# CHAPTER II

# REVIEW OF RELATED LITERATURE AND RESEARCHES

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## INTRODUCTION

"The student should find, analyze and evaluate critically every Portainent search report dealing with his chosen problem, anything less than this will be neither sensible nor scientific."

Whitney

The review of literature promotes a greater understanding of the problem and its crucial aspects and ensures the avoidance of necessary duplication.

John Best

This part of research report provide a background for the development of the present study and bring the reader up to date since good research is based upon everything that is known about the problem, this part of the report gives evidence of investigator's knowledge of the field.

First find out everything everybody has done and then begin where they left off.

Objectives

1.To identify the gap in area and avoid duplication of research.

2. To prevent researcher from repeating previous errors or redoing the work that has already been done.

3.To search suitable research problem.

4. To get information about methodology and techniques for selected(topic) Research problem.

5. To think on process of formation of hypothesis for a research problem.
6. To get information about tools and conclusions comparatively (i.e. with previous researches)
7. To study reference materials and contribute in knowledge.

**Main objectives of review of literature are mentioned below -**

1. Cataloging variables significant for research –

When researcher makes a careful review of the literature, he becomes aware of the significant and insignificant variables in the concerned area of research. A careful review also helps researcher in selecting the variables falling within the scope of researchers interest, in defining and operationalising variables falling and identifying variables, which are conceptually and virtually significant.

2. Avoidance of repetition:

A review of the literature helps researcher in evading any duplication of work done earlier. A careful review always aims at understanding previous studies and signifying their efficacy for the intended study. Thus, previous studies serve as a strong base for the intended studies. In some cases, the duplication or repetition of previous studies becomes unavoidable. This is especially true when researcher has reviewed the lot of literature and got confused. In such a situation, too, a careful review helps researcher in getting familiar with the quantity and quality of researches related to the intended research whose validity is being reviewed always. Thus a literature review forms a focused and carefully structured outline of

what others have done in the area that has been studied and produced to set researches on their own research outline with a new aims and objectives.

3. Amalgamation of previous studies

A careful literature review facilitates researcher to bring together and amalgamate previous studies related to the intended study. This in turn, helps researcher in developing a better viewpoint for proposed research. A synthesized compilation of previous studies also helps a researcher to recognize and categorize the considerable overlaps and gaps in the previous works.

4. Determining importance and relationship in relevant variables

An evaluation of the literature permit researcher in finding out significant variables a perfect literature review contributes behind the stage of simply listing variables to offer an analytical study on the chosen area.

No duplication should take place otherwise not only researcher ;but also subject may get a bad name. every literature survey must be followed by two page write up which must include the following.

1. Title of the book/ journal/ report
2. Authors name, details of publication
3. Aim and objective of the study
4. Research questions and answers
5. Details of data collection , analysis and interpretation
6. Result and conclusions
7. Limitation of the study

**Nature**

A literature review is systematic, explicit and reproducible method for identifying, evaluating and interpreting the existing body of recorded work produced by scholars. A literature review is a assessment of the range of existing materials dealing with knowledge and understanding in a given field. Any scientific investigation starts with a review of the literature, which enables researcher to place his work in the context of what has already been searched and what has not been searched, exhibiting comparison as well as provides a framework for future direction and further research.

A summary of the writings of recognized authorities and of previous research provides and evidence that the researcher is a familiar with what is already known and what is still unknown and untested. Because effective research is based on past knowledge, this steps helps to eliminate the duplication of what has been done and provides useful hypothesis and helpful suggestions for significant investigation, citing studies that shows substantial agreement and those that seem to present conflicting conclusions helps to sharpen and define understanding of existing knowledge in the problem area, provides a background for the research project, and makes the reader aware of the status of the issue. Parading a long list of annotated studies relating to the problem is ineffective and inappropriate. Only those studies that are plainly relevant, competently executed and clearly reported should be included.

In searching related literature the researcher should note certain important elements

1. Reports of studies of closely related problems that have been investigated.
2. Design of the study, including procedures employed and data gathering instruments used.
3. Populations that were sampled and sampling methods employed
4. variables that were defined
5. extraneous variables that could have affected the findings
6. faults that could have been avoided
7. Recommendations for further research.

Related literature includes books, dissertations, Ph.D. thesis, Research reports, Reference books, encyclopedia, journals etc.

**Importance of review**

1. Researcher is able to know that this research is done before or not.
2. Researcher knows the related research procedure
3. Researcher get the information about the related researches.
4. Researcher can get guidance for which tools and techniques he can use for his research
5. It is helpful to know the limitations and assumptions.
6. Requires less time and work

7. Researcher can know how statistical techniques are useful for him.
8. Researcher can give support to research information.

