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Relationship Between Learning Style and Intelligence in Learning English Among Monolingual and Bilingual Students

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Abstract: *The study has investigated the relationship between learning styles and intelligence with academic achievement in learning English as a foreign language among male and female monolingual (Farsi Speakers) and bilingual Students (Farsi and Azerbaijan-Turkish Speakers) in Islamic Azad University-Central Tehran Branch and Khoy Branch, using Felder-Soloman questionnaire. The findings have shown monolinguals are better at visual learning styles and bilinguals are better at verbal learning styles. With regards to the achieved results, it can be concluded that bilingual students learn via senses, events, and observations because of their affective learning style. On the contrary monolingual students learn through symbols and interpretations because of using intuitive learning style. Also monolinguals learning style is visual and bilinguals learning style is verbal. Since bilingualism requires more mental activity, bilinguals use two means for communication and also learning. Thinking is a verbal process therefore they use two languages for thinking and other mental activities, and their potential capabilities develop and their cognitive learning is than monolinguals. The study shows that gender influences learning styles and female students' learning styles are different from male students' learning style and also it depends on the subject to be learnt.*

Keywords: *monolingual, bilingual, intelligence, learning styles, academic achievement, English language*

İngilizce Öğrenen Tek ve Çift Dilli Öğrencilerde Öğrenme Yöntemi ve Zeka İlişkisi

Bu çalışmada İslami Azad Üniversitesinin Tahran Merkez Şubesi ve Hoy Şubesinde tek dilli (Farsça konuşanlar) ve çift dilli (Farsça ve Azerbaycan -Türkçesi konuşanlar) erkek ve kız öğrenciler arasında yabancı dil olarak İngilizce öğrenmede akademik başarı, zeka ve öğrenme yöntemleri arasındaki ilişki Felder-Soloman anketi kullanılarak incelenmiştir. Bulgular görsel - sözel öğrenme yöntemlerinde tek dillilerin çift dillilerden farklılık sergilediğini, tek dillilerin görsel çift dillilerin ise sözel öğrenme yöntemlerinde başarılı olduğunu göstermiştir. Elde edilen sonuçlar doğrultusunda, çift dilli öğrencilerin duyusal öğrenme yöntemlerinden duyular, olaylar ve gözlemler yoluyla öğrendikleri sonucuna varılmıştır. Tek dilli öğrenciler ise sezgisel öğrenme yöntemindeki semboller ve yorumsal yolları kullanarak öğrenmektedirler. Ayrıca, tek dilliler görsel çift dilliler ise sözel öğrenme yöntemine sahiptir. Çift dillilik daha fazla zihinsel aktivite gerektirdiğinden dolayı çift dilliler iletişim kurarken ve öğrenirken iki dilden de faydalanmaktadırlar. Çift dilliler sözel bir süreç olan düşünmede ve zihinsel işlemlerde iki dili de kullandıklarından dolayı potansiyel kapasiteleri gelişmektedir ve tek dillilere kıyasla kavramsal öğrenmeleri de iyi olmaktadır. Ayrıca, cinsiyetin ve konunun da öğrenme yöntemlerinde etkili olduğu tespit edilmiştir.

Anahtar Kelimeler: *Tek dilli, çift dilli, zeka, öğrenme yöntemleri, akademik başarı, İngilizce dili*

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Introduction

Academic achievement is one of the most important factors for the improvement of educational system which indicates students' success in learning process. Various factors influence academic achievement that can be categorized into two groups; the differences which are individual oriented and those that are educational-system oriented. In other words, individual's academic achievement depends on personal, mental, emotional and social characteristics, and also on formal and informal educational system. There are a lot of individual oriented factors influencing academic achievement including intelligence, individual talents, motivation and environment to mention a few.

Learning style is one of the important factors in learning process which plays a defining role in learning (Smith, 2001). Riding and Smith (1997) have defined learning style as an individual constant approach for organizing and processing data during learning procedure. Smith (2001) defines learning style as individual differences which lead to adapting favorable methods to organize and process the data. Learning styles are diverse and include context-dependent styles and context-independent styles, impulsive, contemplative, convergent, divergent, attracting, and compatible styles (Seyf, 1379[1]). Witken and et al (1977) believe that context dependent styles and context independent styles influence recognition skills and interpersonal abilities.

