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Comparison Affection of Peer tutoring on the Attitude to ward Mathematical, Physics and English languages

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Abstract. The purpose of the current research was to investigate Comparison Affection of Peer tutoring on the Attitude toward Mathematical, Physics and English languages lesson. Random sampling method was used. Therefore, 73 students selected from statistical society, and were put randomly in to3 groups: Mathematical (n= 24), Physics (n= 25) and, English Languages (n= 24). Aiken's Questionnaire (pre-test) was used. The 3 groups were put under peer tutoring for 9 ninety- minute- session. When the training finished, The Questionnaire was conducted for students for a second time (past-test). After exploiting the scores for both groups, the result of ANCOVA in a Significant ($p \leq 0/05$) showed that peer tutoring method has had a Significant positive affected on the General attitude of Mathematical, Physics and English language. This method has had a Significant positive affected of pleasure, Motivation, Emphasize and Fear of Mathematical, Physics and English language but hasn't had a Significant difference between groups, Moreover the result of T test in a Significant ($p \leq 0/05$) showed that peer tutoring method has had a Significant difference on the General attitude of Mathematical, Physics next Math, English language. Among the three groups, the greatest impact of Peer tutoring in the Physics next English languages. Hadn't has influence strongly the attitude toward Math.

Keywords: peer tutoring, attitude, Components of Attitude

1. INTRODUCTION

According to Bruner, one of the world's experts in the field of education, education systems need a movement in which with a deeper requirement it is specified where they are going and what kind of trained human beings they need in future. In this case education experts can determine a clear framework for the development of education and training (Kodadad Nejhad, 2009). Identifying the factors affecting educational learning is undoubtedly the main guiding axis in most sequence learning psychologist researches. Bloom (1984, quoted in Ostevar et al 2012) in explaining his educational theory puts forward three dependent variables which if considered carefully enable the educational institution to have an educational system without errors. These three variables which are critical in Bloom's theory include:(A) students' proficiency on the prerequisites of the intended learning, (B) the student's motivation for learning (or they can have), (C) appropriateness between the amount of educational methods with the characteristics of students (Ostevar et al, 2012). Shaping of attitudes at first begins as a learning process. During this process the individual experience a particular object or subject and as the result of reinforcement and imitation processes attains an attitudes towards it, when this attitude is shaped the principle of cognitive stability gains increasing importance. This means that the individuals interpret the new information based on what they have already learned. As a result they reject or modify the incompatible data and easily accept the compatible information (Pahlevan Sadegh, Kajbaf, 2011). Researchers believe that a significant portion of the changes in educational achievement of the students in a specific subject stems from their viewpoint and attitude toward the subject matter. Dr. Ali Akbar Seyf (2007) in this regard states that 25% of the variance of the student's educational achievement is shaped by their emotional readiness and attitude. Among all the factors affecting learning motivation is more important. Three important

