There has been an impact of socio-economic-cultural disadvantage or deprivation (Rural/Scheduled Castes/Scheduled Tribes/Low facility schools/Ashrama schools) on different aspects of children’s cognitive and psychosocial development. Many factors have their negative influence on primary and secondary education system at tribal areas. Hence there is a need for different types of intervention at tribal schools for the children’s cognitive and psychosocial development. The present study focused on assessing the level of cognitive (attention, memory and intellectual ability) and psychosocial aspects (adjustment, self concept and social problem solving skills) among the tribal children; and studying the effect of intervention programme on cognitive (attention, memory and intellectual ability) and psychosocial aspects (adjustment, self concept and social problem solving skills) among the tribal children.

**The review of literature related to aspects of the study has been covered under the following sub headings**

2.1. Influence of socio-economic-cultural disadvantage or deprivation on cognitive development

2.2. Influence of socio-economic-cultural disadvantage or deprivation on psychosocial development

2.3. Influence of gender on cognitive and psychosocial aspects

2.4. Educational problems and status of schools at tribal areas

2.5. Play way Intervention methods for cognitive and psychosocial development of children: art and craft work, games and play, word and vocabulary games, number games and cultural activities.
2.1. **Influence of socio-economic-cultural disadvantage or deprivation (rural/scheduled castes/scheduled tribes/low facility schools/Ashrama schools) on different aspects of cognitive development**

Studies have been conducted across the country and abroad related to the negative influence of deprived and disadvantaged environment on development of cognitive abilities. The focus of the present study in relation to cognitive aspects is attention, memory and intellectual ability. The reviews have been gathered initially to explain that the disadvantaged areas lack adequate stimulation which in turn has negative impact on development of brain and functional lateralization. Further the reviews concentrates on explaining the influence of disadvantaged environment on academic achievement in general as this is one of the important ways to understand the cognitive development at school level. Few studies on influence of disadvantage on other aspects of cognitive abilities in terms of attention, recall, mental ability, abstract and logical reasoning and many studies related to intellectual ability measured in terms of IQ has been mentioned. The review has moved further quoting couple of studies to understand the reason for cognitive/academic underachievement - is it because the children in such area lack motivation to study and utilize educational facilities and/or they lack stimulation and under developed cognitive abilities. The review on cognitive aspects has been finally completed after analyzing studies answering queries on need for mainstreaming these children with other children.

Children living in poverty and deprivation have little exposure to stimulating environment. The experiences of children living in poverty were compared and contrasted with their more affluent peers by Muschamp, Bullock, Ridge, and Wikeley (2009). Children living in affluent areas had better stimulating environment than children living in poverty. Hence it can be seen that children living in disadvantaged
area have limited stimulating environment and can influence development of
cognitive aspects.

Non-stimulating environment can also cause maturational lag in brain
development. Otero, Wilson, Henry, and Peterson (1997) conducted a broad-band
EEG frequency analysis of low socio-economic status (high-risk), middle and middle-
high socio-economic status (low-risk) Mexican subjects to study the possible
relationship between poverty and cultural disadvantage and brain development.
Results showed that high-risk children had significantly more delta absolute power
than low-risk children in the frontal and central leads, and higher values of theta
absolute power in the frontal leads. Alpha absolute power was higher in low-risk
children in the occipital areas and in F8 and T4. Findings suggested that
disadvantages in socio-cultural aspects of the families and neighbourhoods could be
associated with the maturational lag in high-risk children.

Area of residence in terms of urban and rural area is seen to be related to
hemispherical dominance based on specific environmental inputs. The study by
Polyakov (2008) which focused on developmental features of functional brain
asymmetry and higher mental processes and their dependence on the child's place of
residence showed that the urban and rural populations differed in the degree of
functional lateralisation, in the development of movements and actions, speech, and
visuo-spatial processes. Therefore each population has its own developmental norms.
In the ontogenetic stage explored in the study the right hemisphere was developed
better in the rural population, whereas functional systems of the left hemisphere
developed quicker in the urban population.

As indicated in many studies development of brain may be dependent on
environmental factors. And if the environment is lacking in stimulation the best way
to compensate on this is through adequate schooling. Using growth-curve analyses within a three-level hierarchical linear modelling framework, the study by Ready (2010) employed data from the Early Childhood Longitudinal Study (ECLS-K) to examine the links between children’s social class, school absences, and academic growth during kindergarten and first grade. Results suggest that the effects of schooling on cognitive development were stronger for lower socioeconomic status children indicating that schools have a major role to play and can influence on adequate overall cognitive and psychosocial development.

If schools do not play adequate role in overall development of children in deprived environments and culturally deprived areas then it can hamper the cognitive development of children. It can be noted that deprivation hamper differently when compared to disability which could have biological/neuropsychological basis. Itskowitz, Bar-El, and Gross (1986) examined the degree to which the nature of thought processes of culturally deprived and learning disabled children differ. The four groups of intact subjects, culturally deprived subjects, learning disabled subjects, and culturally deprived subjects with learning disabilities were presented with the tests of Similarities and Block Design subtests of the Wechsler Intelligence Scale for Children, the Raven Progressive Matrices, and the Bender-Gestalt Test. Results of scores differentiated between poor cognitive performances that were related to culturally deprived and poor cognitive performances that were related to learning disabled.

One of the important areas that can get affected due to poor cognitive development is academic achievement. Studies have shown that the effect of poverty was found to be significantly negative on academic achievement at both the student and school level (Nachi, 2009) and that there was a very strong negative relationship
between poverty and overall levels of achievement in the school (Croll, 2002). Students from non-deprived areas obtain higher percentages and were better on school/educational achievement (Demie, Butler, & Taplin, 2002) and the urban students perform better on academic achievement than rural students (Tung & DeSa, 2010). In the same way the proportion of students performing above the national norm was higher in affluent-concentrated schools than in poverty-concentrated schools for students in both racial (Black and White) groups (Willie, 2001). On all the variables related to academic achievement the advantaged children scored significantly higher than the scheduled caste and scheduled tribe children (Patel, 1987) and in the same manner academic achievement of non-tribal were higher than the tribal students (Mohanty, 2000) and SC/ST students were low in their academic achievement when compared to non-SC/ST school students (Sujatha & Yeshodhar, 1986).

2.1.1. Influence of socio-economic-cultural disadvantage on attention

Attention is another important cognitive ability, but can be viewed as an aspect of personality or temperament too. The objective of the study conducted by Helen, Jena, Syed and Sally (2009) was to determine whether undernourished children aged six to 24 years had different traits than better-nourished children. Undernourished children in 20 villages in rural Bangladesh and better-nourished children matched for age, sex, and village participated in the study. After adjusting for significant covariates, the undernourished children were seen to be less attentive. Agarwal and Pandey (1985) studied sex differences in many aspects of one being Reaction time on male and female tribal students of the Rohilkhand and Lucknow regions of India. Compared with females, male subjects were found to show less coordination, and poorer reaction time (RT). In both these studies attention was studied as a temperamental factor and not as a cognitive factor.
2.1.2. **Influence of socio-economic-cultural disadvantage on memory**

Hippocampus is one of the main structures of the brain involved in the functioning of memory adequately. Lower socio economic status has been associated with smaller hippocampal volumes (Hanson, Chandra, Wolfe, & Pollack (2011); Noble, Houston, Kan, & Sowell (2012); Noble et al., 2015). Lower socio economic status is exposed to stress, poor nutrition and lack of cognitive stimulation (Hackman et al., 2010). Malnutrition of protein-energy, iron, and zinc harm the developing hippocampus (Georgieff, 2007), while environmental enrichment increases dendritic branching and synaptic density in the hippocampus (Kempermann, Kuhn, & Gage, 1997). Thus, multiple facets of lower socio economic status may harm development of the hippocampus in humans, which in turn effect the development of memory in growing children.

Studies that assessed multiple neurocognitive systems found that the largest effects of social economic status are on language processing, with more moderate effects on executive function-particularly on working memory and cognitive control (Noble et al., 2007b; Farah et al., 2006; Noble et al., 2005; Kishiyama et al., 2009). Some other studies have also found that there is moderate effect of socioeconomic status on declarative memory and spatial cognition (Noble et al., 2007b; Farah et al., 2006; Levine et al., 2005; Herrmann & Guadagno, 1997). Noble et al., (2007b) reported that social economic status explained a smaller but highly significant portion of the variance in memory tasks of tapping, memory, and working memory. Evans and Schamberg (2009) revealed that childhood poverty is inversely related to working memory in young adults and the deficit in memory is mediated by elevated chronic stress of environmental demands during childhood. Over all such studies indicate that
children from lower social economic status are at risk for deficits in memory processing (Siegler et al., 2014).

The study by Michele Tine (2014) investigated the difference in working memory profiles of children living in rural poverty and children living in urban poverty. Verbal and visuospatial working memory tasks were administered to students living in low-income rural, low-income urban, high-income rural and high-income urban developmental contexts. Both low-income rural and low-income urban children showed working memory deficits compared with their high-income counterparts, but their deficits were distinct. Low-income urban children had significantly less verbal and visuospatial working memory deficits than high-income urban children. Low-income rural children had significantly less visuospatial working memory deficits than verbal working memory deficits. These results suggested that different types of poverty are associated with different working memory abilities. In another study children of families from diverse social economic status backgrounds were evaluated on executive functioning using a brief battery and the quality of the home environment. The results showed that the family social economic status inequality was associated with inequalities in home environments and with inequalities in child executive functions (Sarsour, et al., 2011).

