CHAPTER V

CONCLUSIONS AND SUGGESTIONS

This chapter is meant to present a brief summary of the study (study in retrospect) and the conclusions and suggestions derived from the study. The study was intended to test the effect of Blended Learning Strategy on achievement in Biology, environmental attitude and social attitude of secondary school students of Kerala. The summary of the study is followed by short description of the major findings of the study. The Chapter concludes with a discussion on the suggestions and recommendations that can be derived from the study for future research in the field of science education.

6.1 Study in retrospect

The present study is intended to find out the effect. The study under investigation is entitled as “EFFECT OF BLENDED LEARNING STRATEGY ON ACHIEVEMENT IN BIOLOGY AND SOCIAL AND ENVIRONMENTAL ATTITUDE OF STUDENTS AT SECONDARY LEVEL”.

6.1.1 Hypotheses of the Study

The hypotheses formulated for the study are restated below:

- Blended Learning strategy is an effective means for enhancing achievement in Biology of secondary school students.
- Blended Learning is effective in improving Environmental Attitude of secondary school students.
• Blended Learning is effective for promoting Social Attitude of secondary school students.

6.1.2 Objectives of the study

The study had the following specific objectives in view:

➢ To construct and validate an Environmental Attitude Scale for secondary school students.

➢ To construct and validate a Social Attitude Scale for secondary school students.

➢ To identify the Environmental Attitude of secondary school students.

➢ To identify the Social Attitude of secondary school students.

➢ To design a Blended Learning strategy for learning Biology at secondary level.

➢ To find the Achievement in Biology of secondary school students using Blended Learning strategy developed.

➢ To find the effect of Blended learning on achievement in Biology of secondary school students.

➢ To find the effect of Blended learning on Environmental Attitude of secondary school students.

➢ To find the effect of Blended learning on Social Attitude of secondary school students.
➢ To identify the relation between Achievement in Biology through Blended Learning and Environmental Attitude of secondary school students.

➢ To identify the relation between Achievement in Biology through Blended Learning and Social Attitude of secondary school students.

➢ To identify the relation between Environmental Attitude and Social Attitude of secondary school students.

➢ To analyze the ratings of teachers regarding the effectiveness of Blended Learning in Science at secondary level.

➢ To identify the views of students regarding the beneficial and practical aspects of Blended Learning.

6.1.3 Method adopted

The purpose of the present study was to develop a blended learning strategy for learning Biology and to find out its effect on achievement in Biology, environmental attitude and social attitude of secondary school students of Kerala. Hence the investigator adopted experimental cum survey method for the present investigation. The survey method was used to identify the environmental and social attitudes of students as a preliminary step of the study. The experimental method was used to study the effect of Blended Learning for enhancing achievement in biology of secondary school students as well as in improving their environmental and social attitude. Survey method was also used to collect the responses of teachers and students regarding the beneficial aspects
with respect to feasibility and practicability of the blended learning strategy in science instruction.

The basic experimental design adopted in the present investigation was Pre-test Post-test Non-equivalent Quasi Experimental Design. Two groups were taken for the experimental study namely the experimental group and control group. The independent variables selected for the present study are Blended Learning Strategy and Direct Instruction Method. The dependent variables are Achievement in Biology and Attitudes viz., Environmental Attitude and Social Attitude of secondary school students.

6.1.4 Sample selected for the study

The population for the present study comprised of secondary school students of Kerala. Here a sample of 450 secondary school students of representative districts in Kerala had been selected for the survey. Stratified random sampling technique was used for selecting the sample giving due representation to gender, locality and type of school. Experimental method was used to determine the effect of Blended learning on the achievement in Biology of secondary school pupils. For the experimental study the researcher selected two groups of 84 students (42 as experimental group and 42 as control group) from among the 450 students identified for the study. The opinion regarding the beneficial and practical aspects of blended learning were collected from the experimental group and 50 teachers selected for the study.

6.1.5 Tools used for the study

- Lesson Transcripts in Biology based on Blended Learning Strategy on the topic ‘Biodiversity and its Conservation’
Lesson transcripts based on Direct Instruction method on the topic Biodiversity and its Conservation’
Achievement Test on the topic ‘Biodiversity and its Conservation’
Social Attitude Scale
Environmental Attitude Scale
Evaluation Schedule to analyze the ratings of teachers regarding the effectiveness of Blended Learning for teaching Science at secondary schools on select educational outcomes: cognitive aspects; affective aspects; process skills; environmental aspects; social aspects; interdisciplinary and teacher competency.
Questionnaire for Students to assess the views of students regarding the following aspects of blended learning: organizational and study skills; investigation skills; collaborative skills; teacher support; and overall level of satisfaction.

6.1.6 Procedure adopted for the study

Survey method was used to find out the social and environmental attitude of secondary school students using attitude scales viz., Social Attitude Scale and Environmental Attitude Scale developed and standardized by the investigator. 18 lessons based on the topic ‘Biodiversity and its Conservation’ from Biology identified by the researcher were taught using the Blended Learning Strategy developed. The strategy was administered on the experimental group. These lessons were taught at secondary level to find out whether they are suitable for increasing the achievement of students. An achievement test was administered as both pre-test and post-test to know the levels of
achievement of students exposed to Blended Learning Strategy. Social Attitude Scale and Environmental Attitude Scales were also used to find the improvement in Social Attitude and Environmental Attitude of students before and after exposing students to Blended Learning Strategy. Achievement and attitude scores obtained through blended learning and direct instruction were analyzed in order to find out the effect of Blended Learning Strategy over Direct Instruction Method for enhancing achievement and improving social and environmental attitudes respectively.