## REVIEW OF RELATED LITERATURE

**Taber,K.S.;(1994)**

**STUDENT REACTION ON BEING INTRODUCED TO CONCEPT MAPPING**

Students commencing an A-level revision course in physics were asked to draw a concept map for `energy'. Their subsequent comments on the task were generally very positive, and related to both their feelings about the work and their thoughts about their own learning. These important aspects of the student learning experience should not be ignored.

Results and Discussion -

To determine whether the two concept-map assessments were equivalent, we followed our framework and compared the two mapping techniques on the six variables: total accuracy scores, individual proposition scores, proposition choice, map structure complexity, proposition generation rate proposition, and generation procedures.

**Todd, R.J. and Kirk, J. (1996)**

**CONCEPT MAPPING AND THE DEVELOPMENT OF THEORETICAL KNOWLEDGE**

This paper outlines the rationale, approaches to implementation and evaluation, and outcomes of concept mapping as a learning technique in the discipline of information science. While the case study is oriented to the teaching of information science for information practice in the context of university education, the methodology, insights and perspectives presented have wide applicability across many disciplines.

The findings suggest a positive reaction to concept mapping by the students. Within the limits of this preliminary evaluation, the students have indicated that their time invested in learning the technique has been worthwhile, given the benefits to them. There is strong support for concept mapping in terms of helping them to understand major concepts in the subject, and enabling them to analyze the required reading and draw out the concepts and their interrelationships. Students also saw value in the technique in terms of thinking critically about their reading, focusing on ideas with greater clarity, and helping them concentrate on their learning tasks. Some benefits in terms of a more positive attitude to difficult readings and confidence in working with these are also expressed by students.

Conclusion

Obviously an analysis of an application of this kind is preliminary in nature and findings will need to be interpreted with caution. What is needed is more systematic research in tertiary education on concept

mapping as a learning strategy, its impact on the development of meaningful learning, and the role of interacting variables such as cognitive preference, learning mode, and learning climate. From the experience with students of information science, concept mapping appears to be a promising heuristic in developing effective teaching techniques for extending theoretical, concept-based knowledge. Learning requires dedicated commitment to an understanding of the structure and relationships of concepts in a body of knowledge, and concept mapping techniques can lead students in this direction. By enabling students to present a level of detail appropriate to their stage of understanding, concept mapping has the potential for identifying individual differences in the level and nature of learning. Concept mapping has the potential to facilitate the communication of knowledge, both verbally and in written form, and it may make a valuable contribution to broadening the scope of evaluation tools available to educators.

## THE USE OF CONCEPT MAPPING IN LEARNING SCIENCE SUBJECTS BY ARAB STUDENTS (1997)

The study was designed to assess the effectiveness of use of the concept mapping technique in the learning of science subjects by Arab students in a preparatory school second grade, located in the Gaza Strip. Concept mapping is a schematic device for representing a set of concept meanings embedded in a framework of propositions. The subjects of this study were randomly assigned to the two regularly scheduled classes, and each class was assigned to either experimental or control conditions. In the control class, the teaching approach was primarily teacher orientated, that is

the teacher used the lecturing method in sequencing the instructional activities. In the case of the experimental class, the concept mapping approach added the generation of propositional relationships among concepts on maps, using the same content material. The results of this study indicated that the experimental class subjects achieved better than those of the control class.

**Snead, D. and Snead, W.L.(2004)**

**CONCEPT MAPPING AND SCIENCE ACHIEVEMENT OF MIDDLE GRADE STUDENTS.**

This study examined the effects of concept mapping on the science achievement of middle grade science students. The subjects were 182 eighth-grade students, distributed into eight intact earth science classes by ability levels. The ability level variable also was examined as a possible effect on student achievement. Two teachers were involved in teaching a unit on weather for nine weeks. An objective weather test and six performance assessment items were used to measure achievement. For this group of students, analyses indicated no significant overall effects of treatment on science achievement. A statistically significant effect was found between concept mapping and student achievement among the average students, as measured by combined performance assessment items. The results suggest that the effect of concept mapping on science achievement is not clear, but that lower ability students appear to have better success with concept mapping than higher ability students.

**Patankar, P.S.; Baviskar C. R.; Padmini, M. S. (2005)**

**CONCEPT MAPPING : A NEW TECHNIQUE FOR SCIENCE EDUCATION**

The author while stating that the hierarchical structure for a particular domain or Knowledge depends on the context in which that knowledge is being applied or considered, the author emphasize that it is best to construct concept map with reference to the question that we seek to answer through the organization of knowledge in the form of concept map.