The structural equation analyses on a study assessing the effect of family socioeconomic status and parental education on memory by Piccolo et al., (2016) revealed that in the general model (for all ages), the social economic status contributed to cognitive performance of verbal memory, working memory, and executive functions. Social economic status had stronger effects on younger children (up to nine years old), in most tasks examined. It was concluded that after this age, a
combination of factors such as schooling, living in other social environments, among others, may mitigate the effects of family socioeconomic status.

Herrmann and Guadagno (1997) reviewed several literatures to assess the relationship of socio-economic status to memory performance which revealed that memory performance was strongly and directly correlated with social economic status. Higher socio economic status was associated with better performance on battery of memory tasks (Farah et al., 2006). The performance of the advantaged children was better than that of the disadvantaged children on Digit-Span (forward), Free Recall, and Serial Recall and advantaged children performed significantly better than their socially disadvantaged counterparts on tests of Figure Copying, and Digit-Span (backward) (Das & Padhee, 1993). It was reported that the performance of the socially advantaged (Brahmin caste) was better than that of the disadvantaged (Harijan) children on tasks of memory. A hierarchy of mean scores was seen, with the enriched Brahmins at the top, restricted Brahmins in the middle, and enriched and restricted Harijans at the bottom (Das & Padhee, 1993). The comparison between the rural and the urban children, showed 16.18 points of intellectual quotient difference on subtest of Digit Span (Flores-Mendoza & Do Nascimento, 2007). On a task of recall of Hindi words urban girls scored higher on serial recall than rural girls; subjects from superior schools demonstrated greater serial recall (Tiwari, 1986). The children with lower socio economic status had lower performance regarding verbal episodic, semantic memory, working memory, visuoverbal memory and inhibitory control tasks than those with higher socio-economic status (Piccolo et al., 2016). Family social economic status seems to affect performance in episodic, working and semantic memory (Hackman et al., 2010; Piccolo et al., 2014). Social economic status
explained a smaller but highly significant portion of the variance on memory tasks of tapping, memory, and working memory (Noble et al., 2007b).

2.1.3. **Influence of socio-economic-cultural disadvantage on intellectual functioning**

Mental ability reflects one of the cognitive ability of the individual. Bhat’s (1992) study aimed at verifying the invariance of sequence of occurrence of logical reasoning and the rate of its development in children belonging to the socially disadvantaged sections of a tribal pocket of Soligas in Chamarajnagar. Piagetian Tasks, paper-pencil test and Menon’s Test of the Process of Scientific Inquiry were used and major findings indicated that both scheduled castes and scheduled tribes children were found to be lagging behind the general group by at least a year on all the reasoning abilities studied (attainment of abilities of serration, conservation of number and conservation of quantity).

Abstracting and reasoning ability as related to cognitive development were compared in groups of socially advantaged (Brahmin caste) and disadvantaged (Harijan caste) children from enriched and restricted home environments in India by Das and Padhee (1993) which showed that a hierarchy of mean scores was seen, with the enriched Brahmins at the top, restricted Brahmins in the middle, and enriched and restricted Harijans at the bottom, thus supporting the hypothesis of A. R. Jensen that socially disadvantaged children differ from socially advantaged children in abstracting and reasoning ability. In another study one of the tests measuring Level II abilities on Progressive Matrices indicated that socially advantaged (Brahmin with enriched home environments) children performed significantly better than their socially disadvantaged (Harijan) counterparts belonging to restricted home environments (Das, 1992). Results of a study by Gaur and Sen (1989) indicate that the
non-scheduled caste subjects were comparatively more intellectual on Raven Standard Progressive Matrices; less deprived, and had higher socio-economic status than the scheduled caste subjects. Balkrishna (1986) in a study at Bihar revealed that Christian tribal students possessed more intelligence and better reasoning ability than non-Christian tribal students.

On one among the cognitive scales that is The Wechsler Intelligence Scale for Children-Revised (WISC-R) urban student’s scored higher than rural students in Peru (Cueto, Jacoby, & Pollitt, 1997). A study by Randhawa and Hunt (1987) found that urban subjects were superior to rural subjects on a majority of mental abilities subtests. The study by Flores-Mendoza & Do Nascimento (2007) used Coloured Matrices Progressives test and three subtests from Wechsler Intelligence Scale for Children-III were administered on the urban and rural sample. The comparison between the rural and the urban children showed 30 points of intellectual quotient difference on Raven. It was concluded that environmental deficits affect the fluid intelligence more than the crystallized intelligence.

In a study by Dwivedi and Dubey (1989) 40 rural children were administered verbal and performance IQ tests once a year from age seven to eleven years. Analyses revealed that performance IQ was higher than verbal IQ at each age level. A corresponding increase existed in performance and verbal IQ with increasing age, suggesting that the influence of cultural deprivation in rural children is lessened with increased exposure to education in schools.

The above studies have clearly shown that rural area, poverty and disadvantaged environment have direct influence on academic achievement. There rises a question as to whether these individuals are inherently low cognitively or lack stimulation required for cognitive development. In this background Pani’s (1993)
study with tribal and non-tribal boys on reading, achievement, and cognitive measures it was concluded that the performance of tribal subjects was inferior to that of non-tribal subjects not because of inherent inferiority in cognitive ability, but due to lack of proper reading stimulation at home, developmental delay, and to production deficiency.

Studies have also tried to understand if children in such area lack motivation to study and utilize educational facilities. The study of disadvantaged and advantaged secondary school children by Patel (1987) found that all the three groups, viz., scheduled caste, scheduled tribe, and the advantaged children, differed significantly in their achievement motivation. SC/ST students were low in their achievement motivation compared to non-SC/ST high school students (Sujatha & Yeshodhar, 1986). Kreitler, Zigler, Kagan, and Olsen (1995) examined the roles of cognitive and motivational factors in the scholastic achievements of disadvantaged third to fourth graders which found that cognitive variables contributed more than did motivational variables to the predictions of academic achievements.

One of the major findings of the study conducted by Sujatha and Yeshodhar (1986) on SC/ST and non-SC/ST high school students was that there was a significant association between academic achievement and type of school in the case of SC/ST students, but not in the case of non-SC/ST students. It was also concluded that steps should also be taken to provide a stimulating school environment which encourages SC/ST children to develop aspirations and to achieve better.

To improve on cognitive development and achievement is there a need for mainstreaming these children with other children is another question to be answered. In this background the role of school type in determining psychological differentiation and academic achievement of tribal and non-tribal students was studied in the context
of primary education by Mohanty (2000). Psychological differentiation was assessed using the Story Picture Embedded Figures Test, while exam scores served as an indication of academic achievement. Mixed school setting was not conducive for tribal or for non-tribal, and for both psychological differentiations and academic achievement. So to improve on cognitive development the simulative environment has to be provided in the environment that children live in.

2.2. **Influence of socio-economic-cultural disadvantage or deprivation (rural/scheduled castes/scheduled tribes/low facility schools/Ashrama schools) on different aspects of psychosocial development**

Studies regarding the factors influencing psychosocial development of children have been organized initially by discussing through a study as to how the vulnerability associated with poverty and neighborhood characteristics has more psychosocial impact than the impact of orphanhood environment. Later the reviews have been covered related to multiple aspects of adjustment such as interaction of disadvantaged environment, context of living and adjustment attitude of tribal children towards school, school variables in rural area influence adjustment of children, sex differences in adjustment of tribal children. Further the reviews have been covered related to influence on disadvantage on self concept of disadvantaged children, relationship between home environment and the self-concept, and relationship with social support and self-esteem.

Study has shown that how the vulnerability associated with poverty and neighborhood characteristics has more psychosocial impact than the impact of orphanhood environment (Fotso, Holding, & Ezeh, 2009), showing the negative impact of psychosocial development in disadvantaged environment. This study emphasized the need for adequate environment for normal psychosocial development of children.
2.2.1. **Influence of socio-economic-cultural disadvantage on adjustment**

Using longitudinal data collected over two years on a sample of 2,745 urban elementary school children (first to sixth graders, ages six to eleven years) from economically disadvantaged communities, effects of stressful experiences within three contexts (school, family, neighbourhood), cumulative stress, and multiple context stress on three indices of children's adjustment (achievement, depression, and aggression) were examined by Morales and Guerra (2006). All three stressor contexts were related contemporaneously and longitudinally to negative outcomes across adjustment measures, with differential paths in each predictive model.

A study of tribal and non-tribal students in Arunachal Pradesh showed that there existed no difference in adjustment between tribals and non-tribal showed a more favorable attitude towards school than the tribal’s (Kumar, 1989). Non-disadvantaged subjects were better adjusted and higher achieving than socially disadvantaged pupils (Ushasreem, 1987). Another study on adjustment and personality factors of SC/ST and non-SC/ST school students showed that SC/ST students had relatively poor school adjustment compared to non-SC/ST students (Sujatha & Yeshodhar, 1986). On health, family, social and general adjustment there was no satisfactory adjustment of the adivasi students of Ranchi district (Nomani, 1965). Ahluwalia and Kalia (1984) aimed at finding bout whether there were significant differences among rural and urban adolescents in adjustment among other aspects and found that urban adolescent boys scored significantly higher mean scores on home, school, social and total adjustment.

