviews it was understood that mathematics and science activities and thereby construction of knowledge through participation in different social configurations can be developed. Hence, present study was directed to solve real world problems in a constructivist learning environment using *Vygotsky's Approach of Learning.*

2.1.3. Constructivist pedagogy

Zack and McKinney (1995) studied group interaction in a social context of management groups. The research examined the different management groups performing the same task but operating with different social contexts. By means of an in depth multi-method field study, it examined the influence of the groups social context on the patterns of face to face communication. It was observed that the groups were performing a co-operative task. Their findings suggested that we must explicitly take into account *social context* in order to alter group interaction.

Siegel, C. (2005) in his study of implementing a research based model of co-operative learning explored on 8^{th} grade mathematics. Data collection involved interviews and class room observations. Coding schemes and descriptive statistics for data reduction and analysis were used. The results revealed that the subject's prior experience and teaching–learning context as factors that influenced co-operative learning instructions.

J.Nathan and Knath, E. (2003) in their research study of whole class-room mathematics discourse and teacher change, explored whole class discussion in the nature of peer and teacher-directed scaffolding. Discourse analysis of class room videos served both as an analysis tool for study of whole class-room interactions as well as a resource for promoting discussion and reflection. The results showed that the teacher change affected social scaffolding role. So, the study led to insights about how class-room interactions, discourse can be shaped by a *teacher's beliefs and interpretations.*

Cleary, S. (2002) studied the effectiveness of co-operative learning as an instructional strategy to increase biological literacy and academic achievement. In a large biology class, experimental study was adopted. It was found that co-operative learning is an active learning strategy in which students work together to create their *knowledge interdependently* to maximise their own and each other's learning.

A critical examination of the virtual organisation and the natural dependencies of trust, communication and collaborative learning were undertaken by **Lavin (2002).** This was ethnographic study over a period of 10 years. Informal discussions, formal interviews and personal experience yielded information about

working in a virtual organisation. The pivotal themes that emerged from the study are trust, communication and collaborative learning. *Active communication* and a *high level of trust* can lead to collaborative learning.

Crews, Weldon (2002) studied the use of collaboration and reflection in a paired student-teacher placement. A social constructivist theory and research from the areas of peer collaboration and reflection guided the study. Observation, interview and audio-tapes were used to interpret the data. The findings were

1. Collaborative interactions like division of teaching responsibilities, giving two explanations of science content were significant.

2. Reflection impacted in areas of management, science content and pedagogical content knowledge.

Jane, summers (2002) in a study of social goals, achievement goals and the path ways of peer influence, the findings brought new considerations to the concept of peer influence on academic achievement. The effects of shared social goals and achievement goals for individual effects and class room's effects were indicated. It led them to adopt motivational goals of self-protection.

Claire (2003) studied building a professional learning community in pre-service teacher Education. Peer coaching and video analysis were implemented for peer-coaching process (PCP). The implementation of PCP was to explore the ways in which it affected the pre service teacher's reflection and instructional practices. It was also studied how it impacted their acquisition and development of collaboration skills. *Inquiry* was centred into the craft of teaching.

Cahill (2002) studied collaborative conversations to inquiry into students who struggle in school. It was found that *collaborative dialogue* challenged their assumptions and beliefs. The 'status quo' assumptions, beliefs and structures interfered with the change and transformation. Further, sustained involvement in the conversational inquiry process created participation structure that enabled to engage in significant intellectual work.

Joseph, L .Armstrong (1999) conducted research entitled as "collaborative learning: A study of two classes". The findings were

1. The process of *collaboration learning* in the two groups revealed three categories of theme a) group process b) learning process c) group facilitation

   ➔ Group process contained themes of cohesion, trust and respect. Confusion, frustration, conflict.

   ➔ Learning process of discourse, engagement and question

   ➔ Group facilitation of facilitator's actions and participants as facilitator

2. It explored "teaching for cultural diversity" to emphasise inter-cultural competency and personal teaching efficacy.

3. It was supported by an 'ethic of care' philosophy.

Mary, K. (1999) undertook study on discourse in small groups in an Algebra class. The study examined student's talk, transcripts of teacher-student interactions and student-student interactions, field notes, copies of written works, follow up interviews and comparison. The analysis was carried out in relation to several research questions. The findings were based on '*talk in small group'* which differed from 'talk with the teacher'. These were:

1) Students used talk to build their understandings

2) Groups worked together.