**Reccai, A.; Karakirik, E. and Durmus, Soner (2005)**

**A COMPUTER ASSESSMENT TOOL FOR CONCEPT MAPPING**

Current educational theories emphasize assessment as a vital part of teaching-learning process. Alternative assessment techniques aim to expose and promote the process of the learning rather than the final outcome. Concept mapping is a technique for representing conceptual knowledge and relationships between concepts in a graphical form. Requiring to construct concept maps encourages learners to organize concepts and the relationships between them in a hierarchical structure. Although constructing concept maps might be difficult in every domain including mathematics and might require extensive domain knowledge, it is essential to employ concept mapping technique in order to reveal learner's conceptual understanding. Hence, asking learners construct their concept maps or to fill missing parts

in a pre-designed concept maps might be used as a part of the assessment process. A prototype computer system, called Concept Map Assessor (CMA), is designed to help learners to construct concept maps and to evaluate their performances in pre-designed concept maps. In this study, the basic features and elements of the CMA will be presented and its possible contributions to mathematics education will be discussed.

**Dehui,K. (2005)**

**TO IMPROVE TEACHING OF COMPUTER GRAPHICS BY USING CONCEPT MAPPING**

A continuously increasing human population and the knowledge explosion has stimulated tertiary educational systems all over the world to help students become lifelong learners, as well as delivering academic knowledge to students. This requirement only can be attained when teaching pedagogy is dramatically changed. In this paper concept mapping is introduced as an example to demonstrate the improved outcomes of teaching of computer graphics by providing more opportunities for students to practice and enhance their skills on communication, management of time and knowledge, and complex ideas construction. A useful tool for drawing concept map (Smart Draw) is also introduced.

Concept mapping for understanding rendering of 3D objects in CG,

More than half of the students who choose Computer Graphics find it difficult to understand the process of rendering of 3D objects. The main reasons are the complexity of the process itself and the incomprehension of the transformations included in the process, which may be due to the poor mathematical background of some students. To tackle the problem of

communicating complex ideas, concept mapping can be adopted. The following figure organizes the main steps and concepts of this process, including some of the finer details.

In the concept map, every compound stage is dissected into basis concepts and techniques that can be understood easily. Being guided by the map, students can arrange their learning in any order they like and assemble what they learn one-by-one according to the threads given by the map and eventually focus on the individual difficult points that are encountered. Finally when they have worked out the whole concept map based on their personal understanding they will have understood the process very well.

## HANDBOOK OF RESEARCH ON COLLABORATIVE LEARNING USING CONCEPT MAPPING (2007)

Concept Mapping is a way of representing the information visually which is beginning to be implemented at all educational levels in many institutions worldwide. It was developed by Novak and his team in 1972 while working on a 12-year project with elementary school children in Ithaca/USA (Novak, 2004, p. 458) and it is regarded by many researchers as a powerful learning and teaching technique. Based on Ausubel's ideas of progressive differentiation and integrative reconciliation, two of the major advantages of its use can be stated as: 1. When engaging in the construction of concept maps, students think both on the content and on the form, and this exercise promotes the development of both sides of the brain, the creative and the analytical one; and 2. The organised visual representation of content helps in the transfer of knowledge from the short-term memory to the long-term memory, anchoring new concepts to previously acquired ones.

**Boujaoude, S. and Attieh, M.(2007)**

**THE EFFECT OF USING CONCEPT MAPS AS STUDY TOOLS ON ACHIEVEMENT IN CHEMISTRY**

The purposes of this study were to:

(1) examine whether or not the construction of concept maps by students improves their achievement and ability to solve higher order questions in chemistry,

(2) investigate the differential effect of the treatment by gender and achievement level, and

(3) explore the relationships between performance on concept maps and chemistry achievement. Participants were 60 tenth-grade students randomly divided into two groups. The study spanned six weeks in a class that met five times a week. The material covered was acid-base titration and equilibrium in weak acids. The students were pre- and post-tested using a teacher-constructed chemistry test. Results showed that while there were no significant differences on the achievement total score, there were significant differences favoring the experimental group for scores on the knowledge level questions. Moreover, there were sex-achievement interactions at the knowledge and comprehension level questions favoring females and achievement level – achievement interactions favoring low achievers. Finally, there were significant correlations between students' scores on high level questions and the convergence and total concept map scores.

# REVIEW OF RELATED RESEARCHES

**Sonar,M.S.(1975),**

**AN ANALYTICAL STUDY OF THE USE OF THE FILMSTRIPS IN TEACHING SCIENCE IN UPPER PRIMARY GRADES.**

**Objectives**

1.To make a study of the available filmstrips in India with a special reference to the teaching of science in upper primary schools in the following matter

(a) Evaluation of the filmstrips available

(b) Correlation of the filmstrips with General science syllabus and text book.