Context-dependent learners are influenced by their environment, while those learners' who are context-independent are not easily influenced by their environment. Cognitive style is data processing in which learners do not look for answering correctly or abruptly, but impulsive learners answer quickly and do more mistakes.(Kadivar, 1379)

In Kolb's model (Asemiyan, 1384) learning is an interactive process and includes a four-step cycle. The four-step is defined as follows: objective experience (intention to learn experimentally), abstract conception (intention for analytic and conceptual thinking in order to finding the target answer), active experiment (intention to learn via trial and error), and finally reflective observation (which concentrates on assignments and possible solutions before any attempt to solve it. Also it is essential to know the influence of learning styles on academic achievement for improving the learning quality which expands learners' ability and positively influences their academic achievement.

On the other hand, English, as an international language, plays an important role in foreign relations and global information and communication networks, therefore learning English is of a great importance in educational, social, cultural, economic, and political systems in Iran.

Researches have shown that those who have been graduated from English language departments do not achieve sufficient proficiency and are not qualified enough in this field. There are various factors causing the failure of educational systems of foreign languages schools and departments, including improper methods of teacher training in teacher

1) The current year is 1392 (2013) in Iran. Dates of Farsi references have been given according to the current year in Iran.

training centers, inappropriate educational content, out -of-date and inactive teaching methods and lack of motivation in students, starting to learn English in older ages and not applying it in daily life. (Javadi 1380) Also researches show that incompetence of English teachers in teaching methods and using first language in classes ends in students' unsuccessful achievement. (Toosi, 1371,& Rahimi, 1374)

Teaching English as an educational subject begins in junior high schools in Iran and needs lots of facilities which demand high expenses and investments including private language schools, summer schools, and extra curriculum lessons at schools. Families spend a lot of money on these classes, but in spite of spending money and time, failure in learning and academic achievement in English both at schools and universities cannot be ignored. Students have lots of problems in basic English and their poor performance in university results from their poor education before university.

Knowing learning styles and learning strategies and their effect on educational performance can help educators and trainers to design attainable and successful aims and prevent digressions in scheduling during short time. Undoubtedly, being unaware of learning strategies and variety of learning styles can prevent learners from efficient learning and create obstacle in front of learning. Students regulate their learning according to their learning styles and strategies. Therefore the relationship between learning styles and academic achievement and their effects on learners' performance encouraged the researcher to study the relationship between learning styles and intelligence among monolingual and bilingual students.

Purpose of the Study:

Main purpose:

-Studying the Relationship between Learning Styles and Intelligence with Academic Achievement among Monolingual and Bilingual Students

Special Purposes:

-Specifying the Relationship between Learning Styles and Academic Achievement

-Specifying the Relationship between Learning Styles and Students' Intelligence

-Comparing the relationship between Learning Styles and Academic Achievement and Intelligence among Monolingual and Bilingual Students

Hypothesis

1. There is a relationship between learning styles and academic achievement in Learning English among monolingual and bilingual Students.
2. There is a relationship between students' learning styles and monolinguality and bilinguality.
3. There is a relationship between students' learning style and their gender.
4. There is a relationship between students' learning styles and their intelligence.

Methodology:

This study is a fundamental research and post-event rational-comparative one. Statistical populations of this study are Islamic Azad University- Central Tehran Branch and Islamic Azad University- Khoy Branch students. Statistical sample includes 720 monolingual students who speak Farsi and bilingual students who speak Azerbaijani Turkish and Farsi. They study at Islamic Azad University-Khoy branch and Islamic Azad University-Central Tehran Branch. Students were chosen by multi-stage sampling method during 2010-2011 academic year in the above mentioned universities.

Data gathering Instruments

Learning Style Test

Felder-Soloman Questionnaire which has been designed based on Felder-Silverman learning style was used in this study. There are 44 questions in this questionnaire. The questions are not cultural-bound and they have chosen because they are easy to answer. This questionnaire can measure four aspects of learning including eight learning styles:

1. Cognition aspect: intuitive-affective learning style
2. Input aspect: visual-verbal learning styles
3. Processing aspect: active-contemplative learning style
4. Contemplative aspect: sequential-general learning style

There are eleven questions for measuring every aspect, categorized into two options A and B, which are based on two different kinds of learning styles. The alpha ratio for internal congruence of questions in the questionnaire, for each aspect of learning style, with regards to the paradoxical nature of these questions, choosing A or B which measures two different learning styles- was respectively as follows:0.41 for sequential-general aspect,0.51 for active-contemplative aspect, 0.56 for visual-verbal aspect, and0.65 for intuitive-affective aspect.