In the study by Raju and Rahamtulla (2007) the sample consisting of students from the various government and private schools from urban and rural areas of Visakhapatnam district, Andhra Pradesh showed that adjustment of school children
was primarily dependent on the school variables like the class in which they are studying, the medium of instruction present in the school, and the type of management of the school. Agarwal and Pandey (1985) studied sex differences in the effect of affective deprivation on male and female tribal students of the Rohilkhand and Lucknow regions of India. Compared with females, male subjects apart from other aspects were found to show less sociability and adjustment.

2.2.2. Influence of socio-economic-cultural disadvantage on self concept

The study of disadvantaged and advantaged secondary school children by Patel (1987) found that all the three groups, viz., scheduled caste, scheduled tribe, and the advantaged children, differed significantly in their self-concept. Of other findings the study by Pal (1984) showed high caste students from Haryana in comparison to their scheduled caste counterparts possessed better social self concept. The self-esteem of scheduled caste Indian subjects was significantly higher than that of the upper-caste Indian subjects in a study conducted by Thakur and Madnawat (1986). Children in the low socio-economic status schools scored significantly lower on self-esteem than children in the high socio-economic status schools (Farrell, Sijbenga, & Barrett, 2009). Study results in terms of comparison between urban and rural students in the countryside showed that the urban students had significantly higher self concept level than the rural students (Jin-dao, 2003). The outcome of these researches suggests that children from low socio-economic status schools may have lower psychological protective factors such as self-esteem.

Results indicated that Irish girls of junior stream secondary school from the rural setting suffered significantly with poorer self-esteem compared to other groups of boys, city and upper and middle socioeconomic groups (Houlihan, Fitzgerald, & O'Regan, 1994). A study showed that 19.0% of students had problems on the self-
esteem. 15.7% boys and 22.6% girls were low self-esteem (Zhang, Wang, & Sun, 2006). Houlihan et al., (1994) examined the prevalence of poor self-esteem among junior stream secondary school students (aged 12.3 to 16.0 years). Results showed that girls from the rural setting suffered significantly more with poorer self-esteem than did other subjects.

Freda and Albertazzi (2001) in a study on school students (aged 10-14 years) from a disadvantaged neighbourhood in Italy found that students affected by poor scholastic performance and negative self-esteem have a high risk of depression. The investigation in a study by Magano (2007) indicated that there was a significant relationship between home environment and the self-concept for adolescents from disadvantaged home environments.

The study by Guest and Biasini (2001) evaluated children and their primary caregivers who were living in poverty. The study showed that social support was found to be one possible mediator of the child's reported stress on their self-esteem. According to the mediating model, enhancing children's social support may positively influence their self-esteem. Greater levels of self-esteem can affect many aspects of children's lives, such as improving school performance and efforts toward achieving goals. Because of the important role that social support can play on children's self-esteem, social support should be actively promoted through school and community groups and organizations, especially with children from disadvantaged economic situations.

2.3. Influence of gender on cognitive and psychosocial aspects

Regarding gender difference in cognitive and psychosocial aspects very few studies were done on tribal students in relation to the variables of the present study. One study was done on tribal’s related to attention (Agarwal & Pandey, 1985), one study
was done on scheduled castes related to intelligence (Jain, 1988), two studies on tribal children related to adjustment (Agarwal & Pandey, 1985; Verma & Sharma, 1992), and one study on rural children related to self-esteem (Zhang et al., 2006). In rest of the areas like memory and group social problem solving skills none of research was done specifically related to tribal or rural sample. Rest of the studies available concentrated on gender difference among children and adolescents, where as some studies stretched the age range the least being from 7 years children to the maximum of 21 years adolescents. Of the different cognitive and psychosocial aspects gender difference studies were minimal for attention, adjustment and social problem solving skills; whereas extensive research has been done on intelligence and the self concept has been researched moderately.

2.3.1. Influence of gender on attention

Warrick and Naglieri (1993) examined attention as one of the four PASS (planning, attention, simultaneous, and successive cognitive processes) processes using a sample of boys and girls in grades 3, 6, and 9 and found that girls earned significantly higher scores on measures of attention in Grade 3. Jack and Johannes (2001) examined boys and girls who matched the U.S. population in which girls outperformed boys on the Planning and Attention scales of the Cognitive Assessment System by about 5 points.

Riley et al., (2016) used a large web-based sample (the ages of 10 and 70 years) to examine gender differences in sustained attentional control. The sample included participants from 41 countries. The study found significant gender differences in certain aspects of sustained attentional control. Men performed faster and less variably than women, but made slightly more commission errors while women made more omission errors.
Agarwal and Pandey (1985) studied sex differences in tribal students of the Rohilkhand and Lucknow regions of India. Compared with females male subjects were found to show poorer reaction time (RT).

2.3.2. **Influence of gender on memory**

Gender differences among children and adolescents were examined on 14 separate measures of short-term memory by Patricia, Joan and Cecil (2004). A stratified sample of children and adolescents, ranging in age between 5 and 19 years, were assessed on the 14 subtests of the Test of Memory and Learning (TOMAL). Results revealed only two significant differences in absolute scores across gender on the 14 memory subtests. A profile of normal variations in patterns of memory test performance across gender revealed relative strengths for females on verbal tasks and males on spatial tasks.

Huang (1993) found Chinese adolescent males outscored adolescent females on a visual-spatial memory task, whereas Chinese adolescent girls outperformed adolescent boys on a verbal memory task. In a study examining gender differences, Robinson et al. (1996) reported significantly higher scores for male than female preschoolers and kindergartners on a visual-spatial working memory task. Temple and Cornish (1993) assessed gender differences among females and males, ranging in age from 9 to 21 years on a verbal memory recognition task and found that females outperformed males on this verbal memory task.

Kramer, Delis, Kaplan, O’Donnell, and Prifitera (1997) found that in the age group of five to six years girls perform at a higher level than do boys in free delayed recall of a word list, and similar results were evident in the other age groups tested (i.e., boys and girls up to 15-16 years of age).
Studies have failed to find sex differences in face recognition among school-aged children (Freire & Lee, 2001; Temple & Cornish, 1993). Ullman, McKee, Campbell, Larrabee, & Trahan (1997) assessed children, in grades 1–5 and found no significant gender differences on a task measuring visual recognition memory. Forrester and Geffen (1991) found no gender differences on an auditory learning task for 40 girls and 40 boys between the ages of 7 and 15.

Study by Lewin, Wolgers, and Herlitz (2001) examined sex differences in verbal, nonverbal, and visuospatial episodic memory tasks. Results showed that although women performed at a higher level on a composite verbal and nonverbal episodic memory score, men performed at a higher level on a composite score of episodic memory tasks requiring visuospatial processing. Conclusions from multiple studies suggest that females, on average, score higher on tasks of perceptual speed in memory (Halpern, 1997). Conclusions from multiple studies suggest that males, on average, score higher on tasks in visual–spatial working memory and fluid reasoning (Halpern, 1997). The study by Tende, Eze, Yusuf, Malgwi, and Wilcox (2012) examined sex differences in working memory of students in Ahmadu using the N-back task in the age range of 18-35 years. Results obtained from the N-back scores showed that there were no sex differences in working memory between males and females on n-back task.

2.3.3. **Influence of gender on intelligence**

Bhat’s (1992) study aimed at verifying the invariance of sequence of occurrence of logical reasoning in children belonging to the socially disadvantaged sections. The sample consisted of children of Classes III to IX, covering the age group eight to fourteen year from a tribal pocket of Soligas in Chamarajnagar. Major gender related finding indicated that the abilities of serration, concept of age, conservation of
substance and conservation of substance were attained by both boys and girls and there was no significant gender difference.

Three measures of general fluid intelligence that is the PMA Inductive Reasoning Test, the Advanced Progressive Matrices (APM), and the Culture-Fair Intelligence Test were used on high school graduates in the study by Colom and García-López (2002). The results reveal that females outperform males in the PMA Reasoning test, males outperform females in the Raven, and that there is no sex difference in the Culture-Fair Test.

Lynna, Allikb, and Mustb (2000) studied the sex differences in brain size and intelligence in children and adolescents. They put forth that sex differences in brain size and decrease from the age of 7 through 13±14 years and increase from the age of 15 through 18 years. A small and non-significant difference in intelligence at age 9 is followed by a significant difference in favor of girls at age 10, which is in turn followed by differences in favor of boys from the age of 11 through 15. Although the sex differences in brain size and for intelligence show the same general trend of a narrowing and subsequent broadening over the age range 9±15 years, they do not move in perfect synchrony. The girls’ advantage in intelligence peaks at the age of 10, and their disadvantage in respect of brain size is smallest at the age of 13.

The study by Jain (1988) observed that scheduled castes girls were better in intellectual capacity than scheduled castes boys.

