CHAPTER – II
REVIEW OF THE RELATED LITERATURE

2.1 INTRODUCTION

The initial step of research is review of the related literature and its critical appreciation. The most critical and troublesome part of the exploration is review of writing. The meaning of review of researches is to study and assess the over a wide span of time writing. To invest time in related writing is great and profound considering. By investing the time, we can know the detailed knowledge of the related subject. The review of related writing and the investigation of writing take the researcher to that field of information where he knows the related conclusions and consequences of assessments. At the point when the researcher check and assess the working of other research then he thinks about a great deal of strategies to look into, numerous certainties, standards and critical data from different related books. These everything will be exceptionally valuable in his examination.

In reality, the learning can be accessible in books and different libraries. Man, very unique in relation to different creatures recovers the new wellspring of information on the premise of past and composed learning.

At the point when researcher makes a cautious review of the literature, he winds up plainly mindful of the essential and insignificant factors in the concerned region of research.

Review of the researches help the researcher in evasion of any duplicance of work done before. A watchful survey dependably points of deciphering earlier investigations and showing their helpfulness for the examination to be embraced. A cautious review of the researches empowers the researcher to gather and blend earlier investigations identified with the present research. A cautious review of the research

empowers the researcher in finding critical variable pertinent of the region of the present research.

2.2 OBJECTIVES OF THE REVIEW OF LITERATURE

a. To know the changes at different times.

b. To identify the variables relevant for research.

c. Avoidance of repetition.

d. Determining meaning and relationship among variable.

e. Synthesis of prior works.

f. To know the expansion area of problem.

2.3 SOURCES OF STUDYING RELATED LITERATURE

There are different sources of the review of the literature. Some of them are mentioned below:-

a. **Journals and Books: -** Different research journals and books relevant to the area of interest are the primary source of the literature review. A related journal is one which reports only those articles which are carefully reviewed by the experts before publications.

b. **Review: -** Reviews are short articles that give brief information regarding the work done in a particular area over a period of time. Reviews are commonly published in formals, year books, hand books and encyclopedias.

c. **Abstracts: -** These provide a summary of the research report done in different fields. Psychological and sociological abstracts are the two common examples of abstracts. These are the useful sources of up to date information for researcher.

d. **Indexes: -** These show the titles of the research report without any abstract. The titles are categorized, arranged alphabetically in each category so that the researcher can locate any article of interest easily.

e. **Doctoral Dissertations: -** These have also been a very good source of the review of the literature. In libraries of universities, doctoral dissertations are available. Thus the doctoral dissertations present the advantage of prior review. Ordinarily, it is not possible" for the researcher to move through all the important libraries in the country to consult all exiting doctoral dissertations. Hence, we can access to those dissertations that interests him through dissertation. Abstracts international which are published from different universities. In India the survey of research in education (Edited by M.B. Buch) does much the same function.

2. 4 RESEARCH CONDUCTED IN ABROAD

Ae-Hwa-Kim et al (2006) reported that effectiveness of computer assisted comprehension practice to students with disability. For the said purpose the researcher has developed the CACSR (Computer Assisted Collaborative Strategic Reading) programme in improving reading and language skills among students with disability. The sample consists of two teachers' specialization in reading and language arts and 34 students with disability were participated in this study. The intervention group received Computer Assisted Collaborative Strategic Reading (CACSR) instructional procedure, which consists of 50 minutes of sessions twice per week over 10 to 12 weeks.

The major findings revealed that statistically significant differences were found between intervention and comprehension groups in improving reading comprehension ability as measured by the researcher. It concluded that the CACSR intervention

improved their reading by using computer assisted comprehension practice for students with disabilities.

Biemiller (2003) explains that typical children may suffer from poor language comprehension that stems from a limited vocabulary. The investigator suggested that children should be provided with explicit instruction in order to learn new words. Children with learning disabilities do not use independent strategies to learn new words, therefore they should be deliberately taught the meaning of words (Bryant, Goodwin, Bryant, & Higgins, 2003, Bisagno & Haven 2002) in this study, and the researcher found that computer assisted instructional as self-learning materials are influenced by present studies learning in student centered. Further also stated that computer assisted instruction programme having greater benefited to learning disabilities (LD) students with regard to better understanding, effective teaching methodologies, assistive technology and concepts improvement.

Calhoun, James M. (2011) highlighted the comparison of two different interventions used to improve students' performance as tested on the Colorado State Assessment Program (CSAP). The first intervention, increased time-on-task, was used at Freedom High School for the school years 2004-2005 until 2008-2009. In those years, mathematics achievement did not improve and CSAP scores showed a negative trend. In the school year 2009-2010, Freedom High School used a computer-assisted instruction program as an intervention for low performing students. A matched-pair design was used to compare these two interventions to determine if the new intervention would improve student achievement. Finally it concluded that computer-assisted instruction (CAI) approach as an intervention for low performing students or slow learner is much better than any other approach for intervention.

Cotton (2000) thirty five studies on computer assisted instruction were reviewed during the 1980s period. The CAI as a supplement to traditional teacher directed instruction (TTDI) produces more improvement to those obtained with traditional instruction alone. Further, it was analyzed with regard to gender, age and abilities for different domains of curricular areas. The computer assisted instruction had shown mixed results when compared to traditional method of instruction.

The following results were found, a). With regard to raising achievement, the learning rate may enhance through computer assisted instruction. b). Those students learnt by CAI always benefited in certain areas which includes retention, attendance, attitude, motivation, save time and energy on task as well as cooperation and collaboration.

