Chapter 3

REVIEW OF RELATED LITERATURE

3.1. STUDIES AND LITERATURES RELATED TO ART AND DRAWING.

3.2. STUDIES AND LITERATURES RELATED TO CHILDREN’S DRAWINGS.

3.3. STUDIES AND LITERATURES RELATED TO DRAWING ORIENTED INSTRUCTION.
Effective research is based on past knowledge. Only knowledge of the past will help us to equip for the present. A review of related literature helps an Investigator to eliminate the duplication of what has been done and provides useful hypotheses and helpful suggestions for significant investigation (Best, 1999).

Review of related literature allows the researcher to acquaint himself with current knowledge in the field or area in which he is going to conduct his research. For any worthwhile research the researcher needs an adequate familiarity with the literature available in that field of study.

The researcher reviewed to the Encyclopaedia of Educational Research, different teaching methodologies, psychology, various journals, educational year books, dissertations, abstracts, web sites etc. to find out whether similar studies or studies of a comparable nature have been conducted elsewhere. It was found that studies in art and drawing skill based instructional approach are very rare. However a brief literature on such methods, approaches and strategies of teaching presented in this chapter along with the available studies even though they are not directly related to drawing skill oriented instructional approach. The studies and literatures thus examined have been classified into three main sections as follows:

3.1 STUDIES AND LITERATURES RELATED TO ART AND DRAWING
3.2 STUDIES AND LITERATURES RELATED TO CHILDREN’S DRAWING
3.3 STUDIES AND LITERATURES RELATED TO DRAWING ORIENTED INSTRUCTION
3.1 STUDIES AND LITERATURES RELATED TO ART AND DRAWING

Pestalozzi (1888) represented a turning point in the history of the teaching of drawing because of his claim that drawing could be justified as an essential and integral part of every child's education and not merely as an extra activity. According to him every child has to learn how to draw and without instruction in drawing there could be no harmonious human development. Pestalozzi is the first to attempt to teach drawing according to pedagogical principle. He recognized drawing as an educational subject and granted it the same position and importance as other essential educational subjects.

Developmental theories in art originated in the work of Luquet (1927) who used naturalistic observations to describe stage-like progressions in children’s drawing. He assumed that children’s drawings were based on an internal mental model. He identified five stages of development in the first stage ‘fortuitous realism’ a child recognizes likeness between their spontaneous scribble and something known to them in the world. The child’s discovery that his or her marks can be representational leads to more intentional mark making. Luquet calls the next stage ‘failed realism’ when referring to the child’s inadequate skills for producing a likeness, and ‘synthetic incapacity’ when referring to the child’s inability to place marks in correct spatial relationships. The first stage of successful intentional representation is called ‘intellectual realism. This is where the child draws not only what they see but also what they know.

Piaget and Inhelder (1948) argued that a child’s drawing performance reflected the child’s cognitive competence. Until a child reached
the concrete operational stage of development, the child was tied to egocentric mental models of the world. Only when a child enters fully into the stage of concrete operations can combine concepts of perpendicularity, parallelism, seriation and proportion with new ability to discriminate different viewpoints and selecting a viewpoint to depict, produce visually realistic drawings. According to Piaget drawing was not a special domain of development but merely a window into the child’s general cognitive development.

In Erikson’s (1950) view the school age child is focused emotionally on demonstrating skill. Artistic realism seems to be valued in culture, so realism is reflected in children's drawings. If children judge themselves to be good at drawing, they will likely to continue drawing, to see themselves as competent.

Gibson (1953) indicates that controlled practice or training and instruction can improve perceptual judgments and increase the accuracy and differentiation of drawings.

Lowenfeld (1957) published “Creative and Mental Growth”, which quickly became the textbook for art educators. Lowenfeld argues that there are six clearly defined stages of artistic development.

Salome’s (1965) statistical study of visual perception argues that the children need rigorous drawing programs which would teach them the specifics of drawing.

Nelson and Flannery (1967) examined the direct teaching of perceptual skills. Their focus was the relationship between teaching styles and student’s drawing styles. They found a positive correlation between direct teaching of perceptual skills and children’s drawing performance.
According to Schwartz and Douglas (1967) the goals of art for younger children is to:

1. Express their thinking, knowledge and ideas;
2. Explore, try out, and create with new and different kinds of media;
3. Experiment with colours, lines, forms, shapes, textures, and designs;
4. Express feelings and emotions;

Goodman (1968) in his book ‘Languages of Art’ represents a fundamental turning point in the analytic approach to artistic issues. His unorthodox approach to art is part of a general approach to knowledge and reality and is always pervasively informed by his cognitivism, nominalism, relativism and constructivism. From Languages of Art and subsequent works, a general view of the arts as contributing to the understanding and indeed to the building of the realities we live in emerges.

Arnheim (1969) intended to narrow the gap between scientific and artistic knowledge, to use scientific findings to better understand the arts while preserving the equally pivotal role of subjectivity, intuition, and self-expression. He challenged the age-old distinctions between thinking and perceiving, and between intellect and intuition. Arnheim argues that the development of drawing in young children is one of progressive differentiation. He describes the child’s development in drawing as the progressive production of graphic forms, either invented or taught, by which the child tries to realize his or her intention for a particular picture. Arnheim sees these progressive differentiations being driven largely by aesthetic considerations. He recognizes schematic drawings as necessary steps towards depictions that are more complex rather than deficient representations.
Kellogg (1970) points out that by understanding the developmental stages children progress through when drawing, you will be able to allow your child to express themselves spontaneously. She analyzed hundreds of children’s drawings from around the world and identified twenty different basic scribbles. She suggests that these scribble were acquired in a developmental sequence and that there might be a chronological framework that describes drawing in terms of cognitive development. She suggested that children need to progress through the described stages and viewed the omission of detail as lack of knowledge or misunderstanding.

Salome and Reeves (1972) developed a drawing program which gave children the specific perceptual training. This program managed to increase young children’s visual perceptual learning as well as the amount of visual information in children’s observational drawings. They showed how perceptual training of very young children could also benefit the children’s readiness to read.

Taylor (1974) refers to activating ‘a child's passive knowledge about the universe and motivating him to his own creative problem solving and resulting creative self expression’ in the book “Math in Art”

Grove, R (1975) focuses all aspects of fine and performing arts for gifted and ways of implementing such programs at the local, state, and national level in an overview of presentations at the national conference on arts and humanities.

According to Brittain (1979) author of Creativity, Art and the Young Child, "The child's personality often shines through loud and clear when he or she draws or paints."
Lansing (1981) observed that drawing a perceived object was significantly more effective in building mental representations of that object than either the tracing of the object or the mere perception of the object. Drawing was also shown to be significantly more effective in extending one's memory of the object than either tracing or perception of the object. Lansing shows that drawing makes a significant contribution to the development of mental representations.