Lynn, Backhoff, Contreras-Nino (2004) reported that no statistically significant difference existed between scores obtained by boys and girls on the Standard Progressive Matrices test for 7–10 year olds in Mexico. A standardization of the Progressive Matrices in Syria for people aged 7 to 18 years also found no sex differences (Khaleefa & Lynn, 2008). Some investigations of sex differences in the
Raven’s Matrices test showed a male advantage (Irwing & Lynn, 2005; Colom & García-López, 2002; Lynn, 1998). Meanwhile, some other studies have observed an advantage for females (Khaleefa & Lynn, 2008; Abdel-Khalek & Lynn, 2006). Khaleefa and Lynn (2008) reported on a large standardization sample of 6–11 year olds who were tested using the Colored Progressive Matrices test in the United Arab Emirates where in girls performed significantly better than boys, but the difference was only small. Results of 10 to 18 year olds in Egypt assessing intelligence with the Standard Progressive Matrices showed that males obtained significantly higher scores than females at the ages of 16 and 17-18 years (Lynn et al., 2016).

A meta-analysis of 57 studies of sex differences in general population samples on the Standard and Advanced Progressive Matrices (SPM and APM, respectively) was analysed by Lynn (2004). Results showed that there is no difference among children aged 6–14 years, but that males obtain higher means from the age of 15 through to old age. A meta-analysis of 15 studies of child samples on the Colored Progressive Matrices showed that among children aged 5–11 years boys have an advantage of 0.21d equivalent to 3.2 IQ points (Lynn, 2004).

2.3.4. **Influence of gender on adjustment**

Bhagia (1966) in his study found that girls exceeded boys significantly in their adjustment to general environment and organizational aspect of the school. Sunita (1986) found that girl’s were better adjusted at home than boys. Boys were more socially adjusted than girls. Boys were more emotionally adjusted than girls. Verma and Sharma (1992) undertook a comparative study of personality adjustment of adolescent tribal boys and girls. The findings revealed that boys and girls did not differ significantly in emotional adjustment; tribal adolescent girls were socially and educationally less well adjusted than boys; boys showed overall better adjustment
than girls. Agarwal and Pandey (1985) studied sex differences in tribal students of the Rohilkhand and Lucknow regions of India. Compared with females male subjects were found to show less sociability and adjustment.

The study by Raju and Khaja Rahamtulla (2007) examined the adjustment problems of school students from urban and rural schools of Visakhapatnam district and found that adjustment of school children was primarily dependent on the school variables like the class in which they are studying, the medium of instruction present in the school, and the type of management of the school, parental education and occupation. Strong and positive correlation was observed between school adjustment and performance in semester exam among grades of V, VI and VII among tribal students of Ahmednagar district in Maharashtra (Sonal Shivagunde and Kulkarni, 2012).

2.3.5. **Influence of gender on self concept**

Arens and Hasselhorn (2014) investigated gender differences in the relations between domain-specific self-concept facets and self-esteem of German students in Grades 3 to 6. Results indicated no difference in the self-concept–self-esteem relations between boys and girls and in the subsamples of third and fourth graders and fifth and sixth graders.

A study on Age and gender differences in the self-esteem of Chinese children by Watkins, Dong, and Xia (1997) investigate gender differences in 10 year old and 13 year old children attending Beijing public schools. Main effects for gender were seen on physical abilities, school and peer relations subscales. Further analysis indicated that the older girls tended to report significantly lower self-esteem than the older boys in the areas of physical abilities and general self-concept. The boys reported more positive self-perceptions on most nonacademic self-scales.
Gender differences in physical self concept among elementary and secondary school students were investigated by Klomsten, Skaalvik and Espnes (2004). The results indicated significantly higher physical self concept in boys than in girls in eight sub domains, as well as global physical self concept and self-esteem.

A meta-analysis on gender differences in self concept among children and adolescents by Wilgenbusch and Merrell (1999) consolidated the research which included participant samples from 7 different nations and ranged from 1st grade through 12th grade. Mean effect size estimates across dimensions showed a complex pattern of gender differences and similarities. Although some of the findings defied stereotypes, several were consistent with previous notions regarding differences in self-concept based on gender.

Crain and Bracken (1994) examined children and adolescents from 10 to 18 years old using the Multidimensional Self-Concept Scale which consists of six domains (social, competence, affect, academic, family and physical). Although they found a few significant differences (e.g., males were significantly higher on physical self-concept), they noted that the differences in the study, while statistically significant, did not appear to be qualitatively or practically meaningful.

Zhang et al., (2006) conducted a survey among students in two rural middle school of Anhui province on self-esteem. Results showed that 15.7% boys and 22.6% girls were low self-esteem. The differences between genders had statistical significance.

2.3.6. **Influence of gender on social problem solving skills**

Sue Walker, Kym Irving, and Donna Berthelsen (2002) investigated gender influences on the nature and competency of preschool children's social problem-solving strategies. Results indicated that, overall, girl’s responses were more
competent (i.e., reflective of successful functioning with peers) than those of boys. Results of a study conducted by Murphy and Ross (1987) indicated a clear overall advantage for females over male adolescents on the Means-Ends Problem-Solving Procedure. In a study on gender differences in social problem solving skills of 9-11 year old children by Arı and Helin Yaban (2012) result showed that girls produce more solutions than boys for object acquisition and friendship initiation issues.

In the study by Özgülük and Erdur-Baker (2010) gender differences in children's alternative assertive, submissive, and aggressive solutions to interpersonal conflict situations were tested. The sample comprised participants between the ages of 9-15. Results indicated that females were more likely to produce assertive and submissive solutions while males tended to produce aggressive solutions.

The study by Collins, Jane Awinja, and Kenneth (2014) sought to establish gender differences in the problem solving approaches among secondary school students in Kenya. The results showed that gender had no affect on problem solving.

2.4. **Educational problems and status of schools at tribal areas**

Regarding educational problems and status of schools at tribal areas the review of literature has summarized in terms of stating in which tribal areas of India the research has been conducted related to the facilities and schools, the research methods and techniques researchers have used to gather information, the conditions and economic status of the tribal areas, reasons for not sending the children to schools, lacunas in implementing policy formulations, specific facilities available at tribal schools and its limitations in comparison with other schools, tribal parents attitude towards school and education, enrollment and dropout rates at tribal schools, problems about medium of instructions, problems related to recruitment and qualification of teachers and the belief perceived by the officials as the problems that
stood in the way of the tribal’s progress. All these aspects also influence the teaching learning process and child’s development in all arenas.

Regarding educational problems and status of schools at tribal areas reviewed and the studies have mainly been done in Keonjhar districts, Orissa on scheduled tribes (Bhargave, 1989); Kashipur block, Orissa on tribes of Niyamgiri hill ranges, (Kondhs Sahoo, 1989); Koraput District, Orissa on tribes of Dongria Kandhas (Biswal’s, 1991); Chamoli, Garhwal District on scheduled tribes (Lakhera, 1986); Mishing tribe (Rehman, 1989); tribal areas of Andhra Pradesh (Ramana, 1989); scheduled tribes and scheduled castes in Rajasthan (Bhargava & Mittal, 1988); and backward Classes of Howrah District, West Bengal(Mitra, 1981).

Methods used for data collection in the research studies were survey on the basis of anthropological methodologies (Mitra, 1981); survey using a habitation information form, a school information form, an opinionnaire for teachers and an interview schedule (Bhargava & Mittal, 1988); a questionnaire, interview and observation schedules (Ramana, 1989); Questionnaires, with discussion, observation and secondary sources (Sahoo, 1989); schedules, viz. village information form, school information form, opinionnaire and parent interview (Bhargave, 1989); information blanks, village information schedule, family information schedule, information schedule, informal discussion, etc (Biswal’s, 1991); the door-to-door visit technique using Educational Problems Questionnaire (for students) and Educational Problems Schedules (for guardians/ eminent persons/ teachers and administrators) (Rehman, 1989).

The economic condition of the tribal’s was seen to be being poor (Mitra, 1981) to extremely poor (Sahoo, 1989). Though the families were found to be interested in sending their children to school but their economic status did not permit them to do so.
(Sahoo, 1989). Oppression from higher groups was seen mainly due to their economic dominance (Mitra, 1981).

The condition of education and literacy was extremely poor in the case of tribes while in the case of scheduled castes it was slightly better. Neither the scheduled tribes nor the scheduled castes could compare to any extent with higher caste groups, irrespective of rural or urban situations (Mitra, 1981).

No appreciable development was made in this sector despite the constitutional commitment. In many cases, policy matters both from government and other agencies had been properly examined and it was found that policy formulations were far from reality (Mitra, 1981).

The facilities available in the schools were very negligible and meager (Sahoo, 1989) and lacked necessary physical facilities (Biswal, 1991). The infrastructure in the ashram schools in terms of buildings, teaching aids, hostel facilities, etc, were found to be poor (Ramana, 1989). Educational facilities in the non-tribal district were better than those in the tribal district (Bhargave, 1989).

Due to lack of education and literacy the backward classes did not have any awareness about literacy (Mitra, 1981) and parents were indifferent to education as perceived by the officials (Biswal, 1991) and there was lack of motivation in pupils as perceived by the officials (Biswal, 1991). Absenteeism, stagnation and wastage were high in the Ashram schools (Ramana, 1989).

Kondh parents’ attitude towards the education of girls was found to be negative. 68.4% families refused to send their girls to school (Sahoo, 1989). As compared to boys, fewer girls in the area got involved in schools (Biswal, 1991).

The children from the tribe were not attending educational institutions, as expected, at different levels of schooling (Rehman, 1989). Many students drop out
between primary and secondary levels and between secondary and college levels (Rehman, 1989). The enrolment for scheduled castes/scheduled tribes for classes VI to VIII were much on the lower side (Bhargava & Mittal, 1988) so the rate of dropout increased as pupils moved from lower to higher classes (Biswal, 1991). The enrolment of girls was also found to be very low (Bhargava & Mittal, 1988). Dropout turned out to be a vital problem which showed unproductive expenditure and loss of energy by different agencies (Mitra, 1981).