D. Mioduser at el (2000) conducted a study on effectiveness of computer based instruction for teaching early reading skills acquisition when compared with more traditional methods of instruction. The sample consisted of 5 to 6 years age children with severe learning disabilities studying at pre- school were assigned to one of three groups i.e., phonological awareness, word recognition and letter recognition skills. The pre, post design were used to measured the different treatment groups. The major findings of this study suggested that significantly difference found between reading intervention programme through computer in improving word recognition, phonological and letter naming than traditional practice through printed materials or formal reading practice among children with learning disabilities conducted a study on effectiveness of computer based instruction to teach early reading skills acquisition when compared with more traditional methods of instruction. The sample consisted of those at high risk for learning disabilities pre-school children (n=46) under the age of 5 to 6 years, participated in the study. All students were assigned to one of three study

groups and received different treatments i.e., children's phonological awareness, word recognition and letter recognition skills measured prior and after the treatment.

The results of this study suggested that learning disabilities pre-school children received the reading intervention program with computer materials significantly improved their word recognition, phonological awareness, and letter naming skills related to their peers group who received a reading intervention program with traditional methods i.e., printed materials and those who received no formal reading intervention programme. Secondly, the effects of specific features of computer technology on early reading skills performance that contributed to the acquisition as well as gain achievement.

E. H. Kroesbergen et al (2005) studied the effects of a constructivist mathematics intervention which focused on learning multiplication for students with mild mental retardation, as compared to direct instruction. The sample consisted of 69 students from elementary schools of special education were participated in this study. And they received one of two kinds of mathematics intervention i.e., guided or directed instruction. The Pre test, treatment and post test design were implemented. Further the multiplication automaticity and ability tests were administered before and after the four-month training period.

The results show that students in both groups improved statistically significantly during the intervention period. It concluded that the students who received direct instruction shows more gain achievement than students with guided instruction. Secondly, the students with mild intellectual disability can be benefited from constructivist instruction but direct instruction seems more effective.

Evelyn H. Kroesbergen et al (2003) conducted 58 studied on meta analysis with regard to mathematics interventions for elementary school children with special needs. The interventions were deign on three aspects i.e., preparatory mathematics, basic skills, and problem-solving strategies. And the most of the studies included basic skills. The major findings show that a few specific characteristics were found to influence the outcomes of the studies in addition to the duration of the intervention, the particular method of intervention proved important. The self-instruction and direct instruction were found to be more effective than mediated instruction. Further interventions include the use of computer-assisted instruction and peer tutoring found smaller effects than without these supports.

Gretchen, L. Robertson (2002) an article published by a head counselor at a home for adult with intellectual impaired studied on, "Hoe to teach computer skills to development mentally disabled adults". In this article, we portray our empirical examination of computer use among moderate disabled people. The researcher was an enthusiastic computer user who attempted to impart computer direction to mentally challenged people at home occupants. Also, the endeavors at commercial business applications intended for youthful youngsters were unsuccessful. However the inhabitants quickly viewed the advisor utilize the applications, and after that lost intrigue. Further the staff individuals had neither the time nor the utilization interface foundation to explore which applications and user cooperation configuration elements may make computers open to home inhabitants. It inferred that the information gadgets favored, and the user collaboration configuration issues to be considered when planning or choosing applications for this populace.

Gore, Morrison, Maas and Anderson (1989) led an investigation in enhancing and fortifying essential perusing aptitudes through computer. The sample comprise five years of age kids to look at essential perusing aptitudes by applying computer programming program through drill and practice. The real finding of the investigation demonstrated that the CAI program was viable in enhancing essential perusing aptitudes with and without utilization of drill and practice computer program.

Haugland, (1992) revealed that the computer assisted instruction is useful in medicinal program on dialect improvement. Those youngsters are cognitive delayed development or "at risk" for school disappointment. The real discoveries of the examination demonstrate that the preschool kids exhibited significant picks up when all is said in done knowledge, critical thinking, verbal abilities, long and here and now memory, complex manual mastery, and confidence through computer assisted instructional strategy.

Jennifer M. Suh (2011) conducted a research to analyze the virtual manipulative influence on various achievement groups while teaching learning process. The sample comprises fourth and fifth grade students. This research was done in a classroom situation in enhancing number concept i.e., fraction equivalence and fraction addition with not at all like denominators, for example, one low and high accomplishing and two average achieving group taken part in two instructional techniques. Further, three groups utilized virtual manipulative technique and one group utilized physical manipulative strategy were additionally investigated. The research configuration included pre-tests and post-trial of students.

The major findings of the research demonstrates that mathematical content knowledge and videotapes of classroom sessions having statically huge distinction among instructional intervention.

J. M. Ortega-Tudela et al (2006) led an investigation on computer assisted instruction in enhancing basic mathematical concept to student with Down Syndrome (D.S). In this investigation, the effectiveness of a multimedia teaching strategy is contrasted and customary techniques among students with D.S. to showing them tallying and cardinality capacities and basic concept. However, the investigation were directed on two groups; first group of D.S students were instructed by utilizing scientific media programming though the other learned through pencil paper construct errands with respect to an indistinguishable material from the sight and sound group. Advance both the groups' of students were assessed previously, then after the fact instructional courses that is like pre post plan.

The finding of the examination proposed that the media group of students having higher execution and their pick up accomplishment were increasingly when contrast and paper-pencil helped showing bunch among students with down syndrome.

