

Effectiveness of Computer-Assisted instruction in the development of Study Habits in relation to the Gender, Locality and Socio-Economic Status of Secondary School Students.

Dr. Jagannath K. Dange
Asst. Professor,
Department of P.G. Studies and Research in Education
Kuvempu University, Shankaraghatta-577451, 91 (0)08282 256301
Shimoga, Karnataka, India
jkdange@gmail.com

Abstract: The purpose of this study was to find out the effectiveness of Computer-Assisted Instruction in the development of Study Habits in relation to Gender, Locality and Socio-Economic Status of Secondary School Students. Pre-test, post-test parallel group experimental design was followed and Purposive sampling technique was used to form thirty students each control and Experimental groups. Standard Progressive Matrices [SPM] by Raven.J.C [1988] and Test for Higher Mental Ability in Science (THMAS) by Sansanwal and Anuradha Joshi (1989) were administered to make parallel groups. Computer Assisted Instruction package was developed on IX Science content and same used for experimentation. Study Habit Inventory by Sansanwal and Mukhopadhaya [1992] was used to assess the Study habits of IX standard students. The t- test and Two-Way Analysis of Variance were used to analyze the obtained data. The result showed that Computer assisted instruction was more effective than conventional method of teaching science in developing Study habits among students. Significant effect of Gender, Locality and Socio-Economic Status was not found on the development of Study habits when students learnt through Computer Assisted instruction.

Key words: *Study habits; Computer Assisted Instruction.*

I. Introduction

In the present era computers are used in the classroom as a support system to improve the teaching learning process. It also possible to use the computers to reach new skills or concepts, give remedial teaching, provide for enrichment of learning, development of habits, promote scientific attitude, creative thinking and problem solving etc. all these aspects together have been emphasized in the National Policy on Education, 1986[31]. There is clear and widespread agreement among the public and educators that all students need to be proficient computer users or “computer literate”. However, while Governments are spending great deal of money on technology, there seems to be only a vague notion of what computer well enough to play a game, send e-mail or surfing the Web be considered computer literate? Will a student who uses computers in school only for running tutorials or an integrated learning system have the skills necessary to survive in our society? Will the ability to do basic word processing be sufficient for students entering the workplace or post-secondary education? [3].

Information delivery in classroom settings continues to rely on the lecture format as the dominant teaching approach because it is efficient in providing students with large amounts of information in short amounts of time. Students, however, become quickly disengaged when educators do most of the talking and do not allow them to actively participate in the classroom teaching [28]. The Computer-assisted instructional teaching methods suggest that individual learning with the help of computer is more useful than conventional method of teaching science in terms of improving academic achievement. This finding

is in agreement with the findings of the studies [9], [6, 38, 35, 33, 10] concluded that Computer assisted instruction is effective in the development of academic achievement in different subjects. [3], [7, 13] Support the idea that Computer Assisted Instructional Method of teaching is useful in developing study habits. The studies reveal that, there is no difference in the gender when they exposed to learn through Computer Assisted Instruction. The achievement of urban students is better than the achievement of rural students when both the groups were exposed to video assisted instruction [2],[19,10,30], the studies say that some have got findings in favour of no difference in study habits of boys and girls. The same kind of another study [16] says that there is a difference between boys and girls study habits and study habit is key element in the academic achievement. Urban students had better study habits than rural students.

One of the study [18] suggests that a number of questions remain open for investigation, but this summary of results from the beginning of CALL indicate that pedagogical options that computer technology offers language learners are worthy of further investigation. Perhaps more important for educational decision-making today, the overall results did not indicate that CALL was inferior to classroom conditions. The other study [26] finds that the students who were exposed to CAI with *Frizbi Mathematics 4* significantly outperformed students who were exposed to TI on the mathematics achievement posttests in all of the treatment units. Further [2] the findings of the study revealed that the computer-based environment enabled the participants to blind their identities and reduce their anxiety from face-to-face debate, and so was very helpful in developing their communication skills. The others [21] findings suggest that a tight integration of whole-class and technology-assisted instruction is preferable. Studies incorporating technology into the teaching of trigonometry, although sparse, have demonstrated positive effects on student achievement.

II. Need for the Study

The development and recognition of science as a subject in the educational curriculum gave an impetus to the process of defining the aims and objectives of science education. [4] Developed taxonomy of educational objectives consisting of three domains namely cognitive, psychomotor and affective. Many other educators and thinkers defined the objectives of science education. In particular, the development of scientific attitude was prominent among the objectives.

