International Journal of Advanced Educational Research
ISSN: 2455-6157
Impact Factor: RJIF 5.12
www.educationjournal.org
Volume 3; Issue 2; March 2018; Page No. 251-260

Effect of computer assisted language learning on language creativity in relation to cognitive ability

Dr. Ram Mehar[1], Dr. Anudeep Lehal[2]
[1] Senior Assistant Professor, Department of Education, USOL, Panjab University, Chandigarh, Punjab, India
[2] State Council of Educational Research and Training, Gurgaon, Haryana, India

Abstract
The present study investigates the effect of computer assisted language learning on language creativity in relation to cognitive ability. The sample consists of 310 students drawn from VIIth class taken from two different schools of National Capital Region, New Delhi affiliated to Central Board of Secondary Education, New Delhi. Computer assisted language learning material was prepared and implemented to the experimental group after pre-testing. The gain scores were computed after post test for all the students. The cognitive abilities test was also administered. The obtained data were analyzed statistically with the help of mean, standard deviation, analysis of variance and t-test. An Analysis of Variance (2× 3) was used to arrive at the following conclusions: (i) The achievement of the group taught through computer assisted language learning was much higher than that of conventional method of teaching. (ii)The achievement of high cognitive ability group was found significantly higher than that of average and low cognitive ability group. (iii)There was significant interaction effect of instructional strategies and cognitive ability group on achievement in English.

Keywords: computer assisted language learning, conventional teaching methods, achievement in English, cognitive ability

Introduction

English in India is today a symbol of people's aspirations for quality in education and a fuller participation in national and international life. Its colonial origins now forgotten or irrelevant, its initial role in independent India, tailored to higher education (as a "library language", a "window on the world"), now felt to be insufficiently inclusive socially and linguistically, the current status of English stems from its overwhelming presence on the world stage and the reflection of this in the national arena. It is predicted that by 2010, a surge in English language learning will include a third of the world's people (Graddol, 1997) [9]. The opening up of the Indian economy in the 1990s has coincided with an explosion in the demand for English in our schools because English is perceived to open up opportunities (Das, 2005) [6].

One way to broadly characterise English teaching situations in India is in terms of (a) the teacher's English language proficiency and (b) the exposure of pupils to English outside school, i.e. the availability of English in the environment for language acquisition (Nag-Arulmani, 2005) [19].

Bruce (1991) [3] states that computers are being used in classrooms for instruction in composition, literature, decoding, reading, comprehension, spelling, vocabulary, grammar, usage, punctuation, capitalization, brainstorming, planning, reasoning, outlining, reference use, study skills, rhetoric, handwriting, drama, and virtually every other area of language arts. Computers and other new information technologies such as electronic networks are now being used in all facets of teaching the English language arts. These wide ranging applications raise the question: "What role should these technologies play in teaching and learning?" This report discusses examples of applications grouped into five roles: (a) tutor, (b) tool, (c) ways to explore language, (d) medium, and (e) learning environment. Thus, research on its use in classrooms must consider a wide range of possible roles for the technology. A narrow conception of computers use within English language arts teaching today would see the computer as a device with some well-defined function, such as a drill on basic skills. A broader conception sees computers as flexible tools, which can be employed in such diverse ways that the basic question shifts from "Are computers good for English language arts?" to "How can computers be used to accomplish pedagogical goals?" or "How are computers being used?" Thus, rather than looking at technology as a new method, we must focus on the underlying educational issues first, and then ask what role technology best can play in each specific area.

Computer assisted language learning is defined by Levy (1997) as "the search for and study of applications of the computer in language teaching and learning". Computer assisted language learning embraces a wide range of information and communications technology applications and approaches to teaching and learning foreign languages. The recent manifestations of computer assisted language learning are virtual learning environment and web-based distance learning. It also extends to the use of corpora and the concordance's, the interactive whiteboards, the computer-mediated communications, language learning in virtual worlds, and mobile assisted language learning.

Warschauer (1996) [25] and Warschauer & Healey (1998) [26] identified three historical phases of computer assisted language learning and classified them according to their underlying pedagogical and methodological approaches. The first phase is behavioristic computer assisted language learning which prevailed from 1960s to 1970s which consisted

of drill and practice materials in which the computer presented a stimulus and the learner provided a response.

The second phase is the communicative computer assisted language learning which is based on the communicative approach that became prominent in the late 1970s and 1980s (Underwood, 1984) [23]. In the communicative approach the focus is on using the language rather than analysis of the language, and grammar is taught in an implicit manner rather than explicit manner. It encourages originality and flexibility in student output of language.

The third phase integrative computer assisted language learning, started from the 1990s, tried to address criticisms of the communicative approach by integrating the teaching of language skills into tasks or projects to provide direction and coherence. Bruce (1991) [3] states that computer assisted language learning in this period saw a definitive shift from the use of the computer for drill and tutorial purposes (the computer as a finite, authoritative base for a specific task) to a medium for extending education beyond the classroom using the following media such as: (i) Multimedia (ii) Internet (iii) E-Learning (iv) Technology (v) Audio (vi) Video (vii) Webcam (viii) Blogging (ix) Whiteboards (x) Screen Casting (vii) Computers, Tablets and Mobile Devices

The concept of creativity is the ability to generate novel and useful ideas and solutions to everyday problems and challenges. Creativity is an organized, comprehensive and imaginative activity of brain towards an original outcome. The nature and the quality of the creative product include definitions of creativity which emphasizes the outcome or the product that is original, unique, valuable and novel. Guilford (1971) [10] points out the importance of trait concepts in the process of creativity. According to him traits are properties of individuals, and hence the most defensible way of discovering trait concept at present is that of factor analysis. The aptitude traits suggested by him are sensitivity, redefinition, fluency, flexibility and elaboration. Malhotra and Kumari (1990) [16, 17] defined language creativity as the multi-dimensional attitude that is differently distributed among the people and includes mainly the factors of fluency, flexibility, originality and elaboration.