Schwartz (1982) tries to explain the interaction of text and pictures. For young children it may be that thinking and designing occurs most effectively orally and mentally, and that there is no need for them to draw the design they have created in these ways.

Nancy Smith's (1983) study of young children's observational drawings examined whether or not children draw from observation and how they draw. She discovered that children's observational drawings were much more detailed and contained much more information than their memory drawings and that subjects of a more appealing or personal interest were likely to contain more elaborate information. She wrote a 'how to' book for teachers on observational drawing. In Smith's idea, the ability to use images metaphorically depends on the ability to entertain two levels of symbolization at once. The artist must decide which object best represents the concept or emotion and which lines, shapes and colours best represent the object.

Woodman and Albany's book Mathematics through Art & Design (1988) a definition of mathematics is given. Definition of mathematics is the classification and study of all possible patterns and relationships. Pattern is anything the mind can recognize as regularity. The justification of links with art
is in terms of creativity and Children will be led to look upon mathematics as a more attractive subject if we draw their attention to the balance between its functional and its aesthetic aspects.

Golomb (1989) considered the child as a problem solver. She examined children’s drawing and sculpture problems. The problems that the children possess in their studies are inherent to a particular graphic media that the children are using. She also discusses the nature of the visual problems the children have to solve in order to represent their ideas. According to Golomb, the problem solving occurs within the context of visual presentation is of value to the child’s overall development as a problem solver. Golomb considered children’s drawing development in terms of cognitive, problem solving activity. Within a broad framework of human development, she studied children’s drawings as a creative search for meaning. She considered representational drawing to be a truly creative activity that is invented and reinvented in every generation and across different cultures to form a basic vocabulary of graphic shapes. She focused on cognitive activity that is motivated by a child’s need to make sense of their world. She examined children’s drawings for symbolic references to children’s experiences.

Golden (1990) describes five different types of visual-verbal relationships in picture storybooks: “text and picture are symmetrical; text depends on picture for clarification; illustration enhances, elaborates text; text carries primary narrative, illustration is selective; and illustration carries primary narrative, text is selective”

Graham (1990) writes: “visual representations are believed to have been part of human society for almost five thousand years”. He writes about
illustrations in picture books, states that "layers of meaning are only accessible through the illustrations".

Cox (1991) conducted studies on the use of transparency in children’s drawings. According to Cox, a child is mentally able to use symbols to represent reality by 18 months. Therefore a child can engage in pretend play. This ability to pretend can be seen as a toddler uses the movement of the crayon or marker to depict an action in his or her drawings. Dots, for example, may be rain falling or animals moving about the page. Gestures are used to represent the action.

Fein (1993) examined drawings for similarities amongst the drawing of children, artists, and drawings from the past. She looked for some developmental progression from descriptive pictures to symbols that are more abstract. She highlights some of the similarities between the progression of children’s drawings and a historical or evolutionary progression over time.

Hayes et al. (1994) suggested that children’s drawings in science can contribute to the development of individual skills, knowledge and understanding. Drawings have been used in a variety of ways when they have been used to probe understanding in science. Drawing activities have been successfully used to explore children’s ideas about abstract concepts.

Scardamalia et al. (1994) studied on graphical tools for representing students’ knowledge lead to gaining skills in graphical representation of concepts. Researchers conclude that Knowledge Forum experience leads to student gains in graphical literacy.

Kiefer’s (1995) work revealed how the illustrations in picture books influenced children's oral, written, visual and representative responses. Kiefer
agrees that reading pictures is indeed a multifaceted act. Further, children often look at illustrations more closely and "see" details in pictures that are missed by "skipping and scanning" adults.

Arnold et al. (1995) have shown how young children’s ideas about the Earth as viewed from space developed from simple notions of a flat cylinder to a sphere. This investigation attempted to group children’s drawings into levels of understanding. In Strommen’s (1995) research into children’s drawings of a forest, drawing content has been quantified.

In 1997, the National Assessment of Educational Progress (NAEP) evaluated student knowledge and performance in the area of arts, along with academic areas of reading, math, science, writing, history, civics and geography. Education support organizations such as the Annenberg Institute have used the NAEP scores as evidence of the positive relationship between high quality arts education and academic achievement.

Wilson and Wilson (1997) suggests that when we look at different classes of children’s creations from different aesthetic or ideological positions, our interpretations lead to quite different conceptions about what is classified as child art, how it develops and the function it plays in children’s lives.

Costal (1997) in relation to view specific drawing, has criticized the notion that children will become better at drawing by attending to their retinal images. He asserts that children’s progression towards view specific drawings is due to cultural convention.

Davis (1997) writes about the ‘u’ curve of graphic development that recognizes young children’s art as having the same aesthetic qualities as professional artists have. Between the age of five and eleven this artistic
competency drops off and then plateaus never to be regained. She advocates that drawing be taught every day just as math and writing and hands over the task of drawing literacy to curriculum experts and teachers.

Sommer’s (1998) “Drawing and Cognition” describes experimental studies of graphic production processes and argues that the act of drawing is a “graphic engine or a production system” that helps people generate concepts. Goel’s "Sketches of Thought" argues that drawings are 'external symbol systems' to represent real world artefacts that can be manipulated and reasoned with.

Agosto (1999) developed a categorization scheme that describes text-image relationships in picture books.

According to Horowitz and others (1999), it is difficult to study the complexity and multiple dimensions of arts education. Especially when integrating a whole-school curriculum, for example, it is difficult to use random sampling and control groups. Researchers must adhere to the methods of classic experimental design in order to prove a causal linkage between arts and academics.

Welch et al. (2000) says that drawing is a method by which children explore a problem, and discussion between children plays a major role in clarifying problems. For most young children what they produce in the design phase is seen as only one possible solution, the model they make later is yet another and (in their eyes) more significant solution.

In Arts as Education, Goldberg and Phillips (2000) characterize arts education as a powerful instructional strategy that engages all students in learning, regardless of language, culture and life experiences. Supporters of
arts instruction for diverse learners believe that the arts make education more equitable because they “transcend” limitations and boundaries associated with diversity. Proponents assert that the arts provide a rich array of contexts in which learners can successfully derive and express meaning. Offering a variety of contexts, proponents believe, increases the likelihood that everyone can participate fully in education, including those who have struggled in the more traditional modes of teaching and learning. Goldberg and others concluded that the arts lay the groundwork for “socially inclusive learning environments that build on commonalities, while respecting differences”

In diSessa’s (2000) article “changing minds of children”, as technology integrally affects the way children represent, communicate, and remember, in and out of school. He stresses the use of geometric forms in primary grades and basic art concepts are given as colour, line, form, space and texture.

