Chapter VI

Summary and Conclusion

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6.1 Introduction

With the advent of building knowledge society the learning mass has grown exponentially where as the existing educational system can not accommodate all the aspirants to build a knowledge society and leads to the search of an effective alternative system of delivery that will fulfill their desire and offer qualitative improvements such as greater individualization of learning, easier access to information and more use of simulation techniques. Among the alternative modes, e-learning has the edge of catering to a huge number of learners with less per capita expenditure. But many e-learners are expressing that they are craving for some live face to face interaction with peer and instructor and there fore blended learning is considered to be the promising one. This chapter deals with statement of the problem, objectives of the study, variables of the study, hypothesis of the study, method, findings, educational implication, recommendations, scope for further study and conclusion.

6.2 Statement of the problem

Teachers are the pillars of any nation. It is imperative to make them technically sound and professionally confident to create knowledge society. This formidable task of nation building can be achieved only with the help of hybrid learning environments. It is the need of the hour to think of the various possibilities of integrating the conventional face to face class room environment with e learning environment. Hence the problem of the present study is stated thus “Development, Validation, and Effectiveness of Blended Learning on Teaching of Science at B.Ed Level.”
6.3 Objectives of the study

The following are the objectives of the study.

1. To integrate the personal touch of conventional face to face learning and e-learning in teacher education.
2. To identify the level of achievements through blended learning modules in science subjects.
3. To analyse the achievement of student teachers with respect to personal variables through blended learning.
4. To evaluate the effectiveness of blended learning modules in science subjects.
5. To find out the e quest of student teachers learning science through blended learning.
6. To study the ICT readiness of student teachers learning through blended learning.
7. To find out the relationship between e quest and ICT readiness of student teachers learning through blended learning strategy.

6.4 Variables of the study

The independent variable of this study is the blended learning strategy. The dependent variable is the achievement of student teachers in science education. The other variables involved in this study are e quest and ICT readiness. These variables are studied with respect to owning a personal computer, computer courses attended and surfing habit.
**6.5 Hypotheses of the study**

The following hypotheses were formulated based on the objectives of the study:

1. There is no significant difference in the post test achievement in science between the control and experimental group student teachers.

2. There is no significant difference in the post test achievement in science between the control and experimental group student teachers owning a personal computer.

3. There is no significant difference in the post test achievement in science between the control and experimental group student teachers not owning a personal computer.

4. There is no significant difference in the post test achievement in science between the control and experimental group student teachers who had already attended any computer course.

5. There is no significant difference in the post test achievement in science between the control and experimental group student teachers who had not already attended any computer course.

6. There is no significant difference in the post test achievement in science between the control and experimental group student teachers who are surfing regularly.

7. There is no significant difference in the post test achievement in science between the control and experimental group student teachers who are not surfing regularly.

8. There is no significant difference in the post test e-quest scores between the control and experimental group student teachers.

9. There is no significant difference in the post test e-quest scores between the control and experimental group student teachers owning a personal computer.
10. There is no significant difference in the post test e quest scores between the control and experimental group student teachers not owning a personal computer.

11. There is no significant difference in the post test e quest scores between the control and experimental group student teachers who had already attended any computer course.

12. There is no significant difference in the post test e quest scores between the control and experimental group student teachers who had not already attended any computer course.

13. There is no significant difference in the post test e quest scores between the control and experimental group student teachers who are surfing regularly.

14. There is no significant difference in the post test e quest scores between the control and experimental group student teachers who are not surfing regularly.

15. There is no significant difference in the post test ICT readiness scores between the control and experimental group student teachers.

16. There is no significant difference in the post test ICT readiness scores between the control and experimental group student teachers owning a personal computer.

17. There is no significant difference in the post test ICT readiness scores between the control and experimental group student teachers not owning a personal computer.

18. There is no significant difference in the post test ICT readiness scores between the control and experimental group student teachers who had already attended any computer course.
19. There is no significant difference in the post test ICT readiness scores between the control and experimental group student teachers who had not already attended any computer course.

20. There is no significant difference in the post test ICT readiness scores between the control and experimental group student teachers who are surfing regularly.

21. There is no significant difference in the post test ICT readiness scores between the control and experimental group student teachers who are not surfing regularly.

22. The blended learning strategy is not effective in improving the post test achievement of student teachers in science.