Cognition plays a vital role in enhancing creativity. Having a rich store of knowledge in an area is the basis for creativity, but something more is needed. For many problems, that "something more" is the ability to break set-restructuring the problem to see things in a new way, which leads to a sudden insight. It is more likely that leaving the problem for a time interrupts rigid ways of thinking so you can restructure your view of the situation (Gleitman, Fridlund, & Reisberg, 2004) [8]. Barbara (1996) [2] stated that human cognition is conscious and unconscious, concrete or abstract, as well as intuitive (like knowledge of a language) and conceptual (like a model of a language). Cognitive processes use existing knowledge and generate new knowledge.

Need and Significance of the study

The present times demand curriculums integrate technology with the teaching learning practices to improve the achievement levels of the students particularly the language skills. Computer assisted language learning methodology can be applied in a variety of manner and techniques to achieve the goals of English language teaching particularly in India where for the majority of the population English is a second language. Bruce (1991) [3] states that new information technologies such as computers and electronic networks are now being used in all facets of teaching English language. The computer can play five different roles: (a) tutor, (b) tool, (c) ways to explore language, (d) medium, and (e) learning environment in the teaching of language. Pervasive and multifaceted, information technology is beginning to integrate in all the traditional topics, methods, and goals of teaching. Thus, research on its use in classrooms must consider a wide range of possible roles for integrating the technology in the curriculum.

Now days, technology plays a vital role in the teaching learning of languages. Adopting proper teaching strategies helps teachers in solving learners' problems and brings remarkable improvement in their proficiency. Review of literature shows that the use of various teaching strategies gave quite positive in comparison to conventional teaching strategy. The purpose of this study is to focus on the practical implications of computer assisted language learning in the classroom to improve the listening, speaking, reading and writing skills in the English language in relation to cognitive ability. The investigators will investigate various methods and strategies on the use of computers to develop learners' listening, speaking, reading and writing skills in English language. The investigator aims to integrate the results from different data to carry out a holistic study. From a variety of research tools, the investigators hope to explore the phenomenon of using computers for language learners to develop their language skills in relation to cognitive ability. Therefore, the investigators explored the possibilities of using the computer assisted language learning to improve the skills of listening, speaking, reading and writing English among the secondary school students in relation to cognitive ability.

In the present age of globalization, English has emerged as the language of communication both at the national and international level. The current status of English as an international language stems from its overwhelming presence on the world stage and the reflection of this in the national arena. The purpose of this study is to focus on the practical implications of computer assisted language learning in the classroom to improve the listening, speaking, reading and writing skills in the English language. The investigator will investigate various methods and strategies on how to use computers to develop language learners' listening, speaking, reading and writing skills in their English as second language learning. The investigator presents research questions, various approaches of data collection and analysis taken in this study. The investigator aims to integrate the results from different data to carry out a holistic study. From a variety of research tools, the investigator hopes to explore the phenomenon of using computers for language learners to develop their language skills in depth along with language creativity.

Cognitive scientists frequently attempt to precisely specify their proposed mechanisms by implementing them as computer alograthim which can be tested in artificial intelligence programs. Researchers have tried to use artificial intelligence programs to show that the same principles that can explain general problem solving can also explain aspects

of language acquisition and processing. The second way of conceptualizing human cognition emphasizes the difference between language and other abilities. A key idea is that many distinct domains of cognition exist and must be learnt separately, using different mental mechanisms. This approach is referred to as the 'modularity of cognition' or 'mental modules approach' (Chomsky, 1965) [5].

Objectives

1. To compare the language creativity of groups taught through computer assisted language learning and conventional teaching strategy in English.
2. To compare the high, average and low groups of students of cognitive ability with regards to language creativity.
3. To examine the interaction effect of instructional strategies and cognitive ability with regards to language creativity.

Hypotheses

The study was designed to test the following hypotheses:

H_1: There exists significant difference between the language creativity of groups taught through computer assisted language learning and conventional teaching strategy in English.

H_2: There exists significant difference between the achievement of high, average and low cognitive ability groups of students with regards to language creativity

H_3: There exists significant interaction effect of instructional strategies and cognitive ability with regards to language creativity.

Sample

The present study was conducted on a random sample of 310 students of VIIth class English medium private schools (with facility to teach through computer and broad band connection) of Delhi affiliated to Central Board of Secondary Education, New Delhi. It included 155 students from Kendriya Vidalya Noida and 155 students from Mahamaya Balika Inter- College Senior Secondary School Noida in National Capital Region, New Delhi. It was random sample. The study was conducted on two intact groups, one is experimental group and another is conventional group in each school. The two schools were randomly selected from the total schools of New Delhi. The intact sections were selected from each school.

Design

The present study was experimental in nature. One group was treated as experimental group and another group was treated as control group. The experimental group was taught through computer assisted language learning and control group was taught same topics with conventional teaching strategy by the investigators. The study covered two independent variables such as instructional strategies and cognitive ability. The variable of instructional strategies was studied at two levels, namely computer assisted language learning and conventional method of teaching. The variable of cognitive ability group was studied at three levels, such as high, average and low cognitive ability group. The dependent variable was gain language creativity scores which was calculated as the difference in post-test and pre-test scores for the subject.

Tools

The following tools were used for the collection of the data:

1. Combination Test in English was developed by the investigators.
2. Language Creativity Test by Malhotra and Kumari (1990) [16, 17] was used.
3. Cognitive Abilities Test by Thorndike and Hagen (1986) [22] was used.
4. 20 Lesson Plans based on by computer assisted language learning and conventional method of teaching was developed by the investigators.