2. To make a study of the syllabus of General Science and the text books of standards V, VI and VII This will include

(a) Analysis of the syllabus

(b) Locating spots in the primary school syllabus of General Science where in filmstrip teaching can be resorted to

3. To make a study of production of text filmstrip. This will include

(a) Selection of topics on which filmstrip will have to be made

(b) Designing filmstrips

( c) Evaluation of produced text filmstrips.

Findings :

1.Foreign filmstrips have English captions. Indian filmstrips also have English captions. Few filmstrips have Hindi captions. Not a single filmstrip is there which have a Marathi caption.

2.Suitable captions makes the filmstrip more meaningful.

3.Arrangement of topics in Syllabus and arrangement of chapters in the text book do not correlate.

4.Difficult concepts which need visualization have been dropped from the text book.

**Sahajahan, N.M. (1980),**

**AN EXPERIMENTAL STUDY OF TEACHING SCIENCE IN STANDARDS VI AND VII THROUGH MODULES.**

Objectives :

1.To design and develop modules for teaching science in standards VI and VII

2.To study the effectiveness of the modules as an instructional method with respect to the conventional method.

3.To study relationship between the student achievement through modules and the attitude of students towards the module as well as academic motivation of the students.

4.To compare the achievements through modules of high achievers and low achievers, boys and girls, high academic motivation and low academic motivation.

Findings:

1.The modular way of learning was more effective than the conventional method in the case of some modules while in the case of other modules it was found as effective as the conventional method.

2.The teachers reactions to modular approach to instruction were favorable.

3.While learning through modules, no significant difference was found between the achievement of extremely high and extremely low achievers and between boys and girls.

**Sivadasan, K.R., (1981)**

**DEVELOPING SCIENCE KITS AND SELF INSTRUCTIONAL SOFTWARE FOR AUDIO TUTORIAL SYSTEM**

Objectives

1. To prepare materials for individualized instruction.
2. To test them for their efficiency as learning strategy.

Findings

1.The audio tutorial system was an effective strategy for learning.

2.In the audio tutorial system the guided discovery approach was possible and effective.

3.Students could learn at their own pace under this system.

4.The teachers role was minimized in the audio-tutorial system.

5.The ray box could be used as a small science kit.

**Barve,M.V; (1986)**

**PREPARATION AND TESTING OF FILMSTRIPS FOR THE TEACHING OF SCIENCE – A COURSE IN STD. IX AND A STUDY OF THEIR COMPARATIVE EFFECTIVENESS IN THE TEACHING LEARNING PROCESS AS COMPARED TO THE TRADITIONAL PRACTICE**

Objectives

1.To prepare filmstrips on selected topics from the science course of std.IX.

2.To teach the selected units of the science course of std. IX by using these filmstrips.

3.To compare the effectiveness of teaching with the help of filmstrips and the traditional practice of teaching science in terms of the achievement of learner.

Findings

1.Filmstrips was more effective than the traditional method for teaching the facts, principles and concepts in science.

2.Filmstrip and traditional methods were equally effective for teaching abstract concepts in science.

3.It is more effective method for both sexes.

**Agnihotri, S.K;(1987)**

**STUDY OF INFLUENCE OF SOME OF THE METHODS OF TEACHING PHYSICS ON THE ACHIEVEMENT IN PHYSICS OF CLASS X STUDENTS IN DELHI**

Objectives

1. There is no significant difference between the mean achievement in physics of different groups of students taught by different methods.
2. The interaction between teaching methods and different schools is not significant.
3. The interaction between teaching methods and different levels of students is not significant.

Findings

1.The traditional method or the lecture cum demonstration method followed by the verification type of laboratory work was more effective than the assignment cum discussion method but this method was less effective than the programmed instruction method for the teaching of physics.

2.If all the four methods selected for this investigation were ranked with report to achievement in physics systematically designed by the investigation was the first the programmed investigation modified by the investigator for the teaching of Physics was the second and traditional methods or the lecture demonstration method followed by the verification type of laboratories work was the third and the assignment cum discussion method was the fourth.

**Daley, B.J.; Shaw, C.R.; Balistriei, T., Gasenapp, K. ; and Piacentine, L. (1999)**

**CONCEPT MAPS : A STRATEGY TO TEACH AND EVALUATE CRITICAL THINGS**

Objectives

1. To implement concept maps
2. To develop method to teach and evaluate critical things.

Findings

Difference is indicative of the students increase in conceptual and critical thinking.

From these reviews it is concluded that the researches and literature's reviews shows that the techniques and new methods are even though not superior to other but they are useful to large extent hence the problem on which researcher is working is new one and need to be complete, hence researcher is working on problem that is effect of concept mapping in science on achievement in physics of XI $^{th}$ standard students.

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