Teaching of science can justify its place in the curriculum only when it gives emphasis on certain important changes in your pupils, changes in their ways of thinking, in their habits of action and in the values they assign to what they have and what they do [21].The study of science imparts training in scientific method, which develops scientific attitude in their learners. These qualities viz., scientific attitude and study habits are major aspects in grasping and acquisition of knowledge in systematic way and to qualify an individual to live as an efficient citizen in the present day of scientific society [36].

Education for the 21st Century definitely needs a lot of re-thinking on modernization in the wake of increasing globalization and setting up of e-communities and readiness for e-commerce. The content and methodology of the present system of education must undergo a metamorphosis [2]. It is a challenging task to change the content and methodology of teaching particularly because of the ever-increasing number of students in our classrooms and lack of hardware and software. Nowadays, more and more schools are having computers at the higher secondary schools. Most of schools use computers to bring newness in teaching and learning by overcoming monotonous methods of teaching, to develop awareness, and basic skills to work with the systems through hands-on-experiences. Karnataka State government is already released instructional CD's of all subjects to implement in classroom teaching. The use of Computer Assisted Learning (CAL) in schools is gaining momentum.

Computer Assisted Instruction - as a Solution to the Problems of Indian Education. There is an extreme dearth of teachers and schools in our country. The shortage of teachers is becoming acute day by day. After the independence the number of children increased six times and that of teachers increased three and half times only if we see the statistical data provided by HRD. In our country nearly fifty-five lakh teachers spread over around and ten lakh schools are engaged in educating 2025 lakh children and the ratio of teachers and students is 1:30. [17].The teachers are much over-loaded with work that they cannot perform their teaching functions effectively. In addition to the growing students' population, there is explosion in the new knowledge to be learned and used. Particularly in the domain of sciences, these expanding sciences have created expanding technologies, which in turn necessitated increased education. To assist in this complex process, the teacher employs educational materials such as textbooks, workbook, homework etc. In all these aids the careful monitoring provided by the teacher's skill in shaping behavior is not provided. This shortcoming is overcome by use of individualized instructional material [22].

Computer Assisted Instruction method plays a significant role in improving academic achievement. Evidence strongly supports the use of Computer Assisted Instruction in place of teaching science through the conventional method (CM), [7], [23, 29, 25, 37, 18]. Another important study [34] found that CAI it can be possible to eliminate lingual, regional and ethical biases between teacher and student. It has been found that generally researchers considered school achievement to study the effectiveness of the Computer Assisted Instruction. Nevertheless, there is need to deviate from this traditional practice. Hence in the present investigation, the focus was shifted to studying the effectiveness of Computer Assisted Instruction in terms of its instructional and nurturing effect like study habits.

Objectives of the Study: The following objectives are set up for the study.

1. To investigate the effectiveness of the computer assisted instruction in the development of study habits.
2. To investigate the interaction between Computer Assisted Instruction and gender with reference to study habits.
3. To investigate the interaction between Computer Assisted Instruction and locality with reference to study habits.
4. To investigate the interaction between Computer Assisted Instruction and Socio economic status with reference to study habits.

III. Methodology

Variables used in the Study: The variables used in the study are classified into Independent, Dependent and Moderate variables. The independent variable was classroom instruction, either a Conventional or Computer assisted instructional method of teaching. The dependent variable was Students' Study habits and The Moderator variables were students' Gender, Locality and Socio-Economic status (SES).

Hypotheses

1. There is no significant difference between the pre test and Post test scores study habits.
2. There is no main and interaction effect between 'Treatments' and 'Gender' with reference to developing Study habits.
3. There is no main and interaction effect between 'Treatments' and 'Locality' with reference to developing Study habits

4. There is no main and interaction effect between ‘Treatments’ and ‘SES’ with reference to developing Study habits.

Design: The study was experimental in nature. Pre-test post-test parallel group experimental design was followed in the present study.

IV. Sampling Technique

Purposive sampling technique was followed. Students of IX standard of a school of Kolar city, Karnataka state, India were taken as sample for the study. The procedure of selection of the sample is as follows.

A suitable school where the experiment could be conducted was identified by keeping the following facts in view. 1. The willing co-operation of the head of the institution and members of the staff. 2. The strength of the students in class for size of the sample was to be minimum Sixty. 3. Regularity of the students attending the class. 4. Co-education school as sample needed both boys and girls. 5. Availability of computers. 6. Students from different areas like rural and urban. The following table-1 represents the weightage to the demographic variables in the sample.

