

# THE RELATIONSHIP OF STUDENT TEACHERS' GENDER AND ACADEMIC ACHIEVEMENT WITH MULTIPLE INTELLIGENCES

**CHUA LEE CHUAN**

Jabatan Penyelidikan dan Inovasi  
Profesionalisme Keguruan  
chua\_leechuan@yahoo.com

## **Abstract**

Multiple Intelligence (MI) Theory put forth by Howard Gardner in 1983 has been widely discussed and researched upon in the field of education. Although it has proven its importance in both theoretical perspective as well as contribute significantly to teaching practice, not many studies were conducted among student teachers. Therefore, this study aimed to investigate whether there is the relationship between multiple intelligences with students' gender and academic achievement levels. The study employed a descriptive correlation study using Armstrong (1994)'s multiple intelligence inventory to collect data from the respondents. The data were collected from 109 student teachers who are pursuing their Bachelor Degree programme in one of the teacher training institutes in Sarawak. Descriptive statistics, independent sample t-test and Pearson Coefficient Correlation were used to analyse the research data. The findings of the study also revealed statistical significant relationship between body/kinesthetic intelligence with academic achievements. The study also revealed that male and female students teachers self-rated themselves differently in their multiple intelligence levels, but, statistically, there are no gender differences. Based on the findings, implications and recommendations on how to enhance student teachers' academic achievement levels in teacher training institutes were also included in the report.

*Keywords:* Multiple intelligences, academic achievement, student teachers, teacher education, gender

## **Abstrak**

Teori Kecerdasan Pelbagai yang dikemukakan oleh Howard Gardner pada tahun 1983 telah dibincang dan dikaji secara meluas dalam bidang pendidikan. Walaupun ia telah membuktikan kepentingannya dalam perspektif teori serta menyumbang dengan ketara kepada amalan pengajaran, kajian yang dijalankan di kalangan guru pelatih masih terhad. Oleh itu, kajian ini bertujuan untuk mengkaji sama ada terdapat hubungan antara kecerdasan pelbagai dengan tahap pencapaian akademik guru pelatih. Kajian ini merupakan kajian korelasi deskriptif yang menggunakan inventori kecerdasan pelbagai oleh Armstrong (1994) untuk mengumpul data daripada responden. Data dikumpulkan daripada 1090 orang guru pelatih yang sedang mengikuti Program Ijazah Muda di salah satu institut pendidikan guru di Sarawak. Statistik deskriptif, ujian t dan Kolerasi Pearson digunakan untuk menganalisa data kajian. Dapatan kajian menunjukkan bahawa terdapat hubungan signifikan secara statistik antara kinestetik dengan pencapaian

akademik. Kajian ini juga melaporkan bahawa pelajar guru lelaki dan perempuan menilai diri mereka secara berbeza dalam tahap kecerdasan pelbagai, tetapi, secara statistik, tidak terdapat sebarang perbezaan jantina. Ekoran daripada penemuan ini, implikasi dan cadangan tentang bagaimana untuk meningkatkan tahap pencapaian akademik guru pelatih di institut pendidikan guru turut disertakan dalam laporan tersebut.

*Kata kunci:* kecerdasan pelbagai Gardner, pencapaian akademik, guru pelatih, pendidikan guru, jantina

## **INTRODUCTION**

The world of education is changing to cater for the demands and challenges of 21st century. In order to prepare the students for this new world, educators need to impart 21st century skills to learners. These are core competencies such as collaboration, digital literacy, critical thinking and problem solving that teachers need to teach to help students thrive in today's world. Under these conditions, teachers and students' perception towards teaching and learning has to be transformed. Educators need to understand the concept that form the framework of 21st century learning. They need to master a repertoire of pedagogical approaches and strategies to teach in a 21st century classroom. Arising from this transformation, the way students learn will also be different. Intervening factors that might have a great influence on both academic and non academic achievements, need to be investigated. Personality traits such as learning styles, multiple intelligence, motivation, self efficacy are some of the elements that has been proven to improve the academic achievements of students.

Multiple Intelligence Theory has made great contributions to education. The theory has also served as a framework for teachers to explore their teaching styles and to help them in making decisions about teaching and learning experiences for students (Goodnough, 2001). This theory has been used by teachers to assess students' multiple intelligence profile which provided useful information on students' learning styles. Numerous studies has linked the benefits of using multiple intelligence profile in the classroom. Advocates of MI theory reported that the use of MI profile has resulted in ensuring a more learner-centred venue (Gardner, 2000), stimulating real-life settings (Dunn, 1990), educating the whole child (Perrin, 1990), motivating and energizing both teachers and students (Cash, 2011), fostering students' self esteem and teachers' self efficacy (Lazer, 1999) and contributing to professional growth of teachers (Hoerr, 2000). Studies have also reported that multiple intelligence has a positive impact on students' academic achievements (Armstrong, 2009, Beecher & Sweeny, 2008; Douglas, Burton & Reese-Durham, 2008).