Procedure

After the selection of the sample and allocation of students to the two instructional strategies, the experiment was conducted in six phases. *Firstly*, the investigator made necessary arrangements with the Principal of the school selected for the experiment. *Secondly*, the achievement test was a combination test, it was conducted in three phases. (i) Students were given 40 minutes to complete the listening and reading test on the first day. (ii) 40 minutes were given to complete the writing test. (iii) The speaking test was conducted individually for 8minutes each student. Students were given two hours and thirty minutes to complete language creativity test. The tests were scored to obtain the information regarding the previous knowledge of the students. Before implementing the computer assisted language learning, the two groups i.e. experimental and control group were randomly decided and matched on the basis of pre-test scores so that equivalent groups could be formed. *Thirdly*, the cognitive abilities test was administered for the classification of the students. *Fourthly*, the language creativity test as a pre-test was employed before the delivery of the instructional material. The scores of language creativity test were called pre-test scores. *Fifthly*, treatment was given to experimental group with computer assisted language learning and control group with conventional method of teaching. *Sixthly*, after the delivery of instructional material the same language creativity test was conducted on both the groups. The scores of language creativity test were called post-test scores. The experimental and control group scores were compared according to their pre and post-test scores. The difference was called gain language creativity scores.

Analysis and interpretation of the results

Analysis of Descriptive Statistics

The mean gain language creativity scores of students falling into two groups were subjected to descriptive statistics such as mean and standard deviation to analyze the effect of subjecting the groups to different instructional treatments on gain language creativity scores. The obtained gain language creativity scores for experimental and control group has been given in table -1

Table 1: A summary of descriptive statistics of mean gain language creativity scores of experimental and control group

Variables	Experimental Group			Control Group			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
High Cognitive Ability	42	180.38	65.34	42	90.98	41.92	84	135.68	70.70
Average Cognitive Ability	71	150.22	70.52	71	88.29	42.49	142	19.26	65.81
Low Cognitive Ability	42	122.21	39.43	42	72.88	28.73	84	97.55	42.33
Total Cognitive Ability	155	150.94	65.08	84	84.05	38.88	310	117.50	63.24

Source: Field Study, 2016

To substantiate the data presented in table-1, a bar diagram is drawn to depict mean gain language creativity scores for high, average low and total cognitive ability groups of experimental and control group has been given in fig -1.

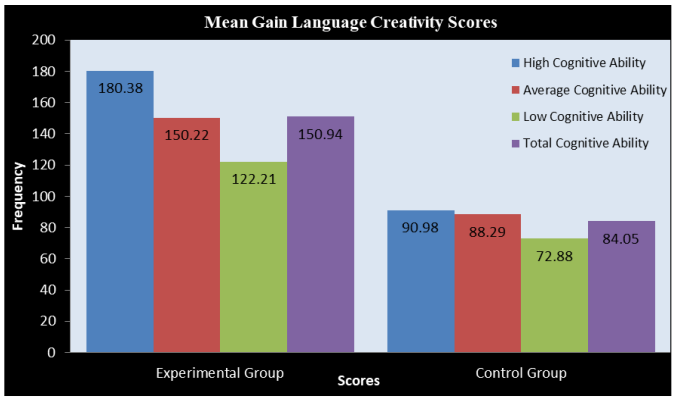

Fig 1: Bar diagram showing comparison of mean gain language creativity scores of experimental and control group

The table and fig-1 shows that the mean gain language creativity score of total cognitive ability of experimental group is 150.94 and of control group is 84.05. This shows that the mean gain scores of cognitive ability group is higher for the experimental group than that of control group with respect to language creativity. Further, the above table reveals that the mean gain language creativity score of high cognitive ability group of experimental group is 180.38 and of control group is 90.98. This shows that the mean gain language creativity scores of high cognitive ability is higher for the experimental group than that of control group. And, for average cognitive ability, it is observed that mean gain language creativity of experimental group is 150.22 and of control group is 88.29. And, for low cognitive ability, it is observed that mean gain language creativity of experimental group is 122.21 and of control group is 72.88. This shows that the mean gain language creativity score of low cognitive ability group is higher for experimental group than that of the control group.

Analysis of variance on gain language creativity scores

The sum of squares, degree of freedom, mean sum of squares and F-ratio have been presented in table-2.

Table 2: Summary of Analysis of Variance (2×3) factorial design on language creativity

Source of Variation	Sum of Squares	Df	Mean of Sum of Squares	F-ratio
Instructional Strategy (A)	326298.18	1	326298.18	121.10**
Cognitive Ability (B)	61606.10	2	30803.05	11.43**
Interaction (A × B)	17924.83	2	8962.42	3.33*
Error Terms	819125.54	304	2694.49	

*Significant at 0.05 level **Significant at 0.01 level

(Critical Value 3.87 at 0.05 and 6.72 at 0.01 level, df 1/304)

(Critical Value 3.03 at 0.05 and 4.68 at 0.01 level, df 2/304)

Instructional Strategy (A)

It is observed from the table-2 that the F-ratio for difference in mean gain language creativity scores of computer assisted language learning and conventional method of teaching is 121.10, which in comparison to the table value is found significant at 0.01 levels of significance. It shows that the two groups are different beyond the contribution of chance. Hence, the hypothesis H_1: There exists significant difference between the language creativity of groups taught through computer assisted language learning and conventional teaching strategy in English, is accepted. The result indicates that the language creativity of group taught through computer assisted language learning is much higher than that of conventional method of teaching.

In order to probe deeper, F-ratio is followed by t-test. The values of the t-ratio for the two groups have been given in the table-3.

