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The impact of color application on the learning of 5th grade, primary school students from their perspective in Chevar District of Ilam city, Iran

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Abstract

Teachers, books, teaching methods, educational management and family have often been considered as fundamental elements in education. However, in modern education, color application during teaching and the physical environment and painting of schools in general, are also among those elements having significant impact on education quality of students. In order to examine the effects of color application on educational quality of 5th grade, primary school students from their viewpoint, the present study was carried out. The statistical universes of the study were the students of 5th grade of primary school in *Chevar District* of *Ilam City*. The number of subjects was 127. The statistical universe was limited, therefore; census method was applied. To collect data, a researcher-made questionnaire- including 19 close-test questions, was used. The validity of the instrument was obtained through getting professionals views and confirmations. To find the reliability, a pilot program which contained 30 questionnaires was executed and the estimated reliability was 0.75. Using x2 score, Fridman and Regression tests, analysis of the data was carried out. The results revealed the existence of a significant relation between color use in class and students' academic achievement (P: 0.034). Moreover, the usage of colour helps students for better attention (P: 0.000). Based upon the finding of the study, the effectiveness ranking of 3 factors was estimated: color use in educational environment, kinds of the colors used in education and use of color by the teacher. Teaching instruments in colour were found to rank first and have the highest effect on learning (P: 0.000). The findings of regression test showed those 3 factors could anticipate academic achievement (P: 0.000) and among those 3 factors, use of color by the teacher could be a predictor for academic achievement.

Keywords: Color, Learning, Primary school students, Chevar district, Ilam City, Iran.

Introduction

On the threshold of 3rd millennium, the role and function of schools has significantly changed (Ghanbari *et al.,* 1387). The teaching atmosphere is an important, effective factor in educational system in which all educational objectives take shape by parents, principal, staff, teacher and student (Coplin, 2011). The effects of variables such as sound, light, color, temperature, the view of school building and size of educational environment, chairs and board can by no means be ignored since they are closely related to the level of students concentration and their physical and psychological conditions, having considerable effect on learning process, in turn (National Scientific Council on the Developing Child 2010). Color has energy; so, it has physiological and psychological effects. The changes made by color in our eyes affect muscles, mind and nerves activities (Daggett *et al.,* 2008). It can be said color is the fastest way of massage-transfer of all kinds of non-verbal communication means. Color stimulates, commonly, all senses and emerges in objective concepts and ideas. It expresses dreaming and wishes or reminds us of another time and place (Barret & Julie, 2011) and it brings about on aesthetic of emotional response.

Color in educational environment provides a secure place which improves visual processing, reduces the tension and challenges of brain development through stimulation, visual relations and patterns. Visual stimulation, in fact, rearranges brain relations and by doing so, it strengthens the relation, on one hand; and it stimulates creativity, problem solution and visual reflection on the other hand (Daggelt *et al.,* 2008). Colorful images can teach effective thinking, particularly important skills of visual thinking (Faramarzi, 1382).

Color diversity reduces tiredness and passivity; therefore, for a classroom to reduce monotony, a combination of different colors (based on age, gender and lesson) is recommended (Daggett *et al.,* 2008).

Color is an important factor in physical environment of learning and it has effects on academic achievement of students. Studies reveal, depending on the culture, age, sex and the level of development, special colors have direct effect on health, morals, emotions, behaviors and performance of the learners (Daggett *et al.,* 2008). Color, even, reduces absence, violence and destructive behavior of the students (Daggett *et al.,* 2008).

The proven efficiency of color in improving the concentration of the students and also using time more efficiently is another confirmation of color impact to optimize learning process of school students; color stimulates the brain unconsciously to retain students' focus on lessons. Schools that used

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good lighting and colors obtained the highest level of academic achievement (Engelbrecht, 2003). Despite the fact that light and color have great impact on learning, teachers are often attracted to colors used by the students, demonstrating their nature and emotional life and ignore the effect color has on teaching of children. Since the related studies are limited, teachers don't regard color as an efficient medium in education. To cast more light on this issue, the present research was carried out in Chevar District of Ilam city upon have the Impact of color application on the learning of 5th grade, primary school students.

