CHAPTER-5

DISCUSSION
Discussion

5.1. Summary of the Major Findings of the Study

Data obtained through different tools and scales were subjected to both quantitative and qualitative analysis. Quantitative data were analysed through the non-parametric statistical procedure as the distribution curve was not normal. Qualitative data were analysed by careful coding and inferring the responses to the question and statement in the questionnaire and rating scale. The major findings of this study are summarized as follows:

- Gainful learning observed while teaching children with mild mental retardation for identification money with CAI.
- Apparent gain observed in the achievement of children with mild mental retardation while teaching various operational skills in Mathematics with CAI though statistical analysis failed to establish significance.
- Teaching through CAI has been helpful for resistance to extinction.
- Teachers perceived enhanced peer interaction by the children with mental retardation as a result of CAI.
- Appreciable changes observed on motivation of children with mental retardation as a result of intervention through CAI.
- Teachers and special educators encouraged the introduction of CAI. But they recommend special training on the use of CAI for them and for Head of the Institution.
• Parents appreciated the use of CAI in inducing overall behavioural changes in children with mental retardation. Especially, they stressed on enhanced sociability and involvement with the school due to participation in CAI programme.

• The non-disabled peers were very enthusiastic about CAI. In some of the sampled schools, the Head of the Institution requested the researcher to take additional classes with CAI on other subjects as well.

• As a whole it can be said that CAI is an effective tool to bring inclusive culture in schools.

5.2. Discussion and Conclusion

It can be inferred that though the average scores of both the groups have changed but noticeable changes are observed in the case of Experimental Group. The Computer Assisted Instruction may have helped the children with mild mental retardation to learn the above areas of mathematics. It is also observed that the difference in the skills like counting, addition, and money identification are more than the difference observed in other skills such as subtraction, multiplication, division and reading time. Counting and addition require simple logic compared to other skills of mathematics. Due to arrested cognitive development, the mild mental retardation children might have difficulties in subtraction, multiplication, division and reading time.

Compared to the Control Group a noticeable change is marked in the Experimental Group in the Grade Level – 1. Experimental Group have
performed better after the intervention period in all the grades. There is a negligible change in the average scores of the Grade Level -3 as obtained by the Experimental Group. This may be due to the difficulty level of mathematics in the Grade Level -3 having content more on multiplication, division and problem solving.

Significance of Computer Assisted Instruction in teaching counting, addition, subtraction, multiplication, division, money and time was found out with the help of Mann-Whitney U test (at p=0.05), a Non-Parametric Statistical Test. The results indicated that the CAI did not significantly contribute in teaching addition, subtraction, multiplication, and time. But CAI is effective in teaching identification of money to the children with mild mental retardation. The null hypothesis of “teaching mathematics to the children with mild mental retardation through computer assisted instruction has no significant effect on performance with reference to identification of money” is rejected at .05 levels. It is also seen from the Table 4.18 and 4.19 that the CAI is not effective in teaching mathematics as a whole to the children with mild mental retardation.

This study supports the earlier study by Girijesh Kumar et al. (2011) on ‘Remediation of Arithmetical Learning Disability by Programmed Instruction and Computer Assisted Instruction’. The study was conducted to compare the relative effectiveness CAI and programme instruction with respect to remediation of arithmetical learning disabilities. Both the Programmed Instruction (PI) and the CAI were effective but no significant difference was found. The present study found that teaching mathematics through CAI has
brought apparent gain in the areas like counting, addition, subtraction, multiplication and time but was not significant statistically.

The study conducted by Irish in 2002 also support this study as it was revealed that computer assisted instruction may be an acceptable format to produce accurate responding for students, but no comparative conclusion could be drawn.


This study does not support the earlier study conducted by Wilson, Mjsterek, & Simmons, 1996; where they found that teacher directed instruction was more effective in developing mathematics fact fluency over CAI for children with learning disabilities. The current study revealed that the CAI has
brought more gain in different areas of mathematics compared to teacher directed instruction though statistically insignificant.

The intervention through CAI has helped the children with mild mental retardation in many ways. Some of those are:

1. After an intervention period of 10 months the teachers accepted that their interaction with the other children of the class and schools had been increased.
2. The Children with Mild Mental Retardation started participating well with the other children.
3. These children were making friends with other peers
4. These children stayed for more time in the school during the intervention phase.
5. They used to very careful about their belongingness during the period of intervention.
6. They took help of their friends to complete the questions related to math.
7. Due to CAI, these children started showing more interest in mathematics.
8. Parents attending the school reported to the teachers that they were very satisfied with the programme.

The teachers (N=30) responded on a 5 point rating scale. Where, their change of perception about the behaviours of the children with mild mental
retardation in the class and school are recorded. The change in perception of the teachers is positive. The details change is described in the Table 4.32.

Prior to the intervention, some of the teachers used to respond that the children with mild mental retardation can never copy information from the board, carry out addition, carry out subtraction, carry out multiplication, follow teachers’ instruction respond to the questions in the class, spend time in the activities in the class and maintain civic behaviour in the school. The number of such responses had been decreased. Majority of the teachers had responded that the children with mild mental retardation can perform the above activities to a below moderate level but can perform. This indicated that the teachers realised the potentials of such children after observing the intervention through CAI.