K. David and et al (2004) conducted a research on computer technology to teaching science among children with learning disability (LD). Further it recommended that learning science has both intellectual and affective suggestions for kids with learning inability. And, as to said setting the computer technology gives cognitively captivating and inspiring instructional devices for a). individualizing the method of conveyance, b). developing expert tutors. c). tying down direction d). Coordinating science with different subjects e). lessening psychological load on working memory. f). and, propelling students to remain focused. These applications are talked about with suggestions for instructing science to students with LD.

Mastropieri, Scruggs, and Shiah (1997) conducted a research on arithmetic problem solving performance among kids with mild mental retardation. This expertise were educated through computer assisted instruction and traditional method. Above

direction takes after specific viewpoints i.e., animated portrayals of issues in an instructional exercise organize, and minimal or no reading.

The main discoveries proposed that the children with mild mental retardation might be effectively utilize computer assisted instruction to encourage arithmetic critical thinking.

M. L. Campbell et al (2008) carried out a study on computer assisted in enhancing letter sounds in a little group with the assistance of Smart Board innovation and additionally a 3s steady time defer system. The sample of the examination comprise three children with learning problem and a numerous test configuration crosswise over letter sound sets and repeated crosswise over students assess the effectiveness of the program. And, likewise, children were evaluated on their gaining of coincidental data exhibited in the informative input proclamations following right reactions to target and non-target jolts.

The main findings of the investigation demonstrate that the computer program was best to teach learning technique in enhancing letter sounds to all children. Also, students gained some letter sounds focused for different students and coincidental data, for example, letter names displayed in the informational input explanations for their own particular and other group individuals target jolts. It concluded that in little group guideline through intuitive white board innovation befitted to students while showing learning strategy or in enhancing letter sound practice.

Mary Jo Noonan (2000) in his examination, to take after by guided work on utilizing consistent time delay under two conditions i.e., 1). Computer assisted instruction (CAI) with interactive programming, 2). Teacher assisted instruction (TAI) with manipulative. The sample comprise five pre-school kids with disability got immediate direction on three essential aptitudes which are matching shapes, colour and

numbers and letters concept. In this examination, an adjusted rotating medicines configuration was utilized.

The major discoveries of the examination proposed that both instructional systems eg. CAI and TAI delivered noteworthy increases accomplishment. And, CAI strategy was either equivalent or better than TAI technique crosswise over aptitudes and members. It reasoned that CAI technique utilizing consistent time delay is a powerful methods for advancing achievement and upkeep of pre scholastic abilities in youthful children with inabilities.

Moore M, Calvert S (2000) conducted a research, to look at the effect of computers on the vocabulary procurement of youth children with autism. The behavioral program and an instructive programming program were compared with regard with students' attention, inspiration, and learning of words. The educational software program included perceptually salient components which are intriguing sounds impact and question development and so on. Promote the behavioral program was parallel. The outcomes demonstrate that the students with autism were more attentive; more noteworthy pick up accomplishments in inspiration and additionally vocabulary learn by instructive programming strategy through computer than in the behavioral program. So, computer programming has more noteworthy impact in showing vocabulary aptitude to youngsters with Autism.

Pang Leung (2005) conducted a study on computer assisted instruction (CAI) in improving the efficiency of single digit without carrying addition. Three students with mental retardation were participated in this study. And, the training program was conducted on a portable personal computer and various instructional techniques included i.e., direct feedback, corrective demonstration, token reinforcement and verbal

association. The data was analyzed and to evaluate the effectiveness of the CAI programme, a multiple baseline across subjects design with follow-up was employed. The result shows that the performances in improving arithmetic skills of children with mental retardation were maintained at 1-week, 4-week, and 12-week period of time as well as follow-ups. Further generalization of the learned behaviour was evident when students were assessed on a paper-and-pencil addition test in a vertical format; all skills were also transferable, with initial help, to a computerized addition test in a horizontal format. Above findings reaffirmed the applicability of behavioral techniques and CAI in improving math skills of students with intellectual disability.

String Leung (2005) led an investigation on computer assisted instruction (CAI) in enhancing the productivity of single digit without conveying expansion. Three students with mental hindrance were taken an interest in this investigation. And, the preparation program was led on a compact computer and different instructional methods included i.e., coordinate criticism, remedial showing, token support and verbal affiliation. The information was investigated and to assess the viability of the CAI program, a various standard crosswise over subjects outline with follow-up was utilized.

The outcome demonstrates that the exhibitions or pick up accomplishment in enhancing number juggling abilities of kids with mental hindrance were kept up at 1-week, 4-week, and 12-week timeframe and additionally subsequent meet-ups. Encourage speculation of the educated conduct was clear when students were evaluated on a paper-and-pencil expansion test in a vertical configuration; all aptitudes were likewise transferable, with introductory help, to a modernized expansion test in an even arrangement. Above discoveries reaffirmed the relevance of behavioral strategies and CAI in enhancing math aptitudes of students with scholarly incapacity.

Paul Macaruso and Alyson Rodman (2011) led an investigation on, "the efficacy of using Computer assisted instruction (CAI) to supplement a phonics-based reading curriculum for preschoolers and kindergarteners in an urban public school system". The CAI programs give practice in phonological awareness and essential phonics aptitudes to students with preschooler. Students were divided into two groups i.e., CAI group and control group accepting a similar classroom guideline without CAI. The result displays that the preschoolers, the Computer assisted instruction group made significantly more noteworthy additions than controls in phonological mindfulness. Further it was likewise watched for kindergartners, computer assisted instruction children with low pretest scores made significantly greater gains than control with regard to word reading. It concluded that the overall preschoolers and low performing kindergartners always benefited from intensive practice provided by CAI programs.