23. The blended learning strategy is not effective in improving the post test e quest scores of student teachers.

24. The blended learning strategy is not effective in improving the post test ICT readiness scores of student teachers.

25. There is no significant relationship between the achievement and e quest of student teachers.

26. There is no significant relationship between the achievement and ICT readiness of student teachers.

27. There is no significant relationship between the e quest and ICT readiness of student teachers.

**6.6 Method**

To study the effectiveness of blended learning strategy, the Pre-test, Treatment, Post-test equivalent group experimental design was adopted in the study.
6.6.1 Sample

A sample of 40 B.Ed student teachers comprising Physical science, Biological science and Computer science optional subjects were selected for the study from MASS College of Education, Kumbakonam as the control group subjects and 40 B.Ed student teachers comprising Physical science, Biological science and Computer science optional subjects from School of Education, SASTRA University, Kumbakonam were selected as the experimental group subjects. They were selected through purposive sampling technique.

6.6.2 Tools

The following tools were used in the study

Tool 1: Achievement test in science education constructed and validated by the investigator.

Tool 2: e Quest scale constructed and validated by the investigator.

Tool 3: ICT readiness scale constructed and validated by the investigator.

6.7 Data Analysis

Descriptive statistics were used to describe the sample with reference to the variable taken for the study. In differential analysis, the significant difference between groups was studied using the t test. The co-efficient of correlation was determined by Pearson product moment method along with regression analysis.

6.8 Findings of the study

The following are the findings of the study

1. There is significant difference in the post test achievement in science between the control and experimental group student teachers.
2. There is significant difference in the post test achievement in science between the control and experimental group student teachers owning a personal computer.

3. There is significant difference in the post test achievement in science between the control and experimental group student teachers not owning a personal computer.

4. There is significant difference in the post test achievement in science between the control and experimental group student teachers who had already attended any computer course.

5. There is significant difference in the post test achievement in science between the control and experimental group student teachers who had not already attended any computer course.

6. There is significant difference in the post test achievement in science between the control and experimental group student teachers who are surfing regularly.

7. There is significant difference in the post test achievement in science between the control and experimental group student teachers who are not surfing regularly.

8. There is significant difference in the post test e quest scores between the control and experimental group student teachers.

9. There is significant difference in the post test e quest scores between the control and experimental group student teachers owning a personal computer.

10. There is significant difference in the post test e quest scores between the control and experimental group student teachers not owning a personal computer.

11. There is significant difference in the post test e quest scores between the control and experimental group student teachers who had already attended any computer course.
12. There is significant difference in the post test e quest scores between the control and experimental group student teachers who had not already attended any computer course.

13. There is significant difference in the post test e quest scores between the control and experimental group student teachers who are surfing regularly.

14. There is significant difference in the post test e quest scores between the control and experimental group student teachers who are not surfing regularly.

15. There is significant difference in the post test ICT readiness scores between the control and experimental group student teachers.

16. There is significant difference in the post test ICT readiness scores between the control and experimental group student teachers owning a personal computer.

17. There is significant difference in the post test ICT readiness scores between the control and experimental group student teachers not owning a personal computer.

18. There is significant difference in the post test ICT readiness scores between the control and experimental group student teachers who had already attended any computer course.

19. There is significant difference in the post test ICT readiness scores between the control and experimental group student teachers who had not already attended any computer course.

20. There is significant difference in the post test ICT readiness scores between the control and experimental group student teachers who are surfing regularly.

21. There is significant difference in the post test ICT readiness scores between the control and experimental group student teachers who are not surfing regularly.
The blended learning strategy is effective in improving the post test achievement of student teachers in science.

The blended learning strategy is effective in improving the post test e quest scores of student teachers.

The blended learning strategy is effective in improving the post test ICT readiness scores of student teachers.

There is significant relationship between the achievement and e quest of student teachers.

There is significant relationship between the achievement and ICT readiness of student teachers.

There is significant relationship between the e quest and ICT readiness of student teachers.

The case studies about the strategy confirm that the blended learning strategy is effective, interesting and offers better satisfaction to the learners.

6.9 Discussion of results with results of other studies

Findings of this study about achievement in science match with the study of Melek Yaman Dittmor Graf (2010) development, implementation and evaluation of cross national blended learning in biology.

Dragana Biebic Radojka Knet Danijela Milosevic (2010) study revealed that in service teachers performed better than pre-service teachers but the present study establishes that pre service teachers also perform well with blended learning strategy.
As in the study of Rehana Masrur (2010) on web based resource materials, this study also finds integration of ICT in teaching learning increased the understanding of subject related knowledge.

Serap Samsa’s (2010) study on scenario based blended learning and attitude of pre service teachers revealed pre service teachers satisfaction over blended learning environment, this study’s findings are also similar to that.

