CHAPTER 12
SUMMARY, CONCLUSION AND RECOMMENDATIONS

12.0 Chapter Overview
The purpose of the chapter is to summarize the research findings, and to propose recommendations. The chapter also suggests items for further research. To this end, the chapter is divided into overview, summary, conclusions and recommendations.

12.1 Overview
The purpose of the research was to develop an information literacy skill among student teachers through information literacy instruction modules.

Aims of the study
The present research has a threefold aim:

a) To assess the information literacy skills of student teachers with respect to understanding of the research process and research skills related to information handling

b) To develop, implement and ascertain the effectiveness of the module enhancing information literacy skills of student teachers based on the first phase of the study

c) To analyze the research projects of student teachers after the implementation of the module.

Objectives
Phase I
1) To develop a testing tool to assess the information literacy skills among student teachers with respect to the
   a) Understanding of role of information in the research process
   b) research skills in relation to information
2) To ascertain the difference in information literacy skills among student teacher from the:
   a) arts faculty
   b) science faculty
   c) commerce faculty
3) To ascertain the difference in information literacy skills among student teachers with a
   a) graduate degree
   b) post graduate degree

*Phase II*
4) To develop and implement the information literacy instruction modules
5) To compare the pre-test information literacy scores of students from experimental and control group.
6) To compare the post- test information literacy scores of students from experimental and control group.
7) To ascertain the effectiveness of the program to enhance information literacy skills among the student teachers by comparing the post-test scores of information literacy when the differences in the pre-test scores of the two groups have been controlled.
8) To seek the feedback from the B. Ed student teachers with respect to their
   a) opinions about Information literacy Instruction Modules
   b) suggestions about Information Literacy Instruction Modules

*Phase III*
8) To assess the extent of usage of Information Literacy skills in preparation of the research project by the B. Ed student teacher.

**Research Question**
The study is set to answer six research questions derived from the objectives.
1. What is the current level of information literacy skill among student teachers?
2. Is there a difference in the information literacy skill level based on their faculty of study?
3. Is there a difference in the information literacy skill level based on their degree of study?
4. Was the information literacy instruction module was effective in enhancing the information literacy skills of student teachers?
5. What are the opinions and suggestions of student teachers regarding the module?
6. Was the information literacy skills learnt through information literacy instruction module were utilized by the student teachers when doing a research project?

**Hypotheses**

The following null hypothesis were formulated for the present study

*Phase I*

1. There is no significant difference in the information literacy skills of student teacher from the
   a) Arts faculty
   b) Science faculty
   c) commerce faculty

2. There is no significant difference in the information literacy skills of student teachers with
   c) graduate degree
   d) post graduate degree

*Phase II*

3) There is no significant difference in the pre-test scores of information literacy skills of students from experimental and control group.

4) There is no significant difference in the post-test scores of information literacy skills of students from experimental and control group.

5) There is no significant effect of the treatment on students’ information literacy skills post-test scores when the differences in the pre-test scores of the two groups have been controlled.
RESEARCH METHODOLOGY

The term methodology refers to the process and procedures one adopts while carrying out the study in order to achieve the particular objectives specified.

Phase I

The descriptive method of the causal comparative types has been adopted in the present research. The study has used the quantitative paradigm to test the hypotheses statistically in order to study the difference in the information literacy skills among student teachers based on their faculty of study and degree.

Phase II

The second phase of the research was to develop, implement and ascertain the effectiveness of the module enhancing information literacy skills of student teachers based on the first phase of the study. For achieving the second objective the Quasi experimental method of the pre-test – posttest non-equivalent groups design, was used for implementing and testing the effectiveness of the program developed.

Phase III

The main aim of the phase three was to assess the extent of usage of Information Literacy skills in preparation of the research project by B. Ed student teachers. The students of experimental group who had attended an information literacy instruction module were assessed by a researcher.

Tools:

The data for the present study was collected using the tools given below:

a. Information Literacy Skills Questionnaire: Questionnaire with open and closed ended items, developed by the investigator was administered to student teachers to assess the information literacy skills of student teachers.

b. Pre-test and post-test: Information Literacy questionnaire developed was used as pre-test and post-test to assess the difference in understanding and skills before and after intervention.

c. Information Literacy Feedback form was used for getting feedback and suggestion from the student teachers with respect to information literacy instruction modules.

d. Focus Group: was used for getting feedback and suggestion from the student teachers with respect to information literacy instruction modules.
f. A Portfolio Assessment Model developed by the NJIT was used to analyze the research project of the student teachers assess the extent of usage of information literacy skills

**Sampling**

**Phase I**

For the purpose of phase I of the present study, the population includes student teachers from education colleges of Greater Mumbai.