An investigation was sought after by **Podell, Tournaki-Rein and Lin (1992)** on, "the CAI practice to a paper pencil to create familiarity with expansion and subtraction realities".

The sample comprised of basic students (n=28) with mild mental retardation participated in the addition concept and the subtraction study (n=21) partaken to evaluate accurateness and speed of the students. There was no statically huge difference found between the two addition accuracy and subtraction accuracy. It presumed that in subtraction students through Computer assisted instruction condition required less trials to authority the assignment than did students in paper and pencil condition.

Sargent, Laurence R : Lehman, Regina; Smith Darrell L.S. Hilderandt, Carol (1982) examine the presents and individualized instructional program for improving self-confidence and functional skill of 30 students who were 14-19 years of age with mild mental retardation. Reproduction was widely as an instructional strategy

as was integration into classes on the premise need and capacity on the social and prevocational data battery: students found the middle value of an 8 point percentile enhanced in every year in the program.

Pekka Rasanen et. al. (2009) led an examination on, "computer assisted instruction (CAI) in showing number aptitudes in kindergarten children". The sample comprised randomly (n=30) kids with low numeracy aptitude were taken for two treatment groups i.e., first group played a computer game eg. the number race which highlighted numerical examination and was intended to prepare number sense. Second group played an game (Graphogame-Math) which highlighted small sets of right numerosities via arranging matching of verbal names to visual examples and number images for three weeks. The students were performed in different angles like verbal checking, number correlation, question tallying, math, and a quick serial naming were measured before and after the interventional program. Findings exposed that both intercessions groups enhanced aptitudes i.e., number comparison.

Ramdossa et al (2011) directed an examination, "a systematic analysis on computer based interventions (CBI) in improving literacy skill e.g., reading, writing and vocabulary of students with autism spectrum disorder". For each CBI strategy, in this investigation orchestrates intercession results, assesses the sureness of confirmation, and depicts programming highlights and in addition framework necessities. Facilitate CBI's impact on education abilities was conflicting. It was a crosswise over investigations. In any case, noteworthy outcomes were accounted for and different investigations detailed no changes. Concerning heterogeneity of the members and the wide assortment of education abilities focused for guideline yet it is unrealistic from the current writing to decide the factors well on the way to be related with successful CBI. It reasoned that the further research tending to around there and

in addition the relative adequacy of CBI versus individual conveyed education direction is justified.

Robert L. Morgan, Aim Charls L. And, Salzberg (1992) explored, "the effect of video assisted training on employment related social abilities of adults with severe mental retardation. Furthermore, in video assisted training, members discriminated a model's behaviour on videotape and got feedback from the coach for reactions to inquiries regarding video scenes". The sample comprise three adult students. The outcomes found that, "members segregated the objective conduct on video yet impacts did not sum up to the work setting for two members until the point that they practiced the conduct. And, in the second examination, two members were instructed to fix and report four work issues utilizing video-helped methodology. So, findings showed that after members practiced how to fix and report maybe a couple work issues, they started to fix and report the rest of the issues with video-helped preparing alone".

Rhailju and Richardson (1986) examined the adequacy of computer assisted instruction in enhancing math accomplishment of fourth grade students. The sample comprises under experimental group was of n=84 students and additionally in the control group of n=70 subjects. All students were separated into two groups i.e., experimental group and control group. The experimental group worked mainly on computer drill and practice strategy, for a period of three times each week as a piece of their regular arithmetic guideline. And, the rest of the two days of the week were spent in the regular instructional condition. Students of under control group got customary direction just for five days. Encouraged knowledge were investigated to see contrasts among pre and post-tests score. For the said purpose a progression of ANOVA was worked out to discover the level of huge gap that existed between the CAI or experimental group and the without CAI or control group.

The outcome founds that with respect to three pretreatment achievement levels no significant impacts was apparent between the achievement of boys and girls as well as no significant interaction effect between sex of the students. Assist discoveries was rehashed all through the examination and a huge impact was seen between the test and control assemble showing that increases in charge bunch were statically fundamentally higher than CAI exploratory group eg. $(F\ 1,\ 143) = 6.07$, $p < .01$.

Shiah, Mastropieri, Scruggs, and Fulk (1994-1995) led an examination on, "the effect of comparison between computers assisted instruction on the math arithmetic problem solving performance of students with learning disability". Each computer based programme incorporated a seven stage subjective methodology and similar teaching strategies were utilized. Further, one example was given energized pictures and second utilized static pictures and a third one utilized static pictures and guideline however without the subjective system. The result expose that the arithmetic problem solving performance of three groups were enhanced and no huge contrasts found among all the groups.

Supothina (1998) did an investigation which included 6 prothomsuska students. This investigation expects to build a Computer assisted instruction in enhancing arithmetic on the theme "Fraction". The sample comprises of 20 prathomsuska 6 students of second semester in current academic year at Ban Huaymotao School in Maesruay. The Pre-test and post-test research plan were followed. Further data were examined based on Computer assisted instruction programs which was built themselves by the researcher. The discoveries of the result revealed that all students could ace adapting freely by utilizing CAI with the 93 % midpoints.

