CHAPTER - 5

SUMMARY AND CONCLUSIONS

The aim of the present study is to find out the effectiveness of competency based approach in learning in cognitive areas viz Language (mother tongue), Mathematics and Environmental Studies among primary school children and to see whether the competency based approach can significantly enhance pupils' status in the developmental objectives of education of the child as a learner, as a person, as a citizen and as a worker.

5.1 Main objectives

The main objectives are

a i. To study and evaluate the appropriateness of the competencies spelt out in the report 'Minimum Levels of Learning at primary stage' NCERT (1991) in terms of their achievability, communicability, and how best they serve as a rational criteria for judging the adequacy of curricular inputs provided and learning outcomes to be expected in the mastery learning model.

ii. And to develop suitable and valid teaching learning strategies for those competencies of the cognitive areas Language (Tamil), Mathematics and Environmental Studies, which are the key subjects as far as the primary education are concerned and for which the competencies are spelt out by NCERT for the above reason. The teaching - learning strategies are the curriculum material cum techniques to be practiced by using mastery learning model to bring about the competencies which are the expected learning outcomes at mastery level.
b. To find out whether the competency based approach in learning is more effective in improving the academic achievement in cognitive areas - Tamil, Mathematics and Environmental studies of standard I-V when compared to the usual content based approach.

c. To find out whether the competency based approach can enhance pupils' status significantly in each of the developmental objectives of education.

5.2 Research Design

The research design used in the present investigation to find out the effectiveness of competency based approach is 'after only with control design'

5.3 Hypotheses formulated

The following null hypotheses were formulated to carry out the investigation

1. The academic achievement of children of standard I, II, III, IV and V of the experimental group taught by competency based approach in cognitive areas Tamil, Mathematics and Environmental Studies are not different from the academic achievement of control group taught by content based approach in cognitive areas Tamil, Mathematics and Environmental Studies.

ii. There are no sex difference in the academic achievement of students of standard I, II, III, IV and V of experimental group in cognitive areas Tamil, Mathematics and Environmental Studies.
iii. There is no significant enhancement in the status of pupils of standard I, II, III, IV and V of experimental group in each of the developmental objectives of education due to the adoption of competency based approach.

5.4 Definition of Terms

Content based approach: The content based approach in the usual procedure followed in the school where emphasis is given more to acquisition of knowledge from examination point of view. Traditional methods of teaching are generally followed and the pupil is treated more as a receiver of information than as a participant in the curriculum transaction.

Competency based approach. The development of each and every competencies spelt out as 'Minimum Levels of Learning' by National Council of Education Research and Training in subjects Tamil, Mathematics and Environmental studies for standards I-V to mastery level in each and every student utilising Bloom's mastery learning model. In this approach the emphasis is more in the development of competencies rather than attainment of knowledge alone and the approach demands utilisation of various child centered approaches where the shift is from teaching to learning and the learner being an active participant in the process throughout.

Competencies: Competencies are the essential learning outcomes spelt out as the Minimum Levels of Learning according to the cognitive capabilities of the child of particular stage for subject areas Tamil, Mathematics and Environmental Studies for Standard I - V by NCERT, 1991.

Cognitive areas: Cognitive areas are the subject areas of the curriculum, the psycho motor and affective areas being the non-cognitive.
Mastery learning: Mastery learning is the learning outcome of the utilisation of mastery learning model which is a performance based individualized instructional procedure. Mastery is defined as 80% and more of achievement in a criterion viz the competency.

Academic achievement: Marks obtained in the quarterly, half yearly and annual examinations which are common for students under both content based and competency based approach.

Developmental objectives of Education: Developmental objectives of education developed by Baquer Mehdi and Gupta 1983. They refer to the objectives to be realised by every child in the primary stage regarding the different roles the child has to play in life as a learner, person, citizen, and worker. These objectives are also related to different aspects of personality.

5.5 Preliminary Phase of investigation

The preliminary phase of the investigation consists of preparation of materials and methods for the conduct of the competency based approach in experimental schools. This called for a lot preparatory work on the part of the investigator. The investigator being a trained teacher and teacher educator in District Institute of Education and Training, a district level functionary of National Council for Education, Research and Training, New Delhi, India, it was feasible for her to plan, prepare and execute the programme.

The initial phase requires on the part of the investigator (i) to acquire a thorough knowledge about the MLLs (Minimum Levels of Learning, which are the curriculum to be followed in coming years in primary education (ii) to analyse the components of Blooms mastery learning to be followed in the investigation as the
individualized form of instruction (iii) to prepare descriptive item pool which are detailed account of curriculum material / strategies in bringing about the mastery learning of each and every competencies and (iv) to suggest the expected pupil behaviour which are specific objectives to be expected as learning outcomes of learning experiences provided during the instruction (v) to select a variety of activity-based, child centered strategies and to develop suitable examples for the understanding and application of these strategies for development of higher order thinking skills apart from quality academic achievement (vi) to frame suitable evaluation procedure to be used in the criterion referenced testing which is an essential feature of mastery learning model and (vii) finally to select suitable tools for the evaluation of the programme of investigation.