Winner (2000) clarified the influence of arts study on non-art domains. A positive, moderately-sized relationship between reading improvement and an integrated arts-reading form of instruction also was found. In general, findings demonstrate the existence of a positive relationship between studying the arts and academic achievement.

Koster’s( 2001) view of art as a visual symbolic system connotes art as a unique language, and opportunities for students to interweave art, writing, and speech to communicate their ideas deepens interpersonal and intrapersonal vocabulary and understanding. Koster viewed that in addition to words and numbers, students can use pictures to explain their solution. Koster compares a similar writing process framework with an art process framework
where writing=art, prewriting=rehearsal, drafting=sketching, revision stage=same for both, peer share=same for both, revision stage=same for both, production=same for both, editing=same for both, teacher conference=same for both and publishing=presentation.

Freedman (2001) has a new appreciation of the visual arts as a way of making meaningful connections with the world so as to understand its purpose, meaning, relationship and influence. In Freedman’s words “Conceptualized as visual culture, the visual arts do not only represent culture, they are the physical embodiment of it”. This socio-anthropological and socio-cultural approach to teaching visual culture is particularly relevant to the complex multicultural postmodern society we live in today. When we realize that visual arts and visual culture are already an important part in the life of every student, we can provide every child with a culturally and socially relevant experience in visual arts.

In *Art and Cognition*, Efland (2002) differentiated between expected outcomes in terms of science versus arts. Academics are associated with science, which is highly valued in our society because science is associated with intelligence. In the same vein, the arts may not be considered a valuable part of education because its effects on academic achievement are not consistently proven. Efland proposed that arts education avoid the need to prove itself by focusing on higher order thinking and learning, rather than specific academic achievement.

Walsh (2003) examined children’s reading of visual texts and found that the images in picture books evoked a variety of responses in the young children participating in her research.
In the book “Diagrams about Thoughts, Thoughts about Diagrams”, Blackwell (2003) provided an overview of the related literature in experimental psychology which views a diagram as a notation that provides information and intention clues in a visual form.

Chandrasekaran et al. (2003) in their review paper on the "Diagrammatic Representations" observe that there is an emerging consensus that diagrams function as an aid in the organization of cognitive activity.

Fish (2004) in "How Sketches Work" point out that sketches are representations of "visual thought" that help to facilitate perception and translation of ideas. He argues that a diagram is a representation created to externalize and visualize problems.

Suwa and Tversky (2004) report that drawing is important in that it reveals a designer’s thinking graphically and facilitates problem solving and creative effort. They argue from their retrospective reports of design process that drawings provide visual cues for revision and refinement of ideas. They also classify the information in the verbal protocols into different categories such as spaces, things, shapes, views, lights and circulation.

Sketching ability can be evaluated by different criteria. Yang and Cham, (2007) studied it in the engineering sector. They have evaluated this ability based on three distinct aspects relevant to engineering design: visual recall, rendering and novel visualization. This study focusing on sketching in engineering design considered the role of a designer’s sketching ability and examined the potential link between this skill and measures of engineering design performance. The results suggested that sketching skill is not comprehensive nor is it solely task based. Rather, a designer’s sketching
ability lies between these two poles. This study’s findings suggest an important interplay between a designer’s ability to sketch and their ability to visualize in their heads or through prototypes. Results also suggested that designers who are given sketch instruction tended to be more willing to express their ideas via drawing. This study clearly emphasizes the ‘repetition’, ‘practice’ and various aspects of sketching skill.

Edward’s (2008) study suggest that human cognitive capacity is divided into two main parts referred to as left brain and right brain. This argues that the ability to draw may depend on the possibility of accessing the brain’s right hemisphere at a conscious level. Some techniques have been developed to help individuals with this access.

Maslen and Southern (2011) found that by drawing, the brain’s editing is somehow put on hold, thereby permitting one to see more fully and perhaps more realistically which means that by drawing, one learns to see.

3.2 STUDIES AND LITERATURES RELATED TO CHILDREN’S DRAWING

Meier (1939) discussed the importance of encouragement, nurturing and modelling in the development of artistically talented individuals. Artistically talented people are influenced by a number of factors which are inherited, acquired, and learned. The presence of a close friend or mentor to encourage the developing talent is necessary.

Carlson (1963) observed that fourth, fifth and sixth graders who were provided special stimulus materials (pictures, records, toys) wrote longer and more original compositions and used a more versatile vocabulary than students in the control group who were writing on an assigned topic.
According to Piaget and Inhelder (1963), preschoolers draw what they know about the world, rather than attempting to capture a photographic mirror of reality. That is why we see drawings depicting both the outside and inside of an object at the same time. While approaching realism, drawings remain fanciful throughout the preschool years with imagination leading colour, composition and content. Piaget & Inhelder, interpreted many early drawing phenomena as pictorial.

Koppitz (1968) found that girls tended to include more body parts and clothing in their figures than boys. Because drawings are often determined and interpreted, in part, on the basis of realism which is identified through completeness of the human figure(s), the additional details drawn by the girls could be misinterpreted as manifesting superior intelligence.

Olson (1968) found that teaching children drawing rules resulted in a significant improvement in their ability to make drawings. There is some evidence that children use rules when drawing. First, children often copy simple shapes in the same way. Second, children seem to follow the same route when making drawings of the same figure.

Kellogg (1970) claim that children are well aware when their pictorial representations are out of proportion. Between the ages of two and three the child begins to form what Kellogg has termed shapes. The scribble forms a cross, an X, and enclosures resembling primitive circles, squares, triangles and oblongs. Soon after, two of those shapes are used in combination. By age three the child puts together several shapes to form what Kellogg termed aggregates. Kellogg described 20 basic scribbles children tend to use during their first exploratory stage. Most children do not use all of these scribbles.
Instead, children favour certain ones as they develop individual styles. It also appears that scribbles are not placed randomly. After examining thousands of drawings, Kellogg catalogued 17 page placements toddlers use as they scribble.

Phillips *et al.* (1978) developed a coding system on children’s drawings of single cubes, in which drawings were coded for structural errors, the number of faces shown or as an exhaustive categorization of the different forms obtained.

According to Gardner (1980) students should be able to solve the problems of proportion and perspective to his or her satisfaction; he or she is more likely to continue to draw. Sadly, many children stop drawing when they are nine or ten because they do not feel that their efforts are satisfactory.

Wilson and Wilson (1982) challenged the notion that children’s drawings ought to be allowed to mature naturally without any outside influences, by either imitation or instruction. In their extensive studies of children’s spontaneous drawings they found that children teach themselves to draw by copying from a whole range of other graphic images found in their culture. They contend that young children learn to draw mainly through imitation and influence. They propose that children should indeed be encouraged to share their drawing skills with each other as well as copy the work of well-known artists in order to learn to draw better.