In present study, validity of the questionnaire was measured by conducting the test on 30 students and re-conducting it after 4 weeks for reassessment. Validity ratio for each aspect is as the following: 0.78 for active-contemplative learning style, 0.77 for visual-verbal aspect,0.75 for intuitive-affective aspect, and 0.61 for sequential-general aspect.

Raven Intelligence Test

For measuring students' intelligence, the questionnaire which is available in Educational Consulting Centers was used. Progressive matrices of Raven include three non-verbal tests which are designed for measuring inference ability that is one of the factors of Spearman's general intelligence test. This test has been evaluated by Consulting Department of Ministry of Education of Iran in 1985 by testing it on 9-17 year-old students. This test was published in 1938 by J.C. Raven, the English psychologist. In this test, test takers must choose different pictures from among 6 or 8 pictures that complete

the matrix. Raven test includes a wide range of mental talents and is useful for all ages and also can be carried out for the ages of 6-65(Khodayi, 1377).

Validity

Since Raven test has been conducted on various samples and communities, so variability has been reported about this test. Stinissen has reported 0.89 validity co-efficiency for primary school students and 0.92 for high school students, Evans has reported 0.92 for children of ages of 15-16, and Stinissen and Snowen have reported 0.94 and 0.95 for Belgian children. (Khodayi, 1377) Rocco, using Kuder Richardson's method, reports 0.87. He has carried out the test on 5000 Uruguayans test takers between the ages 12-24, and Burk working on 567 people, has reported 0.83 for adults and 0.95 for test takers between 56-65 year-old. (Khodayi, 1377). Chapari applied split, re-test, and Kuder Richardson among 2798 both male and female students of a junior high school and a high school in Tabriz in 1374 for studying validity of Raven test.

In split method co-efficiency for students' performance (age-group 12-18 and older) was calculated. Validity co-efficiency for these age groups was 0.91, 0.90, 0.92, 0.90, 0.88, 0.89, and 0.88, respectively. In re-test method the test was carried out again on 40 students of every age-group after4-5 weeks. The validity co-efficiency after re-testing for the age-group of 12-18 and older was 0.91. 0.85, 0.81, 0.84.0.84, respectively (Khodayi, 1377).

Reliability

Verbal reliability of the correlation of Raven test has been shown by Binet and Wechsler, criterion 0/54 and 0/86, respectively. Average and high correlations have been reported in children's case for Raven test, non-verbal tests and other practical intelligence tests. (Emmet ,1952). But correlation lower than 0.70 have been shown for verbal intelligence and vocabulary tests. This correlation compared with that of non-English speaking children varies between 0/30-0/68. (Emmet, 1952). Arvin's researches on primary school students show the correlation of California academic achievement test and Raven tests 0.26 and 0.61, respectively.

Structure Validity Report:

Raven progressive matrices in structural modeling are among the best and purest tools for measuring the general factors of intelligence (Khodayi, 1377). Khodayi has reported correlation of 0.60 for determining the validity of the test among high school students of state high schools of Ardabil using validity method on 50 students. Also Mathematics scores of 371 students and its correlation with Raven raw score was 0.30. Validity obtained from both methods is meaningful if they are less than 0.001, and it verifies that Raven test is of adequate validity. Therefore domestic and foreign researches on Raven test verify its validity. Generally, research findings have shown that Raven test is a valid and reliable test for measuring the intelligence of Iranian test takers.