Kondh parents had negative attitude towards Oriya as the medium instruction (Sahoo, 1989) and children demanded that the medium be their own mother tongue (Kui) (Sahoo, 1989). Problem of adjustment with the medium of instruction, curriculum, teachers, time was prominent (Lakhera, 1986).

Most of the teachers in the area lacked the required qualification; they did not belong to the tribe (Biswal, 1991) and families felt that the teachers did not have a favorable attitude towards their children because the children were Kondhs (Sahoo, 1989). The teaching-learning process in these schools was not found to be satisfactory (Ramana, 1989).

Traditional beliefs and customs were perceived by the officials as the problems that stood in the way of the tribal’s progress (Biswal, 1991) and the boys also revealed that the traditions, taboos and prejudices of their community acted as constraints in the advancement of their education (Lakhera, 1986).

2.5. **Play way Intervention methods for cognitive and psychosocial development of children**

Promotion of the child development emphasizes approaches which are child centered. Play is universal phenomenon of childhood. Play includes games and any creative activities such as art, craft and language (Kapur, 2007). Hence child initiated play way
types of activities that could be considered for the intervention programme include art and craft; games and play; word and language games, number games and cultural activities. This intervention programme aimed at development of the children in terms of cognitive abilities like attention, memory and intellectual functioning; and psychosocial aspects like adjustment, self concept and social problem solving ability.

In this section the intervention methods have been reviewed on to understand how these methods have been used in different modalities, on different age groups of children, children from different backgrounds in terms of area they belong to, the problems that these methods are trying to remediate or develop in general and specific importance is given to the aspects of present study of intervention in terms of cognitive and psychosocial aspects.

It is been seen that art and play has been researched in wide range of situations and its influence on cognitive and psychosocial aspects, whereas number games has not been researched much and has to be researched yet and the present study is a venture in the same direction. Of the psychosocial aspects as the review indicates influence of play way method is researched less about social problem solving skills and again the present study is a venture in the same direction. The reviews also shows that the aspects of intervention has been tried out in many studies on problematic issues of children, where as the present study emphasise on using these child friendly methods for general development of cognitive and psychosocial aspects. Very few studies have concentrated on tribal children in specific, where as the present study is specifically tried to use child friendly methods to tribal school children keeping in mind the specific background they hail in and the persisting conditions, which is why the present research is of importance in terms of using these methods and techniques for development of children in general and tribal children in specific.
2.5.1. **Art and craft work as play way intervention for development of children**

Art and craft work has been used in different modalities such as art therapy (Keve, 1995); art therapy intervention (Garibaldi, 1995); creative arts therapies (Harvey, 1989); group art therapy (Rosal, 1993); group art therapy intervention involving activity like "Me in Ninth Grade" drawings (Spier, 2010); cognitive behavioural art therapy group (Rosal, 1993); cooperative classroom art therapy intervention including group discussion, writing, art-based reflection, and problem solving (Gibbons, 2010); combined art therapy and English curriculum (Rosal, McCulloch-Vislisel, &Neece, 1997); combined art therapy and bibliotherapy (Dunn-Snow, 1997); combined interactive art and drama with health education models (Long and Soble, 1999); Integrated movement, art, and music activities (Harvey, 1989); and drama therapy groups with face painting and storytelling (MacKay, 1987).

Art and craft work has been used for different grades like second grade (Harvey, 1989), third grade (Garibaldi, 1995), fourth grade (Harvey, 1989; Garibaldi, 1995; Rosal, 1993), fifth grade (Garibaldi, 1995; Rosal, 1993), sixth grade (Rosal, 1993), elementary school age children (Dunn-Snow, 1997; Gibbons, 2010), sixth grade students (Long & Soble, 1999), eighth-grade students (Spier, 2010), ninth-grade (Rosal et al., 1997); and adolescents (MacKay, 1987).

Art and craft work has been used for different purposes initiating with primary prevention and intervention on-site in public schools for children with a wide range of family or developmental challenges (Keve, 1995) and moving ahead in promoting activities like to promote changes in the students' understanding of themselves and their relationships with others (Dunn-Snow, 1997) and reduce existing milder issues among children like to decrease school failure, and to improve student’s attitudes about school, family, and self (Rosal et al., 1997). It has been used to improve aspects
like cognition and self-concept (Harvey, 1989) and conflict resolution and group cohesion (Gibbons, 2010). It has been used with different groups like learning disabled to improve self-competence and self-esteem (Garibaldi, 1995), students at risk for making a poor transition to high school to increase coping skills and decrease disruptive behaviours (Spier, 2010), children with behaviour disorders to modify the adaptive classroom behavior (Rosal, 1993) and with addicts, emotionally disturbed and educationally subnormal adolescents for allowing unexpected roles or buried aspects of the self to come to the surface and be expressed (MacKay, 1987).

Art and craft work has had impact on many aspects of bringing about a culture change in the group that is essential for incorporating conflict resolution in the classroom (Gibbons, 2010), changing attitudes (Long & Soble, 1999), decreasing school failure, and to improving student’s attitudes about school, family, and self (Rosal et al., 1997), benefiting by changing children's self-perceptions of academic competence (Garibaldi, 1995), change in self concept (Keve, 1995), gaining more positive attitudes about the self in relation to school, peers (Rosal, 1993), positive growth in thinking (Harvey, 1989), in decreasing disruptive behaviours and increasing coping skills for the transition to high school (Spier, 2010), changing the students’ understanding of themselves and their relationships with others (Dunn-Snow, 1997).

Art and craft work in different modalities have been used by different researchers to deal with various psychological aspects. In respect to the interest of the present study it can be seen that few studies have worked on using art and craft for the development of cognition in general and attention as cognitive aspect in specific. Memory which has been of interest in the present study has not been researched yet by others using art as a medium of change. Art and craft work as intervention to deal with other psychosocial aspects like adjustment, self concept and social problem
solving skill which is of interest of the present study have been researched by many researchers. The studies related to these aspects have been discussed below briefly.

2.5.1.1. **Art and craft work as play way intervention for cognitive development of children.** Harvey (1989) in a study investigated the use of creative arts therapies to effect cognition in second graders and fourth graders. Integrated movement, art, and music activities were conducted. Analysis suggested positive growth in thinking.

Art work in terms of different modalities and therapy has been used to improve aspects like cognition and to bring about positive growth in thinking (Harvey, 1989). As stated by Uma et al., (2002) of the many strategies to enhance attention includes colouring and painting within the lines (Oommen In: Uma et al., 2002). Rosal (1993) examined the use of art therapy to modify one adaptive classroom behaviour among children with behaviour disorders. The Connors Teacher Rating Scale indicated that the two art therapy conditions (cognitive art therapy and art therapy) were more effective than a control group in helping behaviour disordered subjects improve.

2.5.1.2. **Art and craft work as play way intervention for development of adjustment in children.** To deal with adjustment related issues among children art work has been used in ways like art therapy intervention (Garibaldi, 1995); group art therapy (Rosal, 1993; Spier, 2010); interdisciplinary learning that combines art therapy and bibliotherapy (Dunn-Snow, 1997). Art work has been used to deal with adjustment related issues with different groups like, students at risk for making a poor transition to high school to increase coping skills and decrease disruptive behaviours (Spier, 2010), children with behaviour disorders to modify adaptive classroom behavior (Rosal, 1993). Art work in different modalities have been used by different researchers to handle different aspects of adjustment like promoting changes in the
students’ understanding of themselves and their relationships with others (Dunn-Snow, 1997); to reduce drop-out rates, to decrease school failure, and to improve student’s attitudes about school, family, and self (Rosal et al., 1997); in decreasing disruptive behaviours and increasing coping skills for the transition to high school (Spier, 2010); and in improving conflict resolution, social learning, and group cohesion (Gibbons, 2010).

Dunn-Snow (1997) presented a pilot study in which children were provided a model of interdisciplinary learning that combines art therapy and bibliotherapy and these techniques promoted changes in the student’s relationships with others. Spier (2010) examined the effectiveness of a group art therapy intervention within a school setting and results indicated that the school art therapy group can be beneficial in increasing coping skills. The study by Gibbons (2010) described a cooperative classroom art therapy intervention and results indicated a culture change in the group that is essential for incorporating conflict resolution in the classroom. Keve’s (1995) project evaluated the effectiveness of a specific and short-term art therapy modality for children with a wide range of family or developmental challenges. Eleven of the eighteen children who completed the program showed specific signs of improvement.

2.5.1.3. **Art and craft work as play way intervention for development of self concept in children.** Different Interventions used to enhance different aspects of self-concept are art therapy (Garibaldi, 1995; Rosal, 1993); short-term art therapy modality or artwork including self-portraits (Keve, 1995); creative arts therapies and integrated movement, art, and music activities (Harvey, 1989). Art based interventions have been used with groups like learning disabled to improve self-competence and self-esteem (Garibaldi, 1995). Art based interventions have been used to improve aspects like self-concept (Harvey, 1989) bring about change in self
concept (Keve, 1995), gaining more positive attitudes about the self in relation to school, peers, and authority figures (Rosal, 1993), and changing children's self-perceptions of academic competence (Garibaldi, 1995).

