

EFFICACY OF BLOG BASED LEARNING (BBL) IN PHYSICS

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ABSTRACT:

Blog provides opportunities for students to learn autonomously as they take more control of their learning and it enables teachers to augment instruction by providing effective teaching and learning platforms. This experimental study explores the efficacy of Blog based learning by adopting pre-test, post-test parallel-group design. The researcher has chosen eighty eleventh standard students as a sample from a Matriculation Higher Secondary School in Coimbatore. During the experimentation for the control group, the conventional method of teaching followed whereas, for the experimental group Blog based learning was adopted. The content taken for learning was the concept of Gravitation and Space Science from the eleventh standard Physics textbook of the Tamilnadu state board syllabus. The post-test was administered for both control and experimental groups at end of the treatment. After one-month gap, the retention test was administered for both groups to know the memory retention of the learner. The collected data were analyzed by descriptive and differential statistics. In this study, the students learned Physics effectively through Blog based learning rather than the conventional method of teaching.

Keywords: Blog based learning, Edu-blog, Weblog, Retention, Achievement in Physics.

1 Introduction

The rapid development in information and communication technology (ICT) has led to the emergence of computers, multimedia, e-mail, the internet, Blog and so on. The advanced technology has now enabled the learners of flexible learning to stimulate virtual learning and take the learners to the virtual situation where interaction occurs between teacher and student. Student-centred teaching-learning is a flexible one; it provides high-quality education and ensures equity in educational opportunities, especially to the marginalized people of the society. Internet technologies act as a vehicle for delivering knowledge and creating active learning experiences. Innovation in Technology ensures a better teaching-learning process by which students can acquire every domain of knowledge. One of the technological innovations is a blog that can be effective teaching utilized for the learning process. When a blog is utilized as a platform for learning it is referred to as blog-based learning. In this paper, an attempt has been made to find out the efficacy of blog-based learning in physics.

1.1 Blog Based Learning

The blog is an innovative reorientation of the World Wide Web and becoming one of the newest additions in the rally of technological developments in this digital age. It helps not only the common people but also extends its service into the education field. Bruns and Jacobs (2006) emphasized that blogs evolved to become a popular and influential form of online micro-publishing and computer-mediated communication. Learning takes place in various ways viz. audio, video, multimedia, animation etc. A blog is a tool that provides an effective teaching-learning platform and makes the teaching-learning process simple, hurdle-free and affordable. Williams and Jacobs (2004) suggested that blogging is a transformational technology for teaching and learning. In this research, Blog based learning (BBL) is referred to learning activity occurring through Blogs by the learner from anywhere at any time. Blog based learning (BBL) can reach every nook and corner of society. Students can access materials and resources required for their studies from their dwelling place itself through Blogs with the help of the internet. Multimedia based learning materials can be posted on the Blog by the instructor. When the students learn through various sense organs (like the eye, ear) the memory retention can remain longer. In the Blog based learning method, the role of the teacher is mere facilitator or mentor. The learner can actively participate in the learning process while accessing the Blog materials. Moreover, learners can clarify their doubts through the Blog itself. This kind of educational Blogs (Edublogs) enrich the content clarity of the subject.

1.2 Significance of the Study

In the present age of digital proliferation, the students are learning through Internet; by which students get concept clarity and curiosity to learn and thereby the retention level is increased. Now with the help of the internet, Blog is also utilized for the teaching-learning process. Learning through a Blog is an active and engaged process. Students can use Blogs to record what they learn, and teachers can use Blogs to record what they teach. Nowadays students are very curious to use technological devices for learning with the help of the internet. Since students are familiar with technology, Blog based learning (BBL) is the need of the hour. In Blog based learning (BBL), learners can quickly catch up if they miss a class. A blog can also be used to record class excursions, field trips and to create electronic "scrapbooks" of student life. Therefore, Blog is useful for co-curricular and extra-curricular activities also. Blogs could be used to motivate students to do more reading and encourage them to improve their values. It is indispensable to adopt teaching-learning methods based on the blog based learning in the education sector for inculcating good values and developing reading skills (Vimal Kumar and Sivakumar, 2013). Blogs can also be used to bring out the diversity in the classrooms, in terms of learning styles and individual preferences.