Table.1
 Showing the details of the sample selected for study

Group	Boys	Girls	Rural	Urban	Low SES	High SES	Total
Exp	15	15	5	25	17	13	30
Control	17	13	5	25	19	11	30
	32	28	10	50	36	24	
Total	60		60		60		

Obtaining Two Parallel Groups: The equivalent group design would have been ideal for experimentation (5). It was decided to equate the groups by the means of intellectual capacity and higher mental ability in science. Hence Standard Progressive Matrices (SPM) [24] and Test for Higher Mental Ability in Science (THMAS)[26] were administered. Product moment correlation coefficient was computed to find out the index of relationship between these two sets of scores. The obtained co-efficient of correlation was positive. This suggested that matching could be done on both variables. Hence both scores were clubbed for the purpose of matching to get matched pairs. Thus thirty matched pairs of students were obtained and this formed the sample of the study. Out of these two, the experimental & control groups were selected by choosing a chit and random decision was made. The experimental and the control groups are having thirty students each. The pre-test, post-test experimental design was found to be most appropriate in this context.[16] This design generally controls the potential sources of internal validity, as both groups should experience an equal effect of these variables.

V. Conduction of the Experiment

The present study is a pre-test, post-test parallel group design. In this design the effects of the treatments are judged by the difference between the pre-test, post-test scores. This is compared with the control group.

Pre-testing: The thirty pair of students of both experimental and control groups were simultaneously pre-tested on Study habit test.

Applying Treatments: The Science content was taught to both groups for the period of two months. To use Computer Assisted Instruction package students need minimum basic skills to operate computer hence the researcher took first two classes for giving the basic knowledge regarding usage of Computer Assisted Instruction package. After this the actual treatment was started. Each student was given a computer and with instructional package installed to learn the science by them. The researcher assisted the students if any difficulty arises in their learning through Computer Assisted Instruction. Meanwhile, the control group was taught by the researcher by conventional method. This method was teacher dominant, examination oriented, text centered where pupil were passive listeners in the classroom.

Post-testing: Immediately after the completion of treatments both the experimental and control group were post-tested on Study habit test.

Instrumentation: The following tools were used in the study.

Standard Progressive Matrices (SPM)[2] a non-verbal culture free test by name progressive matrices to measure the intelligence of literate as well as illiterate individuals. Test-retest reliabilities reported range from 0.80 to 0.93. Concurrent validity: The correlations of SPM with Binet and Wescheler scale range from 0.54 to 0.86 and Predictive validities of SPM with scholastic achievement range up to 0.70.

Test of Higher Mental Ability in Science [28]. It assesses the higher mental ability like application, analysis, synthesis and evaluation in relation to science. It has a Test-Retest Reliability: 0.81. Validity: The test has concurrent validity.

The above tools were used to make parallel groups for experimentation.

Study Habit Inventory[29]. This inventory assesses study habits concentrating on the nine areas on which it has been developed. The areas like comprehension, concentration, task orientation, sets, interaction, drilling, supports, recording and language. Reliability: Split-Half Reliability: 0.91. Validity: The test has face validity.

Socio-Economic Scale[21]. It tests the socio-economic status of an individual and their family members based on three main components viz., Educational, Occupational and annual income of the family. Reliability: Test-Retest Reliability: 0.71. Validity: The test has content validity.

Computer Assisted Instruction Package developed by the researcher to assess in the development of Study habits. The Computer Assisted Instruction package in science for IX standard was developed on the basis of individualized instruction.

After preparation, Computer Assisted Instruction package was given to the science teachers, Pedagogies and educational experts to receive valuable suggestions on content, methodology and the principles used properly. The suggestion of judges (both qualitative and quantitative) was made use of in the first revision of the components of the package. Further subsequent revisions were taken upon on the basis of tryouts. [15].one to one Evaluation, Small group Evaluation and Field try out were done. In this way the Computer Assisted Instruction package has been evaluated and same was used for the experimental session.

Statistical Techniques Employed: 't' test was used to know whether the experimental and control groups differ on the dependent variable initially, i.e., before and after applying the treatment. Two-Way Analysis of Variance is used to the simultaneous study of two factors as well as interaction between the two.

Delimitations of the Study: The study was confined to the science instruction and English medium students only. The study was restricted to certain selected topics of ninth grade and Only Computer Assisted Instruction approach was followed. The study had intended to find the effectiveness of Computer Assisted Instruction in science on only variable namely Study habits in relation to Gender, Locality and Socio-Economic Status of secondary school students

VI. Analysis of Data and Interpretation

The data has been analyzed hypotheses wise, and same is presented in Table 2, 3, 4 and 5.

