Educational Research and Reviews Vol. 6 (5), pp. 432-435, May 2011
Available online at http://www.academicjournals.org/ERR
ISSN 1990-3839 ©2011 Academic Journals

Full Length Research Paper

Comparing traditional and computer assisted education in the teaching of colour to 6th grade students and determination of its retention

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Accepted 2 March, 2011

In this study, informing 6th grade students on the subject of colour was taught using traditional and computer assisted education methods. Colour information was taught by the researcher for 5 weeks in order to specify the influence of both methods on students. The test, which was prepared at the beginning of the study and at the end of five-week programme, was given to the students, and pre-test and last-test results were reported. The permanence of the training has been determined by applying the same test again to the students two months later. According to the results of the research, it is determined that colour knowledge? ($\bar{x}$ = 41.33) of the students receiving computer-assisted education is higher (t = 3.518; p<0.05) than the students receiving traditional education ($\bar{x}$ = 35.70) and that this same high score is maintained in the retention test applied two months later. The scores of the retention of education by computer assisted and traditional methods are respectively ($\bar{x}$ = 39.15) and ($\bar{x}$ = 32.40), the difference between the scores of the groups is found to be statistically significant.

Key words: Colour information, traditional education, computer assisted education, retention test.

INTRODUCTION

The human being follows a process of development which includes gathering information, and gaining experience from birth to death. Art glamorizes this information and these skills. Art and intelligence are parallel to each other. Art provides intelligence with improvement in the line of beauty. It can be stated that an interaction between intelligence and art is possible.

In general terms, art training is a creative education process in and out of school, which covers the whole of visual arts (Boydaş and Balci, 1997: 169). The aim of art training is to develop the capability of creativeness and thought, and intuition of the individual (Gökaydın, 1996: 27). In the present day with the latest science and technology, art training should utilise the innovations provided by technology instead of leaving it to chance. Thus, Art also requires the support of abstract values and concepts. Regarding the technology and education as inseparable, Engler (1972: 62) stated that by regarding education as a communication network between instructor, student and environment, it can be understood that educational technology has a crucial role in completing these relationship.

In Turkey, in 1984 the Ministry of Education introduced computer applications for the first time and in 1991 primary schools were provided with this computer technology (Doğdu and Arslan, 1993: 86). However, unfortunately, computer assisted education has not been implemented in a very functional way.

Numerous tasks, which are difficult or impossible to administer in the traditional environment, can be achieved with a computer. In art training, computers as educational instruments, facilitate individual learning by performing the tasks of many of visual and audio tools (Aşkar, 1991: 8). Pictures in educational programs are of great importance. Therefore, the existing system can be enriched and enhanced, and new learning materials and pocket programs in any field can be prepared by utilization of computers (Dyrli and Kinnaman, 1995: 5).

Children came into the world as equipped as an artist in emotional and physical terms. However, this facility is

an essence, which needs processing. The effective utilization of computers in the field of art training will support learning and improve success. Children should learn, in addition to turning the machine on and off, how to control the computer, operate programs and apply computer technology in various areas. It is of great importance for the children to have positive experiences with computers. The appropriate utilization of computers and development of appropriate programs will not only enable computers to be a part of a child's life but also effect their social ability and their capability to think (Papert, 1980).

Attention should be paid to the integration of computers into learning and teaching environments thus, enabling children to use the computers as natural tools for learning. Computers should be set up in the natural classroom environment and should be used as active tools facilitate the satisfactory integration of the computers (Swick, 1987: 16).

Uşun (2000: 36) compared computer assisted education and traditional education, and obtained the following results:

1) The tools (blackboard, picture, map, etc.), which are used in the traditional education, are unable to provide the required motivation because they appeal only to the visuality. On the other hand, in computer assisted education, learning becomes more permanent due to the use of various tools such as, sound, moving image, music, graphic that appeal to more senses.
2) In traditional education, programs are prepared according to the average level of the students. On the other hand, in computer assisted, education is arranged according to the short-step-principle. The units are prepared gradually from simple to complicated, from concrete to abstract.
3) Group teaching is regarded as principle in traditional education. However, computer assisted education enables the individual to advance according to his own learning speed by taking into consideration the characteristics of the individual.
4) In the traditional education the instructor, as a center of information, is more active when compared to the student. In computer assisted education the student obtains the information by himself and immediately gets feedback, and teacher performs the task of a consultant.
5) In traditional education, it is not possible for the students to access different kinds of information sources in the process of learning and teaching. In computer assisted education, it is possible to reach various sources of information (via the internet).
6) The lecture method and question-answer technique, which are applied in traditional education, are unsatisfactory in respect of appropriate motivation of the students. On the other hand, motivation is enabled with some arrangements, which provide students with giving the correct answers in computer assisted education.
7) The immediate measurement and evaluation of the learning level of students is not realized in the traditional method. The student will not notice the deficiencies by not obtaining the feedback that he should get. However, in computer assisted education student is given the answers to his completed questions before he gets through the next stage. For the correct answers he/she receives immediate reinforcement, and for the wrong answers he/she is given opportunity to correct him/herself.

These advantages and pluses of computer assisted education stand as a proven result. However, this situation does not mean to repudiate all the traditional education components. For instance, it should be taken into account that reading will enrich the emotions and intuitions of the students. This accumulation of emotion and intuition can naturally contribute to computer assisted education. In other words, computer assisted education, which is accompanied by a pleasurable reading habit, can provide the enrichment of abstraction in art.

In this context, the general aim of this study is to determine the influence of teaching the topic of colours within a visual arts course using a computer assisted education method on academic achievement and retention in learning.

The following hypotheses are tested in accordance with this general aim:

1) A statistical significance, in favor of the experimental group, exists between the post test scores of the experimental group, which was exposed to computer assisted education and the scores of the control group which was exposed to traditional education in instructing the subject of colour within the course of the Visual Art.
2) A statistical significance, in favor of the experimental group, exists between the retention scores of the experimental group, which was exposed to computer assisted education and the scores of the control group which was exposed to traditional education in the teaching of the subject of colour within a Visual Arts course.

METHODS

Research model

In this research, the subject of colour is taught to 6th grade students using two different methods. The success of the students is analyzed in terms of the methods by applying traditional education to one group and computer assisted education to the other group. For the purpose of determining the influence of the methods, multiple subject-single factor experimental patterns between the experimental models was applied. In this context, the research is conducted with the applications of pre-test, post test and retention test.

Study group

The research was carried out in 2007 60 6th grade over a five-week period. The "Equalized group method" is used in the equalization of

Table 1. Comparison of the general pre test scores of the groups.

Groups	N	$\bar{x}$	S.d	t-test	P-value
Pre- test					
Computer Assisted Education	30	16.60	1.50	1.390	0.169
Traditional Education	30	15.89	2.47		
Post test					
Computer Assisted Education	30	41.33	6.25	3.513	0.001
Traditional Education	30	35.70	5.93		
Retention test					
Computer Assisted Education	30	39.15	6.51	4.090	0.000
Traditional Education	30	32.40	6.00		

groups in the process of equalization, the pre-test results that were applied to the groups and the average success scores were taken into account. The equalized groups were impartially designated as the computer assisted group and the traditional method group among themselves.

Preparation of data collection instrument

In this research, a multiple choice test, developed by the researcher, was applied as the data collection instrument. Initially, a measurement instrument of 55 items, prepared in accordance with the views of experts in the field, was applied to a group of 300 students, then this instrument was reduced to 30 items taking into consideration the item capacity levels, item distinctive indexes and total item correlations. For the reliability test, Kuder-Richardson (KR 20) formula was applied. The reliability coefficient was determined as 0.80.

Collection of data

In a five-week period, colour information is taught to one group of students using a computer assisted education method and to the other group of students by the traditional method. In the application process, also the students that have been excluded from the scope of the research after the equalization process are trained together with the equalized group. In the course of teaching, it was observed that the students in the experimental group participated actively in the work related to the subject, and that the students that were excluded from the equalized group also enjoyed the application. At the end of the research, the success of the two groups in learning about the subject was compared by applying a post test to both groups. And 2 months after the application of the post test, by applying the same test to the groups, learning retention of the students about the subject was determined.

