The Effect of Using Mobile App Mediated Self Learning on the Academic Achievement of 11th Grade Science Students

***Divya Nair**

**Assistant Professor, School of Education and Research, MIT ADT University, Pune, India*

Abstract

Self mediated studies regulated by one's own interest and likings have proved to be beneficial in the long run. By taking this into consideration, this study, made use of the mobile app technology to generate curiosity and sustain the interest levels of the students in their academic study. The aim of this research was to check the effectiveness of mobile app mediated self learning on the academic achievement levels of the students. For this purpose, the freely available educational app Robomate+ was selected. Two Equivalent Groups Post- Test Design was the experimental design used. 56 eleventh grade students belonging to the science stream of a junior college, based in Pune city participated in this study. Purposive and convenient sampling methods were used for this selection. One unit of Chemistry was taught to the control group using the traditional methodology whereas the experimental group was trained by using the Robomate+ app. After the training period an achievement test was administered to both the groups. The analysis of the results was done through t-test. Feedback was also taken from the students. The mobile app mediated strategy was found to be successful as indicated by the statistical analysis and the feedback results.

Keywords: *Mobile app, self mediated studies, academic achievement, Robomate+*

1. Introduction

Mobile and its applications are extremely popular among a variety of generations. However, it won't be wrong to state that the familiarity and comfort level of using smart phones or tablets is inversely proportional with age. The younger generations utilize most of their time with this technology based friend of theirs as it provides them with a range of opportunities that they can explore. Right from music, games, movies, shopping, tourism, social media, and education up to the latest news everything is available in a precise form through the mobile technology. If the power and reach of educational apps are used in a proper direction then the actual implementation of active learning among the student population might also take place. This study focuses on this direction and herein lays the importance of this research.

2. Educational App Selection

Robomate+ app was used in this study. This app is freely available at Play store and has all the essential study materials as per the Maharashtra State Board requirement. Interactive videos, detailed study material, different forms of evaluation and training are the key features of this app. The student can understand the concepts at their own pace through this app as they can revisit the same topic multiple times as per their convenience. Thus, Robomate+ had all the features as per the present research requirements.

3. Research Questions

- Whether achievement in science can be increased through mobile app mediated learning program?
- Whether there is a difference between science achievements of students after implementation of the mobile app mediated learning program?

4. Objectives of the Research

- To study the effectiveness of mobile app mediated learning program on the science achievement of 11^{th} standard students.
- To compare the effectiveness of mobile mediated learning program with traditional teaching.

5. Operational Definitions

For the purpose of research the following terms were operationally defined.

- Mobile app mediated learning: It refers to the learning occurred through Robomate+ app by the 11^{th} standard students of the present study
- Effectiveness: It is the significant increase in the mean score of the achievement of 11^{th} standard science students after the implementation of the mobile app mediated learning program.
- Achievement: It is the performance of the 11^{th} standard science students in relation to the knowledge which has been acquired as a result of the Robomate+ program training.
- Science achievement test: Science achievement was measured through performance of the students in the science test developed by the researcher. In the present study achievement in science subject was measured in terms of scores

obtained by the students in the achievement test in science subject prepared by the researcher.

6. Hypothesis

6.1. Null hypothesis

There will be no significant difference at 0.01 level between the mean scores of science achievement of students trained through mobile app mediated learning and the students taught through traditional teaching.

6.2. Research hypothesis

There will be a significant difference between the achievement levels of post-test mean scores of the students in the experimental group and the students in the control group as a result of the mobile app mediated learning.

7. Research Methodology

In the present research, Two Equivalent Groups Post- Test Design was used. 56 students belonging to an English medium junior college of Pune participated in this study. 28 students were part of the experimental group whereas the remaining 28 constituted the control group. Both the groups were matched in terms of their achievement levels in Chemistry subject before the implementation of the program. Purposive and convenient sampling was employed as the sampling techniques. Purposive sampling was taken into consideration because the students were supposed to use the smartphones for the learning program and most of the schools do not allow the students to carry or use smartphones. Hence, it would have been practically impossible to carry out the research in schools. Therefore purposefully the researcher went ahead with the 11^{th} grade college students as there were high chances of these students using smart phones. Convenient sampling was taken into consideration because most of the colleges were not ready to co-operate with the researcher in terms of the data collection process. Hence, the researcher decided to collect data from the sources that were conveniently available and were willing to extend their cooperation in the research. The researcher started by providing a demonstration of the Robomate+ app to the experimental group. The elements and features of the app were demonstrated by the researcher to the students. The queries of the students were also resolved by the researcher. The researcher used to visit the experimental group students on a regular basis to ensure that the students were using the Robomate+ app for self learning purpose for the unit “Some Basic Concepts of Chemistry”. The Chemistry teacher of the junior college was conducting the teaching of the same unit “Some Basic Concepts of Chemistry” using traditional teaching method simultaneously on the control group. After the

training period was over, both the groups were given a time period of 15 days to prepare for the test. A 35 marks achievement test was administered to both the groups at the same time on the pre-decided time. The achievement test was a combination of objective type and essay type tests. A feedback was also taken from the experimental group at the end of the program.