Tzu-Hua Huang et al (2012) contemplated on, "Computer assisted instruction in enhancing mathematical problem i.e., word based addition and subtraction solving system as far as a system direction site to help low-accomplishing second and third grade students in Taiwan. With regard to Polya's problem solving model, "the framework is intended to direct these low-achievers through the parts of the problem solving process that they frequently disregard. The circumstances of verbal inquiries are imagined to walk the students through the course of deduction so they can explain the inquiry with appropriate comprehension of its significance". The outcome shows statistically significant amongst experimental and control group to look at mathematical problem solving ability. The discovering reveals that students of experimental group enhanced abilities speedier than control group. Assist it was likewise watched that the greater part of the students could proceed with the act of fathoming word based numerical inquiries and their eagerness to utilize the framework was high. It was inferred that the Computer assisted instruction in solving mathematical problem can serve effectively as a device for teacher engaged in remedial programme.

Traynor, Patrick L. (2003) directed an examination to look at the Computer assisted instruction program in enhancing whole learning. This examination plans to include just three out of five identified mechanisms of computer programs that have been exposed to build student learning as to following perspectives, "giving practice exercises that include challenges and interest (2) giving a fantasy situation and (3) furnishing the learner with decision over his/her own particular learning, students development comparisons among the different categories of students could be made utilizing a Computer assisted instruction program that joins the staying two components, for example, customizing data, and energizing articles on the screen".

Wolfgang Schoppek & Maria Tulis (2010) conducted a study on, "the fluency of basic arithmetical operation is a precondition for mathematical problem solving". Since it play a minor role in improving contemporary mathematics instruction. The researcher developed individualized education progrmme as a means to improve efficiency. The sample consists of 9 students with 3rd grade to evaluate the application of the software in 2 naturalistic studies. Further, as a tool to relieve teachers from the time consuming tasks of individual diagnosis, selection of problems and immediate feedback, they developed adaptive training software.

The results show that those students learn with a moderate amount of practice by individualized instruction was associated with more gain achievements in learning arithmetic skills as well as problem solving, even after a follow up period of 90 days.

You-Jin Seo (2009) did a study to conduct a meta-study of computer assisted instruction (CAI) studies in mathematics concepts with regard to students with learning disabilities (LD). This research targets to emphasis and examine the effectiveness of CAI in improving mathematics performance of students with LD. The sample consists of n=11 mathematics studies on computer assisted instruction for students with LD at the elementary and secondary levels and analyzed them in terms of their comparability and effect sizes. The findings reveals that, "those CAI studies did not show conclusive effectiveness with relatively large effect sizes. The methodological problems in the CAI studies limit an accurate validation of the CAI's effectiveness. And also implications for future mathematics computer assisted instruction (CAI) studies were discussed".

Yuen-kuang Cliff Liao (2007) conducted a research on effectiveness of computer assisted instruction verses teacher instruction in Taiwan. Since, to observe the effectiveness of CAI, two of the seventeen variables selected for this research such as statistical power, and comparison group. The result shows a statistically significant

impact on the mean experimental group of students. It was concluded that the effects of CAI in instruction are positive over teacher instruction in Taiwan.

The United Nation Convention on the Right of Persons with Disabilities (UNCRPD), suggested under article 9 that, " to enable persons with disabilities to live independently and participate fully in all aspects of life, states parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communication technologies and systems, and to other facilities and services, open or provided to the public, both in urban and in rural areas". UNCRPD is a holly book for persons with disability which provide equal rights, full protection, opportunities to lead life independently and building up inclusive environment. It will be possible through new innovations and effective role of the government.

2.5 RESEARCH CONDUCTED IN INDIA

Anitha (2005) did a study on the topic, "effect of computer assisted instruction on learning of multiplication among children with mild mental retardation". The sample consisted of 10 students with mild mental retardation from various classes as NIOS, Transition, and Prevocational-II at National Institute for the Mentally Handicapped (NIMH) and found the significant difference between CAI & traditional teaching that CAI is superior group and also observed were motivated and showed more interest than the students in control group during the intervention programme and reported in her unpublished M.Ed dissertation.

Finally it is concluded that those children learn through CAI having more gain achievement than the control group of students learn by paper pencil or chalk board

methods. It is observed that CAI methods save time and energy while teaching to children with mental retardation.

Kumar, M (2012), conducted a study on the evaluation of computer assisted instruction in teaching language & arithmetic to children with mild mental retardation. It was a pre and post experimental design, in which, abilities of adolescents were assessed regarding counting, addition, subtraction and reading ability prior to application of CAI. The same abilities of these adolescent were measured after the application of CAI. Difference between these two sessions revealed the effect of CAI. The educational software for special children (mentally challenged): Designed & developed by selection of sample was done at TEPSE and HEPSN Centre of J.N.Vyas University, Jodhpur. After getting the permission from Mental Retardation Model School, with the help of randomized sample technique, 20 male mild intellectually impaired adolescents were selected out of which, 10 were placed in experimental group and rest were placed in controlled group. The age ranged was 14-17 years. It is interesting to observe that almost in all the task of addition and counting as well as in subtraction skills, a remarkable improvement is reported along with the verbal skills for the words generated through "a" (**v**), "ā" (**vk**) and "*ī*" (**bZ**). May be due to lack of exposure or experience or distraction in concentration, reading skills for alphabet "i" (**b**) was not reported improvement. It seems that the attraction of electronic screen, different attractive colours and figures motivated the adolescents to maintain their interest in the academic tasks. It also helps in the achievement of concept of arithmetic like counting, addition and subtraction as well reading skills. Rapid change in figures and colours of tasks improve concentration as well as interest for academic skills. It concluded that interventions incorporating well designed CAI may become a tool for

special educator and parents to improve reading skills for students with intellectual disabilities.