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factors in learning are said to be: 1. motivation 2. motivation 3. motivation. (Mousavi Nasab, 2009). Iranian students do not have a clear picture of themselves, their abilities and attitudes; also they give little importance to each lesson (Kiamanesh and Meraji, 2011). Because of the widespread use of mathematics in everyday life, learning and education of math is considerd as an important priority for students and teachers all over the world in a way that the best predictor for the economic success of the students in society is having competence in mathematics. However, according to the studies of the Institute of Education (2009 Mousavi, 2012) it can be seen that due to its abstract nature, mathematics is neglected and ignored by the students. Razavieh, Seyf, Taheri (2005) quoting Tobias (1993) has reported that so far, millions of people have lost jobs and educational opportunities because their fear of math and poor performance in this subject . At school they had negative experiences regarding mathematics leaving them with that memory for many years. Interference of the negative emotions stemming from these experiences with the information they have had in the mathematical context has led to a problem in understanding math. Other studies have shown that the students' motivation for learning is more important than intelligence. Also, strong motivation leads to learning properly, and low motivation leads to learning less. In fact, motivation is the driving force for effort and activity to learn and maximizes the students learning ability. Unmotivated student not only is reluctant to study and learn but perhaps with their indifference and inattention bother the other students in the class (Mousavi Nasab, 2009). Razavieh, Seyf, Taheri (2007) in their research showed that the strongest predictor of educational achievement in math is the attitudinal component of gratification; in other words, the students who enjoy being involved in the situations that requires the use of math and have a sense of belonging to mathematics benefit from progress in this course, are less anxious when taking math exams and experience feelings of restlessness and confusion less than others in this regard. Finding of Sadegh Pahlevan, Kajbaf, (2011) suggests the direct and significant impact of the process of mathematical education on attitudes toward mathematics, also the direct and significant impact of the structure of beliefs and values on the processes of education and attitudes towards learning mathematics. The main problem of the students regarding learning physics is their negative attitude and viewpoint towards the applicability of the entries and the relation of the content of the lessons with everyday life. (Shekari Kashani et al., 2010) .Findings of Khazae, Kamian (2005), indicated that in terms of educational achievements there are significant differences between the traditional method of problem solving and the traditional method. Also there is significant difference between these two methods in the amount of educational attitudes towards physics. The results obtained from English language shows that it is one of the courses that especially in high education accounted for the highest educational failure (Kalanatri, Gholami 2013). Education Organziation does not get satisfactory results despite spending enormous amounts of money and investing heavily for seven years on the education of English. Mafton (1997) states that the fundamental problem in learning the foreign language in Iran is that after thirty year, still there is not a written programs or a specific or clear policy for teaching the foreign language. According to Mentel Bruml(1995 quoted in Agha Ahmadinejad, Mobashernia, 2007) attitudes influence the teaching and learning of foreign language and are considered a kind of emotional and evaluative response, while many high school students are not willing to learn English at high school. The results of the study of the role of interaction in learning a language shows that the interaction provides an opportunity for the learners to practice what they have faced during learning process and as a result complete their learning (Pica et al., (1996) quoted in Alavi, Keihan PAnah, 2003). Every year the Education Organization spends great amount of money on education planning, writing, English language teacher training, and printing books but the result of this investment and expenses is the graduation of the students who after years do not reach an acceptable level of language knowledge and ability. Basically, there is a great distance between what is achieved and what must have been achieved. Looking at the language level of those students who have entered university we find out that almost except those of high school graduates who have been trained in the private language institutes, the rest are not in a desirable level in terms of knowledge of

English. This suggests that the middle and high school education is not effective. Kalanatari, Gholami (2013) state that the reason for the failure and lack of development of English is using methods of teaching English in Iran which are mainly "translation grammar oriented" and believes that: "Although in recent years new techniques are recommended unfortunately still we don't see significant progress and success in the process of learning English in our country. In recent years great efforts have been put into improvement of educational programs and teaching methods. Evidence shows that some of these methods are very effective compared to others and lead to the students' better learning but still one of the basic problems of teachers is selection of appropriate teaching methods and enhancing the amount of learning progress of students and thus creating motivation for learning (Shekari Kashani et al., 2010). Very old methods are used in our children's classrooms. If we want to prepare them to be the workforce in the future we should have an understanding of modern training methods. Appropriate these methods in accordance with our capabilities and needs and later benefit from them in the classrooms. Khdadadnezhad (2009) states that research on teacher assistant shows that this method is effective in improving students' educational achievement and the development of important social attitudes. Robert Slaven (quoted in Seifi, Javan, Abi 2013) argues that this method leads to a change in attitude and thus increasing interests and respect among students with various racial and ethnic groups, improving the social acceptance of ordinary students by the classmates, fostering the sense of friendship among them, increasing self-steam, and interest in education and discussed topics. Evidence suggests that Iranian students are not willing to work together. Most of them believe that their peers don't have enough knowledge of language to help them and to offer proper solutions. They refrain from teamwork which provides appropriate situations to give and receive feedbacks and preferred individual work. In fact, we can say that students are not group oriented and lack the stong motivations to participate in group work. (Alavi, Keihan panah 2003). Talmud clearly stated: to learn, the individual should be a learning partner. Quintilian says students can take advantage of training each other. (Johnson and Johnson, 1977, quoted in Khodadad nejhad 2009) The issue of attitude and its great importance is shaping to people's lives is an undeniable reality. This is paid attention every day more than before by specialists and the general public. How we should change the attitudes is in issue often neglected. Thus the present study tries to compare the effectiveness of peer teaching in mathematics, physics and English.