Table 3: t-ratios for mean gain language creativity scores of experimental and control group

Variable	Experimental Group N Mean SD	Control Group N Mean SD	SE_D	t-Value
Gain Language Creativity Scores	155 150.94 65.08	155 84.05 38.88	6.08	11.01**

**Significant at 0.01 level

(Critical Value 1.97 at 0.05 and 2.50 at 0.01 level, df =308)

A bar diagram has been drawn to depict the mean gain language creativity scores has been presented in fig-2.

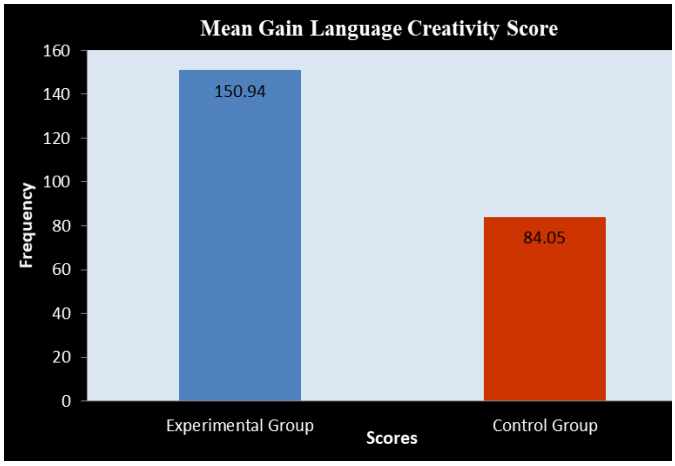

Fig 2: Bar diagram showing comparison of mean gain language creativity scores of experimental and control group

It is observed from the table-3 and fig-2 that the mean gain language creativity scores of experimental group i.e. group taught through computer assisted language learning is 150.94, which is higher than the corresponding mean gain language creativity scores of 84.05 for the control group i.e. group taught through conventional method of teaching. The t-value testing the significance of mean gain difference on language creativity in English of experimental and control group is 11.01, which in comparison to the table value is found significant at 0.01 levels of significance. Hence, the hypothesis of significant difference is accepted in case of computer assisted language learning and conventional method of teaching irrespective of grouping across other variables. The result indicates that the students taught through computer assisted language learning perform significantly better in language creativity than that of students who are taught through conventional method of teaching.

Cognitive Ability (B)

Table-2 shows that the F-ratio for difference of mean gain language creativity scores of different cognitive ability group is 11.43, which in comparison to the table value is found significant at 0.01 levels of significance. Hence, the hypothesis H_2: There exists significant difference between the achievement of high, average and low cognitive ability groups of students with regards to language creativity. The result indicates that language creativity scores of high cognitive ability group are higher than that of average and low cognitive ability group.

To investigate further F-ratio is followed by t-test. The values of the t-ratio for different cognitive ability group have been given in the table -4.

Table 4: t-ratio for different cognitive ability groups on mean gain language creativity scores

Variables	High Cognitive Ability N Mean SD 84 135.68 70.70	Average Cognitive Ability N Mean SD 142 119.26 65.81	Low Cognitive Ability N Mean SD 84 97.55 42.33
High Cognitive Ability N Mean SD 84 135.68 70.70	--	1.76	4.24**
Average Cognitive Ability N Mean SD 142 119.26 65.81	--	--	2.71**
Low Cognitive Ability N Mean SD 84 97.55 42.33	--	--	--

** Significant at 0.01 level

A bar diagram has been drawn to depict the mean gain language creativity scores of high, average and low cognitive ability groups has been presented in fig-3.

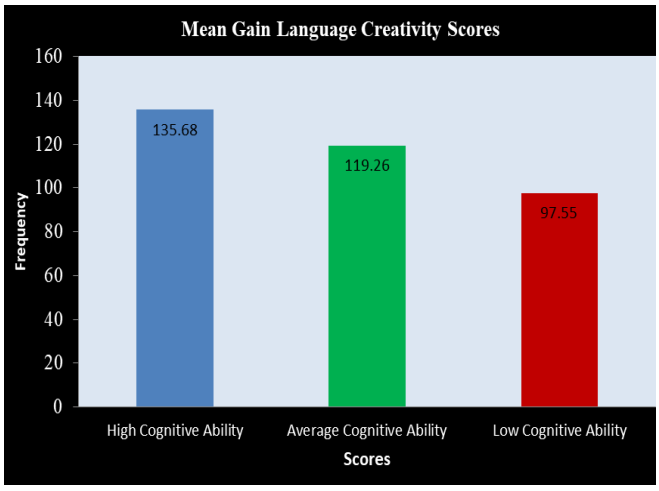

Fig 3: Bar diagram showing comparison of mean gain language creativity scores of different cognitive ability group

Table-4and fig-3 shows that the mean gain language creativity score of high cognitive ability group is 135.68, which is higher than the corresponding mean gain language creativity score of 119.26 for average cognitive ability group. The t-ratio for difference in gain language creativity scores of high and average cognitive ability is 1.76, which in comparison to the table value ($t_{0.05}$= 1.98, df 224) is not found significant even at 0.05 level of significance. Hence, the hypothesis of significant difference is not accepted in case of high and average cognitive ability irrespective of grouping across other variables. The result indicates that the mean gain language creativity score is not found significant for high and average cognitive ability group.

Table-4and fig-3 shows that the mean gain language creativity score of high cognitive ability group is 135.68, which is higher than the mean gain language creativity score of 97.55 for low cognitive ability group. The t-ratio for difference in gain language creativity scores of high and low cognitive ability group is 4.24, which in comparison to the table value ($t_{0.01}$= 2.62, df 166) is found significant at 0.01 level of significance. Hence, the hypothesis of significant difference is accepted in case of high and low cognitive ability irrespective

of grouping across other variables. The result indicates that high cognitive ability group of students perform significantly better than that of low cognitive ability group of students with regard to gain language creativity scores.