Materials and methods

Research objectives

The research objectives are as follows: a) To study the impact of 3 factors (The color use by teacher, the teaching instruments in color and the color use in teaching environment) on student's attention. b) To determine the impact of 3 factors on the level of students learning. c) To determine the ranking of 3 factors on learning of the students. d) To determine the anticipator of school achievement among 3 factors.

Research methodology

In this study, the researcher has examined the impact of color application on learning of 5th grade of primary school.

The research is descriptive and of a survey kind. The statistic universe includes 61 girls and 66 boys of 5th grade in Chevar District of Ilam City. The statistic sample contains 99 students (65 girls and 34 boys). Since the statistical universe was limited (127 people), census method was used for those 99 responded.

To collect data, a researcher-made questionnaire - including 19 close-test questions - was used. Academic achievement of the students, in this questionnaire, was assessed by questions; number 6, 22 and 23, i.e. their final scores in arts, mathematics and literature. The variables; learning of students and level of their concentration were also assessed through questions set in questionnaire.

Validity of instruments was confirmed by some experts and professionals in educational science and psychology. Applying their views, corrections and modifications were made, the final questionnaire was drawn up. Reliability was obtained through a pilot program and the estimated figure was 0.75. Data analysis was done by X2 score, Friedman and Regression tests.

Table 1. The results of X2 test to assess the impact of color use upon students' attention

The difference of frequencies	The expected frequencies	The observed frequencies	Items
24.5	24.5	49	Colored Images
2.5	24.5	22	Colored Scripts
-20.5	24.5	4	Black Lines
-1.5	24.5	23	Big Lines

Analysis

Research findings

Hypothesis (1): color application by teacher increases the level of concentration of attention upon lessons taught in the class. With regard to the results of Table 1, the most percentage of participants (about 50%) stated using colorful images while teaching is an effective medium to pay more attention in classroom.

Table 2. The results of X2 test to assess the impact of color use at the time of teaching upon students' attention

Parameter	Test
42.000	X2 Score
3	Degree of Freedom+
0.000	Level of Significance

Hypothesis 2: The 3 factors teacher using color, teaching instruments color, color use in educational environment) are effective in learning of the students Table 2. Table 3 shows 3 factors; color use by teacher (P: 0.000), and color use in educational environment (P: 0.000) are effective in learning of the students. Hypothesis 3: There are differences in the ranking of 3 factors based on the level of their effectiveness in learning.

Table 3. The results of X2 test according to the effect of each 3 factors on learning of the student

Test	Color use in teaching environment	Color in teaching instruments	Teacher's color Use
Chi-Square	74.780	95.600	65.180
d.f.	2	3	2
Asymp.Sig.	0.000	0.000	0.000

The findings of Table 4 demonstrate the existence of a significant difference in the ranking of 3 factors effectiveness in the learning of students. Based on the obtained results in Table 4, colored teaching material and instruments have the highest effect (average of 2.72) in learning.

Hypothesis 4: The 3 factors own the potentials to predict academic achievement.

Based on multi-variable Regression test and according to Table 5 to define academic achievement through anticipatory variables (color use by teacher, colored teaching materials and instruments, color use in teaching environment), it is observed color use by teacher (P:0.470) is the strongest variable to predict and anticipate academic achievement of the students. Moreover, the relation of anticipatory variables (color use by teacher, color in teaching materials and instruments, color use in teaching environment) with criterion variable is significant, on the basis of regression coefficient analysis (t: 3.665) with level of significance (P: 0.000).