A two-stage stratified random sampling technique was used for selecting the sample. At the first stage, sampling involved selection of colleges on the basis geographical areas of Greater Mumbai. Here the stratified random sampling technique was used and the stratifying factor was the geographical location of the college. Colleges were selected randomly from three strata of Greater Mumbai, viz, South Mumbai, North Mumbai and Central Mumbai.

The second stage of sampling involves selection of students from the colleges of education selected in the first stage. The selection of the sample of students at this stage was incidental or available due to reasons beyond the control of the researcher. The sample included both males and females.

**Phase II**

For the present study, randomization in sample selection was not possible because random assigning of student teacher to the experimental group and the control group would disturb the normal functioning of the colleges. Therefore for the present study, the researchers conducted the experiments in two colleges with similar characteristics. To conduct experiments intact classes formed the groups. For selecting the colleges, the researcher has made use of multistage purposive sampling. In the first stage the two colleges offering the B Ed course who gave permission to conduct the experiment were chosen. In the second stage, the researcher randomly assigned one college as the experimental group and others as a control group. B Ed student teachers from All India Khilafat College of Education, Byculla were assigned as the experimental group and student teachers from the Akbar Peerbhoy College of Education; Vashi was assigned as a control group.
Phase III

The students of the experimental group who had attended the information literacy instruction modules were assessed in phase 3.

Procedure of the study

Phase 1  Information Literacy skills questionnaire was developed and administered to student teachers from colleges in Greater Mumbai

Phase 2  Based on data received from the first phase of the study, information Literacy instruction modules were developed. These modules were implemented in college identified as experimental college. A pre-test and post-test was administered to the experimental and control group before and after completion of Intervention module. Periodical assessment of the experimental group was done through quizzes and worksheets. Information Literacy feedback and focus groups were undertaken for opinions and suggestion on information literacy instruction module.

Phase 3  After the completion of the module, the research projects submitted by the student teachers were analyzed for extent of usage of information literacy skills learnt during information literacy instruction modules.

Techniques of Data Analysis

Data analysis:

Data was analyzed by adopting Descriptive and Inferential statistics

Descriptive analysis:

1. Measures of Central tendency: mean, median and mode
2. Measures of variability: SD, skewness and Kurtosis
3. Graphical methods: Frequency polygon, bar graph, pie chart

Inferential statistics:

ANOVA, T-test, Wolf’s formula
12.2 Summary of the research questions

Six research questions developed as a result of the articulation of the research problem are reviewed below.

RESEARCH QUESTION ONE

Research question one asked:

1. What is the current level of information literacy skill among student teachers?

This research question was successfully answered as analysis of the information literacy questionnaire revealed a poor level of information literacy skills among student teachers. The main aim of the questionnaire was to assess the information literacy skills of student teachers with respect to their understanding of the research process and research skills. It was found that students had a very low understanding of the research process. It was also found that they were not aware of what information could be obtained from the catalogue. Students also preferred locating books by title rather than by call the number which further indicates their inability to understand the organization of the library. Research suggests that this may be due to lack of awareness of students regarding the tools and resources of the library. The researcher felt that lack of understanding of the research process among the student teachers may lead to anxiety, loss of confidence, wastage of time and poor grades.

Addiction to the internet can be one of the factors for poor research skills among students. As students find it convenient to use and get plenty of information with a simple search statement, they feel that everything is available on the internet. It was found that students face different problem in research skills. Students were not able to identify the need and considered relevant and irrelevant words from the question when framing the research strategy. Even though students were aware that citation helped to give credit to the authors, they were not aware of citation elements or the citation style used. Analysis of the questionnaire revealed different areas where students were weak. This can help in developing the information literacy instruction. Thus while answering these questions researchers identified areas where students were lacking and could analyse the problems faced by the students.
RESEARCH QUESTION TWO
Research question two asked:

2. Is there a difference in the information literacy skill level based on their faculty of study?
This question was answered successfully, as it was found that there was a difference in the information literacy skills in student teachers from the Science, Commerce and Arts faculty. Students from Science faculty had high information literacy skills.

RESEARCH QUESTION THREE
Research question three asked:

3. Is there a difference in the information literacy skill level based on their degree of study?
This question was also answered successfully as it was found that there is no difference in the information literacy skills of student teachers based on their degree of study. This is clearly evident, since from school children to Ph. D. all students are lacking information literacy skills, hence a degree of study will not matter. It may also due to the fact that there is a lack of information literacy training among different levels of education as a result it is not developed, enhanced or transferred.