Barrett & Bridson, (1983) have the opinion that young children can be provoked into showing their view, for instance, by stressing depth relations between objects before asking children to draw, by
making an explicit request for the child’s view of an object, or by making it important that the child communicate viewpoint information.

According to cultural studies by Alland (1983), when children are provided with drawing materials and encouragement they tend to compose works that reflect the particular culture.

Sommers (1983) reminds ‘graphic conservatism’, a term proposed to describe children’s tendency to repeat established visual formulas. Once a drawing strategy has been acquired, further development most usually takes the form of adding detail and embellishing the drawing rather than revising its basic form.

Freeman and Cox (1985) have examined a variety of drawing problems with young children using a developmental framework. While Cox does acknowledge differences in the representation of the human figure in different cultures, these studies seem to be primarily concerned with determining the age at which certain drawing behaviours most likely occur. Children’s drawings, particularly figure drawings, are still used in the cognitive assessment of young children.

Bremner (1985) conducted Studies using real objects as subject matter have generally involved either an elevated view, with the child looking down at an angle on the array so that far objects were either totally visible or partially occluded by near ones, or an eye-level view in which the far object is totally occluded by the near one.

Case (1985) argued that the development of working memory controls the growth of cognitive structures. Working memory is therefore a useful construct with which to measure developmental changes in the
information-processing capacity which drawing requires. Because individuals can accurately perceive, remember, and manipulate the environment, they clearly have the ability to represent it. Recall can be facilitated by a more richly represented image, which in turn can presumably serve as a mirror into a child’s mental representation of that image. Thus, exploring children’s mental representations through drawings may provide researchers with a better understanding of their developing knowledge structures.

Cratty (1986) termed scribbling as “motor babbling”. According to Cratty by providing children with the materials and opportunities to scribble we can promote physical skills. Just as babbling is a natural way to gain language, scribbling is a natural gateway to muscle control and coordination.

According to Winner (1986), younger children are not concerned with proportion and perspective, the older school-age child wants his or her drawings to look realistic. Young children tend to omit depth information from their drawings.

Cox (1986) suggests that although young children do not spontaneously use partial occlusion, they do feel constrained to show only the objects that are visible in a scene, omitting totally occluded ones.

Lee and Bremner (1987) found that drawings classed as linear perspective in terms of the way the table top was drawn could rarely be classified as consistently drawn using that system when the way the legs were drawn was also examined.
Radkey and Enns (1987) compared end and side views of a two-object array; however, their study does not tackle the issue of how children’s viewpoint in drawing.

Golomb and Helmund (1987) attempted to explore preschooler’s attitudes toward their drawings, through the investigation of their thoughts and feelings about the activity, the medium and the mode of representation. They found that regardless of the medium (paints or crayons) used, children were satisfied with their own productions. For example, most children seemed surprised when asked about altering something in their drawing. Further, when asked if there was anything they could do to make it better, only a few children accepted that they could improve it.

To our knowledge, Sommers (1989) is the only researcher to present a global cognitive model of drawing abilities. He organizes it into two hierarchical systems: Marr’s model of visual perception and a graphic production system. The latter comprises four hierarchically organized components: depiction decisions, production strategy, contingent planning and articulatory and economic constraints.

In Finke’s (1989) research on the use of images for creative synthesis, subjects are shown a set of geometric shapes and asked to suggest a creative combination of them. Finke’s model of creativity claims that new configurations can be generated and explored by manipulating and combining images.

Tallandini and Valentini (1991) found that children’s representations of schools were expressed in three different pictorial components: (a) the building structure (a global component) (b) the building access and (c) the
windows. Using these components, Tallandini and Valentini observed children’s drawings of school buildings and found a progression in representational strategy, with a clear association between age and strategy for all these pictorial components. Children’s most rudimentary strategy, labelled failed symbolism, either did not have these pictorial components or they were unrecognizable. The second strategy, generic symbolism had pictorial components similar to a house, with no evidence of it being a school building. Specific symbolism, the third strategy had components belonging to any school building. Finally, realism included pictorial components that made unequivocal reference to a specific, real school; usually the school attended by the child. Children aged 5–7 draw schools like a simple house without any particular indications that it represents a school. As children conceptually differentiate categories of buildings, they modify the picture into a more specific prototype.

Wales (1991) in a study of pictures produced by aboriginal children in Australia, examines what can occur when children are exposed to quite different cultural influences. He makes distinctions between a child’s mental representations and the different ways that may be used to realize that representations pictorially. Wales cautions us to consider the cognitive, personal and cultural factors that could be taken into account when studying children’s pictures.

Kosslyn & Koenig (1992) proposed a visual perception model which describes more accurately the perceptual components underlying copying than the visual perception system of Van Sommer’s drawing model. Van Sommer’s assumption that a production strategy is a component is unclear
and articulatory and economic constraints are not cognitive components, but constraints imposed during action programming.

According to Cox (1992), Tadpole human figure simply seems to be a symbolic, rather easy, and convenient way to convey the idea of a person. Then the child is six years old, outlines replace single lines used to depict legs and arms. Shoulders don’t usually appear until age nine, and body proportions begin to take some importance around age eight or nine.

Attempting to interpret young children’s unwillingness to revise their drawing, Golomb (1992) suggested that there is a relative stability in a child’s drawing style. She argued that young children tend to repeat the satisfying graphic schemas and to perfect them gradually. Golomb observes that children show only transient interest in their own scribbles, and often readily move from one scribble to the next. With increasing perceptual-motor coordination, the scribbles become complex patterns, guided by visual attention, and determined by esthetic considerations like that of balance and tended to be more circumspect, analyzing the process as a specific skill that develops over time.

According to Braine et al. (1993) children’s drawings show dramatic gains in organization, detail, and representation of depth during middle childhood when some depth cues such as making distant objects smaller than near ones begin to appear.

Mitchell (1994) in his book ‘Iconology’ demonstrates the ‘textual picture’ that a text cannot do without words, whereas ‘pictorial texts’ demonstrate that the image cannot do without words.
Rich (1994) described student's drawing can be used to present main ideas and generate summary statements in writing. Specifically, student-drawn text illustrations seem to be most effective in situations that relate to conceptual recall, problem solving, and explanation of systems or processes.

Toomela (1995) analyzed drawing as a system rather than a unitary ability. The aim was to investigate whether and which language factors influence drawing performance and drawing development. In two studies of 2- to 11-year-old children drawing as a system of components was investigated. Tests were designed to measure motor output, imagery, memory, perception and verbal abilities. The analysis of relationships between drawing measures and components of a drawing system revealed that all of the proposed components independently affected drawing development. Results of analyses of the data from younger and older children separately suggest that different components of a system are crucial for drawing development at different phases of development.