2. METHOD

The method of the present study is experimental. Statistical population included all students of the first grade of high school in one of the districts of Tehran (N=149). Among the 6 classes of the first grade, 3 classes were selected and their students were randomly divided into three groups of Math (n=24), Physics (n=25), and English (n=24).

Aiken's Attitude Scale was used for collecting the required data. This scale consists of 24 items based on a 5-point scale from totally agree to totally disagree and measures four emotional processes towards Math, Physics, and English (Sharifi, 1976. These items are graded reversely from 5 to 1 and the score each subject gives to each item is converted into the range of 20 to 100. Structural validity of this scale has been confirmed by Tyler (1979) (Razaviyeh *et al*., 2005). To investigate the reliability of the scale, Cronbach's alpha coefficient or internal consistency were used (Sharifi *et al*., 2010). The coefficient obtained for the whole scale was 0.86 and for each of the items was equal to 0.82-0.89. This indicates a high internal consistency between the scale items.

In the first session of trial, attitude test (pretest) was done, students were grouped, and the top students were chosen and trained.

Program of English group:

1- Sessions 2 to 5: Teaching conversation, vocabulary, and grammar and taking an exam on the taught materials by the top students based on the determined policy; asking and solving the mistakes, written exam, and correction of exam sheets and solving the mistakes (7 groups and 7 teacher).

2- Sessions 6 and 7: Watching the videos of Magic English and preparing a summary of them in English.

3- Sessions 8 and 9: Free discussion and hot seat.

4- Session 10: Poster designing in English on an optional subject by Publisher software.

Program of Physics group:

1- Session 2: Teaching, asking, solving the mistakes, and written exam on Chapter one.

2- Session 3: Asking, solving the mistakes, written exam, and correction of exam sheets and solving the mistakes on Chapter 2.

3- Session 4: Teaching Chapter 3.

4- Session 5: Teaching the first part of Chapter 4.

5- Session 6: Teaching the rest of Chapter 4 and part of Chapter 5.

6- Session 7: Reviewing the previous taught chapters.

7- Session 8: Teaching the last chapter.

8- Sessions 9 and 10: Designing a poster on the game with Physics and its concepts.

Program of Math group:

1- Session 2: Teaching Absolute Value, making some rational numbers, radical forms, writing in math language, and factorization.

2- Session 3: A review on Absolute Value, making some rational numbers, radical forms, writing in math language, factorization, and additional practices.

3- Session 4: A review on the second chapter and correction of mistakes/

4- Session 5: Teaching the third chapter; exponentiation (Algebraic expressions).

5- Session 6: A review on what taught in the first semester.

6- Session 7: Topics related to line.

7- Session 8: Two-equation, two-variable system and trigonometric solution.

8- Sessions 9 and 10: Designing a poster on the game with Mathematics.

Teaching, asking and correcting the mistakes, written exam, and correction of exam sheets and solving the mistakes were part of all sessions.