8. Data Analysis

8.1. Statistical Analysis

In order to ensure that the results obtained would be due to the implemented program and not due to the in-built intelligence of the students the researcher conducted a matching test of the experimental and control groups. The matching test was entirely a MCQ test based on the chemistry topics of grade X, Maharashtra State Board syllabus. The mean and standard deviations of the two groups is indicated in Table 1.

Table 1: Equating the groups by means and standard deviation

For equating the groups	
Experimental group	**Control group**
Mean = 26.03	Mean =26.42
Standard deviation = 11.10	Standard deviation = 11.57

Science achievement was measured after the experiment, by a test developed by researcher. The scores of the 11^{th} grade students on the post test were computed. The means and standard deviations of scores on posttest of both the experimental and the control group are detailed out in Table 2.

Table 2: Comparison of mean scores of control group and experimental group

Details	Post test	
	Control group (N=28)	**Experimental group (N=28)**
Mean	19.44	23.03
Standard deviation	7.32	7.91

The results show that means of control group and experimental group are not equivalent. It can be observed that mean score of experimental group of post test is more as compared to mean score of control group. In order to observe at a glance the difference between the obtained scores of experimental group and control group the scores are represented graphically. The details of this are provided in Figure 1.

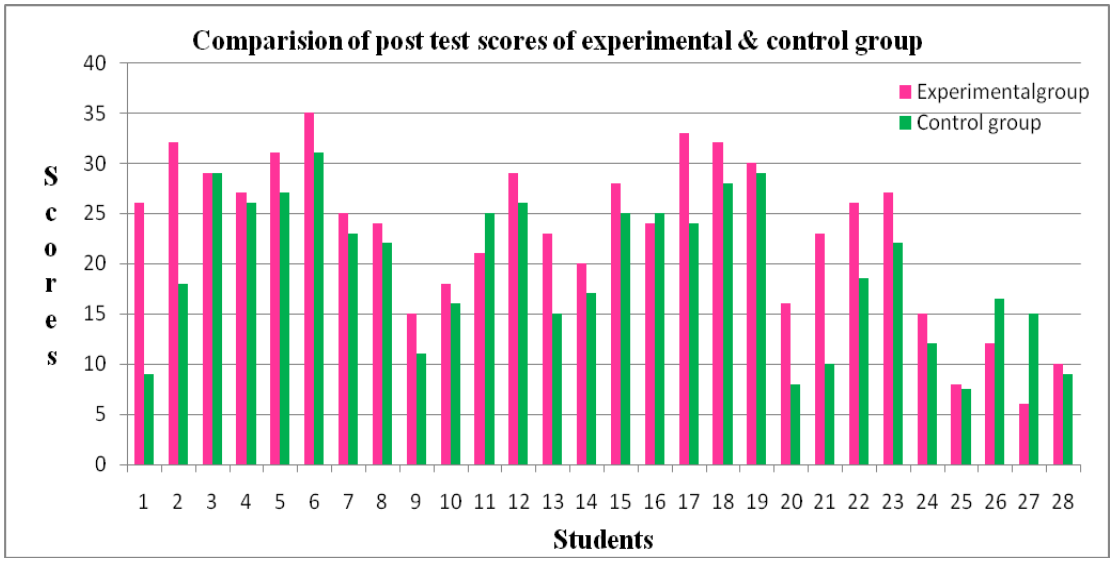

Figure 1: Raw scores of control group and experimental group on post test of science.

Both the groups had an equivalent mean score regarding science scores during the matching equivalent test conducted before implementation of the mobile app mediated program. Both the groups had received similar science concepts training with regards to the unit selected. The only difference was that the control group had received the training from regular traditional teaching from the college and the experimental group received the training through Robomate+ app. Therefore, it can be said that the increase in scores of experimental group on the science achievement is due to the mobile app mediated program implemented by the researcher.

In order to determine the statistical significance of difference between two means "t test" was used to analyze the data of the study. To determine the significance of difference between means obtained on post test scores it was necessary to calculate mean and standard deviation. Computation of correlation between scores obtained on post test of both control and experimental groups was done by Pearson product moment method. Results are summarized in Table 3.