## **PROBLEM STATEMENT**

Multiple Intelligences Theory is assuming an important role in education. Based on past studies, it is an undeniable fact that information of MI can produce numerous benefits to both the teacher and the students. Hence, school teachers need to be aware of students' multiple intelligences during the teaching and learning process. Due consideration must be taken by teachers to identify students' multiple intelligences and empowering them with recognition of their intelligences in order to enhance and develop learning capabilities. It has also been reported that MI strengths and weaknesses are not static as students' unimproved areas of intelligence can be developed at a later stage (Fasko, 2001; Silver et al., 2000) which implies that MI Theory

can be accepted as an educational approach to improve students' modalities of intelligence. Moreover, many researchers also stressed on the relationship between multiple intelligences and academic achievements (Campbell, 1991; Amrstrong, 2009, Beecher & Sweeny, 2008; Douglas, Burton & Reese-Durham, 2008; Kornhaber, Fierros & Veenema, 2004). Although numerous studies have proven the importance of multiple intelligence theory in influencing academic achievement, a thorough search through literature found that not many studies were conducted among student teachers in this region. Thus it seems necessary to explore further this relationship between multiple intelligences and academic achievements among student teachers in one of the teacher training institutes in Sarawak. The study also aimed to investigate if there are any gender differences in multiple intelligences of these student teachers. It is hoped that by investigating the relevance of these three variables, it can help to contribute both in theoretical perspective as well as how it can contribute to the teaching practice.

## **OBJECTIVES OF THE STUDY**

This study aimed to address the following objectives

1. Is there a significant difference between multiple intelligence and gender?
2. Is there a significant relationship between multiple intelligence and academic achievements of student teachers?

## **LITERATURE REVIEW**

Teachers today are finding it a great challenge to identify the most appropriate methods to achieve significant students' academic performance. It is an undeniable fact is that every students learns differently from others and hence has a unique learning styles. Some learn faster using their eyes, while others performed better using their ears or body. Similarly, there are others who enjoy learning when music is played or enjoy playing logical games. There are students who prefer to work alone instead of group work. The uniqueness of every students' learning styles cannot be denied. Therefore, teachers played a central role in identify students' learning styles to maximize learning.

### **Gardner's Theory of Multiple Intelligences**

In the early 1980s, developmental psychologist and educational researcher, Howard Gardner asserted that different people approach learning in different ways and its the differences that make them unique. Gardner maintained that individual differences reflect their multiple intelligences. He developed the MI Theory and asserted that each individual has not only one general intelligence but multiple intelligences. He stressed that the traditional notion of intelligence is too limited and that every one has multiple intelligences. In school, students tend to learn better when their multiple intelligences are recognized and supported. Therefore, which schools must consider students' multiple intelligence in order to maximize students' learning.

Gardner's Multiple Intelligence Theory outlined eight different intelligences: verbal/linguistic, logical/mathematical, visual/spatial, musical, body/kinesthetic, interpersonal, intrapersonal, and naturalistic.

### **Verbal/Linguistic Intelligence**

This intelligence enables a person to use language effectively, achieve certain goals through the use of language. According to Gardner (1983), speakers, lawyers, poets have high linguistic intelligence.

### **Logical/Mathematical Intelligence**

This intelligence refers to the ability to understand cause and effect system of relationship. Analyze problems logically and try to solve it step by step, reason deductively and inductively, play with numbers and do mathematical calculation efficiently (Saban, 2009)

### **Visual/Spatial Intelligence**

This person has the ability to visualize and see the world through mind's eye. It enables a person to regenerate an experiment through imagination and perception (Shearer & Luzzo, 2009). This person often observes things and reproduces them through colours, pictures, painting and art work. It enables a person to develop three dimensional images and move them either mentally or concretely (Smith, 2008).

### **Musical Intelligence**

This intelligence enables a person to compose or generate music, sweet and melodious voice. The person enjoys and appreciates music (Smith, 2008).

### **Bodily/Kinesthetic Intelligence**

This intelligence enables a person to use different parts of the body skillfully, to integrate mental ideas to body movements. Athletes, dancers and choreographers, are among good examples of people having this type of intelligence.

### **Interpersonal Intelligence**

This person has the ability to understand other people, their wishes, intentions and motivations. They work well in groups rather than to work individually. Political leaders, religious leaders, sales people, counselors, teachers are in this category (Smith, 2008).