Hypothesis H_{01} : There is no significant difference between the pre test and Post test scores study habits.

Table-2
 Mean gain scores of Experimental groups in Study habits.

Study Habit	Tests	N	M	S.D.	't'	Sig.. at 0.01
	Pre-Test	30	118	14.82	3.70	Significant
	Post-test	30	131.3	13.63		

The above table shows that the obtained 't' value 3.70 is significant at 0.01 level showing that pre-test and post-test scores of Study habits differ significantly. It is noted that mean Study habits score of post-test is greater than pre-test. It can be concluded that there is development of Study habits among students when they learnt Science concepts through Computer assisted instructional package.

Hypothesis H_{02} There is no main and interaction effect between 'Treatments' and 'Gender' with reference to developing Study habits.

Table-3
 Summary of ANOVA of Study habits by Gender & Treatments

Source of variation	df	SS	MS	F	Significance
Treatments (A)	1	1120	1120	6.05	S*
Gender (B)	1	59.76	59.76	0.32	NS
Interaction(AB)	1	24.9	24.9	0.13	NS
Within groups (error)	56	10355.7	184.92		

S*-Significant at 0.05; NS- Not Significant.

The obtained F- value with reference to factor-A treatments is 6.05 and the corresponding tabled value is 4.03 with df, 1 & 56 at 0.05 level. Since the obtained F value is greater than tabled value, it is significant. Hence, it may be concluded that there is a main effect of treatments with reference to developing study habits. The obtained F- value with reference to gender is 0.32 and the corresponding tabled value is 4.03 with df, 1 & 56 at 0.05 level. Since the obtained F value is lesser than tabled value, it is not significant. Therefore the corresponding null hypothesis H_{02} is accepted. Hence, it may be concluded that there is no significant difference between study habits of boys and girls. Some studies [10], [30], also found no difference among boys and girls study habits. Computer Assisted Instruction method of teaching science is equally effective for boys and girls in developing study habits.

The obtained F- value with reference to interaction is 0.13 and the corresponding tabled value is 4.03 with df, 1 & 56 at 0.05 level. Since the obtained F value is lesser than tabled value, it is not significant. Therefore the corresponding null hypothesis H_{02} is accepted. Hence, it may be concluded that the interaction between treatments and gender with reference to developing study habits is not significant. This signifies that, treatments do not differ in their effectiveness in developing study habits depending upon students' gender.

Hypothesis H_{03} : There is no main and interaction effect between 'Treatments' and 'Locality' with reference to developing Study habits.

Table-4
 Summary of ANOVA of Study habits by Locality & Treatments

Source of variation	Df	SS	MS	F	Sig.
Treatments (A)	1	1140.29	1140.29	6.13	S*

Locality (B)	1	1.99	1.99	0.01	NS
Interaction(AB)	1	152.77	152.77	0.82	NS
Within groups (error)	56	10407.7	185.85		

S*-Significant at 0.05; NS-Not Significant.

The obtained F- value with reference to locality is 0.01 and the corresponding tabled value is 4.03 with df, 1 & 56 at 0.05 level. Since the obtained F value is lesser than tabled value, it is not significant. It may be concluded that there is no significant difference between study habits of urban and rural students. Computer Assisted Instruction method of teaching is equally effective for urban and rural students in developing study habits.

The obtained F- value with reference to interaction is 0.82 and the corresponding tabled value is 4.03 with df, 1 & 56 at 0.05 level. Since the obtained F value is lesser than tabled value, it is not significant. Hence, it may be concluded that the interaction between treatments and locality with reference to developing study habits is not significant. In other words, when treatments and locality of students are allowed to interact, they are significantly not effective.

This signifies that, treatments do not differ in their effectiveness in developing study habits depending upon students' locality.

Hypothesis H_{04} : There is no main and interaction effect between 'Treatments' and 'SES' with reference to developing Study habits.

Table-5
 Summary of ANOVA of Study Habits by SES and Treatments

Source of variation	df	SS	MS	F	Sig .
Treatments (A)	1	1144.11	1144.11	4.92	S*
SES (B)	1	77.51	77.51	0.33	NS
Interaction (AB)	1	1.23	1.23	0.01	NS
Within groups (error)	56	13012.49	232.36		

S* - Significant; NS -Not Significant.