Data Analysis:

For analyzing the data, statistical method of multivariate analysis of variance has been adopted. As it is shown in table 1, the highest and lowest average for active learning style for Azerbaijani-Turkish speaking bilingual students and for Farsi speaking monolingual students are 5.54 and 5.37, respectively. The highest and lowest contemplative learning style among Farsi speakers and Azerbaijani-Turkish speakers are 5.61 and 5.44, respectively, and the highest and lowest average affective learning style among Azerbaijani-Turkish speakers and Farsi speakers are 6.74 and 6.38, respectively. The highest and the lowest average intuitive learning style among Farsi speakers and Azerbaijani-Turkish speakers are 4.20 and 4.18, respectively. The highest and lowest visual learning style among Azerbaijani-Turkish students is 5.36 and for Farsi speakers is 6.23, and the highest and lowest average of verbal learning style is 5.60 for Azerbaijani-Turkish speaker students and 4.74 for Farsi speaking students. The highest and lowest average of sequential learning style is 6.12 for Azerbaijani-Turkish speaking students and 5.83 for Farsi speaker students. The highest and lowest average learning style is 5.11 for Farsi speaking students and 4.82 for Azerbaijani-Turkish speaking students.

As it is shown in table 2 the average active learning style among female students, which is 5.59, is higher than that of male students', 5.43. The average contemplative learning style among male students (5.55) is higher than that of females' (5.38), and the average affective learning style among female students (6.70) is higher than that of male students' (6.56). The average intuitive learning style among male students (4.37) is higher than that of female students' (4.22), and the average visual learning style among male students (5.89) is higher than that of female students' (5.44). The average verbal learning style among female students (5.52) is higher than that of male students' (5.08), and the average sequential learning style among female students (6.17) is higher than that of male students' (5.92). The average general learning style among male students (5.03) is higher than that of female students' (4.77).

For the investigation of the main effect of language and gender independent variables on dependent variables (learning styles), multivariate analysis of variance has been adopted. First the meaningful test of multivariate analysis of variance (Bartlett, Wilks, lawley-Hotelling) was carried out for investigating the main effect of language and gender variables on dependent variables of learning style. The results of meaningful tests of multivariate analysis of variance have been shown in table 3.

As it is seen in table 3, the tests of multivariate analysis of variance are meaningful for language variable with the probability of error of 0.001, and gender is meaningful with less probability of error less than 0.05. Therefore the effect of language and gender as variables on dependent variables (learning styles) is meaningful. Since the effect is meaningful (3.39), therefore the answer to the hypothesis, the difference between the main F of language, is positive and language as variable effects learning styles (Wilks' lambada: 0.39)and learning styles of monolinguals and bilinguals. It can be concluded that

there is a meaningful difference between learning style of monolinguals and bilinguals (99%)(2.14) (Wilks' lambada: 0.93). The answer for F is positive, because the effect of gender as a main variable on adopting different learning styles by monolingual and bilingual students is positive and it can be concluded that there is a meaningful difference between male and female students' learning styles. (95%)

Since the multivariate analysis of variance tests are meaningful in the case of main effect of language and gender as independent variables, therefore mono-variant analysis was figured out for every dependent variable. The summary of results has been presented in table 4.

F, figured out for affective learning styles is (3.66) as it is seen in table 4. As it is seen in table 4 F is with the error probability of less than 0.05 for language, the independent variable, and F is bigger than 0.001 with the freedom degree of 2. Therefore it is 14.58 for visual learning styles, 13.91 for verbal learning styles, 4.30 for intuitive learning styles. As a result there is difference between affective, intuitive, visual, and verbal learning styles of monolingual and bilingual students. F measured for visual learning style (9.71), verbal (9.45) is bigger than F measured for gender as an independent variable with error probability of 0.05 is bigger than F with error probability of 0.01 and freedom degree of 1 for sequential learning styles (3.48) and total (3.83). As a result there is a meaningful difference between affective, intuitive, visual and verbal learning styles of monolingual and bilingual students. Therefore there is a meaningful difference between visual, verbal, sequential, and total learning styles of male and female students. Inasmuch as the average of the scores of male students' visual learning style (5.90) is more than that of female students (5.52), and also scores of female students' verbal learning style (5.52) is more than that of male students' (5.07), male students' have better visual learning style than female students and female students have better verbal learning styles than male students. Also, since the average of sequential learning style of female students (6.16) is more than that of male students' (5.92) and total learning style score of male students (5.03) is more than that of female students' (4.78), male students have total learning style and female students have sequential learning style.

The relationship between learning styles and academic achievement

For specifying the relationship between learning styles and academic achievement, the correlation coefficient between learning styles and academic achievement of students has been presented in table 5.