The model school attached to the DIET, Tirur, MGR district, Tamil Nadu was considered to be the ideal place to develop and standardize the materials and methods and procedures of evaluation to be followed in the competency based approach. The tryout of the materials and methods was done for a period of one complete academic year from June 1992 - April 1993. The investigator received all possible support and cooperation from the subject experts of DIET in Tamil, Mathematics and Environmental Studies in the preparation and finalisation of tools, particularly in the development of descriptive item pool. The finalised materials are made into booklets.

The following are the list of materials which were selected / developed and found to be the effective tools to be used in the investigation proper.
5.6 Methods and materials used

Minimum levels of learning

Mastery learning strategy

Descriptive item pool prepared for every competency of Tamil, Mathematics, Environmental studies of Standards I - V.

Expected pupil behaviour as specific objectives of the learning experiences provided for the mastery learning of the competency

Evaluation procedures

Syllabus Study

School readiness and Socially useful productive work programme which are already in use in the school are incorporate in the competency based approach

Child centred and activity based strategies

1. Teaching for creativity
2. Inquiry training model
3. Concept attainment model
4. Project method
5. Science a process approach
6. Role play
7. Peer tutoring
8. Cooperative learning
9. Child to child approach in learning health and hygiene concepts

For the evaluation of the effectiveness of competency based approach, the achievement of students of standard I to V in the quarterly, half-yearly and annual examination in subjects Tamil, Mathematics and Environment Studies and the rating of students in the statement of developmental objectives at the beginning and at the end of the programme are taken as measures of index of the effectiveness.
5.7 **Main Study**

The main study includes three stages (i) selection of experimental and control group (ii) preliminary orientation to the teachers of the experimental schools in methods, materials prepared and the principles and procedures to be followed in the competency based approach (iii) the conduct of the investigation in the experimental schools.

(i) **Selection of experimental and control schools.** Rural panchayat union schools of Chengai M.G.R. District are selected on the basis of their academic achievement in previous years. The schools with a mean value of achievement of 45% and a σ value of 12% in all the three subjects in all the five standards were selected. From these schools, ten school as experimental group and ten school as control group are selected by using the technique of multiple random sampling. All these schools had one teacher for each standard.

(ii) **Orientation to teachers.** Orientation was given to the fifty teachers of experimental schools in participatory method, in the components of the competency based approach in general and in particular to the aspects related to the standard to which teachers are attached. Fifty teachers were individually handed over the booklets prepared and instructed accordingly.

(iii) **Conduct of the investigation:** The experimental schools followed the competency based approach for the whole academic year June 1993 - April 1994 and the teachers of control schools followed the usual content based procedure. Both the schools followed the same syllabus and had common question papers for their examinations. The experimental classes followed the competency based approach in developing MLLs prescribed to that standard to mastery level apart from teaching learning of the then existing syllabus. As the MLLs are spelt out as essential learning outcomes according to
the cognitive capabilities and development of children, the mastery of MLLs make the
learning of contents of syllabus more meaningful.

The MLLs prescribed for that standard in subjects Tamil, Mathematics, and Environmental Studies are developed to mastery level among every student. The mastery learning model of Bloom as an individualized form of instruction allowed students to proceed in their own speed, to move on to the next competency when he completes the mastery of the ongoing competency and takes a criterion referenced testing. The general plan of instruction is developed by the teacher so as to achieve mastery learning in that particular competency by all the students. The teacher develops curricular material apart from the one given in the text books, selects suitable strategies for presenting the curricular material, plans for suitable educational technology, utilises the community resources provides for work experience and plans for evaluation. The teachers utilise the descriptive item pool prepared, the expected learning outcomes suggested interns of pupil behaviour for each and every competency as guide in the mastery learning strategy. Teacher utilises various child-centered and activity based strategies with their knowledge, understanding and application of these strategies. The teacher prepares lesson plans, and also maintains evaluation format suggested for in the investigation.

A brief note of various programs attended by every pupil were also maintained for students' participation in various programs. The investigator made a periodic observation of the teachers engaged in the conduct of the competency based approach. The academic achievement of the students in standards I-V in quarterly, half yearly and annual examination was recorded for both the schools and compared. The ratings on the developmental objectives for children in the experimental schools before and after the programme were also compared.
5.8 Conclusions

Feedback from the practicing teachers.