Table-4and fig-3 shows that the mean gain language creativity score of average cognitive ability group is 119.26, which is higher than the corresponding mean gain language creativity score of 97.55 for low cognitive ability group. The t-ratio for difference in gain language creativity scores of average and low cognitive ability group is 2.71, which in comparison to the table value ($t_{0.01}$= 2.62, df 224) is found significant even at 0.01 level of significance. Hence, the hypothesis of significant difference is accepted in case of average and low cognitive ability irrespective of grouping across other variables. The result indicates that the average cognitive ability groups of students perform significantly better than that of low cognitive ability group of students with regard to gain language creativity scores.

Interaction between instructional strategies and cognitive ability (A×B)

Table-2 shows that the F-ratio for interaction between computer assisted language learning and cognitive ability group is 3.12, which in comparison to table value is found significant at 0.05 levels of significance. It indicates that variable of instructional strategy interacts with cognitive ability to yield significant difference in respect of gain language creativity scores. Hence, the hypothesis H_3: There exists significant interaction effect of instructional strategies and cognitive ability with regards to language creativity, is accepted. The result indicates that there is a significant difference in gain language creativity scores in English due to interaction effect of instructional strategies and cognitive ability group.

To ascertain the significance of difference among means of different cognitive ability of experimental and control groups. The t- ratios are calculated which have been shown in table-5

Table 5: t-ratio for difference in mean gain language creativity scores of instructional strategies and different cognitive ability group

Variables		Experimental Group			Control Group		
		C1 N Mean 42 180.38	C2 N Mean 71 150.22	C3 N Mean 42 122.21	C1 N Mean 42 90.98	C2 N Mean 71 88.29	C3 N Mean 42 72.88
Experimental Group	High Cognitive Ability N Mean SD 42 180.38 65.34	--	2.30*	4.94**	7.46**	8.17**	9.71**
	Average Cognitive Ability N Mean SD 71 150.22 70.52	--	--	2.71**	5.60**	6.34**	8.17**
	Low Cognitive Ability N Mean SD 42 122.21 39.43	--	--	--	3.52**	4.29**	6.55**
Control Group	High Cognitive Ability N Mean SD 42 90.98 41.92	--	--	--	--	0.33	2.31*
	Average Cognitive Ability N Mean SD 71 88.29 42.49	--	--	--	--	--	2.30*
	Low Cognitive Ability N Mean SD 42 72.88 28.73	--	--	--	--	--	--

*Significant at 0.05 level **Significant at 0.01 level

Note: Here C_1 stands for High Cognitive Ability, C_2 for Average Cognitive Ability and C_3 for Low Cognitive Ability

A bar diagram has been drawn to substantiate the results has been given in fig-4.

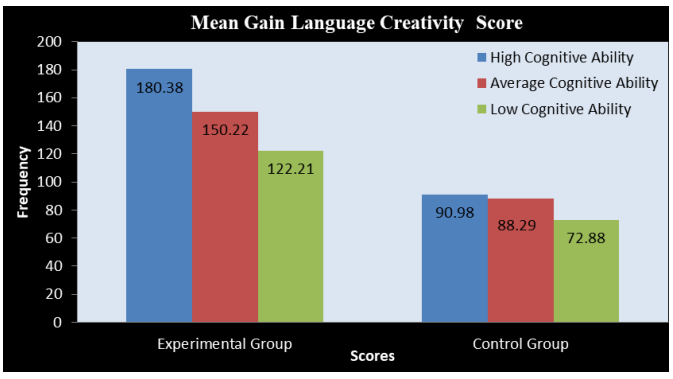

Fig 4: Bar diagram showing mean gain language creativity scores for interaction effect of instructional strategies and cognitive ability

Table-5 and fig- 4 reveals that high cognitive ability group with mean of 180.38 of experimental group shows higher mean gain language creativity scores than that of average cognitive ability group with mean 150.22 of experimental group. The t-ratio for difference in mean gain language creativity scores of high and low cognitive ability of experimental group is 2.30, which in comparison to the table value ($t_{0.05}$=1.98, df 111) is found significant at 0.05 level of significance. Hence, the high cognitive ability of experimental group exhibits higher mean gain language creativity scores than that of average cognitive ability of experimental group.

Table-5 and fig-4 reveals that high cognitive ability group with mean of 180.38 of experimental group shows higher mean gain language creativity scores than that of low cognitive ability group with mean 122.21 of experimental group. The t-ratio for difference in mean gain language creativity scores of high and low cognitive ability of experimental group is 4.94, which in comparison to the table value ($t_{0.01}$=2.64, df 82) is found significant at 0.01 level of significance. Hence, the high cognitive ability of experimental group exhibits higher mean gain language creativity scores than that of low cognitive ability of experimental group.

Table-5 and fig- 4 shows that high cognitive ability group with mean of 180.38 of experimental group exhibits higher mean gain language creativity scores than that of high cognitive ability group with mean 90.98 of control group. The t-ratio for difference in mean gain language creativity scores of high cognitive ability of experimental and control group is

7.46, which in comparison to the table value ($t_{0.01}$=2.64, df 82) is found significant at 0.01 level of significance. Hence, the high cognitive ability of experimental group possesses higher mean gain language creativity scores than that of high cognitive ability of control group.