Gardner's (1995) multiple intelligences framework reminds us of the importance of developing children's abilities to comprehend and interpret various sign systems and to communicate using various modes of expression.

Willats (1995) suggested that the process of drawing development could be seen as a result of a series of interactions between production and the child's perception of his/her own depictions. According to him, children change their drawings in order to get them to look better. One stage persists until the child becomes displeased with the drawing system he currently uses, considering it as an insufficiently good representation. Consequently, he adopts a new denotation system, which again results in a drawing that does
not look correct. The whole developmental process goes on, following the same pattern.

Case and Okamoto (1996) showed that there are cultural differences between Chinese and Canadian children’s drawings. These findings suggest that children’s drawings not only reflect representational development but a child’s understanding of self and culture as well. Case and Okamoto also demonstrated that training or additional drawing experiences contribute to the complexity of the drawings.

Stables (1997) challenged the belief that young children can use drawing as a means of modelling and developing ideas which was strongly held in the late 1980’s, and it has been suggested that this may represent an inappropriate paradigm of secondary technology being transferred to the primary sector.

Kindler and Darras (1997) approach the notion of plurality in drawing. Rather than thinking about artistic development as a linear progression, they develop the Metaphor of a map. This model describes three segments of artistic development. The first segment deals with gestation, birth and development of pictorial imagery in the early childhood years. The second segment is concerned with the phenomenon of ‘initial imagery’. The third segment describes the many roads that may be followed in the development of pictorial imagery. They suggest that as children grow they develop an expanding repertoire of strategies of pictorial representation which they apply according to the perceived needs and functions of their drawings and the context in which their work is produced.
Anning (1997) believes that at the moment drawing is ‘caught, not taught’ in most classrooms and she stresses the importance of teacher modelling a range of different types of drawing methods. There are some evidence that where the activity is clearly structured and modelled children can use designs for making. Another method of overcoming the lack of relationship between children’s designs and their making activity may be to use sketching for pre-design ideas and drawing for post-making recording. Children’s ability to use drawing to clarify and explain their ideas has a marked impact in their ability to design and problem solving. Another key factor seems to be their ability to visualize three-dimensional shapes.

Bensur et al. (1997) found age differences in the developmental complexity of children’s drawings. These differences were related to their recognition and memory of various objects found in their environment. Although it was implied that a more developed working memory was responsible for more complex drawings. It is also evident that increased spatial ability also influences complexity. The study concluded that increased drawing complexity reveals advanced working memory and spatial abilities.

Gross and Haynes (1998) conducted a series of studies to explore how and if drawing facilitated verbal reports in children, supporting the premise that drawing does indeed appear to enhance children’s communication of feelings and perceptions. In their initial investigation they compared two groups of children: one group who talked about experiences while they drew and a second who were simply asked to tell about their experiences. Children who were given the opportunity to draw while talking about their experiences did report more information than the children who were merely asked to talk. A
second experiment was conducted to examine children who were interviewed with both procedures; it also revealed that children do report more when asked to draw.

Planta et al. (1999) assumed that children’s drawings reveal their inner world as reflected in their representation of experiences with their own family. The advantage of using drawings is that they represent a means of gathering children’s self-report data without some of the limitations of questionnaires or interviews.

Nagata (1999) in his study suggested that the problem reported by students of not being able to draw may be the lack of proper seeing and perception of the object.

According to Rogers and Wallace (2000), for many teachers drawing is seen as minor method of communication and is given little emphasis in their general classroom programme. As a result children lack understanding of the purpose of design and necessary drawing skills. They can find it difficult to draw oblique lines and acute angles in representing solid shapes and structures, and are often asked to design without knowledge of available materials and their properties. As a result their designs may often exceed the technical skills of the children, or the limitations of the materials available to them.

To Welch et al. (2000) Sketching is a method by which children explore a problem, and discussion between children plays a major role in clarifying problems.

Fleer (2000) suggested that children’s drawing skills may be more fluid and adaptable than it has been previously thought. With the correct
modelling by teachers and exposure to examples of the various drawing genres used for designing, young children may be very capable of drawing designs and using them as reference points in their making activities.

In a study, Jolley and Foster (2000) used a selection task in order to investigate the relationship between children’s production and comprehension of realism in drawings. They argued that the controversial findings of previous studies were probably due to the ambiguous instructions given to children to choose the “best” drawing of an array of drawings. In order to avoid the possible confusion of emotional and cognitive components that such an instruction implies, they attempted to give more precise instructions. More specifically, they attempted to investigate children’s comprehension of realism (which drawing looks most like a real object), preference (which do you like the most) and estimation of their own drawing ability (which looks most like your drawings). Moreover, they used as selection stimuli children’s actual drawings and not the adult versions of children’s pictorial representations that previous researchers have incorporated in their studies. They found that children preferred more advanced drawings than the ones they could produce themselves and that young drawers overestimated their skills in contrast to older subjects who gave more accurate self-evaluations.

As Hughey and Slack (2001) note, "When children use a combination of drawing and narrating, the linguistic and spatial multiple intelligences reinforce each other"

Cohen-Liebman (2001) has observed that drawings are useful in obtaining information on abuse and neglect from children and in forensic
interviews with child clients for court cases involving maltreatment or child custody.

La Voy et al. (2001) explored the idea that, because cultural differences permeate children’s representations of people, children from different cultural backgrounds may represent these differences in their drawings. Cultural differences were examined by looking at differences in social factors such as smiling, and at details and perception of societal worth expressed by the height of the figures. Results indicated that American children drew more smiles and Japanese children drew more details as well as larger figures.