The results of this study are similar to the findings of Bridget Melton and others (2009) highlighting the preference of blended delivery over traditional lecture method by learners.

Yun Jeong Park and Curtis J.Bonk (2007) reported no significant difference between distance and residential students’ achievement through blended learning. This study finds both regular and occasional surfers ensure better achievement.

6.10 Educational implications of the study

The study reveals that blended learning strategy is effective in improving the achievement in science education at B.Ed. level. The overall out come of the study underlines the effectiveness of blended learning strategy with large effect size in achievement of science education, e quest score and ICT readiness score of student teachers. The blended learning strategy will be helpful in augmenting the teaching learning process in the following ways,

1. Blended learning strategy in B.Ed. will make our budding teachers confident of facing the challenges of new age teaching.

2. Blended learning strategy is not fully technology dependent the teacher is having a lion share to mark his creativity along with abundant e resources
available in the web world. This will give the balance of human touch and technical punch.

3. Cross media navigation is the integral part of blended learning. This will make The learners transform the abstract ideas in to concrete learning to enable the teacher to cover the syllabus in time.

4. Along with teachers, learners are also having due importance to become self regulated learners so as to attain mastery in learning.

5. With the advent of building knowledge society the increasing learner mass can be easily accommodated through this strategy.

6.11 Recommendations

The following recommendations are elicited by the investigator out of the study,

To the student community

It is recommended to the students to have a regular practice of browsing in spite of their hectic study related academic activities. It will offer a new insight about different walks of life and give a peep to development and limitations of various domains.

To the teaching community

The pre and in-service teachers can make use of the internet to train themselves in the on line learning tools like, webinar video conferencing, studio soft wares and EPSS to make them qualified as next generation teachers.

To the parents

The fruits of internet are many and progressive at the same time it has got some ill effects also on the young learners in their formative years. Parents can offer controlled supervision to their children to avoid any negative influence of internet over them.
To the Institutions

Educational institutions irrespective of their stature can ensure at least the minimum gadgets needed for effective utilization of blended learning in their curriculum.

To policy makers

Rulers can device an educational policy giving due share to blended learning through programmes like NMEICT (National Mission of Education through Information and Communication Technology).

As per the daily “The Hindu” dated May 01, 2011, The Global Information Technology Report 2010-11 released by the world economic forum and the business school INSEAD, India has slipped five places in the network readiness index rankings of countries. The rankings assess the “conduciveness of national environments for ICT development and diffusion, including the broad business climate” regulatory aspects, the human and hard infrastructure needed for promotion, the degree of preparation for and interest in using ICT by key stake holders and the extent of its use by them.

India has lost ground in most of the “readiness” component of the index, which is made up of individual, business and government readiness subcomponents. The country’s position in readiness slipped to 33 overall from 22 last year (2009-10), the fall being the steepest in the individual readiness parameters, which include quality of the education system, adult literacy and tariff for fixed phone and fixed broadband internet, among others. Yet, the report notes India’s rank of 21 in the individual readiness sub component is impressive. “Government readiness is still high (47th), but ICT seems to have become less of a priority since last year” it adds. It has also been ranked a competitive 33 in business readiness.
Table 6.1 – Network Readiness analysis

<table>
<thead>
<tr>
<th>Year (No. of economies)</th>
<th>India’s rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 - 2011 (138)</td>
<td>48</td>
</tr>
<tr>
<td>2009 – 2010 (133)</td>
<td>43</td>
</tr>
<tr>
<td>2008 - 2009 (134)</td>
<td>54</td>
</tr>
<tr>
<td>2007 - 2008 (127)</td>
<td>50</td>
</tr>
<tr>
<td>2006 – 2007 (122)</td>
<td>44</td>
</tr>
</tbody>
</table>

**Environment component**

<table>
<thead>
<tr>
<th></th>
<th>58</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market environment</td>
<td>41</td>
</tr>
<tr>
<td>Political and regulatory environment</td>
<td>52</td>
</tr>
<tr>
<td>Infrastructure environment</td>
<td>81</td>
</tr>
</tbody>
</table>

**Readiness component**

<table>
<thead>
<tr>
<th></th>
<th>33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual readiness</td>
<td>21</td>
</tr>
<tr>
<td>Business readiness</td>
<td>33</td>
</tr>
<tr>
<td>Government readiness</td>
<td>47</td>
</tr>
</tbody>
</table>

**Usage component**

<table>
<thead>
<tr>
<th></th>
<th>67</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual usage</td>
<td>98</td>
</tr>
<tr>
<td>Business usage</td>
<td>45</td>
</tr>
<tr>
<td>Government usage</td>
<td>47</td>
</tr>
</tbody>
</table>

**Primary source:** Global information technology report 2011 – released by World Economy Forum and the Business School INSEAD.