Rosal (1993) examined the use of two art therapy conditions (cognitive art therapy and art therapy). A personal conduct drawing interview found that both conditions (cognitive art therapy and art therapy) helped subjects gain more positive attitudes about the self in relation to school, peers, and authority figures. Rosal et al., (1997) investigated the effectiveness of a combined art therapy and English curriculum in a ninth-grade classroom. One of the goals of the study was to improve student’s attitudes about school, family, and self. The results indicated that the project was successful in reaching its goals.

A study by Garibaldi (1995) examined the extent to which an art therapy intervention affected the self-esteem of learning disabled and normally-achieving students. The findings of the study indicated that the participation in art therapy can benefit children's self-perceptions and also the teachers perceived significant change in their students' level of social acceptance. Keve (1995) evaluated the use of art therapy for primary prevention and intervention in public schools. Change was assessed using the Piers-Harris Self-Concept Scale, evaluation of artwork including self-portraits, and teacher feedback. Eleven of the eighteen children who completed the program showed specific signs of improvement.

Dunn-Snow (1997) presented a pilot study in which elementary age children were provided a model of interdisciplinary learning that combines art therapy and bibliotherapy which was implemented by reading stories to the students and introducing them to children's literature. These techniques promoted changes in the students' understanding of themselves. Harvey (1989) in a study investigated the use
of creative arts therapies to effect self-concept in second graders and fourth graders. Integrated movement, art, and music activities were conducted. Analysis suggested positive growth in thinking and relationships between self-concept and creativity.

2.5.1.4. **Art and craft work as play way intervention for development of social problem solving skills in children.** Interventions like group art therapy intervention and cooperative classroom art therapy intervention, (Spier, 2010; Gibbons, 2010; Johnson, McLeod, & Fall, 1997) have been used to enhance some aspects of social problem solving skills indirectly, in terms of increasing coping skills (Spier, 2010) and working on conflict resolution and problem solving in the classroom (Gibbons, 2010).

The study by Gibbons (2010) described a cooperative classroom art therapy intervention in a public elementary school that provided other aspects like conflict resolution education and group cohesion among sixth grade students. The group explored the roles of fictional characters in conflict by including other aspects of problem solving. Results indicated a culture change in the group that is essential for incorporating conflict resolution in the classroom. The study by Spier (2010) examined the effectiveness of a group art therapy intervention within a school setting to increase coping skills. Changes in pre and post-intervention "Me in Ninth Grade" drawings suggested improved ability to anticipate social roles and an increased sense of school belonging.

2.5.2. **Games and Play as play way intervention for development of children**

Games and play has been used in different grades like third-grade children (Bleck & Bleck, 1982); fourth grade children (Post, 1999); fifth-grade children (Robinson, Landreth & Packman, 2007; Baggerly, 1999; Post, 1999); sixth grade children (Post, 1999); elementary school children (Baggerly & Jenkins, 2009; Johnson et al., 1997;
Ray, Schottelkorb & Tsai, 2007); eight and nine year children (Boehm-Morelli, 2000; Garaigordobil & Echebarría, 1995); eight to thirteen years children (Dubow, Huesmann & Eron, 1987); nine years children (Pellegrini & Davis, 1993); pre-adolescent children (Thompson, 2001); and 13 years old children (Langsner & Anderson, 1987).

Games and play has been used in different modalities such as child-centred play therapy (Baggerly, 1999; Post, 1999; Baggerly & Jenkins, 2009; Johnson et al., 1997; Ray et al., 2007); short- and long term Child Centered Play Therapy (Ray, Henson, Schottelkorb, Brown & Muro, 2008); long-term Child Centered Play Therapy (CCPT) (Muro, Ray, Schottelkorb, Smith & Blanco, 2006); filial therapy training model in child centered play therapy (Robinson et al., 2007); play and nondirective play therapy (Boehm-Morelli, 2000); play intervention, (Lopez, 2002); structured play (Bleck & Bleck, 1982); playground activities (Pellegrini & Davis, 1993); sand play (Allan & Berry, 1987); cooperative games program (Carlson, 1999); friendly and cooperative game program (Garaigordobil & Echebarría, 1995); playing strategic board games (Thompson, 2001); outdoor challenge education program (Langsner & Anderson, 1987); school-based interventions designed (Dubow et al., 1987).

Games and play has been used to work with children showing behavioural and emotional difficulties (Muro et al., 2006) and students who had demonstrated trouble with working together cooperatively (Carlson, 1999) and in instances to handle labelled children in the schools (Johnson et al., 1997) and with children identified with attention deficit/hyperactivity disorder (ADHD) (Ray et al., 2007).

Games and play in different modalities have been used by different researchers to deal with various psychological aspects. In respect to the interest of the
present study it can be few studies have worked on using for the development of cognition in general and attention as cognitive aspect in specific. Memory which has been of interest in the present study has not been researched yet by others using as a medium of change, may be because it is already proven that games and mnemonic techniques improve the memory. Games and play as intervention to deal with other psychosocial aspects like adjustment, and social problem solving skill which is of interest of the present study have been researched by some researchers. Many studies have been conducted to study the impact of different games and play on self concept and self esteem and many of these studies have not concluded positively on impact of different games and play on self concept and self esteem.

2.5.2.1. **Games and play as play way intervention for cognitive development of children.** Games and play has been used for different purposes like over all child development (Garaigordobil & Echebarría, 1995); to improve various cognitive domains like academic achievement, visual perceptual skills of children (Thompson, 2001) and reading achievement (Boehm-Morelli, 2000). The impact of long-term Child- Centred Play Therapy (CCPT) with children identified by teachers as exhibiting behavioural and emotional difficulties was statistically significant in improvement on ADHD domain apart from other aspects (Muro et al., 2006). Ray et al., (2007) demonstrated that children who participated in sessions of childcentered play therapy and reading mentoring demonstrated statistically significant decrease in the ADHD Index. There was significant improvement on the visual perceptual skills for the group of pre-adolescents who played strategic board games (Thompson, 2001) as assessed on WRAT 3R, WISC III Coding and Block Design subscale.
2.5.2.2. Games and play as play way intervention for development of Adjustment in children. Games and play activities have been initiated to deal with psychosocial aspects of adjustment and handling teacher-student relationship stress (Ray et al., 2008); improvement in social behaviour in the classroom (Garaigordobil & Echebarria, 1995); cooperation and group cohesion (Carlson, 1999); coping with the issues in their lives (Johnson et al., 1997). Intervention groups of both short and long-term Child Centered Play Therapy demonstrated significant improvement in teacher-student relationship stress from pre to post test in a study conducted by Ray et al., (2008) on students exhibiting emotional and behavioural difficulties. The friendly and cooperative game program encourage children to cooperate and share, as well as to develop symbolic play and hence the intervention stimulated significant improvement in social behaviour in the classroom (increasing behaviours of leadership, cheerfulness, sensitivity, and respect, and decreasing aggressiveness, apathy and anxiety) (Garaigordobil & Echebarria, 1995). A shift in attitudes from the first to the last session was observed with more helping behaviours noticed towards the end of cooperative games program and over the course of the sessions, cooperation and group cohesion when participating in these games increased for students who had demonstrated trouble with working together cooperatively (Carlson, 1999). Nondirective child-centred play therapy facilitated the labelled children’s expression of feelings and increased skill in coping with the issues in their lives which helped in concluding that the strengths children gain during play therapy allow them to more effectively cope with their world outside the play therapy room for labelled children in the schools (Johnson et al., 1997).

2.5.2.3. Games and play as play way intervention for development of Self concept in children. Games and play activities have been initiated to deal with
psychosocial aspects of self concept and self esteem (Ray et al., 2008; Bleck & Bleck, 1982; Post, 1999; Baggerly, 1999; Lopez, 2002); and improvement in social interaction (Bleck & Bleck, 1982). Some studies have given contrary results to the general expectation that games and play will improve self concept (Boehm-Morelli, 2000; Langsner & Anderson, 1987). One study has shown improvement in self esteem/self concept but statistically not significant enough (Post, 1999; Lopez, 2002).

There was significant improvement on the self-esteem in the areas of peer and home for the group of pre-adolescents who played strategic board games (Thompson, 2001). Kindergarten children in the experimental group of child-centred play therapy procedures and skills play sessions showed slightly positive trends in self concept, although it was not in statistically significant range, any how detailed observation and teacher reports revealed an increase in self acceptance, self esteem, self confidence, self control, and positive relationships (Baggerly, 1999).

In a study by Bleck and Bleck (1982) early group sessions focused on social interaction and self-disclosure and were designed to increase group trust and cohesiveness, awareness of self and others, and understanding of feelings. The next set of sessions dealt with disruptive school behaviour, its consequences, and alternatives to such behaviour. The final sessions focused on cooperation, sharing, and feedback. Subjects in the intervention group showed significant improvement on the Coopersmith Self-Esteem Inventory.

Contrary to predictions, play with an adult (some form of mutual recreation) and nondirective play therapy was not found to be more effective than a control group in enhancing reading self-concept and reading achievement in remedial readers in a study conducted by Boehm-Morelli (2000). There was no significant improvement in
self-esteem among students as a consequence of the outdoor challenge education program (Langsner & Anderson, 1987).