Narayan et. el. (1994) developed a software package under CAI for children with Mental Retardation (CAI) multicentred projects-1. The first package included 1. Reading functional words, 2. Numbers upto 10 and prepared for DOS environment. CAI was found to be feasible for students in 1996, second package was developed, field trial report by the project showed beyond doubt that children with mental retardation can learn and generalize skills. The observation and suggestions from the various centers are included a). The CAI definitely contributes to the increase in the attention and concentration of the retarded children and their level of motivation is increased b). The students with mentally challenged are able to generalize the learnt skills c). The classroom behaviour improves when the CAI is used as a reinforcement for achieving target in the classroom. Finally it was suggested that there is an absolute necessity for package in the mother tongue as in many schools the medium of instruction is mother tongue.

Rai Kamlesh (2008) conducted a study on technology to teach self-help skills to teaching elementary students with mental disability aims to find out the effectiveness of a treatment package that included video technology to teach three self-help skills such as cleaning sunglasses, putting on a wrist watch as well as zipping a jacket skills. The investigator was conducted study in a small group setting and also used a constant time delay (CTD) procedure for students with mental retardation. The data was analyzed and measured the percentage of task analysis steps performed correctly before and after a video model prompt. The design was a multiple probe across behaviour and replicated across participants were taken for experimental and control group.

Sharma in (2004) conducted a study to find out the efficacy of computer assisted instruction in improving mathematic concepts of students with mild mental retardation. This study consisted 10 participants were involved as sample at secondary and vocational level. The findings of the study shows significant difference between computer assisted instruction and traditional teaching in improving mathematics calculations. The above findings concluded that CAI was more effective than conventional way of teaching. Further, the mathematic concepts could be taught more effectively through computer assisted programme, and the contribution of electronic devices such as computer and calculators in increasing understanding in mathematics is indispensable.

The major findings of the study indicate that an instructional package that includes video technology may effective method in improving daily living skills to students with mental children with mental retardation. It concluded that the video technology must be used as an approach to improving self-help skills of students with intellectual impairment.

Rehabilitation Council of India Act, 1992, NPE-1986, PWD Act, 1995, and National Trust Act, 1999 directly and indirectly talked about insufficient manpower in the field of special education rehabilitation science. For parents who have children with special needs, computer assisted software and technology could be used as self-learning material with minimal initial support to implement an individualized educational programme. To some extent issues like insufficient human resource could be solved by the policy maker and other professionals working in the field of rehabilitation, if such software are available.

Vashisht K. C. and Malik S. (2001) recommended that the advantages and beneffits standpoint of computer technology in special education. A basis for assessment of a specialized curriculum programming package is given. Further it was called attention to that computer was a capable device to consolidate methodologies and tailor course to talk about individuals need. Despite the fact that, "students can learn at their own particular limit and speed and educator and students both can make self-assessment of objective accomplishments".

Yash P. S. & Anju Agarwal (2013) investigated 'Teaching Mathematics to Children with Mental Retardation Using Computer Games'. The sample of 18 mild and moderate mentally retarded children of age group of 6 to 16 were selected from Bareilly city of Uttar Pradesh.

The group taught with the help of computer games produced significantly greater remediation of Mathematics skills as compared to the group taught through conventional method of teaching. This means that computer games produce greater gain in Mathematics concepts among children with mental retardation. With regard to main effect of gender on acquisition of Mathematics-concepts, it was found that gender does not affect acquisition of Mathematics concepts on two concepts. However, on one concept, a contradictory result was obtained. Similarly, it was found on two Mathematics concepts that boys benefit more from computer games as compared to girls. However, on one concept, no difference was found. Educationists and other scientists believe that early intervention gives children the best chance of developing their full potential. Here, the finding that Computer games improve the acquisition of Mathematics concepts than the conventional format of teaching may prove very useful.

2.6 RESEARCH GAP

The main purpose of this review was to get information on the related area of Computer Assisted Instruction for Mentally Retarded children. Various studies have been conducted in the related areas in India and abroad. Although the conditions and available resources are different in developed countries. In one study the researcher has developed the CACSR (Computer Assisted Collaborative Strategic Reading) programme for improving reading and language skills among students with disability. The result shows that the CACSR intervention improved their reading by using computer assisted comprehension practice for students with disabilities. In another study researcher suggested that children should be provided with explicit instruction in order to learn new words. Children with learning disabilities do not use independent strategies to learn new words, therefore they should be deliberately taught the meaning of words and in that study the computer assisted instructional were used as self-learning materials. It is benefited to learning disabilities (LD) students with regard to better understanding, effective teaching methodologies, assistive technology and concepts improvement. In the year 2011 Calhoun, James M. concluded in his study that computer-assisted instruction (CAI) approach as an intervention for low performing students or slow learner is much better than any other approach for intervention.