The highest correlation co-efficiency is (0.93)for total learning styles and the lowest correlation co-efficiency is (0.31) for total learning style. The meaningfulness test of correlation about correlation co-efficiency is meaningful. Therefore, the answer to the hypothesis of the study about the relationship between learning styles and academic achievement is positive, which means that there is meaningful relationship between learning styles and academic achievements.

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Relationship between students' intelligence quotient and their academic achievement

As it is shown in table 6 the more the intelligence quotient, the better the academic achievement is, therefore that the students with the intelligence quotient above the average have good academic achievement distribution (88.06), while in this group 16.12% of students with the intelligence quotient lower than average have good academic achievement. This relevance was visible in other categorizations, too. There is a meaningful relation between students' intelligence and their academic achievement.

Discussion and conclusion

Findings of the present study show that there is difference between visual and verbal learning styles of Farsi speaking monolingual students and Azerbaijani-Turkish and Farsi speaking bilingual students. Farsi speaking monolingual students have better visual learning style than Azerbaijani-Turkish and Farsi speaking bilingual students, and Azerbaijani-Turkish and Farsi speaking bilingual students have better verbal learning style than Farsi speaking monolingual students.

According to the findings, it can be concluded that Azerbaijani-Turkish and Farsi speaking bilingual students learn through senses, events, and observation because they have affective learning style. On the other hand, Farsi speaker monolingual students learn through symbols and interpretations because they have better intuitive learning style. Also, Farsi speaker monolingual students have better visual learning style than Azerbaijani-Turkish and Farsi speaking bilingual students. They learn better if the lesson is presented using graphs, illustrations, tables and pictures as visual mnemonics. On the contrary, Azerbaijani-Turkish and Farsi speaking bilingual students learning style is more verbal compared with Farsi speaker monolingual students and they learn better if lessons are taught verbally. Bilingualism is a good resource for students. They believe that bilinguals are better aware of other languages and they learn new languages easier. For them, language is both communication means and a mental activity, because thinking is mostly verbal. Therefore, they believe that since bilinguals are benefited from two languages they have two mental instruments. Bilinguality causes the improvement of potential abilities of mind.

Another important point is that experiments have shown that some assignments in which cognitive or divergent thinking is needed and is directly related to verbal competence, bilingual test takers proceed over monolingual students in terms of cognition. Bilinguals, superiority in assignments which need cognitive stability is because that they deal with two language structure systems and have more linguistic knowledge than monolinguals and this shows stability in manipulation of verbal and non-verbal symbols.

The study results show that there is difference between male and female students learning styles. It seems that gender differences in learning styles can be justified as following. The first probable reason behind these differences can be related to contextual

factors. Gender differences can be different and various because of the variation in contexture. In this regard the difference between male and female students' learning styles is related to the different learning subjects.

Second probable reason about gender differences in learning styles is because of the concept of 'gender'. In all researches we meet some differences which are based on biological differences between men and women. But a review of studies show that most of the differences have not concentrated on biological differences. In fact gender differences in learning styles result from socialization process which happen in every individual's life, and also these processes changes in accordance with changes in educational contexture. Society and school's viewpoints about gender differences lead to construction of gender as a social structure not biological one, therefore people think of themselves as male or female. On the other hand gender identity is developed by participating in social groups activities. Therefore gender identity (as a psychological concept) not gender (as a biological concept) can explain most of the processes about gender and education.

As a conclusion it can be summarized that according to Kolb model senses are the central core of abstract learning styles, and thinking plays this role in abstract conceptualization learning style. Therefore it can be said that gender identity and the effect of social variables on that would be logical if female students adopt affective learning styles and male students adopt contemplative learning styles, since they adopt what is their routine. Also for knowing individual differences, cognitive learning styles formation must be understood. It is supposed that in family circles with the first experiences of learning, learning styles form. Parents adopt some methods for upbringing their children, they organize her/his cognitive system with different cognitive styles and gender modules. For example in educational and problem solving situations fathers note the progressive and cognitive aspects of their sons more than their daughters' and they are more concerned with their inter-personal relations (Coffield and et al., 2004). The differences between male and female students are more recognizable in mathematics. Generally it can be said that gender identity is imposed by culture and family to the child, and also parents' attitudes, behavior, and attention towards their children and the expected roles and genetic factors, all and all, form different learning styles in men and women.