3) The teacher learned about student's understanding from their talk

Michelle, S. (1999) studied pre-service elementary teacher's attitude towards mathematics and the teaching of mathematics in a constructivist class room. It was found that attitude was found to become more *positive after participation in constructivist class room.*

Fairbanks. and Freedman (2000) studied the role of effective *mentors* in learning to teach. The findings were:

- Establishment of relation between mentor teacher and student teacher was an ongoing process

- By sharing perspectives, providing examples mentor teachers metaphorically lend their experience to their new colleagues, supporting their leaning by assisting them in completing the responsibilities of a legitimate participant

- Experience as a continuous process through which a teaching identity is produced and reproduced through the social interaction and particular contexts that exist within schools and class rooms.

Remedies, Clrke, and Hawthorne (2008) investigated "the silent participant in *small group collaborative* learning contexts". The findings were :

a. Silent participation was an established mode of participation in a small group collaborative learning context

b. "Elaborate to learn" carried a number of risks.

c. Silence was viewed as failure to learn

d. Silent was a consequence of multiple constraints-personal, contextual and cultural.

Scott-Ladd, B. and Chan, C. (2008) focused to teach students to manage *team learning* and improve team work satisfaction using action research. The findings were:

1. When students were taught to manage the processes of team work and take greater ownership of managing conflict and team relations, they report less conflict and less social loafing

2. Female students were more inclined to work collectively with more emphasis on feelings\intuition and integrating learning where as males viewed their roles as leaders, thinkers and problem–solvers more positive.

3. Two samples were relatively small and did not identify biases related to age, gender and culture.

Implication for the present study

Teaching and learning are essentially social activities. Vygotsky has theorised that social interaction is a key mechanism in the process of learning and development. So, Vygotskian constructivism approaches delve into the learners' mind through active learning. Learner generated inquiry authentic experiences, collaborative investigations and discussions, reflection, discourse in small group, peer influence, peer coaching, scaffolding and structuring learning around primary concepts. Hence, we must understand how existing structures and *social contexts influence patterns of social skill behaviour*.

The research study (Zack and Mc Kenny, 1995) directed to investigate to study how social contexts in teacher education structure influence patterns of communicative behaviour. In order to study social interaction in a co-operative learning instruction students' prior experience and teaching–learning context, peer and teacher–directed scaffolding, peer collaboration and peer influence, peer coaching should be considered as factors through use of social constructivist theory (Siegel, 2005; Nathan and Knath, 2003; crews, 2002; Summers, 2002; Claire, 2003).

The study can also be undertaken in teaching of mathematics and science like subjects in a constructivist class room to study discourse in small groups (Mary, 1999; Michelle, 1999) and participation in a small group collaboration learning context (Clarke and Hawthorne,2008). The social relationship elements were also demonstrated in some studies to establish relationship, teaching identity, team work, taking greater ownership in small group collaborative learning context (Scott-Ladd and Christopher,2008;Clarke and Hawthorne,2008;Fair bark and Freedman.2000).

Hence, the study stimulated to investigate social skill components in the process of small group discourse, collaboration, co-operation and sharing as per the perspectives of Vygotsky's Approach of Learning.

2.1.4. Problem Based Learning

Nuy (1991) studied interactions of study orientation in educational environment in which learning activities take place. The study explored interactions between three structure dimensions of study orientation. In this study, dimensions of structure were explored in a curriculum, based on PBL. Factor analysis on students' judgements unfolded three dimensions of structure

1. *Content*

2. *Organisation*

3. *Social setting*

It was found that these three dimensions were structured in the educational environment in which PBL was embedded.

Chirial, H.E (2008) had undertaken a study to understand group processes in PBL. Data had collected through a multi-strategy approach. The main method for data gathering was qualitative. The qualitative method was used as follow-up study. The data gathering methods were observation, questionnaire and interviews. The results disclosed that it is possible to give a comprehensive and descriptive picture of the group processes that occur in PBL tutorials. It provided a better understanding of internal *dynamics in group*. Thus, it offered a theoretical tool for research purposes.