Farmer, Yue and Brooks (2007) claimed that blogging is a helpful practice for the development of higher-order learning skills, active learner-centred pedagogy. This Blog based learning (BBL), Promotes Creativity, Intuitive and Associational thinking. Moreover, it has the potential for increased access and exposure to quality information. In Blog based learning (BBL), social interaction is possible. Additionally, there is a possibility to link one's classroom with another classroom somewhere else in the world. It is the way to open for communicates with Bloggers outside the classroom (Pinkman, 2005). This technology enables the learner to learn at anytime from anywhere, time and space will not be a constraint. The blog is not only useful for students but useful for teachers also. Through the Blog itself, a teacher can post students' homework and assignments. Studies published include research on Blogging's effect on learner autonomy, increasing writing fluency, as a place for completing writing assignments (Ward, 2004; Wu, 2005). So without a classroom, learning can occur effectively. Thus, it is user friendly and flexible, providing a learner-centred environment. All these technological advantages should be utilized in the teaching and learning process. In Physics, some concepts are difficult to comprehend and solving problems are also difficult for the students at higher secondary levels. Most of the students are not even able to attend the problems in physics in their school examinations and other competitive examinations conducted by various bodies. Through the Blog based learning (BBL) approach, Physics concepts can clearly be explained with effective animations and graphics. Thus, Blog based learning (BBL) would be effective for learning physics in terms of achievement and retention.

1.3 Previous Studies

Research studies in blog-based learning indicate that there is a research gap in learning domain-specific subjects like physics. Many studies have been conducted on learning foreign languages through blogs (Onuma Lakaranchua & Punchalee Wasanasomsithi, 2013). Whereas, for the science subject, more specifically for Biology, Physics and Computer Science only a few studies have been carried out (Mudasiru Olalere Yusuf & Adedeji Olufemi Afolabi, 2010; Vimalkumar, 2010; Tlili A Essalmi & Jemni, 2016). As for as Teacher Education is concerned many research studies in blog-based learning have been investigated to find out the effectiveness (Enas S. Abulibdeh, 2013; Sumathi & Krishnakumar, 2013; Nugraha & Eliyawati, 2019; Senturic, 2021). It has also been found that less focus on emerging issues in the utilization of blogs and to ascertain the reactions of the students towards the student-centred learning mode (Shirley Ayao Ao, 2014; Mai Neo & Ken Neo Tse Kian, 2003). About qualitative studies on blog-based learning, less emphasis is witnessed when compared to qualitative studies. Moreover, studies reported that more than half of blog users are female (Henning et al., 2004); most of their content was journal-type researches.

Many research works have been carried out on social relationships. For instance, Samad, Nilashi & Ibrahim (2019) investigated a study related to social networking found that social presence, academic performance and students' social wellbeing are shown a positive relationship. Blogging helps to maintain effective relationships with others (Schmidt, 2007). It has been identified that a blog is a platform of discussion related to common or pro-social behaviours such as class assignments, hanging out with friends or organizing an event such as dance, singing etc. It assists in connecting with friends more quickly and helps to relieve social anxiety by expressing thoughts and emotions (Lenhart & Fox, 2008); based on social networking help make new friends (Huffaker, 2010). It also increases the opportunity for interaction with different people (Liou & Peng, 2009); a tool to develop group discussions (Cuhadar & Kuzu, 2010); encourage interaction between students and teachers in classroom settings (Hazel Hall & Davison, 2007); and develop adequate coping strategies (Tan et al., 2012). Most of the studies supported blog based learning but Dorota Domalewska (2014) revealed that limited interactions between bloggers were reported. This investigation indicates the restricted use of the blog to promote collaboration in the foreign language classroom.