It is revealed from the responses of the Special Educators that the CAI has been very helpful for promoting inclusion of the children with mild mental retardation in the regular school (Refer to the Table 4.31). It has been a motivation for the children to learn mathematics. The CAI had been useful for increasing attention of the children, managing their problem behaviour, and also helpful in enhancing academic behaviour. After observing the intervention, the regular teacher of the school requested the special educator for including other non-disability students in the intervention. As reported by the special educators the participation of these children in all other activities in the school had been increased. The intervention through CAI has been helpful to the children with mild mental retardation as the degree of rejection by the non-
disabled children have been reduced and they started getting recognition in the class and school.

The current study support earlier research on motivation by Tanaka, M., (1979). Motivation of the children with mild mental retardation to learn mathematics may be due to their success in completing the task given through computer followed by immediate reward associated with the success inbuilt in the programme.

The answer to the second research question was found out from the response of the parents. The responses of the parents are overwhelming. Majority of the parents expressed that their children attended the CAI regularly and were very happy on the day of the CAI to come to school. The children narrated about the interesting steps and scenes of CAI at home with emotion of happiness. The parents expressed that the children spent more time in the CAI class and their attention compared to other instructional classes was more. The parents further expressed that the children are benefitted from CAI class for learning mathematics. Their children have started initiating in learning counting, addition and identification of money after attending the CAI class. They reported that their children will participate in the CAI programme in future for learning all the subject if opportunities are given. They also expressed that they will inform other parents to include their children in such programmes as they can be benefitted. The detailed responses may please be referred at the Table-4.30.
Analysing the response of the teachers of regular schools, the parents, and the special educators for finding the answers of research questions it is found that the children have taken more interest in CAI for learning mathematics. Their attention span has been increased. They have initiated learning mathematics. The other problem behaviours which were hindrance to the learning academic have been reduced. The children have started interacting with other children. These finding support the earlier findings by Bialo and Sivin (1990); Braun (1990); Lawton and Gerschner (1982); Mokros and Tinker (1987); Robertson, et al. (1987); Rupe (1986); Schmidt, et al. (1985-86); Wepner (1990.). Their study suggested that the students like working with computers because computers: are infinitely patient, never get tired, never get frustrated or angry, allow students to work privately, never forget to correct or praise, are fun and entertaining, individualize learning, are self-paced, do not embarrass students who make mistakes, make it possible to experiment with different options, give immediate feedback, are more objective than teachers, free teachers for more meaningful contact with students, are impartial to race or ethnicity, are great motivators. give a sense of control over learning, are excellent for drill and practice, call for using sight, hearing, and touch, teach in small increments, help students improve their spelling, build proficiency in computer use, which will be valuable later in life, and eliminate the drudgery of doing certain learning activities by hand (e.g., drawing graphs).

This study also supports the study by Kaiser’s (1991); where his experiment showed that students with intellectual deficit were eager to come to
mathematics class when computers use was permitted. The students dealt with mathematics in a greater depth, they enjoyed discovering the methods of solving the problems.

Overall, it can be said that CAI is being useful in teaching mathematic and proven to be an effective method for bringing an inclusive culture for the children with mild mental retardation in regular school

5.3. Implication of the Study:

A) Implication for the Practitioners:

- As CAI has been effective in teaching identification of money; the teachers and special educators may use this for teaching such skills in the school through this method.

- As CAI has helped in enhancing learning counting, addition and subtraction, the teachers and special educators may use this for teaching basic mathematics to the children with mild mental retardation.

- Computer Assisted Instruction has helped children with mild mental retardation to be retained in the class and school for more time leading to their involvement in the class. The teachers and the special educators may use this for all the subjects to enhance their learning.
As CAI helped the children with mild mental retardation to attend the task for more time and initiated involvement in the task; the teachers and special educators may use this for other subjects also.

B) Implication for the Researchers:

- The CAI was used for finding out the effectiveness of teaching mathematics to the children with mild mental retardation. Though effect was not significant but a noticeable change in the performance in counting, subtraction, and identification of money is marked. Hence, researchers may carry out similar research to find out its effect in other subjects to such children and also children with other disabilities.

C) Implication for Making Policy:

- This study may be useful for forming policy for teaching mathematics through CAI to the children with mild mental retardation who are included in the regular schools.
- This study may support to formulate policy for using CAI in the special schools for the children with mental retardation.
- This study may help to making policy to use CAI in a modified version for teaching children with different categories of disabilities.
• This study may encourage the Govt. to make the CAI as compulsory supplement methods for class room under RTE for reducing discrimination and promoting inclusion.

• Appropriate authority may consider for developing similar types of software for teaching various subjects in the special schools as well as in regular schools.

5.4. Limitation:

➢ Like all other groups with disability, the children with mental retardation constitute a heterogeneous group with many diversities. So, generalization of the findings has to be made with caution. Still it is expected that the findings especially related to the effectiveness of CAI may encourage teachers and parents to use attractive software packages to teach children with mental retardation.

➢ The study was limited to mainly to the urban and some part of semi urban localities. As it did not cover the rural population, a generalization may not be drawn.

➢ The programme may have included problem solving content to find out its use for children with mild mental retardation to solve problems.
5.5. Suggestion for Further Research:

The findings of the study indicate that several other significant research works can be conducted using Computer Assisted Instruction. Some of those are:

- To assess the impact of Computer Assisted Instruction on the achievement of children with mental retardation and/or non-mentally retarded students in subjects other than Mathematics.
- To assess the impact of Computer Assisted Instruction on the achievement/concept attainment of learners with other types of disabilities.
- To assess the impact of Computer Assisted Instruction to develop reasoning capacity of non-disabled as well as disabled learners.

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