Analysis of the data

Analysis of the data, obtained from the application, was conducted using SPSS software. By calculating the pre-test and post test average scores and standard deviation of the test and control groups, the differences between groups before and after the experimental activity was tested as 0.05 in the level of significance using a “t” test applied to the dependent and independent groups.

RESULTS AND DISCUSSION

Utilization of computers in education environment enables the improvement of the level of information and retention in learning by appealing to numerous senses simultaneously (Clark and Craik, 1992). The scores and statistical evaluation results of the pre test, post test and retention test of this study, which were conducted in order to compare traditional and computer assisted education in teaching colours and to determine the retention of the learnt information are specified in Table 1.

A significant difference does not exist between the pre-test scores of the computer assisted and traditional educational groups. For this reason, it can be stated that students do not differ in terms of pre-condition learning or input behaviors ($t=1.390$; $p>0.05$), in other words, the groups are equal. The average post test score of the students, who received computer assisted education is $\bar{x}=41.33$, and the average post test score of the students who receive traditional education is $\bar{x}=35.70$. The difference (success) between the points of post test of the groups is found to be significant [$t=3.518$; $p<0.05$]. Considering this, computer assisted education provides a significant improvement in the success of the students on the topic of colour when compared with traditional education. This result shows that the improvements that are observed in the success of the students can be related to the processes that were carried in the computer assisted education. The average score in the students’ retention test, who received computer assisted education is $\bar{x}=39.15$ and the average retention test score of the students who received traditional education is $\bar{x}=32.40$. The difference of 6.75 between the scores in the retention test is found to be significant at the level of $\propto=0.05$ [$t=4,090$; $p<0.05$]. According this result, it can be stated that students receiving computer assisted education shows differences in terms of remembering what they have learnt and enables retention in learning when compared to traditional education, in other words it

can be stated that computer assisted education is more effective than traditional education.

To support education activities with visual and audio equipment provides enrichment based on the technological developments or availability of technology. It has been stated that traditional education is not concerned with a structure or process, which accepts the differences among the students in terms of the ability to learn, information level, educational background and objectives as a basis (Brusilovsky et al., 1998). Glennan and Melmed (1996) declared that in the educational environments in which computer applications of classroom are realized, success motivation for the subject and cooperation abilities of the students are all improved. The more the students' five senses are engaged in the trial and presentation process, the higher the proportion of remembering. Also, the method of instruction with sound and animations facilitates remembering what has been learnt in the computer assisted learning environment. In the various studies conducted in the field of computer assisted education, similar results have been obtained, and it is determined that for the computers to enrich the education environments with animations, stimulations, and sound, improves the quality and speed of learning (Walker and Hess, 1984; Hermann, 1988). In terms of application, conveying scientific concepts and principles visually to the students via appropriate teaching techniques and computer assisted education is more effective in increasing the student's motivation to learn when it is compared to other methods (Hounshell and Hill, 1989). The computer is regarded as an effective tool in facilitating the learning process and increasing the potential of the students and computer assisted education method is more effective in improving students' skills in mathematics, science, art and reading and writing (Fletcher-Flinn and Gravatt, 1995). For this reason, these results support the results of the study.

The average score of the students' retention test, who received computer assisted education is $\bar{x}$=39.15, and the average score of the students' retention test who received traditional education is $\bar{x}$=32.40. The difference of 6.75 between the scores of the retention test is found to be significant ($t=4.090$; $p<0.05$). According to this result, it can be stated that computer assisted education makes a difference in terms of students remembering what they have learnt and enabling retention in learning when compared to traditional education, in other words it can be stated that computer assisted education is more effective than traditional education. Verschaffel and colleagues (1999) stated that the results of the retention test did not deny the positive effects of the experimental learning environment in their studies.

Conclusions

The findings of the study show that, in the teaching of topic of colour, the experimental group who received computer assisted education show more improvement in academic achievement and retention in learning as compared with the control group that was exposed to the traditional education method. Furthermore, it was observed that the students in the computer assisted education group participated more actively in the course and that they enjoyed the course more. In this context, computer assisted education method can be utilized for other appropriate subjects within a visual art course.

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