Table-5 and fig- 4 indicates that high cognitive ability group with mean of 180.38 of experimental group exhibits higher mean gain language creativity scores than that of average cognitive ability group with mean 88.29 of control group. The t-ratio for difference in mean gain language creativity scores of high cognitive ability of experimental group and average cognitive ability of control group is 8.17, which in comparison to the table value ($t_{0.01}$=2.62, df 111) is found significant at 0.01 level of significance. Hence, the high cognitive ability of experimental group possesses higher mean gain language creativity scores than that of average cognitive ability of control group.

Table-5 and fig- 4 reveals that high cognitive ability group with mean of 180.38 of experimental group possesses higher mean gain language creativity scores than that of low cognitive ability group with mean 72.88 of control group. The t-ratio for difference in mean gain language creativity scores of high cognitive ability of experimental group and low cognitive ability of control group is 9.71, which in comparison to the table value ($t_{0.01}$=2.64, df 82) is found significant at 0.01 level of significance. Hence, the high cognitive ability of experimental group exhibits higher mean gain language creativity scores than that of low cognitive ability of control group.

Table-5 and fig- 4 shows that average cognitive ability group with mean of 150.22 of experimental group exhibits higher mean gain language creativity scores than that of low cognitive ability group with mean 122.21 of experimental group. The t-ratio for difference in mean gain language creativity scores of average and low cognitive ability of experimental group is 2.71, which in comparison to the table value ($t_{0.01}$=2.62, df 111) is found significant at 0.01 level of significance. Hence, the average cognitive ability of experimental group exhibits higher means gain language creativity scores than that of low cognitive ability of experimental group.

Table-5 and fig- 4 shows that average cognitive ability group with mean of 150.22 of experimental group exhibits higher mean gain language creativity scores than that of high cognitive ability group with mean 90.98 of control group. The t-ratio for difference in mean gain language creativity scores of average cognitive ability of experimental group and high cognitive ability of control group is 5.60, which in comparison to the table value ($t_{0.01}$=2.62, df 111) is found significant at 0.01 level of significance. Hence, the average cognitive ability of experimental group exhibits higher means gain language creativity scores than that of high cognitive ability of control group.

Table-5 and fig- 4 shows that average cognitive ability group with mean of 150.22 of experimental group exhibits higher mean gain language creativity scores than that of average cognitive ability group with mean 88.29 of control group. The t-ratio for difference in mean gain language creativity scores of average cognitive ability of experimental and control group is 6.34, which in comparison to the table value ($t_{0.01}$=2.61, df 140) is found significant at 0.01 level of significance. Hence, the average cognitive ability of experimental group exhibits higher means gain language creativity scores than that of average cognitive ability of control group.

Table-5 and fig- 4 shows that average cognitive ability group with mean of 150.22 of experimental group exhibits higher mean gain language creativity scores than that of low cognitive ability group with mean 72.88 of control group. The t-ratio for difference in mean gain language creativity scores of average cognitive ability of experimental group and low cognitive ability of control group is 8.17, which in comparison to the table value ($t_{0.01}$=2.62, df 111) is found significant at 0.01 level of significance. Hence, the average cognitive ability of experimental group exhibits higher means gain language creativity scores than that of low cognitive ability of control group.

Table 4.22 and fig 4.20 Table-5 and fig- 4 indicates that low cognitive ability group with mean of 122.21 of experimental group exhibits higher mean gain language creativity scores than that of high cognitive ability group with mean 90.98 of control group. The t-ratio for difference in mean gain language creativity scores of low cognitive ability of experimental group and high cognitive ability of control group is 3.52, which in comparison to the table value ($t_{0.01}$=2.64, df 82) is found significant at 0.01 level of significance. Hence, the low cognitive ability of experimental group exhibits higher mean gain language creativity scores than that of high cognitive ability of control group.

Table-5 and fig- 4 indicates that low cognitive ability group with mean of 122.21 of experimental group exhibits higher mean gain language creativity scores than that of average cognitive ability group with mean 88.29 of control group. The t-ratio for difference in mean gain language creativity scores of low cognitive ability of experimental group and average cognitive ability of control group is 4.29, which in comparison to the table value ($t_{0.01}$=2.62, df 111) is found significant at 0.01 level of significance. Hence, the low cognitive ability of experimental group exhibits higher mean gain language creativity scores than that of average cognitive ability of control group.

Table-5 and fig- 4 indicates that low cognitive ability group with mean of 122.21 of experimental group exhibits higher mean gain language creativity scores than that of low cognitive ability group with mean 72.88 of control group. The t-ratio for difference in mean gain language creativity scores of low cognitive ability of experimental and control group is 6.55, which in comparison to the table value ($t_{0.01}$=2.64, df 82) is found significant at 0.01 level of significance. Hence, the low cognitive ability of experimental group exhibits higher mean gain language creativity scores than that of low cognitive ability of control group.

Table-5 and fig- 4 indicates that the high cognitive ability group with mean of 90.98 of control group exhibits higher mean gain language creativity scores than that of average cognitive ability of control group with mean of 88.29.The t-ratio for difference in mean gain language creativity scores of high and average cognitive ability of control group is 0.33, which in comparison to table value ($t_{0.05}$=1.98, df 111) is not found significant even at 0.05 level of significance. Hence, the high cognitive ability of control group do not possess higher

mean gain language creativity scores than that of average cognitive ability of control group.

Table-5 and fig- 4 reveals that high cognitive ability group with mean of 90.98 of control group exhibits higher mean gain language creativity scores than that of low cognitive ability group with mean 72.88 of control group. The t-ratio for difference in mean gain language creativity scores of high and low cognitive ability of control group is 2.31, which in comparison to the table value ($t_{0.05}$=1.99, df 82) is found significant at 0.05 level of significance. Hence, the high cognitive ability of control group possesses higher mean gain language creativity scores than that of low cognitive ability of control group.