Liben and Downs (2001) found that children as young as three could recognize maps as symbolizing referent spaces but that their understanding was limited due to their developing symbolic and spatial concepts. They also showed that by the age of five or six, children can identify spatial relations on a map, but have difficulties with its geometry. Moreover, boys tended to perform better than girls in correctly identifying the direction of an object when the map was turned 180° in comparison to how the real room was laid out. Another important aspect of a child’s development is the ability to depict spatial elements from his or her environment through an understanding of where an object is located in comparison to him- or herself. A child’s understanding of spatial tasks can also be explored through his/her drawings. young children fail to comprehend a picture’s reference point of view and are unable to understand individual references despite understanding that the picture or map represents another object. In addition, young children have difficulty in understanding a picture’s viewing angle.
Lijima et al. (2001) found that row or frontal arrangements were most commonly used by girls, whereas the incidence of aerial composition was significantly higher in boys’ drawings. Boys also tended to draw dynamic objects (e.g., cars, machines, robots) in bold colors whereas girls tended to draw nature and life oriented objects (e.g., humans, flowers, butterflies) using warm colours. These sex differences in drawings mirror some of the sex differences found in toy preferences and leisure activities. They found that children’s representations of schools were expressed in three different pictorial components: (a) the building structure (a global component); (b) the building access; and (c) the windows. They observed children’s drawings of school buildings and found a progression in representational strategy, with a clear association between age and strategy for all these pictorial components. Children’s most rudimentary strategy, labeled failed symbolism, either did not have these pictorial components or they were unrecognizable. The second strategy, generic symbolism, had pictorial components similar to a house, with no evidence of it being a school building. Specific symbolism, the third strategy, had components belonging to any school building. Finally, realism included pictorial components that made unequivocal reference to a specific, real school, usually the school attended by the child. Children aged 5–7 draw schools like a simple house without any particular indications that it represents a school. As children conceptually differentiate categories of buildings, they modify the picture into a more specific prototype.

Coates (2002) conducted a Small-scale study and it arose from observations in a school setting of young children talking to themselves as they drew pictures. Often it seemed that this talk was a rehearsal for the
drawing and it was this link that the project set out to explore. Children aged from 3 to 7 years were studied in their classrooms where they were participating in a free choice of activities. This paper examines the drawings collected together with transcriptions of the children’s descriptions of their drawings. It looks at the symbolism contained within the pictures and the stories woven within each one. The study is intended as a pilot for a longitudinal research project focusing not only on children’s drawings and accompanying narrative but extending to an exploration of emergent writing.

Arizpe and Styles (2003) analyzed the children’s drawings by using a categorization scheme. They investigated how children aged 4-11 read the visual texts in three multilayered picture books. Arizpe and Styles also examined three features of the children's drawings created in response to the literature: literal understanding, overall effect and internal structure. The literal understanding of the drawings was described as "the child draws people or events from texts to communicate story and events". The overall effect of the drawings considered "qualities such as the aesthetics of the image and a discussion of colour, tone, form and line". Finally, when focusing on the internal structure of the drawings, the researchers examined "the composition for balance and the relationship between objects or characters and their relative scale". In the study, the participants drew pictures in response to the three selections of children's literature. The researchers examined the literal understanding, overall effect and internal structure of the children's drawings and concluded that the children's drawings demonstrated "that even the youngest children can interpret, comprehend and communicate the visual-far beyond what they might be assumed to know". Arizpe and Styles believed
that the children developed "deeper understanding[s] through their visual explorations". They found that the drawings of the younger children "often showed understandings they were unable to articulate".

Golomb (2004) identifies children’s drawings of the human figure as the most informative in terms of cognitive development. This is studied more frequently than other representations and allows researchers to assess the development of children’s use of figural differentiation and representation. Children typically progress from scribbles to first representational shapes and forms, to complex representations of the human figure. In other words, as children mature and develop cognitively, their representations move from simple pictures to differentiated, complex ones. A young child will often draw a “tadpole” figure with a circle as the body/head and sticks as appendages. This representation is a generic creature shaped to symbolize a person. As children develop, they experiment with their representation of the human figure and eventually arrive at a differentiated form that is specific and includes their personal drawing style.

Tversky (2005) reported that when a scene is conveyed by a narrative where the participants are addressed as 'you' and placed them in an environment surrounded by objects then they adopt an internal perspective by constructing a mental spatial framework consisting of extensions of three axes of the body, head/feet, front/back, and left/right, and attaching the objects to themselves. However, when the scene is conveyed by a diagram, participants spontaneously adopts an external perspective on the environment.
Jolley (2010) proves that preschool and primary school children, that is, children aged 4 to 12 years produce representational drawings and present an increasing drawing ability as their age increases.

Jolley et al. (2012) in the article ‘How Drawing is Taught in Chinese Infant Schools’ explained the benefits of drawing for children and are wide-ranging but are likely to be mediated by the art curriculum and other governmental guidance to teachers relevant to drawing/art. Furthermore, such statutory regulations vary between cultures and therefore curricula represent an important influence on the cultural differences found in children's drawings. Previous articles on the teaching of drawing in Chinese schools have commented upon the emphasis placed on children copying from adult drawing models. However, a new art curriculum was implemented in Chinese infant schools (3-6-year-olds) in 2002, still in operation today, which instead places an emphasis on the children's enjoyment of drawing through making creative and expressive pictures from their imagination. This article described the key objectives stated in the Chinese art curricula for infant schools. The article comments on the pedagogical practices adopted and comparisons are made with Western art education and, to the teaching of drawing/art in England for the same age group.

Taken together, these studies suggest that children’s drawings illustrate an array of mental representations, creativity and cognitive abilities. In the present study the Investigator attempted to develop a new Drawing skill oriented Approach in which three types of drawings that are used to indicate children’s feelings and understanding concerning the things depicted: observation type, memory type and schematic type.
3.3 STUDIES AND LITERATURES RELATED TO DRAWING ORIENTED INSTRUCTION

‘The Effect of Drawing on the Development of Mental Representations: A Continuing Study’ is an experimental study by Lansing (1984). Kindergarten children observed and drew a two-dimensional, abstract object. The most accurate and fully developed mental images of the object were produced when the children received instruction, drew the object six times rather than two times, and drew with pointed pencils and brushes rather than big brushes.

Moore and Caldwell (1993) in their study ‘Drama and drawing for narrative writing in primary grades’ found that when the curriculum is designed to develop specific writing skills and the teachers are trained on the substance and implementation of the planned exercises, drama and drawing can significantly improve the quality of narrative writing for second and third graders. This is consistent with a limited number of other studies that have used drawing to enhance writing and a more abundant array of studies that connect dramatic activities with verbal skills. In general, the differences between the program and control students were substantial and significant.

Dorothy et al. (1994) reported a project and it was designed to do a number of things. First there has been an exploration of the purposes which could be achieved by involving children in drawing in junior primary science classes. Second, the study involved the exploration of teaching strategies which could facilitate the achievement of those purposes, this exploration being classroom based whilst meeting the requirements for research.
In the study ‘The Effect of Drawing on Memory Performance in Young Children’, Butler *et al.* (1995) conducted two experiments which examined the effects of drawing on young children’s memory of an event in one day and one month later, respectively. Children who were asked to draw what happened were as accurate and reported more information than children who were asked to tell what happened, although only the verbal reports of both groups were scored.