The analyses of the results and the feedback from the practicing teachers in the experimented schools, in the use of various materials methods in the course of investigation have revealed the following:

The minimum levels of learning, spelt out in Tamil, Mathematics, and Environmental Studies for standards I - V, which are the curriculum framework for the primary education in near future are achievable by all the students to mastery level by utilising necessary strategies of teaching-learning with appropriate content. The competency based approach is more effective than the content based approach in bringing about higher achievements and the competency based approach is equally beneficial for both boys and girls.

Minimum levels of learning developed to mastery level have raised the academic achievement of children of standard I - V in Tamil, Mathematics, and Environmental studies for which the approach is carried out.

Mastery learning strategy with its principles of self pacing, individualized instruction, criterion testing for mastery, diagnosis and remedial measures for students who have not mastered has been found to be the best strategy to be utilised in primary schools.

The descriptive item pool prepared and the expected pupil behaviour, have helped the teachers in the selection of appropriate content / illustrations / stories / themes to be utilised in the various strategies for bringing higher order thinking skills, teaching for creativity and for bringing about collaborative skills.
The varied child-centered strategies utilized in the present investigation viz teaching for creativity, Inquiry training model, concept attainment models, discussion method, project method, science a process approach, techniques of role play, peer tutoring techniques of co-operative learning, child-to-child programme in the learning of health and hygiene concepts are all practicable among primary schools effectively to bring about quality learning, higher order thinking and collaborative skills and self learning capacity.

Criterion referenced testing provided in the form of formative evaluation is successful.

The competency based approach is one where processes, skills, competencies are developed to mastery level and the contents and the text book materials are taken as means in the development of competencies to mastery level. This approach in bringing about quality higher academic achievement is the affordable form of individualized instruction in our rural schools with minimum essential facilities as this approach demands no financial support but, only extra planning and commitment on the part of the teacher.

Teachers role in the competency based approach as the curriculum material developer apart from using the text book contents, in selection of appropriate contents and strategies to be used from the repertoire of various strategies made familiar with in selection of suitable contents/activities for criterion referenced testing, is that of a facilitator of learning in providing open learning environment and opportunity for self learning. This has have given room for exercising his originality and responsibility.
Teacher accountability and commitment is the essence of competency based approach and demands teacher empowerment.

The findings, innovations, approaches developed through fundamental researches carried out in universities, projects carried out at higher levels must be made to disseminate to the gross root level of primary education and must be made familiar to the professionals at the primary schools who are the actual practitioners dealing with raising the quality of education. So proper orientation in participatory method to develop a repertoire of various strategies with suitable examples is very essential. Exposure to the theory of models / strategies with suitable examples serves the purpose best.

In the absence of specifically defined objectives given as curriculum, and special activity based strategies, the teachers in the content based schools resort to teaching the lessons as prescribed in the text books, following the usual method of teaching, based on question - answer pattern, completion of tests and assignments. The existing pattern practiced in schools is generally teacher - oriented. It is not child - oriented in the sense that attention is not paid to ascertain the process of learning that is taking place in the child, and whether the concepts have been acquired with understanding, clarity and meaningfulness. With the result the child may master the lesson either through understanding the content or through mere rote memorization as there is no other alternative.

There is no provision for experiential learning in content based teaching, the only source of knowledge about practical instances are received from the examples cited by teachers and given in text books. As such the child has no opportunity to learn by experimenting doing nor does the teacher is formally expected to follow a set of predetermined norms calling for competency based.
teaching learning strategies. Further this involves a lot of planning and incorporation of teaching materials and change in the classroom climate and the practice of such strategies is possible only when the school authorities concerned are fully conversant with the need of teaching about the competency based approach to learning. Hence the teachers of the control group do not find any other alternative except to follow the existing and expected pattern of teaching learning process in the respective schools. No extra effort is taken to teach the competencies involved in learning the content in the syllabus. As the curriculum is not being given in the form of essential learning outcomes in easily communicable competencies / sub competencies, the teachers are not in a position to get proper direction as what to do, and they naturally take it for granted that the completion of syllabus alone as their work, rather than laying the foundation upon which the process of learning has to take place In the context of the lack of individualized form of instruction and any form of insistence on teacher accountability, the achievement of the control group though average as is revealed by the results are the best possible in rural areas.

Inferences from the statistical analyses of data

From the analyses of data received from experimental and control group the following conclusions are drawn.

The mastery learning of competency have increased the achievement of students of standard I - V in Tamil, Mathematics and Environmental studies for which the competency based approach is adopted in the present investigation.

Regarding the achievement in subject in Tamil students in the experimental school have scored consistently above 75% in quarterly, half yearly and annual
examinations in each of the standards of I-V. This is in contrast to the performance of students of the control group ranging from 45 - 50% in quarterly, half yearly and annual examination in all the standards. The difference between the achievement of students is significant at 0.01 level.

Similarly with respect to mathematics the achievement of students in the experimental school is consistently about 80% and above in all the standards in quarterly, half yearly and annual examination. The achievement of control group range roughly from 45 - 50%. The difference in the achievement between the two groups is significant at 0.01 level.