1.4 Objectives of the Study

The main objective of the study is to explore the efficacy of Blog based learning (BBL) in Physics achievement scores at the higher secondary level. Further, the specific objectives are as follows:

1. To find out the significance of the difference between pre-test mean scores of control and experimental groups.
2. To find out whether there is any significant difference between post-test mean scores of control and experimental groups.
3. To find out the effectiveness of Blog based learning based on the Physics retention test scores at the higher secondary level.

1.5 Hypotheses of the Study

Based on the above-mentioned objectives the following null hypotheses have been formulated.

1. There exists no significant difference between the pre-test mean scores of the control group and the experimental group.
2. There exists no significant difference between the post-test mean scores of the control group and the experimental group.
3. There exists no significant difference between retention test mean scores of the control group and experimental group.
4. There exists no significant difference in the post-test mean scores of the experimental group in terms of gender.

2 Methodologies

To explore the efficacy of Blog based learning in the academic achievement of Physics, the researcher adopted an experimental research method. Specifically, a quasi-experimental design pre-test post-test parallel group design was followed in this study. Hence, it involves two equivalent groups, namely the control group and the experimental group. These groups were equated as nearly as possible.

2.1 Variables of the Study

The independent variable in this study is Blog based on learning and the dependent variables are academic achievement and retention.

2.2 Sample for the Study

The researcher has chosen a Matriculation Higher Secondary School in Coimbatore as a sample school for the present study by using the purposive sampling technique. A total sample of 80 students out of 96 students from Biology and Computer science groups. Both groups were selected as samples of the study based on their previous examination marks and formed a homogenous group. Using a simple random sampling technique, samples were divided into two equal groups named control and experimental groups and each group consisted of forty students. The control group was exposed to the conventional method and the experimental group was through blog-based learning

2.3 Research Tools

The following tools are used to collect the data for the present study;

- i. Blog developed and validated by the investigator for learning Physics for the unit 'Gravitation and Space science' from the eleventh standard Physics textbook of Tamil Nadu State Board syllabus.
- ii. Achievement test prepared and validated by the investigator.

2.4 Development of Blog Based Learning (BBL)

The development of Blog in the present study includes the following steps;

1. The investigator selected a free Blogging site, wordpress.com and developed a Blog account by using an e-mail ID.
2. After developing a Blog, the investigator opened the Blog and Named it 'VIMALRESEARCH'
3. After naming the Blog, the researcher has chosen a suitable template and designed the layout suitable for the study.
4. The investigator embedded title, information, images and other multimedia elements in the Blog for research convenience.
5. Fourteen Lesson chunks were developed and embedded in the Blog.
6. The investigator published the Blog with a web address or URL address as 'vimalresearch.wordpress.com'.
7. Finally, the Blog was created successfully.

The blog has navigation for 'HOME', 'ABOUT ME', 'GUIDES PROFILE', and 'LESSONS'. The interface of the Home page and Lesson pages are presented in the following figure no. 1, 2, 3, and 4.