Table-5 and fig- 4 reveals that average cognitive ability group with mean of 88.29 of control group exhibits higher mean gain language creativity scores than that of low cognitive ability with mean 72.88 of control group. The t-ratio for difference in mean gain language creativity scores of average and low cognitive ability of control group is 2.30, which in comparison to the table value ($t_{0.01}$=1.98, df 111) is found significant at 0.05 levels of significance. Hence, the average cognitive ability of control group possesses higher mean gain language creativity scores than that of low cognitive ability of control group.

Discussion of the results

The findings of the study reveals that computer assisted language learning is more effective than the conventional methods of teaching of English with regards to language creativity. Hence, the Hypothesis, H_1: There exists significant difference between the language creativity of groups taught through computer assisted language learning and conventional teaching strategy in English, is accepted. The results are supported by the findings of Mammucari (1989) [18] that there is a positive impact of teacher training programs in creativity on improving observable traits of creative teaching. Malhotra and Kumari (1990) [16, 17] found that the students who were exposed to the synectics method of teaching showed significant improvement on all the four factors viz. fluency, flexibility, originality and elaboration. Fatemi (2003) [3] demonstrated the practical implications of understanding the creativity of language for language education. Carter and McCarthy (2004) [4] found that creativity had a positive impact on narrative and related story-telling genres. Huh (2005) [13] found a positive impact of incorporating creative thinking skills into language instruction in computer assisted language learning environments. Lee (2006) [15] found that creativity can be enhanced through conscious and creative efforts. Wang (2011) [24] reported the positive role of language retrieved pictures in supporting computer mediated intercultural brainstorming to promote creativity.

The findings are contradicted by the studies of Baldensperger (2014) [1] who found no statistically significant evidence indicating brain/mind learning environments increases creativity scores more than non-brain/mind learning environments, suggesting a need for future studies to investigate students' creativity levels and the application of research from the neurosciences in education.

The findings of the present study reveal that the high cognitive ability group is better than that of average and low cognitive ability with regards to language creativity. Hence, the Hypothesis, H_2: There exists significant difference between the achievement of high, average and low cognitive ability groups of students with regards to language creativity is accepted. The results are supported by the findings of Han (2000) that creative ability in young children is rather domain-specific. Carter and McCarthy (2004) [4] found that creativity had a positive impact on narrative and related story-telling genres. Lee (2006) [15] found that creativity can be enhanced through conscious and creative efforts.

The present study reveals that the interaction effect of instructional strategies and cognitive ability is significant in English with regards to language creativity. Hence, the Hypothesis, H_3: There exists significant interaction effect of instructional strategies and cognitive ability with regards to language creativity, is accepted. The results are supported by the findings of Malhotra and Kumari (1990) [16, 17] who found that the students who were exposed to the synectics method of teaching showed significant improvement on all the four factors viz. fluency, flexibility, originality and elaboration. Kennedy (2007) [14] found that the computer assisted vocabulary learning program was successful in significantly increasing students' receptive and productive knowledge of foreign language vocabulary words. Salemic (2010) [21] found positive effects of instruction emphasizing fluency, flexibility, originality, and elaboration on students' vocabulary acquisition and reading comprehension.

Findings

1. The performance of group taught through computer assisted language learning strategy was found significantly higher than that of conventional teaching strategy with regards to language creativity.
2. The performance of high cognitive ability group was found significantly higher than that of average and low cognitive ability group of students with regards to language creativity. Further analysis revealed that:

(i) The mean gain language creativity scores were not found significant for high and average cognitive ability group.
(ii) The mean gain language creativity scores were found significantly higher for high and low cognitive ability group.
(iii) The mean gain language creativity scores were found significantly higher for average and low cognitive ability group.

3. There was significant interaction effect of instructional strategies and cognitive ability group with regards to language creativity. Further analysis revealed that:

1) The high cognitive ability of experimental group possesses higher mean gain language creativity score than that of average and low cognitive ability of experimental group.
2) The high cognitive ability of experimental group possesses higher mean gain language creativity score than that of high, average and low cognitive ability of control group.
3) The average cognitive ability of experimental group exhibits higher mean gain language creativity scores than that of low cognitive ability of experimental group.
4) The average cognitive ability of experimental group

exhibits higher mean gain language creativity score than that of high, average and low cognitive ability of control group.
5) The low cognitive ability of experimental group exhibits higher mean gain language creativity score than that of high, average and low cognitive ability of control group.
6) The high and average cognitive ability of control group did not yield significant difference in mean gain language creativity scores.
7) The high cognitive ability of control group possesses higher mean gain language creativity score than that of low cognitive ability of control group.
8) The average cognitive ability of control group possesses higher mean gain language creativity score than that of low cognitive ability of control group.

The present research gives conclusive and practical evidence in favour of computer assisted language learning and emphasizes that it should be explored and blended in the teaching learning practices to play a pivotal role in enhancing the English language skills of the learners. It can be blended with conventional methods of teaching to enable the learners optimize their skills.

Educational implications of the findings

The findings of the present study revealed that computer assisted language learning has a positive impact on students' needs, interests, skills, motivation and efficiency. It provided flexible and inclusive learning environment and enhanced achievement in English. In the present research, students taught through computer assisted language learning exhibited better gain in language creativity as compared to students taught by conventional teaching strategy. The schools should make investment in the development of the computer assisted language learning material. Language laboratories should be set up in the schools. Potential of computer assisted language learning should be utilized to enhance quality of language teaching- learning at school level. Computer assisted language learning based instructional material creates positive environment in classroom as it increases the concentration, motivation and interests of the learners. Students with low cognitive ability in English should be identified and for alleviation of cognitive ability special seminars, Counseling sessions, remedial classes, peer learning and team work should be organized. School administration should promote the utilization such programmes in their school. Parents should encourage their children to utilize various on-line resources available in the market. There are various on-line resources available free of cost by national council of educational research and training. Standardized testing and certification for proficiency in the use of language should be done by a government approved body. Government should provide computers and technological assistance to government schools as well as government aided and private schools. Government should establish teacher resource centre's for the professional development of language teachers.