The obtained F- value with reference to socio economic status is 0.33 and the corresponding tabled value is 4.03 with df, 1 & 56 at 0.05 level. Since the obtained F value is lesser than tabled value, it is not significant. Hence, it may be concluded that there is no significant difference between study habits of High and low SES students. Computer Assisted Instruction method of teaching is equally effective for both High and low SES students in developing study habits. The obtained F- value with reference to interaction is 0.01 and the corresponding tabled value is 4.03 with df, 1 & 56 at 0.05 level. Since the obtained F value is lesser than tabled value, it is not significant. Hence, it may be concluded that the interaction between treatments and socio-economic status with reference to developing study habits is not significant. In other words, when treatments and socio-economic status of students are allowed to interact, they are not significantly effective.

This signifies that, treatments do not differ in their effectiveness in developing study habits depending upon students' Socio-economic status.

But the mean value of Low SES students (132.23) is greater than the High SES students (129.69). Hence Computer Assisted Instruction method of teaching is very useful for low SES students in developing study habits when compared to the high SES students.

Researcher's file: To give a view of what really happened in the classroom and the reactions of the students towards a new approach like computer assisted instruction to teach science, the following changes noted by the researcher are presented here.

At the first, the students just looked towards the researcher with eager faces, during the first session in the classroom when the researcher informed that, all the students will be learning science through computers, student started smiling and they were eager to operate computers. When they were provided opportunity to operate computers for learning science, all students started to switch on their respective computers and confused which programme had to be started. Some students opened programme and started learning by their own but some did not operate and took proper guidance from researcher for operating Computer assisted instruction package.

Students were very attentive while learning through Computer Assisted Instruction and whenever they required any kind of help in the operation, taken guidance freely and frequently from the researcher. This shows the students who participated in learning through Computer Assisted Instruction never hesitated. But some of the below average and introvert students were hesitant at the beginning sessions of the experiment, but later they also started taking guidance and participated freely without any hesitation. Students were so much interested with this type of learning approach that they started asking the researcher to continue with another topic and sometimes even asked to engage next periods also. This approach of teaching was talked about with other sections by experimental group students and with their regular science teacher regarding the interesting new learning method of science. The regular science teacher consulted researcher and attended many Computer Assisted Instruction sessions and even taken needed guidance for preparation of such Computer Assisted Instruction package.

It could thus be concluded that Computer Assisted Instruction method could certainly be used to make learning more interesting and individualized and thus develops study habits.

VII. Major findings of the Study

1. Computer assisted instruction is more effective than conventional method of teaching science in developing Study habits.
2. Computer assisted instruction method of teaching science is equally effective for both boys and girls in developing Study habits.
3. Computer assisted instruction method of teaching science does not differ in its effectiveness for rural and urban students in developing Study habits.(Rural students are slightly more benefited when compared to urban students)
4. Computer assisted instruction method of teaching science is equally effective for high and Low socio-economic status students in developing Study habits. (Low socio-economic status students are slightly more benefited when compared to high socio-economic status students)

Educational Implications and Recommendations:

The findings and the results of the study have wide implications on the present system of education. It has specifically better implications on the teaching of science at secondary stage. These findings should be taken to cognizance by the educational authorities particularly at the secondary and higher secondary stages of education.

The experiment conducted by researcher reveals clearly that the Computer assisted instructional package in science based on principles of individualized learning helps in the promotion of study habits. Schools can use Computer Assisted Instruction method of teaching science for the development of good study habits.

It was found that Computer assisted instructional method of teaching is more beneficial for rural and low socio-economic status students in developing study habits. India is a country of villages and most of the people belong to low socio-economic status. Hence this method is very much suitable for developing study habits in a country like India.

It was found that Computer assisted instruction method of teaching science differs in its effectiveness for rural and urban students in developing study habits. Hence students may be segregated based on their locality.

Computer assisted instruction method of teaching science is equally effective for high and low socio-economic status students in developing study habits. Hence socio-economic status does not have any role to play in the in the development of study habits. By the investigator's experience with Computer assisted instructional method of teaching it was seen that it could be easily be adopted to secondary school students in the existing Indian classrooms.

One of the psychological bases of effective teaching i.e. equal opportunity of learning could be provided by adopting this method and The current science textbook of secondary school may be analyzed and topics that could be presented through computer assisted instruction mode could be clearly pointed out.

Training programmes on Computer assisted instruction could be organized for pre-service and in-service teachers so as to develop an understanding and the necessary skills for the successful preparation and implementation of the package in the classroom situation. The teachers working in government and private institutions may compulsorily make use of computer assisted instruction as one of the commonly

used method to teach the school subjects and The teacher educators must also be trained in using computer assisted instructional method, so that they are competent enough to train student teachers.

VIII. References

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