6.1.7 Statistical Techniques used

The following statistical techniques were used for analyzing the data:

(1) T-test
(2) Analysis of Co-variance
(3) Percentages

6.2 Major conclusions of the study

The research studies on testing the effect of blended learning were mostly done in business and management studies. Only a few studies have been done on achievement and attitude of secondary school students, majority of which were done in mathematics and geography teaching. The survey also revealed that only a few studies have been conducted in India especially in Kerala.

Blended learning as conceived in this study is a fundamental redesign that transforms the structure of, and approach to, teaching and learning and therefore must be approached with the awareness of the challenges of doing things differently. As blended
learning brings together the familiar (classroom) and unfamiliar (online) environments, “the movement towards more blended learning opportunities is unfolding in an organic way, rather than an organized way. It offers learners the opportunity “to be both together and apart.” Blended learning provides a ‘good’ mix of technologies and interactions, resulting in a socially supported, constructive, learning experience. The purpose of social presence in an educational context is to create the conditions for inquiry and quality intersection to collaboratively achieve worthwhile educational goals.

The present study tested the significance and effect of blended learning in Biology. It studied the effect of blended learning in terms of the variables achievement, environmental and social attitudes respectively. The results indicate that blended learning is effective for enhancing achievement in Biology, improving Environmental Attitude and promoting Social Attitude of secondary school students.

6.3 Outcomes of the study

- Blended Learning Strategy developed in this study provides a conceptual framework for selecting and combining a multitude of learning techniques.
- Blended Learning aims to provide sustained behavioral change resting solidly on an instructional design model that acknowledges the learning stages, provides appropriate instructional strategies for those stages, and reinforces skill and attitude development through practice, feedback, and testing.
- By recognizing and carefully balancing the learner needs, preferred or common learning methods, and the available resources, blended learning provides a
significant increase in the effectiveness of learning, bringing a greater experience facilitating activities, and helping to transform environmental theory into practice.

Moving from standard instructor-led classrooms to more self-paced learning offers cost-effective approach for learning and achieving. It reduces boredom, decreases costs, and produces tangible results that relate to enhanced learner value and attitudes.

6.4 Suggestions based on the findings of the study

i. The study revealed (based on the analysis of achievement scores) that BLS is significantly superior to DIM with regard to post test achievement scores. It is therefore recommended that BLS should be adopted for teaching Biology at secondary school level.

ii. Since BLS is superior to DIM in improving Environmental Attitude of students with regard to post environmental attitude scores, blended learning could be effectively utilized in schools.

iii. The study also revealed that BLS is superior to DIM in promoting Social Attitude of students with regard to post social attitude scores. Hence the strategy is found relevant.

iv. The analysis of the ratings of teachers and students on select educational aspects and outcomes of Blended learning revealed that BLM is effective in all the items listed. So it is recommended that BLS should be adopted for teaching Biology at secondary school level.
6.5 Implications of the study

- The goal of blended learning is to unite the best features of in-class teaching with the best features of online learning, to promote active, self-directed learning opportunities for students. An instructional design for the blended learning strategy should naturally define the roles of the teacher and the students engaged in the instructional process.

- Meeting the learners’ expectations and enriching their experiences is central to a blended learning system. So improper use of modalities and blends may lead to confusion and complexities and hence should be avoided.

- Consistent with the aim and requirements of an institution and to attend to the needs of its beneficiaries in its environment, authorities concerned can rely on the availability and stability of high quality instructional resources in the most varied areas of education for developing knowledge, skills and attitudes.

- The choice of a blend should be determined by several factors: the nature of the course content and instructional goals, student characteristics and learning preferences, instructor experience and teaching style, online resources and others.

- A reconceptualization of the learning paradigm entails the incorporation of new pedagogies and learning theories (e.g., student-centered, social constructivism), the development of new understandings and knowledge through students’ social interactions with a community of peers, and new roles of students (e.g., active author of content, self-paced learner) and teachers (e.g., mentors, coaches).
6.6 Suggestions for further research

- The experimental study was limited to a small sample representing a single district and urban locale. The study may be replicated on a large sample including many districts of both rural and urban locales.

- A study on the impact of Blended Learning Model on student’s attitudes towards biology and their critical thinking dispositions and learning styles could be studied.

- Blended Learning Strategy including a variety of combinations such as real time collaborative interactions, either online or face-to-face, and self paced situations could be attempted. A strategy that combines several different delivery methods, such as Collaboration software, Web-based courses, Learning Management Systems, and knowledge management practices could be studied.

- Effect of Blended Learning on the motivation and interest of Students in learning Biology could be attempted.

The investigator would feel gratified if the findings of the study would lead to better understanding of the teaching learning process which would enable students to learn in a more meaningful way, support curriculum planners to design new curriculum based on Blended Learning and guide secondary school Biology teachers to make teaching an interesting and rewarding experience and motivate researchers to undertake further research.