RESEARCH QUESTION FOUR
Research question four asked:

4. Was the information literacy instruction module effective in enhancing the information literacy skills of student teachers?
This question was also answered successfully as it was found that information literacy instruction modules were effective in enhancing information literacy skills of the student teachers. Effectiveness of the module was tested using the pre-test post-test analysis, hypothesis testing and determining the magnitude of the effect of treatment through wolf’s formula. Hypothesis testing revealed that there was a significant difference in the means of the experimental and control groups after the intervention. Wolf’s formula provided with effect of the size of treatment which was found to be 1, which suggests that module was highly effective in enhancing the information literacy skills of student teachers. Pre-test post-test analysis revealed areas where there was a significant difference in scores of variables. It was found that for few variables there was only a slight difference, this may be due to the fact that students had already
scored high on that variable in the pre-test or they must have not understood the module. The researcher feels that there are different aspects of the module like active learning strategy, duration, timing and assessment, which were responsible for enhancing the information literacy skills of student teachers.

**RESEARCH QUESTION FIVE**

Research question five asked:

5. What are the opinions and suggestions of student teachers regarding the module?

Information Literacy feedback and focus group interviews were conducted to get feedback from students regarding their opinion and suggestion for improvement of information literacy instruction module. Feedback was obtained for the following aspects usefulness of the content of the module, confidence in doing research, different methods used during instruction like worksheets, quizzes, reflection exercises, study materials and handouts, most helpful session, least helpful session, opinion and suggestion and overall assessment of the module. On the whole students felt that information literacy instruction was helpful to them. Opinions and suggestions of student teachers are discussed in chapter 10.

**RESEARCH QUESTION SIX**

Research question six asked:

6. Was the information literacy skills learnt through information literacy instruction module were utilized by the student teachers when doing a research project?

This question was also answered successfully as it was found that only 10 out of 65 students had utilized the information literacy skills learnt through the information literacy instruction module. According to the researcher there are different reasons why this could have happened

- each guiding teacher had a particular style of guiding wherein it was found that bibliography of all students under a particular guide had same references
- there were not more than 10 references for the project.

Evidence from the research suggests that there are different factors which may give rise to lack retention and transfer which was discussed in chapter 11.
Phase 1

Information Literacy Skills among student teachers

- An information literacy questionnaire which was administered to student teachers of different colleges revealed that the majority of student had poor knowledge of the research process and research skills. Different problems were identified in terms of the research process like lack of research readiness, moderate awareness of research needs among the students. Lack of knowledge of research strategy with respect to the research question, keywords, reference materials and citation details. Lack of knowledge with respect to referencing and citation style. Similar problems were identified with respect to the research skills like difficulty in identifying information need, and eliminating non-significant words, inability in broadening and narrowing the research topic, difficulty in identifying the source to get background information, lack of knowledge of services provided by the library. Incorrect use of the “OR” operator and the search indexes within the catalogue. Lack of knowledge of truncation, Citation elements Controlled vocabulary and help devices. Inability to identify synonyms and reading citations. Difficulty in synthesizing information and evaluating information found in websites and books and periodicals. Difficulty in recognizing when to cite a source. Lack of knowledge of fee based information source, copyright, intellectual property right, and plagiarism and citation style.

- There was a significant difference in the information literacy skills of student teacher of the Arts faculty, Science faculty, Commerce faculty, so the null hypothesis was rejected. The mean information literacy skills of student teachers from the Arts and Commerce faculties, Arts and Science faculties and student teachers from Commerce and Science faculties significantly differ from each other, with student teachers from Science faculty being the highest, i.e. student teachers from the science faculty have higher information literacy skills compared to the student teachers from Commerce and Arts faculties.

- Similarly there was no significant difference in the information literacy skills of student teachers with a graduate degree and post graduate degree, thus the null hypothesis was accepted.
Phase II

✓ A pre-test post-test analysis revealed that overall, students performed far better in the post-test than in the pre-test.

✓ There was no significant difference in the Information literacy skills scores of control and experimental group, i.e. both the groups were on the same level. Thus it can be said that student teachers from both the experimental and control groups were nearly similar in their information literacy skills. Hence it assures that both the groups were similar before administering the pre-tests consisting of information literacy skills as well as implementation of the treatment. i.e. information literacy instruction program.

✓ There was a significant difference in the post-test information literacy skills scores of the control group and the experimental group after exposing them to the Information literacy instruction program.