3. FINDINGS AND RESULTS

Table 1. Descriptive statistics index of the effects of peer tutoring on general attitude of mathematics, physics and English of the studied groups.

group	Source	Total(pretest)	Total(posttest)
Mathematical	Mean	74.2708	72.6042
	N	24	24
	Std. Error Difference	13.52068	15.37831
Physics	Mean	57.5333	67.3667
	N	25	25
	Std. Error Difference	11.71735	17.52591
English language	Mean	68.5069	75.7986
	N	24	24
	Std. Error Difference	14.64759	16.44137
total	Mean	66.6438	71.8607
	N	73	73
	Std. Error Difference	14.90193	16.63279

Table 2. Summary table of covariance for the effects of peer tutoring on the mathematics, physics and English attitude with the control of the pretest attitude variable.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
total1	9280.558	1	9280.558	65.692	.000	.488
group	1047.013	2	523.507	3.706	.030	.097
Error	9747.874	69	141.274			

The results of table 2 show that the significance level of F is 0/030 which is smaller than alpha 0/05. It can be concluded that after removing the effect of pre-test the teaching method of the peers has caused a change of attitudes toward teaching mathematics, physics and English in the studied groups. The amount of the effect of test is 0/097. There was a strong relatinoship between scores on the test before the intervention, and after the intervention in the overall attitudes test towards mathematics, physics and English. The amount of its effect was 0/ 488. To achieve this goal of determining which created difference is more t-test was performed in two independent groups and the results are shown below.

Table 3. Descriptive statistics index of the effect of peer tutoring on the general attitude towards mathematics and physics in the studied groups (difference between the scores of pre-test and post-test).

group	N	Mean Difference	Std. Deviation	Std. Error Difference
Mathematical	24	-1.6667	11.21270	2.28878
Physics	24	10.0000	13.80287	2.81750

Table 4. Independent t-test of the effect of peer tutoring on the general attitude toward mathematics and physics in the studied groups (considering the difference between pre-test and post-test scores).

Source	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	Mean Difference	Std. Error Difference	df	t	Sig. (2-tailed)
Mathematical& Physics	1.966	0.168	-11.66667	3.62999	46	-3.214	0.002

According to Tables 3 and 4 the achieved significance level regarding the change of attitude towards math and physics , the obtained t-test is -3.214 and significance level of 0/002is less than 0/05,Therfore, it can be said, peer tutoring can change the attitude of the studied groups towards mathematics and physics and the impact on physics is more effective than the impact on attitude towards mathematics.

Table 5. Descriptive statistics index of the effect of peer tutoring on the general attitude toward Physics and English in the studied groups (considering the difference between pre-test and post-test scores).

group	N	Mean Difference	Std. Deviation	Std. Error Difference
Physics	24	10.0000	13.80287	2.81750
English language	25	7.2333	10.58672	2.11734

Table 6. Independent t-test of the effect of peer tutoring on the general attitude toward Physics and English in the studied groups (considering the difference between pre-test and post-test scores)ç

Source	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	Mean Difference	Std. Error Difference	df	t	Sig. (2-tailed)
Physics & English language	3.593	0.064	2.76667	3.50542	47	0.789	0.434

According to Tables 5 and 6 the achieved significance level regarding the change of attitude towards physics and English, the obtained t-test is 0/789 and significance level of 0/434 is more than 0/05, Therfore, it can be said, peer tutoring cannot significantly change the attitude of the studied groups towards physics and English and considering the obtained means these two grupts have been similarly influenced by the peer tutoring.

Table 7. Descriptive statistics index of the effect of peer tutoring on the general attitude toward mathematics and English in the studied groups (considering the difference between pre-test and post-test scores).

group	N	Mean Difference	Std. Deviation	Std. Error Difference
Mathematical	24	-1.6667	11.21270	2.28878
English language	25	7.2333	10.58672	2.11734

Table 8. Independent t-test of the effect of peer tutoring on the general attitude toward Mathematics and English in the studied groups (considering the difference between pre-test and post-test scores).

Source	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	Mean Difference	Std. Error Difference	df	t	Sig. (2-tailed)
Mathematical English language	0.271	0.605	-8.90000	3.11423	47	-2.858	0.006

According to Tables 7 and 8 the achieved significance level regarding the change of attitude towards math and English, the obtained t-test is -2.858and significance level of 0/006 is less than 0/05, Therefore, it can be said, peer tutoring can change the attitude of the studied groups towards them and the impact on English is positive and meaningful in comparison with attitude towards mathematics.