Post (1999) addressed the impact of child-centred play therapy on the self-esteem of children. The results indicated that children participating in play therapy did not change; the students not participating in play therapy demonstrated a decrease in self-esteem over the course of the school year. Play therapy for Hispanic students from a predominantly low socio-economic school in a large metropolitan city improved the experimental group’s self-concept scores though not significantly (Lopez, 2002).

2.5.2.4. Games and play as play way intervention for development of social problem solving skills in children. It is seen that games and play has been useful with improving social skills and prosocial behavior of children by reducing aggressive behavior (Allan & Berry, 1987; Dubow et al., 1987). Such aspects do indicate that there could be an increase in understanding the social issues and problems and indirectly improving on social problem solving skills. Carlson (1999) noticed that over the course of the sessions, cooperation and group cohesion when participating in these games increased. Garaigordobil and Echebarria (1995) saw significant improvement in social behaviour in the classroom and also showing increasing behaviours of leadership, cheerfulness, sensitivity, and respect, and decreasing aggressiveness, apathy and anxiety. Thompson (2001) observed that effects were achieved amongst gender groups in the ability to analyze and to home issues. Finally Johnson et al., (1997) detected the strengths children gain during play therapy which allow them to more effectively cope with their world.

Allan and Berry (1987) in the study with children has showed that treatment session involving ten sand play sessions which facilitated the slow process of
differentiation, regulation, separation of various emotions and resulted in reduction of aggressive behaviour and improved social skills in children. Dubow et al., (1987) assessed the effects of four school-based interventions designed to promote prosocial behavior. Aggressive boys from behaviour disorder classrooms received cognitive (self-control), behavioural (pro-social skills), combined cognitive–behavioural, and/or attention/play training. Teacher reports indicated that subjects receiving cognitive–behavioural and attention/play interventions improved significantly in pro-social behaviour more than those exposed to cognitive and behavioural training.

2.5.3. **Word and vocabulary games as play way intervention for development of children**

Word and vocabulary games has been used for different grades like third-grade children and second grade (Morrow, 1985); third grade (Ikeya & Kasai, 2003); elementary educational (Bolt, 1998); primary level (Pellegrini & Galda, 1982; Gourgey, 1984; Wagner, 1987); mean age of 11.5 years; (Wright, 2006); sixth grade (Ikeya & Kasai, 2003; Miller, Rynders & Schleien, 1993); seventh grade (Abu, Al-Khraisha, Mdanat & Dirasat, 2003); 13-16 years (Flaherty, 1993); high school students, (Freyberg, 1973; Pepler & Ross, 1981).

Word and vocabulary games has been used in different modalities such as drama, enactment, dramatic play (Pellegrini & Galda, 1982; Gourgey, 1984; Wagner, 1987; Clift, 1983; Frost et al., 2001; Wright, 2006); socio-dramatic play (Smilansky, 1968); dramatic game condition (Miller, Rynders, & Schleien, 1993); language games (Abu et al., 2003); games class (Bolt, 1998); puppetry (Egge & McEvers, 1987); imaginary play episodes (Miller et al., 1993); recreational reading program (Morrow, 1985); cooperative role play (Flaherty, 1993); peer support program (Ikeya & Kasai, 2003).
Word and vocabulary games in different aspects has been used to work with children for increasing higher order thinking (Clift, 1983); conceptual reading achievement (Abu et al., 2003); controlling noncompliant students who do not behave in a cooperative manner (Flaherty, 1993); children’s emotional development (Frost et al., 2001); improve perceived quality of friendships (Miller et al., 1993).

In respect to the interest of the present study it can be few studies have worked on using word and vocabulary games for the development of cognition in general and attention in specific. Memory which has been of interest in the present study has not been researched yet by others using word and vocabulary games as medium of change. Word and vocabulary games as intervention to deal with other psychosocial aspects like adjustment, and social problem solving skill which is of interest of the present study have been researched by some researchers. Many studies have been conducted to study the impact of different aspects of word and vocabulary games on self concept and self esteem.

2.5.3.1. **Word and Vocabulary games as play way intervention for cognitive development of children.** Word and vocabulary games in different aspects has been used to work with children for improving attention (Pellegrini & Davis, 1993); cognitive growth (Bolt, 1998); intellectual development (Freyberg, 1973; Pepler & Ross, 1981); increase higher order thinking (Clift, 1983); conceptual reading achievement (Abu et al., 2003).

Pellegrini and Davis (1993) observed classroom behaviour (task relevant behaviour on standardized seat work immediately before and after playtime) and playground behaviour (social and non-social exercise and sedentary behaviour). Results indicate that children were less attentive to seat work as a function of time and that longer confinement resulted in more exercise for boys and more social sedentary
behaviour for girls. Social behaviour at playtime and post-playtime attention to seat work were significantly related.

Bolt (1998) investigated and described whether cognitive growth occurred among subjects in an elementary educational games class in which case discussions were used as a teaching method. Data revealed an improved general propensity to identify problems, suggest solutions, and cite concepts in written reflections. Researchers have commented that children who actively participate in dramatic play during preschool and early elementary years are advanced in intellectual development (Freyberg, 1973; Pepler & Ross, 1981). In her research with high school students, Clift (1983) found that students using dramatic enactment performed as well as students in traditional lecture, discussion, or seatwork modes. Moreover, they experienced more instances of higher order thinking and less topic-irrelevant thought than students in the non-dramatic mode.

2.5.3.2. **Word and Vocabulary games as play way intervention for development of adjustment in children.** Word and vocabulary games in different aspects has been used to work with children for positive social interactions (Miller et al., 1993); positive changes in student behaviour (Egge & McEvers, 1987); improve behaviours and attitudes of children (Morrow, 1985); controlling noncompliant students who do not behave in a cooperative manner (Flaherty, 1993).

Fifth-grade students were assigned to one of two treatment conditions in a study conducted by Miller et al., (1993). One group was involved in a dramatic game condition and the second group was involved in a non-competitive games condition. Students in the drama condition were targeted for positive social interactions by peers significantly more and were more highly regarded as friends than were those in the games condition. Egge and McEvers (1987) described the use of puppetry as among
other aspects promoting understanding of self, attitudes, feelings, and behaviours. Following the program, self-reported enthusiasm, and positive changes in student behaviour and self-esteem were observed by the counsellor, teachers, administrators and parents.

Morrow (1985) examined whether the behaviours and attitudes of children as potential voluntary readers could be improved by a recreational reading program. During the project, teachers in the experiment rooms regularly read aloud to the subjects, discussed stories, told stories using felt boards and puppets, and showed movies. Interviews with teachers and observations of classrooms before and after the study provided anecdotal and descriptive information that demonstrated change in the teacher’s attitudes and practice. Flaherty (1993) reports on a school project based on cooperative role play procedures. Children with learning disabilities participated in the project. Four different role plays emerged: traditional roles, positive attitudes, typical classroom roles, and two occasional roles. Results of the project indicate that a cooperative role play was an effective learning tool for the subjects. Reports indicated that the cooperative role play was an effective technique for controlling noncompliant students who do not behave in a cooperative manner.

2.5.3.3. **Word and Vocabulary games as play way intervention for development of self concept in children.** Word and vocabulary games in different aspects has been used to work with children for enhancing positive self concepts (Pellegrini & Galda, 1982; Gourgey, 1984; Wagner, 1987; Wright, 2006; Frost et al., 2001); enhancing self-esteem (Ikeya & Kasai, 2003; Egge & McEvers, 1987).

Most of the research on drama in the classroom has been done at the primary level, where drama has been found to improve among other aspects of self concepts, and attitudes toward others (Pellegrini & Galda, 1982; Gourgey, 1984; Wagner,
1987). The study by Wright (2006) investigated drama education. Subjects from five different classes drawn from provincial city and rural village schools with a mean age of 11.5 years were the participants in the study. The subjects were then given a ten-week drama program. Results indicated a significant growth in role-taking ability, and an improvement in self-concept. Dramatic play contributes to children’s emotional development by helping them reach places of increased positive self-concepts, (Frost et al., 2001).

The purpose of the study conducted by Ikeya and Kasai (2003) was to investigate the effects of a peer support program on the development of social skills and self-esteem of children. The peer support program was designed to develop social skills through experiences in games and role-playing. The group of children whose scores on social skills increased significantly also showed higher scores on self-esteem. Therefore, the peer support program produced interrelated effects on social skills and self-esteem. Egge and McEvers (1987) described the use of puppetry as a school guidance technique that promoted understanding of self, attitudes, feelings, and behaviours. Following the program, self-reported enthusiasm and positive changes in student behaviour and self-esteem were observed by the counsellor, teachers, administrators, and parents.

2.5.3.4. **Word and Vocabulary games as play way intervention for development of social problem solving skills in children.** Word and vocabulary games in different aspects have been used to work with children for improving social skills (Ikeya & Kasai, 2003; Smilansky, 1968). The purpose of the study conducted by Ikeya and Kasai (2003) was to investigate the effects of a peer support program on the development of social skills and self-esteem of children. The peer support program was designed to develop social skills through experiences in games and role-playing.
Third and sixth graders participated in an eight-hour program. The group of children whose scores on social skills increased significantly also showed higher scores on self-esteem. Therefore, the peer support program produced interrelated effects on social skills and self-esteem. Smilansky (1968) found that by engaging in sociodramatic play (dramatic play that involves more than one player), their social skills were enhanced.