In the study, ‘Reading is seeing: using visual response to improve the literary reading of reluctant readers’; Wilhelm (1995) demonstrated the value of the arts as an intermediary in the educational process. The author used visual art to engage two students in reading. This study established correlations between arts education practices and student achievement. Correlational research suggests promising instructional strategies and activities for educators to use; studies like this one promote understanding about what those actions concretely look and sound like and reveal the meanings those actions have for students.

De Jenrette (1997) in ‘The arts, language, and knowing: an experimental study of the potential of the visual arts for assessing academic learning by language minority students’ suggested that students reveal more history knowledge when their knowledge is assessed through a combination of writing plus drawing than when it is assessed through writing alone. This finding held not only for students with limited English skills but for typical students as well. This study showed us that drawing may be one way to reveal what students know but cannot put into words.
Anderson (1997) conducted a research study on drawing for communication evolved from an interest in formulating a freehand perspective drawing instruction strategy for non art majors and adults without design training. The need for the drawing training has been expressed by different practitioners, in particular, those who are interested in developing an ability to produce quality realistic drawing from thought in order to create, communicate and exchange ideas. The focus of the study was to investigate the 3-D grid perspective drawing instruction implemented in an entry level drawing class for design students; the method has proved to be successful in developing the desired drawing skill. The purpose of the study was to explore and propose a drawing instructional strategy and a concept of drawing for communication described from the perspective of and in terms of the discourse of interpersonal and socio-cognitive development. Vygotsky’s concept of the zone of proximal development is employed in the theoretical development of the study and the research investigation along the lines of socio cultural development. In the beginning phase of the study, the interpretation of the 3-D-grid drawing instruction utilized in this class is described with a particular focus on the process of the drawing production skill development itself. In the research phase, the paradigm of the practice of drawing for communication was more fully developed, and two research propositions were generated. The interpretations of the instructional strategy, the use and form of semiotic tools and the skill of drawing for communication introduced in the class were extended to include the means of training described within the context of the social and interpersonal communication exchanges of the class. The designer communicative skill offered in this entry level design drawing class was
described in terms of the development of skill in producing realistic drawing from visualization, the designer communication language skill development and unique ways of producing drawing integrated/interacting with language production during the process of developing both skills through design studio transactions. In Implications of the findings, concepts of cognitive development, drawing training development, art education and general education were discussed.

Catterall (1998) in the study ‘Involvement in the arts and success in secondary school’ draws on data collected from more than 25,000 students contained in the 10-year database of the National Educational Longitudinal Survey. The author examined the relationships between student’s arts participation and their achievement, attitudes and behaviour in secondary school. The analysis established a significant correlation between 8th and 10th grade students’ arts activities and their grades, standardized test scores, staying in school, and being interested in school. This study lays the groundwork for a viable rationale for arts inclusion in the schools. The research showed that arts rich learning environment is associated with a host of positive educational measures. The study connects the arts to academics and to other “valued-added” outcomes.

Nelson et al. (1998) in their study entitled ‘Drawing skills and science concepts in young children: A study of relationships’ try to find out the relationship between drawing skills of young children, ages 4 to 8 years, and their ability to perform a cognitive task, materials identification, were investigated. Ninety-one children completed an art drawing and a task requiring the identification of materials in differing compositions. An aesthetic
drawing score, a developmental drawing score, which included mark-making, design making, creation of symbols and developed schemas and a total drawing score were obtained. A simple linear regression procedure revealed significance for the total drawing scores and the identification scores. Age was found to be a factor in the drawing skill development.

According to Eisner (2002), arts instruction introduces flexibility to standardized education environment through which teachers can promote diversity and individuality. Diverse “special populations” of students who benefit from arts-based teaching and learning include students who struggle with academics. In one program for third graders struggling with reading, artist-teachers and reading specialists combined performing arts with instruction. They found that students who participated in this program, compared with their peers who did not participate, were better able to demonstrate comprehension of the story they performed. According to him, academic teachers who learn arts-based instruction become more artistic and creative. A collaborative, interdisciplinary teaching experience provides deeper learning experiences for both teachers and students.

Efland (2002) relates higher levels of thinking to the comprehension of symbols: the ability to interpret symbols and construct their meaning. The arts, in its various media and approaches, offer a broad range of symbols and other ways of representing ideas. Students who experience the arts learn to interpret symbols and understand abstract ideas. Students of the visual arts, for example, learn visual problem solving by interpreting the symbolism of visual artworks. The ability to construct meaning through various representations leads to deeper, more conceptual thinking.
Mardirosian and Fox (2003) found that a performing arts reading program increased third graders’ comprehension primarily for the story the students performed, with less impact on general reading and writing skills. Authors concluded that arts based teaching is more likely to produce “near” learning – the understanding of the arts based activity in which students engage, than “far” learning -- the ability to generalize or transfer learning to academic areas that were not part of the arts based activity.

‘Drawing as a method of exploring and interpreting ordinary verbal interaction: an investigation through contemporary practice’ by Saorsa (2004) is a research study carried out in the manner of a reflexive exploration through drawing practice. Series of drawings generated by the researcher were developed, as an integral part of the research process, from an initially creative and intuitive response to primary and secondary data: original conversations, audio recordings and written transcriptions respectively. The analysis constituted a continuous development of initial sketches, through tracings and over layering, to large-scale works. Linguistically orientated methodological approaches, derived primarily from the social sciences and including Content, Linguistic-Syntactic and Conversation analyses, were used continuously with the drawings in a comparative analysis procedure that explored equivalences between verbal and visual ‘texts’. The research culminated in a Pragmatic analysis of viewers’ responses to defined sets of drawings, demonstrating that far from being an isolated and subjective phenomenon, the experience of art could be understood in hermeneutic terms as a profound dialogical achievement, relative to the achievement that is definitive of a casual conversation. In accordance with the hermeneutic
character of the process as a whole, reflexive content in the research was considered a crucial factor throughout the analysis and conclusions focused on emotion, meaning and interpretation more than on cognitive research issues of artistry or perception. In terms of new knowledge, this project demonstrates a self-reflexive enquiry by means of drawing practice and its analysis as an original form of research. The potential for further work is consequently based on the development of the methodological approach in fields other than the fine arts, so that drawing practice, as well as fulfilling aesthetic ambitions and/or intentions, can also be considered a useful research tool.

Li-Ming Liu (2004) examines the relationships between the qualities of creativity, drawing ability, and visual/spatial intelligence of selected third-grade students in the Hsinchu area of Taiwan, Republic of China. The population for this study included approximately 11,653 third-grade students from 99 public elementary schools. Subjects were randomly selected from 16 out of 99 elementary schools. The Milne-Kasen Story Pictures (A Test for Creativity), the Young Visual Artist’s Checklist, the Portfolio Review Measurement, the classroom teacher’s nomination of Milne-Kasen Visual/Spatial Intelligence Checklist were given to 427 selected students. Data were processed, analyzed and reported using descriptive and inferential statistics. The findings revealed that positive relationships exist between a child’s creativity potential and self-image of artistic ability and local art educators’ observations of students’ artwork and classroom teachers’ observations of student’s art-related behaviours. There were significant differences in responses based upon the demographic factors of gender,
community, age and time of test taking. These findings should impact the delivery of art education to children at the elementary school level. In addition, it might influence the development of the art education curriculum in Taiwan.