Gijbels, Bossche and Segers (2005) studied the effects of PBL through a meta-analysis from the angle of assessment. Three criteria were identified for implementation of PBL. These were

1. Understanding of concepts

2. Understanding of principles that link concepts

3. Linking of concepts and principles to conditions and procedures for application

Diane, .Judd (1999) conducted a study on problem solving strategies on pre-service teachers coping in a technology learning environment. The study explored the interrelated connections between learning constructivism, problem solving strategies, *social cognitive interactions* and teacher education programme. It was found that

1. Pre-service teachers use the constructivist components like socialisation, collaboration, shared knowledge and resource support tools in this created learning environment

2. The created learning environment affected the learner's problem solving strategies through the use of graphs, charts and matrices.

Gossman, p, Stewart, T. and Jaspers (2007) focused on integration of PBL scenarios to the curriculum. It was found that

1. PBL promoted *greater engagement* with the subject.
2. One element of PBL was that teaching and learning stems from and comes after, exposure to a scenario. The situation made the students learnt how to think and to reflect upon.
3. PBL offered a viable alternative to traditional course delivery.

Implication for the present study

The paradigm shift from traditional teaching method to a more innovative teaching-learning method was the key in transforming the way that students were prepared to carryout learning activities. Rather than presenting the content first, PBL presents with an ill-structured, complex, real world and messy problem and with multiple solutions. PBL offered a viable alternative to traditional course delivery (Grossman & et.al, 2007). PBL started from and came after exposure to a scenario. PBL was a situation where the students learnt how to think and to reflect upon. It was found that three dimensions were structured in the educational environment in which PBL was embedded: content, organisation and social setting (Nuy, 1991). The created learning environment affected the learners' problem-solving strategies through constructivist components like socialisation, collaboration, shared knowledge and resource support tools (Diane, 1999). Hence, the interrelated connections between learning, constructivism, problem-solving strategies, and social-cognitive interactions during PBL in teacher education programme can be explored.

2.1.5. Social Skill

Hamann, Lineburgh and Paul (1998) in their study of teaching effectiveness and *Social Skill* development determined emotional sensitivity and social control were related to teaching effectiveness among pre-service teachers. They assessed an individual's skill in receiving and interpreting non-verbal communication of others as an individual's ability to engage others in a social discourse. An individual's skill in communication particularly non–verbal

communication during discourse was dealt with pre-service teachers. The study did not focus on verbal and non-verbal communication concurrently for social discourse. Therefore, study on Social Skill development through face-to-face communication can be undertaken.

Moonha, Samuel (2003) in a study entitled as promoting social skill development in a community of practice tried to create community environment to enable improved student learning. Through implementation of intervention, the impact explicitly promoted social skill development on overall community functioning and students' learning. The finding was that desired social behaviours like more frequent peer-to-peer knowledge sharing, greater student involvement in the work progress and better use of shared resources were modelled in formal settings. Hence, it suggested a healthy *social culture* enabling the proper functioning of learning environments.

A study of **Susan, Gottfried (2002)** entitled elements of effective collaboration: a life story of expert collaborators was aimed to understand deeply of the elements that foster effective collaboration. The finding suggested that

1. The interpersonal relations were characterized by tolerating and accepting others.

2. Collaborators placed value on giving and receiving encouragement and assistance.

Kiran, shulka (1992) in a study of development of social competence as a function of parental behaviour and peer interaction, explored peer interaction. The purpose of the study was to explore peer interaction influencing development of social competence of the learners. The result indicated that peer interaction had significant effect on the development of *social competence.*

Camardse, A. Hoffman (2002) examined the perspectives of students, parents and teachers regarding the social implications of inclusion. Quantitative (social skill rating system) and qualitative (semi-structured interviews) methods were employed to delineate the differences in social skill behaviour between students with disabilities and without disabilities in a general education class-room. In this study, all students reported themselves as more socially competent in co-operation,

assertion and self-control than did adults. All students reported that friendships were easier to form when common interests were formed. Inclusion programmes might benefit from incorporating the pro-social skills of helping others, by providing situations for students with disabilities and assisting others.

Implication for the present study

Studies related to emotional sensitivity and social control, interpersonal relations and influence of peer interaction towards development of social competence indicated the social implications of teaching effectiveness (Line Burgh and Paul, 1998; Gottfried, S, 2002; Shukla, K. 1992; Hoffman, 2002). Samuel (2003) strongly reported that exhibition of desired social behaviours improved student learning. Hence, it suggested the importance of a healthy social culture towards enabling the proper creating of learning environments. The studies were even. So, studies related to social behaviour in constructivist learning environment was not found. In addition to this, affective development in particular, towards development of social skill components was never located among pre-service teachers in the constructivist learning environment. So, the gap was clearly marked in this direction. Hence, a study on social behaviours among pre-service teacher trainees in constructivist learning environments can be examined.