Table 3: Summary of "t testing" to find out difference between mean scores of experimental and control groups

Post test	Mean	N	Std. deviation	Coefficient of correlation	(df)	t value	Significance level
Control group	19	28	7.32	0.74	27	3.84	Significant at 0.01 level
Experimental group	23	28	7.91		27		

The t value in the C table for df 27 is 2.77 at 0.01 level of significance for two tailed test. The obtained value 3.84 was greater than table value of 2.77, which was significant. Therefore null hypothesis was rejected and research hypothesis was accepted. The post test mean score of experimental group on science achievement were significantly higher as compared to those of the control group. On the basis of statistical analysis of data, it can be stated that the science achievement mean score of experimental group was found to be significantly higher than mean score of control group. Hence, it can be said that the program implemented by the researcher was effective to enrich the science achievement of 11th standard students.

8.2. Analysis Based on Feedback Form Filled by Students

To know the effect of mobile app mediated learning program questionnaire of six simple questions was used. All the students from the experimental group were given to fill the feedback form. The feedback form of the students was analyzed by percent analysis method. It was concluded that students enjoyed learning through the mobile app mediated learning program method. Details of the same are indicated in Table 4.

Table 4: Analysis of the students' feedback

Question	**Yes %**	**No%**
Did you like the implemented program?	100	–
Did you find studying through the mobile app useful?	100	–
Would you like to learn all the science lessons through the app?	100	–

	Average%	**Good%**	**Very good%**	**Excellent%**
How would you rate the mobile app Robomate+?	–	17.85	39.28	42.85

	Video lectures%	**Test series %**	**Online support**	**Any other, please specify**
What was the most interesting or beneficial aspect of the app?	92.85	3.5	3.5	–

	1-2 hrs	**3-4 hrs**	**More**
How much time did you allot while studying through the app?	39.28	57.14	3.57

9. Conclusion

The statistical results of the present study confirmed that the mobile app mediated learning program was effective for developing science achievement in the students. The 11th standard students get the learning experiences mostly from school or tuition centres. In both the cases mostly the traditional method of teaching is preferred. The present program provided the opportunity to develop science achievement following the principles of self paced learning through the mobile app mediated learning program. The effectiveness of the program was due to inclusion of appropriate content and concepts delivered to students through a variety of tools like videos, test series, online support etc. that were present in the Robomate + app. These tools were fruitful to enrich their thinking, understanding capacity and science achievement. When the findings of the achievement in science of 11th standard students of the present study were examined, it was seen that experimental group has effect due to the mobile app mediated learning program as compared to the traditional teaching to control group. The findings concur with the other studies. From the responses obtained through the feedback forms it can be concluded that students enjoyed learning through the mobile app mediated learning program method.

10. Contributions to the Field of Education

- This study showed that mobile app mediated learning increases students' academic achievement in science course and this method should be used in the regular teaching of the subject.
- The present study contributes in bringing about social acceptance to learning through mobile technology by yielding positive results in the students' academic performance who have been trained through the mobile apps. Thus, this study can bring about a positive change in the perspectives of the school authorities, teachers and parents who are still hesitant of utilizing the changing technological aspects for the teaching learning process.
- This research program will contribute to curriculum development for educationist for reforming and developing the curriculum as per the new technological advancements.
- This program will be useful for the parents to develop the science abilities of their children by encouraging them to study through educational mobile apps.
- This program will be beneficial for the slow learners to develop and internalize difficult concepts that they aren't able to understand in the traditional teaching learning environment by allowing them to visit the unclarified concepts as many times as they wish and thus will allow self paced learning of the students by using mobile apps.
- The present study can encourage the teachers to develop their own personalized educational apps for their respective subjects for bettering the overall teaching learning process.

- The feedback obtained from the students indicated that they liked studying through the mobile app. By taking the responses obtained in this study into consideration the teachers can use mobile apps for gaining the attention of the students and to motivate them into studying the subjects wherein they are least interested in.
- Probably, the present research is the first of its kind to be carried out in India. Hence, this study provides the perfect base for encouraging further researches in the field of mobile app mediated learning in the Indian context.

References

11.1. Journal Article

[1] *Morris N., "Podcasts and mobile assessment enhance student learning experience and academic performance." Bioscience Education, vol. 16, (2010), pp.1-7.*

[2] *Rezaei A., "The effect of mobile applications on English vocabulary acquisition." Jurnal Teknologi, vol. 68, (2014) pp.73-83*

[3] *Kuznekoff J., "Mobile phones in the classroom: examining the effects of texting, twitter, and message content on student learning." Communication Education, vol. 64, (2015), pp.344-365*

[4] *Barhoumi C., "The effectiveness of whatsapp mobile learning activities guided by activity theory on students' knowledge management." Contemporary Educational Technology, vol. 6, (2015), pp.221-238.*

[5] *Webb J., "Location-based mobile phone applications for increasing student engagement with field-based extra-curricular activities." Planet, vol. 27, (2015), pp.29-34.*