Gan’s (2008) study entitled as ‘The Effect of drawing Generated by Students on Idea Production and Writing in Grade 4’ explores the effect of student-generated drawing on idea production and writing performance of fourth grade children. The drawings and notes were created by 22 students in grade 4 using an online multimedia environment to advance their understanding of optics. The findings indicated that children who drew more while writing produced significantly more words, sentences, idea units and earned higher overall idea grade in writing than did those who drew less in writing. The results suggested that it was the combination of drawing as a planning strategy and as an external support for representing ideas in knowledge building that contributed to its effectiveness in making differences in idea production and writing of fourth grade children.

For the study ‘The Effects of the Art Education Program on Drawing Skills of Six-Year-Old Gifted Children in the High Socio-Economic Status in Turkey’, Gur and Temel (2010) designed an Art Education Program was to develop the drawing skills of gifted children. In this study, the program was implemented with six-year-old gifted children receiving regular pre-elementary school education to investigate its impact. The main question to be answered was: Does the Art Education Program affect the drawing skills of six-year-old gifted children? The study included 26 girls and 26 boys from private preschools in Ankara, Turkey. Among these children, 26 were chosen as the experimental group and 26 were chosen as the control group. Both groups
undertook the Silver Drawing Test before and after the program so any changes could be measured. The experimental group, after the pre-test, participated in an Art Education Program consisting of 18 sessions. There was a significant improvement in the drawing skills of the experimental group when compared to the control group ($p < 0.001$). However, the relationship between the pre-test, final test scores and years of pre-elementary education was not statistically significant at five percent significance level.

Musa (2010) conducted a study entitled as ‘Misconceptions of cell division held by student teachers in biology: A drawing analysis’. The purpose of this study was to identify biology student teachers’ misconceptions of cell divisions using drawings and interviews. Data were collected from 124 biology student teachers. An analysis of drawings and interviews suggested that biology student teachers have a series of significant problems and misconceptions regarding cell division and structuring of concepts in a meaningful manner. These problems were mainly associated with meiosis rather than mitosis. The students confused the stages of the cell division process and the events occurring at these stages. Some misconceptions identified from this study included that DNA replication occurs in the prophase during the cell division, interphase is the resting phase of mitosis, the chromosome number is doubled in prophase of mitosis and halved in anaphase of mitosis, the chromosome number remains the same during meiosis-I and it is halved during meiosis-II, and a chromosome has always two chromatids during cell division. These results were compared with related literature and recommendations were made for teachers and researchers for future studies to overcome students’ misconceptions.
Maani and Reeves (2012) in their study entitled Encouraging the Acquisition of Drawing Skills in Game Design: A Case Study, suggests that from a Graphic Design perspective, criteria for evaluating drawing skills may involve some or all of the following: effective use of line, positive and negative space, illusion of perspective, indication of depth and distance, revealing form through light and shadow, level of detail, observational skills, texture-energy, composition and balance, proportion, scale, information value, use of colour, drawing style, character proportions, gestures and poses, indication of movement and relationship to background environment.

Pediatr (2012) in his study on ‘Drawings of very preterm-born children at 5 years of age’ found that very preterm children showed a developmental delay in drawing ability. Structural equation modeling revealed a positive relation between both cognitive as well as motor development and the DAP. The aim of this study was to examine differences in drawing skills between very preterm and term children, and to determine whether very preterm children’s cognitive and motor development is reflected in the draw-a-person test (DAP) at age 5. Seventy-two very preterm children and 60 term children at 5 years of age were compared on the DAP. Cognitive and motor skills of the very preterm children had been assessed four times, at 1/2, 1, 2, and 5 years of age.

‘An investigation of the expressive and representational drawing development in National Curriculum, Steiner, and Montessori schools’ is a research study by Rose (2012) investigated the expressive and representational drawing ability of British National Curriculum, Steiner, and Montessori pupils aged 5 to 9 years old. Ability was measured from
performance on specified drawing tasks. 135 children participated, 45 from each educational establishment consisting of 15 from each of the three age groups 5, 7 and 9-year-olds. Participants completed three expressive drawings (depicting a happy, sad and angry mood) and three representational drawings (observational drawing of a wooden mannequin, a house from memory and a free drawing). Results indicated that for expressive drawings Steiner pupils generally depicted more content themes, used formal properties more expressively and produced higher quality expressive drawings than Montessori and National Curriculum pupils. There were differences between National Curriculum and Montessori pupils the Montessori children tended to do better than the National Curriculum pupils on these measures. Although representational drawing development varied in younger Steiner pupils compared to their National Curriculum and Montessori peers, no differences were observed among the oldest children attending the three schools. The positive relationship between expressive and representational drawing performance was the strongest in Steiner pupils. The results suggested that the art program in Steiner education is more conducive to nurturing expressive drawing ability than those delivered in Montessori and National Curriculum education, with seemingly no disadvantage in representational drawing ability in the primary school years.

The way children portray emotions in their drawings of human and nonhuman topics is assumed to reflect their artistic, emotional, and cognitive development. The study ‘The Development of Expressive Drawing Abilities during Childhood and into Adolescence’ by Picard and Gauthier (2012) was designed to investigate the development of expressive drawings during
childhood and into adolescence, using a large age range (5–15 years) and sample size 480, so as to provide a precise and comprehensive view of age-related changes in children’s ability to produce expressive drawings. More specifically, they focused on children’s developing ability to use the techniques of literal and metaphorical expression, either alone or in combination. We also examined the effects of sex, topics (house, tree or person), and the depicted emotion (happiness or sadness) on the use of each expressive technique. The main findings were that there is a developmental shift between childhood (5–10 years) and adolescence (11–15 years) in the use of expressive techniques, from simple (literal) to more complex forms of expression (metaphorical).

**Conclusion**

The studies and literatures described above acknowledge the importance of drawing in the process of learning. It stresses new ways of looking at the development of drawing skill. There is still much work to be done in this area. The above review of the studies and literatures help the investigator to develop a wide perspective of the nature of the interaction of the variables concerned by the present study. It may be noted that the developing of a Drawing Skill Oriented Instructional Approach for primary school children in Basic Science is of vital importance in the present educational setup in Kerala. This in itself argues for the need for a study of this kind.