Table 9. Descriptive statistics index of the effects of peer tutoring on the attitude components of mathematics, physics and English in the studied groups.

group	Source	Pleasure (pretest)	Pleasure (Posttest)	Motivation (pretest	Motivation (Posttest)	Emphasize (pretest)	Emphasize (Posttest)	(pretest) Fea	Fear (Posttest)
Mathematical	Mean	69.166	72.50	70.000	67.638	79.583	74.305	78.333	75.972
	N	24	24	24	24	24	24	24	24
	Std. Deviation	17.754	19.714	19.756	19.122	9.990	11.483	16.418	19.3361
Physics	Mean	58.800	67.6	x.000	63.866	56.266	64.666	63.066	73.333
	N	25	25	25	25	25	25	25	25
	Std. Deviation	15.241	19.96	16.158	18.823	15.102	21.256	13.330	17.795
English language	Mean	62.222	71.66	65.833	75.277	75.555	78.05	70.416	78.194
	N	24	24	24	24	24	24	24	24
	Std. Deviation	21.165	22.113	19.763	19.259	9.7141	15.476	18.212	17.472
total	Mean	63.333	70.54	62.465	68.858	70.274	72.2374	70.502	75.799
	N	73	73	73	73	73	73	73	73
	Std. Deviation	18.442	20.442	19.930	19.398	15.632	17.374	17.057	18.070

Table 10. Summary table of covariance for the effects of peer tutoring on the attitude components of mathematics, physics and English by controlling the variable of the pre-test attitude component.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pleasure(pretest)	14409.447	1	14409.447	64.810	.001	.484
The effect of peer tutoring	264.303	2	132.151	.594	.555	.017
Error	15340.998	69	222.333			
Motivation (pretest)	7748.150	1	7748.150	30.208	1.00	.304
The effect of peer tutoring	1205.125	2	602.563	2.349	.103	.064
Error	17697.980	69	256.492			
Emphasize (pretest)	5989.068	1	5989.068	30.845	1.00	.309
The effect of peer tutoring	733.500	2	366.750	1.889	.159	.052
Error	13397.506	69	194.167			
Fear (pretest)	7828.154	1	7828.154	35.090	1.00	.337
The effect of peer tutoring	793.534	2	396.767	1.779	.177	.049
Error	15393.142	69	223.089			

The results of tables 9 and 10 show: regarding amount of enjoyment: significance level of F is equal to 0/555 which is more than the alpha 0/05. It can be concluded that after removing the effect of the pre-test, peer tutoring method has not made a significant difference in increasing the enjoyment of mathematics, physics and English in the studied groups and had the same impact on amount of enjoyment of mathematics, physics and English. The amount of effect of the test is 1/7. Regarding motivation: significance level of F is .103 which is more than the alpha 0/05. It can be concluded that after removing the effect of the pre-test, peer tutoring method has not made a significant difference in increasing the motivation in mathematics, physics and English in the studied groups and had the same impact on amount of motivation in mathematics, physics and English. The amount of effect of the test is 6/4. Regarding emphasize significance level of F is 159 which is more than the alpha 0/05. It can be concluded that after

removing the effect of the pre-test, peer tutoring method has not made a significant difference in increasing the emphasize in mathematics, physics and English in the studied groups and had the same impact on amount of emphasize in mathematics, physics and English. The amount of effect of the test is 5/2. There was no relationship between the pre-intervention and post-intervention scores and amount of emphasize on mathematics, physics and English in the groups. The amount of the effect is .309. Regarding fear significance level of F is 0.177 which is more than the alpha 0/05. It can be concluded that after removing the effect of the pre-test, peer tutoring method has not made a significant difference in amount of fear of mathematics, physics and English in the studied groups. The amount of effect of the test is 4/9. There was no relationship between the pre-intervention and post-intervention scores and amount of fear of mathematics, physics and English in the groups. The amount of the effect is 33/7.