With regard to Environmental studies the achievement of students of experimental group is found to be far more superior viz 80 - 82% when compared to that of students of control group with 45 - 50% in quarterly, half yearly and annual examination in each of the standards. The difference between the means of two groups being significant at 0.01 level.

The analysis of achievements of students of standards I-V of control and experimental groups in all the three subjects have revealed that the mean values of achievements of control group lie around 46% and the achievement scores show wider dispersion. The mean value of achievements of experimental group fall around 80% and the achievements show a comparatively narrow dispersion. The achievements of experimental group lie consistently at a higher level right from the quarterly examination itself.

Hence the hypothesis (i) that 'the academic achievement of children of standard I, II, III, IV and V of the experimental group taught by competency based approach in cognitive areas Tamil, Mathematics and environmental studies are not different from
he academic achievement of control group taught by content based approach in
cognitive areas Tamil, Mathematics and environmental studies' is rejected. This finding
highlights the merits of the competency based approach.

Regarding the sex differences in the achievement of the students in the
experimental group, the difference in achievement of boys and girls is not found to be
significant in the three subjects viz Tamil, Mathematics and Environmental Studies for
all the standards! there are few exceptions as follows. In second standard girls score
over boys in Tamil and Environmental studies at 0.05 level of significance in annual
examinations. In third standard girls score significantly more than boys in Tamil and
Mathematics in half yearly and annual examinations at 0.05 and in 0.01 level.
Nevertheless, the achievement of boys and girls are uniformly found to be superior in
the experimental schools. The sex difference in achievement of the control group are not
statistically significant in achievements. The hypothesis (11) that 'there is no sex
difference in the academic achievement of children of standard I, II, III, IV and V of
experimental group in cognitive areas Tamil, Mathematics and Environmental studies'
is accepted except for one or two cases

The competency based approach is effective in the realisation of the
developmental objectives of education and all round development of personality.

The percentage distribution of rating under the scale values of 1-5 done before
and after the implementation of competency based approach, and the 't' value calculated
for the differences of twenty ratings for the developmental objectives of education of the
child as a learner with the required competencies - knowledge understanding and skills,
with the required attitudes and appreciations, with the required behaviours and skills
have revealed the following: there is a shift in the rating towards the higher end in every
objective in every standard and the difference in the rating done prior to and after the competency based approach is statistically significant.

The analysis of rating of students for the developmental objectives of education of the child as a person with the required competencies knowledge, understanding, and skills, with the required attitudes and appreciation, with the required behaviours and skills have revealed the following: The distribution of ratings fall under the scale values of 4 and 5 even prior to the implementation of the competency based approach. A shift in the rating to the higher level is noted. The differences in the rating before and after is statistically significant at 0.01 and 0.05 level. In the cases of objectives where the differences in rating is not significant, it can be seen that the, developmental objectives have already been realised to fuller extent.

The analyses of ratings of students done prior to and after for the developmental objectives of education of the child as a citizen with the required competencies knowledge, understanding, and skills, with the required attitudes and appreciation, with the required behaviours and skills have revealed the following. The ratings the pupils received fall mostly under the scale values of 4 and 5 and the shift in ratings is towards the higher rating value. The significance of difference in rating is at 0.05 level and 0.01 level and the developmental objectives for which the difference in ratings are not significant, it can be noted that they have already been realised to satisfactory level.

The analysis of rating of students of experimental schools done prior to and after the implementation of competency based approach for the developmental objectives of education of the child as a worker with the required competencies knowledge understanding, and skills, with the required attitudes and appreciation, with the required behaviours and skills have revealed the following: The ratings done prior to the experimental treatment fall under the scale values of 4 and 5. A shift towards the higher
end is noted. The significance of difference between the ratings are at 0.01 and 0.05 levels and in the developmental objectives where the difference in rating are not significant, most the pupils have received the highest rating value of 5 at the start of the investigation itself.

The hypothesis (iii) that 'there is no significant enhancement in the status of pupils of standard I, II, III, IV and V of experimental group in each of the developmental objectives of education due to the adoption of competency based approach' is rejected in most of the cases where the differences in rating of twenty students taken at random is at 0.01, 0.05 levels. In the cases of developmental objectives where the difference is not significant at 0.01 or 0.05 level, it can be noted that these objectives are fully realized by the students even prior to the implementation of the investigation. To sum up the competency based approach is effective in the realisation of developmental objectives of education and in maintaining the level of attainment of the objectives.

5.9 **Limitations and suggestions for further research**

1. It would have been better if the investigation is confined to one cognitive area only. But in order to get a gestalt view of competency based approach in the context of MLL, it was felt necessary to take all the three subjects and all the five standards.

2. An indepth study of this programme can be conducted on a longitudinal basis among primary school children of rural and urban areas.