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Table 4. The results of hypothesis 3, ranking difference based on the level of effectiveness in learning of students

Fried Man Test		Mean Ranking	Component
Number	100	1.35	Color Use in Teaching Environment
X2	126.69	2.72	Color in Teaching Instruments
Degree of Freedom	2	1.94	Teacher's Color Use
Level of Significance	0.000		

Table 5. Regression co-efficients of school achievement anticipatory factors

Level of Significance	Non Standardized Coefficient		Standardized Coefficient	T Test	Items
	Beta	Std.Error	Beta		
0.000	4.267	1.164		3.665	Constant Coefficient
0.000	0.234	0.045	0.470	5.183	Teacher's Color Use
0.912	-0.011	0.101	-0.010	-0.111	Color Use in Teaching Environment
0.506	-0.056	0.085	-0.060	-0.668	Color Teaching Instruments

Discussion and conclusion

Usage of colour and its role has been a recent concern of psychologist and educational experts. In spite of the great impact of color on academic achievement, the research in this area has been insufficient. Yet, the results of handful researches did in this area prove the significant effects of color application on education and learning.

The results of the study showed 3 factors (color use by teacher, color in teaching materials and color use in educational environment) have remarkable impact on students to be more attentive in class (P:0.000). The obtained results assert the fact that in order for learning process to increase its output (profitability), color and image application are certainly effective. In fact, through attention to a special color, students could catch the lessons better. They are more enthusiastic to solve the problems when color is used for background and picture and designs are used to decorate the reading passages and materials. In an article entitled, "Color in an Optimum Learning Environment" Daggett et al. (2008) state that color, keeping the environment out of monotony, improves the domain of students' attention and by stimulating their minds preserves their attention so that they can achieve better academic results. The results of the study are consistent with the study done earlier (Engelbercht, 2003). Moreover, it was determined that 3 factors; color use by teacher (P: 0.000), color in teaching instruments (0.000) and color use in educational environment are effective in learning of the students. Colors can be applied as an instrument to serve thinking and learning of the students.

It is important to point out color use either in the painting of walls and interior design of classes, or in instruments and its use by teacher has a great impact on student's energy, efforts, happiness and learning. Finally, Housen *et al.* (2001) states that learning happens when students have interaction with their environment (including individuals, objects and phenomena) and think over them. The impact of a variable such as color, due to its relation with students' senses and its effects upon learning and educational processing, can by no means be overlooked. Thompson and Sheri (2011) in an article entitled "Color in Education" indicates the choice of special color in school can strengthen or weaken learning. The result of the present study is consistent with Kandan Del and Behrouz (1386). In this research, it was observed that the ranking of 3 factors, based on the range of their impact, is significantly different (P: 0.000). The findings demonstrated the color in teaching materials and instrument have the highest impact on teaching. There was no other research on this subject. The results also revealed a significant relation exiting between anticipatory variables (3 factors) and criterion variable- academic achievement (P: 0.000). Color use by teacher; B: 0.470 is the best variable to anticipate and define academic achievement of the students and the results are consistent with those of Thompson and Sheri (2003) by the title of "Color in Education". Thompson states, "Pay regard for color that not only does its own decorative patterns and models but it also has impact on academic achievement and students' performance". In an article: "Design to Maximize Student Performance", Francis, Ken (2011) asserts, "School achievement is the most important criteria to assess quality of schools. A proper design of school facilities and educational equipment has an effective role in students' success. The results are in consistency with those of Kandan Del and Behrouz (1386).

Suggestions

Concerning the results of the study, the following propositions are offered: 1. To realize the desirable benefits of color application, age, sex and function of the learners are of a great concern. To introduce only a particular color in all schools across the country is not practical. 2. School officials are recommended to have concern over kinds of colors and painting of schools so that it could bring about the required potential to achieve educational objectives. Color builds an educational system in which important components can be better

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distinguished form unimportant ones. 3. It is essential to correct the attitude of teachers and school officials about teaching environment. The difference between an educational class and ordinary class, in their nature and quality - should be notified; through holding workshops and seminars, it could be realized.

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