✓ The treatment i.e. the information literacy instruction module developed by the researcher for the enhancement of information skills among the student teachers of the experimental group was effective. It means student teachers have gained knowledge and understanding of the research process and research skills to a large extent.

✓ Overall information literacy feedback analysis and focus group indicated that the students found the sessions very helpful and they were able to acquire different skills which would be helpful to them in their individual research project Generally students indicated that there was an appropriate mix of practical and theory although there were requests for more practical work.

Phase III

✓ Results indicate that only 15.38% (10 research projects) of the research projects had made use of the information literacy skills learnt during the information literacy instruction.
12.4 Recommendations for improving information literacy skills

- There should be one compulsory library based assignment.
- Faculty and Librarian should collaborate to develop a meaningful research based assignment.
- Information Literacy Instruction should be integrated into the curriculum as a credit based course.
- There should compulsion on the number of library sources and internet resources to be used with more emphasis on the use of the scholarly sources.
- Teachers and authorities of the college should insist on students attending library orientation to increase their awareness about the organization of information and understanding of library tools and resources.
- There should at least one or two lectures by a librarian during the academic term
- As it was found that student lacked a research strategy, academic staff should collaborate with librarians, by giving assignments to the students that require searching and using library resources like journals, indexing abstracting sources to reinforce their learning
- As students were also not aware about the citation style and mechanics of citation, one uniform citation style should be selected and teachers should reinforce students’ use of citations and references
- NAAC and National Knowledge Commission have identified information literacy instruction as one of the best practices, this should be converted into Information Literacy policy.
- A well organized and informative handout should be prepared to give information about the research process
- Emphasis should be given by teachers, the librarian and the management on the important role of authentic information in all aspects of life for surviving in continuously changing society.
- It was found that students lacked accessing and locating skills. This may be due use of jargon and specific procedures. The librarian should collaborate with database vendors and IT professionals to make searching simple and easy.
- In order to avoid plagiarism, students should be made aware of the ethics of research and each institution should have a policy on plagiarism.
• The present study indicated that students had knowledge about different aspects of research but they lacked in application of the knowledge. Information literacy instruction should be developed with more emphasis on practical aspects of searching and using information.

• The present study also discovered that there is a difference in the information literacy skills of student teachers with respect to their faculty of study, therefore the instructions should be developed keeping this in mind.

• When designing information literacy instruction, information literacy activities should be connected with subject content rather than an independent or abstract course, to help students find the meaning of their learning.

• There should be continuous evaluation of the instruction through regular feedback from all the stakeholders.

• Information Literacy instruction should be student centered rather than teacher centered where there is continuous engagement of the students.

**General Suggestions**

Information Literacy is necessary for lifelong learning. Therefore it has to be transferable, to make that possible some suggestions are being given.

• Stakeholders must be educated about the importance of information literacy skills in learning, teaching, the workplace, lifelong education and day to day life.

• There should be continuous marketing of information literacy instruction to entire stakeholder community.

• Collaboration between teachers and librarians is essential for enhancing the information literacy skills of students.

• Information Literacy should be promoted as a critical literacy for surviving in the 21st century rather than only library literacy.

• Librarians and teachers should be trained for building information literacy instruction.
Suggestions for Further Research

- The present study developed a tool for assessing information skills of student teachers. This may be enhanced and strengthened by using a much larger sample from different locations and environment further leading to a standardized tool.
- The universality of the findings may be established by conducting studies with larger samples selected from varying and heterogeneous populations.
- Variables such as caste, gender, demography etc. have not been considered in this study: whether these influences the effectiveness of information literacy instruction needs to be studied.
- In this study the three faculties have shown differences in scores of information literacy skills. A comparative study of the faculties may be explored.

Suggestions for some specific studies

- To study the interactive effect of gender and previous research experience on the information literacy skills of student teachers.
- To study the interactive effect of age and gender on the information literacy skills of student teachers.

12.5 Conclusions of the study

In conclusion it can be said that student teachers lack information literacy skills. In the present study an information literacy instruction module was conducted for a period of 3 days which resulted in the enhancement of the information literacy skills among the student teachers. However it was found that students were not able to apply the skills learnt in the module to their research projects. Similarly as the module was not content driven but independent, they considered these to be more of library skills. Besides the guides of students had their own way of instructing the students regarding the development as well as writing of the project. However about 10 students out of 65 were able to apply the skills learnt through the intervention module in their research projects. Literature in information literacy instruction has reiterated that information literacy instruction is a continuous process that needs to be content driven. One time intervention is not sufficient. Interventions must be designed to fulfil specific requirements by the researchers as they develop their research projects.