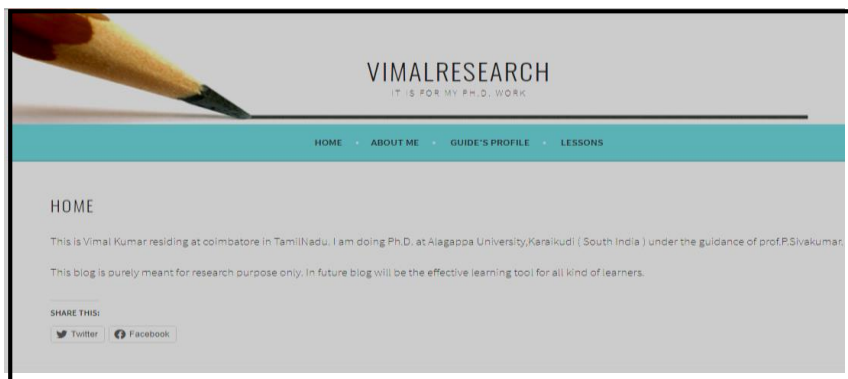


Figure:1 Interface of the Home page

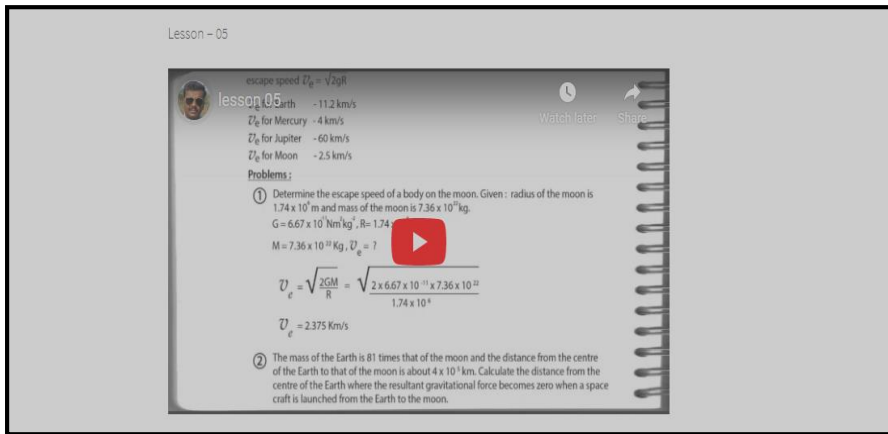


Figure: 2 Interface of the Lesson page

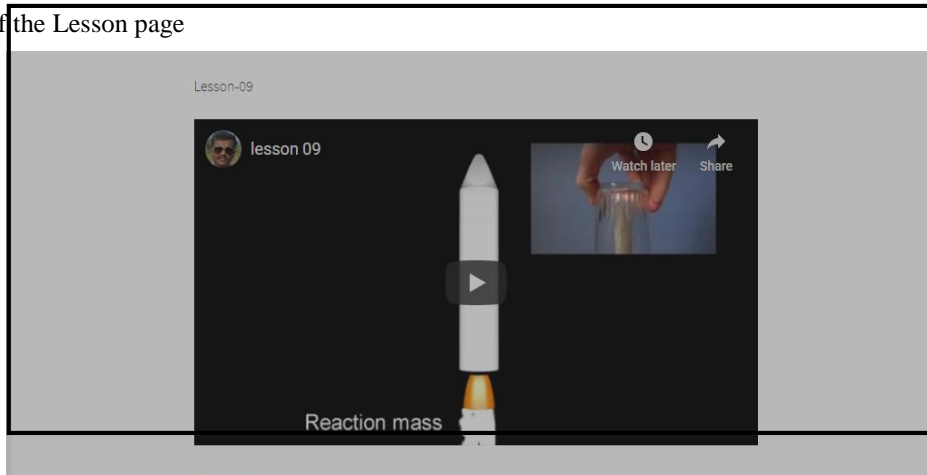


Figure: 3 Interface of the Lesson page

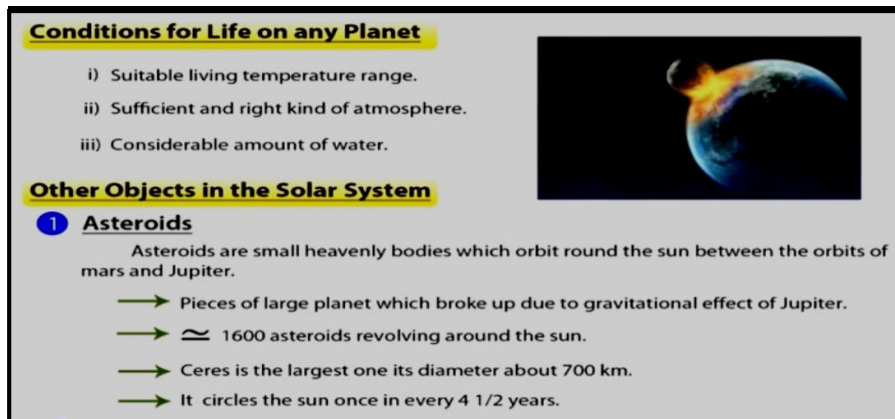


Figure: 4 Interface of the Lesson page

2.5 Data Collection

After the development of the tool, the investigator administered the achievement test for both control and experimental groups. The conventional method of teaching was followed for the control group. Whereas for the experimental group, Blog based learning was adopted. Before starting the experimentation, a pre-test was conducted for both control and experimental groups. After completion of treatment, a post-test was conducted for both control and experimental groups. After one month gap, a retention test was conducted for both groups to find out the retention level of the learner.

2.6 Data Analysis

In the present investigation, various appropriate statistical techniques are used to analyze the collected data. The main objectives of the data analysis are to find out the efficacy of Blog based learning in Physics. The investigator used descriptive statistics (Mean & S.D.) and differential statistics ('t' - test) to determine the effectiveness of Blog based learning.

3.0 Results

3.1 Quantitative Analysis

H₀₁: There exists no significant difference between the pre-test mean scores of the control group and the experimental group.

Table 1 Significant difference between pre-test mean scores of the control group and experimental group

Group	N	Mean	SD	t-value
Control	40	38.80	5.140	
Experimental	40	39.05	5.818	0.214*

● - Not Significant at 0.05 level

As presented in table no 1, the pre-test mean score is found to be 38.80 for the control group (N=40) with a standard deviation of 5.140. For the experimental group (N=40), the mean score is 39.05 and the standard deviation is 5.818. The computed t-value 0.214 was smaller than the table value 1.96 at 0.05 level of significance. Therefore, the stated null hypothesis is accepted. Hence, it is inferred that there is no significant difference between the pre-test mean scores of the control group and the experimental group.