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Tables:

Table 1: multivariate analysis of variance

Learning styles	**Mean**	**SD**	**Learning styles**	**Mean**	**SD**
Active style			**Contemplative style**		
Farsi Speaking	5.37	1.76	Farsi Speaking	5.61	1.76
Azerbaijani-Turkish speaking	5.54	1.58	Azerbaijani-Turkish speaking	5.44	1.58
Affective style			**Intuitive style**		
Farsi Speaking	6.38	1.73	Farsi Speaking	4.20	1.63
Azerbaijani-Turkish speaking	6.74	1.64	Azerbaijani-Turkish speaking	4.18	1.73
Visual style			**Verbal style**		
Farsi Speaking	6.23	2.01	Farsi Speaking	4.74	2.01
Azerbaijani-Turkish speaking	5.36	1.97	Azerbaijani-Turkish speaking	5.60	1.95
Sequential style			**General style**		
Farsi Speaking	5.83	5.73	Farsi Speaking	5.11	1.73
Azerbaijani-Turkish speaking	6.12	6.67	Azerbaijani-Turkish speaking	4.82	1.67

Table 2 : Mean and standart deviation score of learning styles among male and female students

Learning style	**Mean**	**SD**	**Learning style**	**Mean**	**SD**
Active styles			**Contemplative style**		
Female	5.59	1.76	Female	5.38	1.76
Male	5.43	1.58	Male	5.55	1.58
Affective style			**Intuative style**		
Female	6.70	1.73	Female	4.22	1.63
Male	6.56	1.64	Male	4.37	1.73
Visual style			**Verbal style**		
Female	5.44	2.01	Female	5.52	2.01
Male	5.89	1.97	Male	5.08	1.95
Sequential style			**General style**		
Female	6.17	5.73	Female	4.77	1.73
Male	5.92	6.67	Male	5.03	1.67

Table 3. The effect of language and gender on dependent variables (learning styles)

Variable	Test	Value	F	P
Language	Barttlett-Pillai	.07	3.36	.001
	lambada-	.93	3.39	.001
	Wilks Hotelling-	.08	3.43	.001
	Lawley	.07	6.18	.001
Gender	Bartlett-Pillai	.02	2.14	.03
	lambada-	.98	2.14	.03
	Wilks-Hotelling-	.02	2.14	.03
	Lawley	.02	2.14	.03

Table 4: Mono-variant analysis for each dependent variable, separately

Variety Sources	Dependent Variable	ss	Ms	df	F	P
Language	Active	8.12	4.06	2	1.43	.240
	Contemplative	8.81	4.41	2	1.55	.212
	Sensual	21.01	10.51	2	3.66	.026
	Intuitive	24.64	12.32	2	4.30	.014
	Visual	114.88	51.44	2	14.58	.001
	Verbal	108.48	54.24	2	13.91	.001
	Sequential	16.03	8.01	2	2.60	.075
	Total	15.01	7.51	2	2.44	.088
Gender	Active	4.20	4.20	1	1.48	.225
	Contemplative	4.83	4.83	1	1.70	.192
	Sensual	3.20	3.20	1	1.11	.292
	Intuitive	3.47	3.47	1	1.21	.271
	Visual	38.27	38.27	1	9.71	.002
	Verbal	36.90	36.90	1	9.46	.002
	Sequential	10.76	10.76	1	3.48	.050
	Total	11.76	11.76	1	3.83	.050

Table 5: the correlation coefficiency,learning styles, and academic achievement

Learning styles	Correlation coefficiency
Active	.55
Contemplative	.31
Affective	.56
Intuitive	.65
Visual	.44
Verbal	.51
Sequential	.54
Total	.93

Table 6: Distribution of the intelligence and academic achievement

Academic Achievement	Good		Medium		Poor		Total	
	n	%	n	%	n	%	n	%
Above Average	118	88.06	12	8.95	4	2.98	134	18.62
Average	306	59.53	202	39.30	16	3.11	514	71.39
Below Average	10	16.12	36	58.06	16	25.80	62	8.63
Total	434	60.27	250	34.72	36	5	720	100