2.1.6. Teacher Education

Nancy, Fraser (2003) in a study "the heart of the class-room: affective development in teacher education" investigated affective competence in the development of teaching skills. The study's key findings led to the conclusion that teacher development courses in affective mentoring were key contributions.

Louise's (2000) studied the role of a teacher study group in negotiating constructivist science teaching in an elementary school. Each teacher learned in negotiating constructivism by valuing the study group for the support of science teaching. The researcher found that the study group created a non-threaten forum for reflection, support and sharing **(Jacquelyn, 2001).** Data were gathered from repeated and multiple measures including a demographic questionnaire, concept mapping, stimulated recall interview, a short–answered assessment, interview, a video tape and field notes. It was found that candidates' knowledge construction were greatly aided by strategies like

1) Small group teaching method

2) Instructor's examples

3) Discussion

4) Instructor's explanations.

Laurn, C. (1999) conducted a case-study of constructivist supervision to prepare student teachers for diverse classrooms. Practicum experience in a constructivist-oriented teacher education programme was designed to promote reflectivity. The result indicated that constructivist supervision facilitated *reflectivity* of some student teachers and not in others.

Maureen (2001) in a study of "constructivist teacher education: taking theory to practice of faculty educators" aimed to document the change process from use of a traditional didactic-based to learner centred constructivist model. It was found that developing constructivist pedagogy requires a process of active *reflection dialogue* for authentic change to occur.

Implication for the present study

Studies confirmed that the teachers' group created forum for reflection, learnt support and sharing in negotiating constructivism (Fraser, 2003; Louise, 2000 and Curley, 1999). Studies were available on constructivism by application to instruction within the domain of pre-service teacher education (Jacquelyn, 2000 and Maureen, 2001). But, no studies were found on examination of social behaviours using constructivist pedagogy among pre-service teacher trainees. Hence, this gap led to study social skill behaviours of pre-service teacher trainees using constructivism by application to instruction.

2.2. Relevance to the Present Study

After thorough review of related studies, the implications can be summarised in three following heads: **Focus, Methodology and Findings**

Focus

41 studies under six areas were reviewed. The studies on *constructivism* were all focused towards *knowledge construction* process. These had never looked into the affective development of subjects. So, *Social components during knowledge construction process were not studied.* Social skill components were studied unevenly. These components were examined in teacher development and teaching effectiveness but, never studied on constructivist learning environment.

Methodology

Most of the research studies on constructivism had adopted qualitative research. The data was collected by interview, field notes, focus group meeting, personal communication and observation. Thus, there was consistency in the type of methodology used in various studies. It might be due to the fact that the area of constructivism demands *qualitative case-study* to examine sharing, co-operation and collaboration. Thus, Constructivist Approach of Learning is embedded with the process of sharing, participation, discussion, scaffolding, peer collaboration, discourse in small group and active reflection.

Findings

On the basis of findings of the related studies the following implications can be drawn:

The classroom was grounded on social-constructivist philosophical base. A constructivist culture was understood within social context. Mathematics and science activities embedded in problem scenario were essential in a social configuration to construct meaningful mathematical knowledge. Group work in a co-operative learning instruction and in the process of collaboration was designed to study social interaction. Activities such as discussion, question-answering and work problems were seen to be critical factors of successful knowledge construction. Peer interaction significantly effect on the development of social competence. The social relationship elements were demonstrated to establish relationship, teaching identity, team work, taking ownership in small group collaborative learning context. Pre-service teacher trainees used collaboration and shared knowledge as the constructivist components.

The review of the above 41 research studies gave many directions to experiment the effectiveness of constructivism approach of learning in Indian context. But the present study took up only the followings keeping research questions in mind.

- Social constructivist approach instead of individual constructivist approach
- Social skill behaviours instead of cognitive behaviours during mathematics and science learning
- Sharing ,peer collaboration, teacher directed scaffolding instead of peer coaching
- Small group PBL instead of instructor's example and explanations

Thus, in view of the above implications, an attempt has been made in the present study to construct Social Skill components through Vygotsky's Approach of Learning among pre-service teacher trainees.