Cotton (2000) studied says that the CAI as a supplement to traditional teacher directed instruction (TTDI) produces more improvement to those obtained with traditional instruction alone. Those students learnt by CAI always benefited in certain areas which includes retention, attendance, attitude, motivation, save time and energy on task as well as cooperation and collaboration. Gore, Morrison, Maas and Anderson (1989) led an investigation in enhancing and fortifying essential perusing aptitudes through computer. The finding of the investigation demonstrated that the CAI program was

viable in enhancing essential perusing aptitudes with and without utilization of drill and practice computer program. Haugland, (1992) revealed that the computer assisted instruction is useful in medicinal program on dialect improvement. In the year 2004 K. David and et al conducted a research on computer technology to teaching science among children with learning disability (LD). M. L. Campbell et al (2008) investigation shows that the computer program was best to teach learning technique in enhancing letter sounds to all children. It concluded that in little group guideline through intuitive white board innovation befitted to students while showing learning strategy or in enhancing letter sound practice. Mary Jo Noonan (2000) in his research work stated that by guided work on utilizing consistent time delay are under two conditions i.e., 1). Computer assisted instruction (CAI) with interactive programming, 2). Teacher assisted instruction (TAI) with manipulative. Some few researches are on computers on the vocabulary procurement of youth children with autism and some studies are on computer assisted instruction (CAI) in improving the efficiency of single digit without carrying addition. String Leung (2005) in an investigation on computer assisted instruction (CAI) in enhancing the productivity of single digit without conveying expansion. Some studies were conducted on the efficacy of using Computer assisted instruction (CAI) to supplement a phonics-based reading curriculum for preschoolers and kindergarteners in an urban public school system. Pekka Rasanen et al (2009) led an examination on, "computer assisted instruction (CAI) in showing number aptitudes in kindergarten children". In the year 2011 Ramdossa et al worked on a systematic analysis on computer based interventions (CBI) in improving literacy skill e.g., reading, writing and vocabulary of students with autism spectrum disorder. Rhailju and Richardson (1986) and Shiah, Mastropieri, Scruggs, and Fulk (1994-1995) examined the adequacy of computer assisted instruction in enhancing math accomplishment of

fourth grade students. Tzu-Hua Huang et al (2012) contemplated on, "Computer assisted instruction in enhancing mathematical problem i.e., word based addition and subtraction solving system as far as a system direction site to help low-accomplishing second and third grade students in Taiwan. You-Jin Seo (2009) did a study to conduct a meta-study of computer assisted instruction (CAI) studies in mathematics concepts with regard to students with learning disabilities (LD). Traynor, Patrick L. (2003) directed an examination to look at the Computer assisted instruction program in enhancing whole learning. Vashisht K. C. and Malik S. (2001) recommended that the advantages and beneffits standpoint of computer technology in special education. You-Jin Seo (2009) did a study to conduct a meta-study of computer assisted instruction (CAI) studies in mathematics concepts with regard to students with learning disabilities (LD). In India many studies were conducted on effect of computer assisted instruction on learning of multiplication among children with mild mental retardation. Kumar, M (2012), conducted a study on the evaluation of computer assisted instruction in teaching language & arithmetic to children with mild mental retardation. Narayan et. el. (1994) developed a software package under CAI for children with Mental Retardation (CAI) multicentred projects-1. The first package included 1. Reading functional words, 2. Numbers upto 10 and prepared for DOS environment. CAI was found to be feasible for students in 1996, second package was developed, field trial report by the project showed beyond doubt that children with mental retardation can learn and generalize skills. Sharma in (2004) conducted a study to find out the efficacy of computer assisted instruction in improving mathematic concepts of students with mild mental retardation. Rai Kamlesh (2008) conducted a study on technology. The studies conducted by D. Mioduser at el (2000), E. H. Kroesbergen et al (2005), Evelyn H. Kroesbergen et al (2003), Gretchen, L. Robertson (2002), Jennifer M. Suh (2011), J. M. Ortega-Tudela et

al (2006) , Mastropieri, Scruggs, and Shiah (1997), Sargent, Laurence R : Lehman, Regina; Smith Darrell L.S. Hilderandt, Carol (1982), Robert L. Morgan, Aim Charls L. And, Salzberg (1992) were not related to CAI.

Out of small number of studies conducted in the area of special education only one thing emerges i.e. the beginning has been made but the researchers are either at the awareness level or exploratory in nature. More specific, precise and scientific researches are needed to make special education a reality in practice on a much larger scale than what has been happening of today.

More teacher training modules need to be developed so that not only pre-service but in service teachers also could be trained in inclusive practices.

A great need of research has been felt in the area of curriculum development to make it more need-based and provide score for curricular adaption. Feasibility studies need to be conducted by using multi instructional approaches and testing variety of instructional strategies at various levels. Parameters of assessment and evaluation need to be looked into and necessary modification need to be done and validated across the age levels and standards. The administrative and management aspects of inclusive education need to be studied at the micro and macro levels both in rural and urban setting so that the models thus developed could be replicated in varied situations. Conscious efforts are required to bring in attitudinal changes in the teachers, managers, non-disabled students and the community through the use of multi0media. The researches could be conducted to develop and test the efficacy of the multi-media packages for different target groups.

After reviewing relevant studies the researcher realized that very little empirical research has been taken up on aspect of present research in India. Some researches that were done in foreign countries do not directly relate to the aspects taken up by the

researcher and there learning situation and societal perspective is different from India.

Thus, a comprehensive study was required to be taken up with the use of CAI for

Mentally retarded children.

END NOTE

1. Kim, A.-H., Woodruff, A. L., Klein, C., & Vaughn, S. (2006). Facilitating co-teaching for literacy in general education classrooms through technology: Focus on students with learning disabilities. Reading and Writing Quarterly, 22(3), 269–291.