**Secondary source:** The Hindu dated May 01, 2011. (Tiruchirapalli edition)

Infrastructure remains an issue, with the country being ranked 58 overall in the environment component, with the infrastructure- environment parameters fetching it a lowly position of 81 – in relation to factors such as internet infrastructure and bandwidth, electricity production and percentage of population covered by the mobile network.
However, its performance has been viewed positively in the market environment sub component. Despite “wide-spread red tape and distortive taxes”, the market environment is assessed rather positively at 41st thanks to a sophisticated financial market, well-developed clusters, and the widespread availability of new technologies.

In the usage component, where the country has been ranked 67, the individual usage parameters have been ranked a poor 98 overall, with the mobile phone subscription to population ratio, percentage of households with computers and the internet and broadband users to population ratio weighing down the ranking, among other things. The report however stated that while internet access remained limited in India, mobile telephony “had been growing exponentially as a result of strong demand, increasing purchasing power, and also fierce competition and innovation that helped it improve network coverage and drive prices down.

In this scenario, in the individual readiness sub component India ranks 21st, where as in the individual usage sub component India stands 98th and in infrastructure environment sub component it ranks 81st. It clearly shows that the individuals are augmenting e quest with ICT readiness it is the duty of the rulers to quench the thirst of the aspiring population by providing right infrastructure in right time with required bandwidth. So it is strongly recommended that educational policy makers can think of providing 1GBPS connectivity to all higher educational institutions along with all necessary hardwares. It is also recommended that, the UNESCO’s mission of one child one lap top must be hastened to make information era a reality.
6.12 Conclusion

The learners are heterogeneous not homogeneous, there is diversity in the classroom climate because there are individual differences. Every case is a unique case. There are no forty students in the classroom, but forty individuals are in the classroom. There is knowledge explosion and population explosion resulting in over crowded classes. The modern teacher has to teach more to more. Individualization of instruction is a challenging task on the part of the teacher; this can be achieved only through supplementary devices based on educational technology. These strategies supplement teaching but not supplanting. Unified knowledge can be achieved through various methods of instruction; in this context e-learning occupies the unique place as personal computers have become a part and parcel of family life. In the ancient guru Kula system the student went in search of the teacher, thanks to technological revolution the teacher goes to the drawing room of the learner as e tutor. These changes are not only inevitable but essentially useful.

Through Blended learning strategy science can be taught effectively. More and more new information with the support of modern electronic media can be passed to the learners easily. In the information era ocean of information can not replace the teacher and his personal influence in the mind of the learner. In this method the teacher is having face to face interaction and gives guidance about the veracity of the content to ensure right learning to take place through self motivated learners. Though the groups in the study are homogenous, the difference in mean score and standard deviation will stand testimony to the fact that, Blended Learning strategy is superior to conventional lecture method of teaching. There seems to be no doubt that auto instructional strategies are
supplementary as well as main process of learning. Teaching is replaced by learning, ultimately leading to self learning. Blended learning strategy not only increases the achievement it also improves the e quest of the learners to become the active seekers of scientific temper. It also enhances the young teachers ICT readiness to play a purposeful role in the dynamic world of learning. Thus blended learning strategy today is the panacea to heal all our learning ailments. This instructional strategy is applicable to all disciplines of engineering, medicine and humanities besides teacher education.

6.13 Scope for further study

The present study entitled “Development, Validation and Effectiveness of Blended Learning Modules on Teaching of Science at B.Ed. level” is an investigation at B.Ed. level. It is suggested that further studies may be conducted in the following areas.

1. It is suggested that experimental study on blended learning strategy can be carried out in optional subjects like Language, Mathematics, Commerce, Economics, History and Geography of B.Ed. curriculum.

2. It is suggested that the same study can be carried out in core and elective subjects of B.Ed. curriculum.

3. It is suggested that the same study can be carried out in optional, core and elective subjects of other teacher education programmes like, D.T.Ed., M.Ed. and special education.

4. Blended learning strategy with reference to e quest and ICT readiness at various levels on various subjects like, Agriculture, Engineering, Medicine and Law can be studied.
5. It is suggested that influence of other variables than the ones now studied can also be investigated.

6. Efforts may be taken to develop and validate modules on all possible topics to develop a “Blendosphere”.