4. DISCUSSION AND CONCLUSION:

The findings of the present study is consistent with the results of: Cooper et al (1996), Jacobs et al (1996), Lei inn & Zaslavsky (1997) on changing the negative attitude towards the mathematics referring to effectiveness of cooperative learning in mathematics, and (Sobhani Nezhad, Fardayi, Abedi, 2011) Matson (1980), Forsyth (1995) Davison Neel (2001), which referred to attribution restricting, and Jordan (2002) Fuchs et al.(2003), which noted the interactive learning in small groups. On its causes it can be said that the attribution restricting method is based on the assumption that the attributions relating to the causes and outcome are an important part of the interpretations of the people of those outcomes, and with changing of these attributions we can change the individual's behaviors. John and Parvin believe that the assumption of attributive restricting is that the attributions related to the causes of the outcomes are important parts of people's interpretations of the outcomes and by changing these attributions we can change and reform the attitudes, values and wrong beliefs that lead to the restriction of the individual's behaviors. Davison and Neel (2001) regard the change of style of inappropriate attribution of the students as the aim of attribution restricting; it means that the students who attribute their failures in some courses to their low capabilities learn to change their inappropriate attributions. The aim of attribution restricting is to change the style of inappropriate attribution of the students. (Sobhani Nezhad,Fardayi.Abedi, 2011). The most important motivational factor influencing meaningful learning is cognitive drives. According to Azbel cognitive drive is an internal motivation which stems from the curiosity and interest of the learner to explore, manipulating understanding and dealing with environment. Drives or cognitive interests are mainly acquired and based on the specific experiences of the learners. When learners are successful in learning the materials and are satisfied with it, they would be motivated to learn more (Habibi, 2011). Experts in education believe that the students who learn through collaboration not only learn better, but enjoy learning better because instead of just being a listener actively participate in the learning process and consider themselves responsible for their own learning. One of the active methods which nowadays is noticed by many education experts is peer learning. Peer interactions enable the participants to have a clear experience of common interests and efforts, equal distribution of power, trust and honesty. Discussion in small groups will lead to monitoring of the students' learning and therefore leads to their independence in learning and studying. (Morteza Karami et al., 2012) Researches suggest that students wish to receive feedback from their classmates. In collaborative learning students are more likely to make and receive feedbacks. Without the presence of the teacher, they learn how to create feedback. In fact, in lingual activities learning to create feedback in the absence of a teacher as a guide occurs naturally (Murphy (1987) quoted in Alavi, Keivanpanah 2005). Interviews with students also confirmed this and showed the students without the teacher feel freer to express their opinions and can more easily share their weaknesses with their classmates (Cornell 8 2000 quoted in Alavi, Keivanpanah 2005). According to the theory of

self-determination Dessi and Ryan (1995 quoted in Kodashenas et al 2013) stated that intrinsic motivation is created when a peer teacher gives students more freedom. Using technology and group discussions help them create motivation for learning. Kashvo's studies (2006 Sarojani et al. 2013) showed : The role of the teachers (their character and teaching methods) shapes the motivation and attitude of students for learning English. When the learners come to class with low intrinsic motivation they happen to be motivated by the peer teacher's choice of stimulating method and personality trait. (Oreo 2013) Creating new, creative, interesting and controversial works by peer revives the students lost interest. Regarding the reason for the fact that why the peer's methods towards the mathematics had no significant effect on physics and English Kagan (1994) and Fenma (2000) indicated that girls compared with boys show more negative attitudes toward mathematics; this means that girls regard mathematics as the realm for the boys and think it is appropriate for them, while the boys themselves do not have such attribution and attitudes toward mathematics. the findings based on observation of the reraserch suggests that that the group has started with high motivation and after a few sessions they staterd to lose ineterst . This finding is consistent with the results of Alavi and Kievanpanah (2005) stating that the Iranian students are not willing to do group work .Most of them believe that their classmates lack the necessary knowledge of language to resolve their problems and to provide appropriate solutions. They refuse to do the group work that provides the best opportunity to give and receive feedback and preferred the individual work. It seems utilizing one approach for a long time is boring while short sessions can have a more favorable effect on the students.

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