2. Biemiller, A. (2003). Vocabulary: needed if more children are to read well. Reading Psychology, 2, 323-335.

3. Calhoun Jr., James McCoy, "An Analysis of Mathematics Interventions: Increased Time-on-Task Compared with Computer-Assisted Mathematics Instruction" (2011). Electronic Theses and Dissertations. Paper 106.

4. Cotton, K. (2001, August). Computer-assisted instruction. Northwest Regional Educational Library: School Improvement Research Series, 10. Retrieved June 29, 2002, from http://www.nwrel.org/scpd/sirs/5/cu10.html

5. Mioduser, H. Tur-Kaspa & I. Leitner, The learning value of computer-based instruction of early reading skills D. Journal of Computer Assisted Learning (2000) 16, 54-63.

6. Evelyn H. Kroesbergen and Johannes E. H. Van Luit, Constructivist mathematics education for students with mild mental retardation. European Journal of Special Needs Education. Vol. no. 20, February 2005, pp. 107-116.

7. L. Robertson, Gretchen & Hix, Deborah. (2002). Making the computer accessible to mentally retaded adults. Commun. ACM 45. 171-183. 10.1145/505248.506006.

8. Manders, Damon, "Research and Development in the U.S. Army Corps of Engineers: Improving the Common Stock of Knowledge" (2011). US Army Corps of Engineers. 145.

9. Haugland, S., & Wright, J. (1997). Young children and technology. Boston: Allyn & Bacon.

10. Moyer-Packenham, P. S., & Suh, J. M. (2011). Learning mathematics with technology: The influence of virtual manipulatives on different achievement groups. Journal of Computers in Mathematics and Science Teaching.

11. Ortega-Tudela, J & Gomez-Ariza, Carlos. (2006). Computer-assisted teaching and mathematical learning in Down Syndrome children. Journal of Computer Assisted Learning. 22.298-307. 10.111/j.1365-2729.2006.00179.x.

12. Davis, K. S., & Falba, C. J. (2002). Integrating technology in elementary preservice teacher education: Orchestrating scientific inquiry.

13. Shiah, R. L., Mastropieri, M. A., Scruggs, T. E., & Fulk, B. J. M. (1995). The effects of computer-assisted instruction on the mathematical problem solving of students with learning disabilities. Exceptionality, 5, 131-161.

14. Campbell, M. L., & Mechling, L. C. (2009). Small group computer-assisted instruction with SMART Board technology. Remedial and Special Education, 30(1), 47-57.

15. Caryl, H. Hitchcock, Mary Jo Noonan (2000). Computer-Assisted Instruction of Early academic Skills. Sage Journals. Vol. 20. Issue 3, pp. 145-158

16. Moore, M., & Calvert, S. (2000). Brief report: Vocabulary acquisition for children with autism: Teacher or computer instruction. Journal of Autism and Developmental Disorders, 30(4), 359-362.

17. Macaruso, Paul & Walker, Adelaide. (2008). The Efficacy of Computer-Assisted Instruction for Advancing Literacy Skills in Kindergarten Children. Reading Psychology. 29. 266-287. 10.1080/02702710801982019.

18. Podell, D., Tournakirein, N., & Lin, A. (1992). Automatization of mathematics skills via computer-assisted-instruction among students with mild mental-handicaps. Education & Training in Mental Retardation & Developmental Disabilities, 27(3), 200–206.

19. Pekka Räsänena, , Jonna Salminena, Anna J. Wilsonb, Pirjo Aunioa, Stanislas Dehaenec, Computer-assisted intervention for children with low numeracy skills. Cognitive Development 24 (2009) 450–472.

20. Ramdoss, S., Lang, R Mulloy, A. Franco, J., O'reilly, M., Didden, R., et al. (2011) Use of computer-based interventions to teach communication skills to children with autism spectrum disorders: A systematic review. Journal of Behavioural Educaton, 20. Pp. 55-76.

21. R.L. Morgan and C.L. Salzberg. (1992) Effects of video-assisted training on employment-related social skills of adults with severe mental retardation. Journal of Applied Behaviour Analysis, vol. 25 issue 2. Pp. 365-383.

22. Rwey-Lin Shiah, Margo A. Mastropieri, Thomas E. Scruggs & Barbara J. Mushinski Fulk (1994). The effects of computer assisted instruction on the mathematical problem solving of students with learning disabilities. Exceptionality A Special Education Journal, Vol 5, issue 3, pp 131-161.

23. Traynor, Patrick L. (2003). Effect of Computer assisted instruction on different learners. Journal of Instructional Psychology. https://www.questia.com/read/1G1-105478983/effects-of-computer-assisted-instruction-on-different cited on 04-04-2017.

24. Wolfgang Schoppek & Maria Tulis. (2009). Enhancing arithmetic and word problem solving skills efficiently by individualized computer-assisted practice. The Journal of Educational Research.

25. Kamlesh Rai (2008). Technology to Teach Self-Help Skills to Elementary Students with Mental Disabilities. Journal of the Indian Academy of Applied Psychology, Vol. 34, No.2, 201-214.

26. Sharma, P (1995) Basics on Development & Growth of a Child. New Delhi: Reliance Publishing House.

27. Yash P. S. & Anju Agarwal (2013). Teaching Mathematics to Children with Mental Retardation Using Computer Games. ISSN 2320-009X, vol. 2 issue 1, pp. 44-58.