H₀₂: There exists no significant difference between the post-test mean scores of the control group and the experimental group.

Table 2 Significant difference between post-test mean scores of the control group and experimental group

Group	N	Mean	SD	t-value
Control	40	59.65	5.868	
Experimental	40	82.85	6.546	18.901**

** - Significant at 0.01 level

Table no. 2 reveals, the post-test mean score is found to be 59.65 for the control group (N=40) with a standard deviation of 5.868. For the experimental group (N=40), the post-test mean score is 82.85 and the standard deviation is 6.546. The calculated t-value of 18.901 was greater than the table value 2.36 at 0.01 level of significance. Hence, the stated null hypothesis is rejected. Thus, it is inferred that there is a significant difference between the post-test mean scores of the control group and the experimental group.

H₀₃: There exists no significant difference between retention test mean scores of the control group and experimental group.

Table 3: Significant difference between retention test mean scores of the control group and experimental group

Group	N	Mean	SD	t-value
Control	40	44.23	4.376	
Experimental	40	78.53	5.983	34.099**

** - Significant at 0.01 level

From table No. 3, the retention test mean score is found to be 44.23 for the control group (N=40) with a standard deviation of 4.376. For the experimental group (N=40), the retention test mean score is 78.53 and the standard deviation is 5.983. The computed t-value 34.099 is greater than the table value 2.36 at 0.01 level of significance. Therefore, the stated null hypothesis is rejected. Hence, it is found that there is a significant difference between the retention test mean score of the control group and the experimental group.

H₀₄- There exists no significant difference in the post-test mean scores of the experimental group in terms of gender.