References

1. Baldensperger DP. An investigation of the impact of brain/mind learning on creativity (Doctoral dissertation). Available from Pro Quest dissertations and theses database (Order No. 3616842). Retreived May 20, 2014 from 2014, http://search.proquest.com/docview /1526442462? /accountid=28367 (1526442462)
2. Barbara VE. What is cognitive science?. Massachusetts: Massachusetts Institute of Technology, 1996.
3. Bruce B. Roles for computers in teaching the English language arts. In J. Jensen, J. Flood, D. Lapp, & J. Squire (Eds.), Handbook of research on teaching the English language arts (pp. 536-541). New York: Macmillan, 1991.
4. Carter R, McCarthy M. Talking, creating: Interactional language, creativity, and context. Applied Linguistics. 2004; 25(1):62-68.
5. Chomsky N. Aspects of the theory of syntax. Cambridge, USA: Massachusetts Institute of Technology Press, 1965.
6. Das BK. Focus on English. New Delhi: NFG-English, National Council of Educational Research and Training, 2005.
7. Fatemi SM. Reflections of a language educator (dissonant discourses, creative language, mindful expressiveness and their implications for language education) (Doctoral dissertation). Available from ProQuest dissertations and theses database (OrderNo.NQ79217). Retrieved May 21, 2014 from 2003. http://search.proquest.com/docview/3 05224335?accountid =28367 (305224335).
8. Gleitman H, Fridlund AJ, Reisberg D. Psychology (6th ed.). New York: W.W. Norton & Company, 2004.
9. Graddol D. The future of English. London: The British Council, 1997.
10. Guilford JP. The nature of human intelligence. London: McGraw-Hill, 1971.
11. Han K. Varieties of creativity: Investigating the domain-specificity of creativity in young children (Doctoral dissertation). Available from ProQuest dissertations and theses database (Order No. 9973594). Retrieved May 21, 2014 from 2000. http://search.proquest.com/doc view/304612888?accountid=28367 (304612888).
12. Harris CL. Language and cognition. Massachusetts, USA: Boston University, 2003.
13. Huh K. The role of computer assisted language learning in the language learning and creative thinking development of English as second language students (Doctoral dissertation). Available from ProQuest dissertations and theses database (Order No. 3206152). Retrieved May 10, 2014 from, 2005. http://search.proquest.com/docview/305383391?account id=28367 (305383391).
14. Kennedy AW. Laying the cornerstone, building the foundation: An analysis of a computer assisted vocabulary learning program as a tool for productive and receptive vocabulary learning in the foreign language classroom (Doctoral dissertation). Available from ProQuest dissertations and theses database (Order No. 3313725). Retrieved May10, 2014 from, 2007. http://search.proquest.com/docview/304892364?accounti d=28367 (304892364).
15. Lee DW. The impact of nurturing creativity in language arts classrooms for improving students' creative products (Doctoral dissertation). Available from ProQuest

dissertations and theses database (Order No. 3211919). Retrieved May 21, 2014 from, 2006. http://search.proquest.co, http://search.proquest.com/docview/304937333?accountid=28367 (304937333).
16. Malhotra SP, Kumari S. Language creativity test. Agra: National Psychological Corporation, 1990.
17. Malhotra SP, Kumari S. Manual for language creativity test. Agra: National Psychological Corporation, 1990.
18. Mammucari DR. A study to determine the impact of teacher training programs in creativity on improving observable traits of creative teaching (Doctoral dissertation). Available from ProQuest dissertations and theses database (Order No. 8920276). Retrieved May 10, 2014 from, 1989. http://search.proquest.com/docview/303805554?accoun tid=28367 (303805554).
19. Nag-Arulmani S. Language attainments and learning opportunities: Pointers for a new curriculum framework. New Delhi: NFG-English, National Council for Educational Research and Training, 2005.
20. Prabhu NS. Second language pedagogy (4thed.). Oxford, NY: Oxford University Press, 1987.
21. Salemic ML. Utilizing fluency, flexibility, originality, and elaboration to enhance creativity and vocabulary use for improving reading comprehension in third through sixth grade students (Doctoral dissertation). Available from ProQuest dissertations and theses database (Order No. 3443006). Retrieved May 10, 2014 from, 2010. http://search.proquest.com/docview/854048325?acc ountid=28367 (854048325).
22. Thorndike RL, Hagen E. Cognitive abilities test: Levels A to F (2nd ed.). Windsor, England: NFER-Nelson, 1986.
23. Underwood J. Linguistics, computers and the language teacher: A communicative approach. Rowley, Massachusetts: Newbury House. Retrieved January 20, 2017 from, 1984. https://en.wikipedia.org/wiki/Computer_assisted_language_learning.
24. Wang H. From cultural diversity to group creativity: Using language-retrieved pictures to support computer mediated intercultural brainstorming (Doctoral dissertation). Available from ProQuest dissertations and theses database (Order No. 3485121). Retrieved May 21, 2014 from, 2011. http://search.proquest.com/docview/906735496?accountid=28367 (906735496).
25. Warschauer M. Computer assisted language learning: An introduction. In S. Fotos (Ed.), Multimedia language teaching (pp 3-20). Tokyo: Logos International Retrieved July 31, 2014 from, 1996. https:// en.wikipedia.org/wiki/Computer_assisted_language_learning.
26. Warschauer M, Healey D. Computers and language learning: An overview. Language Teaching. 1998; 31(2):57-71.