2.5.4. **Cultural activities like dance, music and extracurricular activities as play way intervention for development of children**

Cultural activities like dance, music and extracurricular activities has been used for different grades like 4th grade (Byrkjedal, 1992); primary school students (aged seven to twelve years) (Caf, Kroflic, & Tancig, 1997); middle school students (Eidson, 1989) adolescents aged 12 to 18 years; (Hendricks, 2001); adolescent females (Blomfield & Barber, 2011).

Cultural activities like dance, music and extracurricular activities has been used in different modalities such as movement within a safe group environment (Eke & Gent, 2010); systematic movement and dance (Caf et al., 1997); musical instruments training (Musacchia et al., 1997); music lessons (Walker & Boyce-Tillman, 2002); music training (Chan et al., 1998; Ho et al., 2003); music therapy (Hendricks, 2001); short-term music therapy program (Baker & Jones, 2006); music therapy treatment program (Eidson, 1989); music therapy work (Byrkjedal, 1992); extracurricular activities (Blomfield & Barber, 2011); extra-curricular physical activities (Amanda, 2002).

Cultural activities like dance, music and extracurricular activities in different aspects has been used to work with children for individual’s development (Eke & Gent, 2010). In respect to the interest of the present study few studies have worked on
using cultural activities—dance, music and extracurricular activities for individuals' general development and to improve reaction time and different aspects of memory. Intellectual functioning which is one of the important aspect of the present study has not been researched in relation to cultural activities influencing development of intellectual functioning. Cultural activities like dance, music and extracurricular activities as intervention to deal with other psychosocial aspects like adjustment which is of interest of the present study have been researched by some researchers. Many studies have been conducted to study the impact of different aspects of cultural activities like dance, music and extracurricular activities on self concept and self esteem, where as cultural activities like dance, music and extracurricular activities has not been used as a medium of change in social problem solving skills which is of interest of the present study.

2.5.4.1. Cultural activities like dance, music and extracurricular activities as play way intervention for cognitive development in children. Cultural activities like dance, music and extracurricular activities in different aspects has been used to work with children for improving quicker response (Musacchia et al., 1997); enhancing verbal learning and retention abilities (Chan et al., 1998); enhancing verbal memory (Ho et al., 2003).

A study (Musacchia et al., 1997) demonstrated that playing musical instruments triggers changes in the brain stem as well as in the brain cortex. Researchers measured the activity of neurons in the brain of the experimental subjects who had been playing musical instruments since the age of five. They found that musicians’ brain stems not only showed increased activity, but also quicker response times. The longer a person had been playing an instrument, the sharper the responses. Adults with music training in their childhood demonstrated better verbal memory,
according to a study by Chan et al., (1998). A study of involving boys aged between 6 and 15 year found that those with music training had significantly better verbal learning and retention abilities. The longer the duration of the music training, the better was the verbal memory (Ho et al., 2003). The authors suggest that the cause of the increase in verbal memory was neuroanatomical changes in the brains of children who were playing music.

2.5.4.2. **Cultural activities like dance, music and extracurricular activities as play way intervention for development of adjustment in children.** Cultural activities like dance, music and extracurricular activities in different aspects has been used to work with children to increase ease and confidence in new social environments (Walker & Boyce-Tillman, 2002); improve social relationships in the home and outside (Walker & Boyce-Tillman, 2002); enhance interpersonal behaviour (Eidson, 1989); improve cohesive and cooperation classroom climate (Byrkjedal, 1992).

Walker and Boyce-Tillman (2002) report the potential benefits of music lessons (above the acquisition of musical skills) as including increased sense of self-efficacy, self-confidence and self-esteem, increased ease and confidence in new social environments, increased independence, improved social relationships in the home and outside, emotional release and expression of emotions and control over unpleasant feelings, thoughts and emotions. Eidson (1989) examined the effect of a behavioural music therapy treatment program on students interpersonal behaviour demonstrated in group sessions and in classrooms. Subjects included emotionally handicapped middle school students. Experimental subjects’ scores for classroom behaviour were almost twice as stable as scores for control subjects. Byrkjedal (1992) examined experiences from music therapy work in a fourth standard class in a Norwegian rural school. The
music therapy interventions were based on general music therapy theory combined with elements from group psychology. The findings show that the pupil’s behaviour and interpersonal patterns changed during the course of music therapy. The classroom climate changed from being in conflict, to being more cohesive. Results concluded that Music therapy seemed to be an adequate way of working with classroom climate, being able to accelerate group processes and cooperation.

2.5.4.3. **Cultural activities like dance, music and extracurricular activities as play way intervention for development of self concept in children.** Cultural activities—dance, music and extracurricular activities in different aspects has been used to work with children to increase self-concept (Hendricks, 2001); increase self-confidence and self-esteem (Walker & Boyce-Tillman, 2002); positive general self-worth, social and academic self-concept (Blomfield & Barber, 2011); improve body image (Caf et al., 1997); and improve physical self-perceptions (Amanda, 2002).

The purpose of the study conducted by Hendricks (2001) was to determine the effectiveness of adding music therapy techniques to cognitive behavioural group treatment for depressed adolescents (12 to 18 years). Results indicated that the intervention increased self-concept scores. Walker and Boyce-Tillman (2002) report the potential benefits of music lessons (above the acquisition of musical skills) as including increased sense of self-efficacy, self-confidence and self-esteem.

The study by Blomfield and Barber (2011) investigated whether developmental experiences that occurred during extracurricular activities were linked to a more positive self-concept for Australian adolescents, and whether this link was particularly salient for youth from disadvantaged schools. Adolescents from diverse high schools across Western Australia were surveyed. The findings revealed that adolescents from low socio-economic status schools who participated in
extracurricular activities had a more positive general self-worth and social self-concept than adolescents from similar socio-economic schools who did not participate in any extracurricular activities. Furthermore, the positive developmental experiences that occurred during extracurricular activities predicted a more positive general self-worth and social and academic self-concept, and this link was stronger for youth from low socio-economic status schools. These findings suggest that the developmental experiences afforded by extracurricular activities may foster positive adolescent development.

Caf et al., (1997) investigated the effects of systematic movement and dance on creativity, body image and activity in hypoactive primary school students. The findings indicate that subjects in the experimental group became more relaxed, began to communicate with one another. After four months of training the experimental group improved elements of their body image. An investigation by Amanda (2002) considered the differences in physical self-perceptions between participants and non-participants in extra-curricular physical activities. Data analyses indicated that participants involved in extra-curricular physical activities displayed significantly higher attractive body adequacy and physical self-worth scores than non-participants. These findings indicate that pupils who participate in extra-curricular activities may display higher self-perceptions in some perceived domains of their physical self.

2.5.4.4. **Number games as play way intervention for development of adjustment in children.** Number games as a medium of change on the areas of interest of the present study has not been researched upon widely. One or two studies have been analysed to understand its impact on some cognitive factors.
Guberman and Saxe (2000) examined emergent divisions of labour in children’s collective mathematical problem solving during educational game playing. Third and fourth graders were divided into four groups and played Treasure Hunt in pairs. The four groups were based on mathematics achievement grade and included high, low and two mixed ability groups. 32 pairs of game players played in their classrooms twice weekly for less than two months. The results showed that individual goal-directed activities was sustained and were constitutive of the collective play; collective efforts to accomplish emergent problems valued in play had implications for individual goals.

The study by Ke and Grabowski (2007) investigated the effects of game-playing on fifth-graders maths performance and attitudes. Fifth graders were assigned to a cooperative Teams-Games-Tournament (TGT), interpersonal competitive or no game-playing condition. A state standards-based maths exam and an inventory on attitudes towards maths were used for the pre test and post test. Multivariate analysis of covariance (MANCOVA) indicated that game-playing was more effective than drills in promoting maths performance, and cooperative game-playing was most effective for promoting positive maths attitudes regardless of students’ individual differences.

The review has covered wide range of aspects related to the present study to understand the lag in level of cognitive development (attention, memory and intellectual ability) among children in tribal areas and the reasons for the same including the school environment; lacunas in the tribal and school environment for hampering the development of psychosocial aspects (adjustment, self concept and social problem solving skills); educational problems and status of schools at tribal areas; the need for adequate child friendly intervention for improving cognitive and
psychosocial aspects among tribal children; different aspects (art and craft work, games and play, word and vocabulary games, number games, cultural activities—dance, music and extracurricular activities, and other activities) involved in the intervention programme and the reasons for the same.

The review has highlighted the need for promotion of the child development emphasizes approaches which are flexible and child centered. So, if one needs to provide quality education, there should be shift of focus from teacher initiated instructional practices to improve academic skills to child initiated play way methods, to promote child development. Play is universal phenomenon of childhood. Play promotes motor, cognitive, language, emotional, social and moral development. Despite the growing interest in play way and child centered approaches to teaching and learning in India, these approaches are still the exception rather than the norm.

At the tribal level keeping in mind the limited man power, financial and implementation limitations, intervention has to be planned adequately for overall development of such children. The review of literature showed the possibilities of some of the interventions that worked to an extent in this background which included art and craft work; games and play; word and vocabulary games; number games; and cultural activities. Hence the present study concentrated on evolving a play way intervention programme for development of tribal school children in terms of cognitive abilities (attention, memory and level of intellectual functioning) and some of psychosocial aspects (self concept, adjustment and social problem solving ability).