Table 4 Significant difference in the post-test mean scores of the experimental group in terms of gender

Variable	N	Mean	SD	t-value
Male	19	81.37	6.002	
Female	21	84.19	6.867	1.377*

*- Not significant at 0.05 level

As presented in table No. 4, the post-test mean score of male students belonging to the experimental group (N=19) is 81.37 with a standard deviation of 6.002. The post-test mean score of female students belonging to the experimental group (N=21) is 84.19 with a standard deviation of 6.867. The computed t-value 1.377 is smaller than the table value 1.96 at 0.05 level of significance.

Therefore, the stated null hypothesis is accepted. Hence, it is inferred that there is no significant difference in the post-test mean scores of the experimental group in terms of gender.

4.0 Discussion

- ❖ From table no 1, it is evident that the difference between pre-tests scores of control and experimental groups are not significant. It is concluded that the pre-test scores of the control group and experimental group exhibited the same level and the homogeneity of the groups was ensured at the beginning of the treatments. The same results are seen in the studies of Prabha S. Chiniwar (2013), Sumathi (2013), Selvakumar, Sivakumar, & Daphine (2020) while found homogeneity.
- ❖ It is evident from table no 2, post-test mean score of the experimental group is higher than the post-test mean score control group. The finding shows that Blog based learning (BBL) is more effective than the conventional method of teaching physics. It is supported by technology-related studies made by Shazli Hasan Khan (2016), Anitha and Premalatha (2016), Dipanshu Sharma (2016), Sivakumar and Selvakumar (2017 & 2019).
- ❖ From table 3, the result of the retention score shows a significant difference between the control and experimental groups. This analysis reveals that the latter group has high retention score than the former group. The finding reveals that Blog based learning has high memory retention than the conventional method of teaching at the higher secondary level. This finding is consistent with technology-related research findings made by Praveen Dhar (2013), Megha M. Uplaneet, et.al., (2011), Selvakumar and Sivakumar (2019).
- ❖ From table 4, it has been found that there is no significance of the difference between post-test scores of the experimental group with regard to gender in learning Physics at the Higher secondary level. Hence the post-test scores of male and female students belonging to an experimental group show more or less similar levels in learning physics. The finding shows that the Blog based learning did not significantly influence by the sub variable gender. This finding is supported by the technology-related study made by Sivakumar and Selvakumar (2019).

4.1 Recommendations of the Study

The following are the recommendations given by the investigators based on the insight gained from the present study;

- ❖ In this present study, students learned Physics effectively through Blog based learning than the conventional method of teaching. The effectiveness of Blog based learning has been established without any doubt. Hence, the newer instructional technology using Blog based learning can be introduced at the higher secondary level.
- ❖ The higher secondary students learned Physics through Blogs and conventional methods. In this study, the investigator identified that the achievement scores and retention scores are high for students who are learned through Blog than the conventional method. Since the Blog is an effective tool for the teaching-learning process to enrich the achievement level in Physics, the administrative authorities of school education may provide proper guidance for the school teachers to develop a Blog for teaching and learning.
- ❖ In-service training programmes on developing Blogs for school teachers should be organised at the regional level by the School Education Department. They may also conduct workshops on the development and usage of Learning Blogs for students.
- ❖ The authorities of school education may take an initiative to create school Blogs for the interaction of students with teachers. Similarly, teachers' Blog may be created for discussion of teachers among themselves.
- ❖ The Tamil Nadu Teacher Education University (TNTEU) should include in their curriculum, Blogs as a compulsory component under the practical stream and hence, the pre-service teachers may be well acquainted with learning Blogs.

4.2 Conclusion

The rapidly changing global technology plays an important role to ensure the effective teaching and learning process. Blog based learning has been implemented successfully in developed countries. In India, both the teacher and students should be given adequate training to utilize the Blog based learning process. The curriculum should be revamped in order to incorporate this new strategy in the teaching and learning process. In this study, the students learned Physics effectively through Blog and hence Blog Based Learning (BBL) could be effectively used in the teaching and learning process. This would enrich the conceptual clarity of the subject at anytime from anywhere.

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