### **Intrapersonal Intelligence**

This person understand its own strengths, weaknesses, motivations and feelings and are able to channelize them properly (Smith, 2008)

### **Naturalistic Intelligence**

This person has the ability to understand the characteristics of living things such as plants and animals (Gardner, 1999). This type of person takes interest and remain very sensitive towards different phenomena of the natural world (Smith, 2008).

### **Gender Differences in Multiple Intelligences**

Numerous studies have been conducted to find out if there were gender differences in general intelligence and multiple intelligences. Recent studies on general intelligence reported that male respondents rated themselves higher in intelligence their female counterparts (Zhang & Gong, 2001; Rammstedt & Rammsayer, 2002). According to Hogan (1978) women tend to be

perceived themselves as less intelligent than men because society possibly denies them intellectual equality.

In contrast, results are too varied for gender differences in multiple intelligences. Based on review of literature, male respondents rated their intelligences to be higher in logical/mathematical and visual/spatial (Bennett, 2000; Furnham et al., 1999). Female respondents estimated their intelligences to be higher in musical and interpersonal (Bennett, 2000) and naturalistic and existential intelligences (Abbas, Zuraidah Mohd Don, Knowles and Iman, 2015). As the results are too varied for generalization to be made, further investigations are needed to validate these reports.

### **Relationship between Multiple Intelligence and Academic Achievements**

A thorough review of literature reviewed that multiple intelligences have contributed much to education. Studies conducted on MI also reported numerous benefits of using MI in the classrooms. MI assisted in developing positive students' attitudes and improving students' learning quality (Campbell, 1992); improving students' responsibility, self direction and independence (Campbell, 1991); ensuring a more learner-centred venue (Gardner, 2000), stimulating real-life settings (Dunn, 1990), educating the whole child (Perrin, 1990), motivating and energizing both teachers and students (Cash, 2011), fostering students' self esteem and teachers' self efficacy (Lazer, 1999) and contributing to professional growth of teachers (Hoerr, 2000).

More importantly, studies have also shown reported that multiple intelligence has a positive impact on students' academic achievements (Campbell, 1991; Amrstrong, 2009, Beecher & Sweeny, 2008; Douglas, Burton & Reese-Durham, 2008; Kornhaber, Fierros & Veenema, 2004; Gulap Shahzada, Umar Ali Khan, Fakhr ul Islam and Khan Faqir, 2014). According to Gulap Shahzada, Umar Ali Khan, Fakhr ul Islam and Khan Faqir (2014), among the 8 types of intelligences, seven, except musical intelligence, were significantly correlated with academic achievements at .05 level of significance. The seven intelligences were verbal/linguistic, logical/mathematical, interpersonal, intrapersonal, naturalistic, body/kinesthetic and visual/spatial.

Due to the great impact the theory has on education, it implies that teachers need to expand their repertoire of techniques, tools and strategies beyond the typical linguistic and logical intelligences which were predominately used in schools (Armstrong, 2009) and to implement pedagogical approaches and strategies that can foster creativity and collaboration (Gardner, 1999).

### **METHODOLOGY**

This study aimed to investigate the relationship between multiple intelligence and academic achievement. The researcher employs a quantitative research methodology to address the predetermined research objectives of the study. Among the quantitative methodologies, a survey method was used in order to obtain responses from a large number of trainees who participated in the study.

The population was taken from a group of student teachers pursuing their teacher education programme in Teacher Education Institute Batu Lintang Campus. They comprised of 8 groups who enrolled with the institute in June 2016 to undertake primary teacher education programme majoring in English Language, Chinese Language, Mathematics, Religious Studies. At the time

of the study they were enrolled in the first semester of 4-year teaching degree programme. A total of 109 student teachers took part in the study. All of them gave their verbal consent to participate prior to the administration of the research instrument.

Questionnaires were used as the research instrument to collect quantitative data. The research instrument was adapted from Armstrong's Multiple Intelligences inventory consisting of 83 statements. Gardner's eight multiple intelligences were included in the inventory. Each statement is scored on a 10-point Likert-type scale with a score of 1 indicating completely disagreement with the statement and a score of 10 to indicate complete agreement. Completion of the questionnaire took approximately 15-20 minutes.

To determine the internal reliability of the items used to measure multiple intelligences as well as to determine the suitability of the research instrument for use in the Malaysian education settings, Cronbach's alpha coefficients of reliability were derived and the results indicated acceptable reliability with values ranging from .59 to .89. The reliability for verbal/linguistic, logical mathematical, visual/spatial, musical, bodily/kinesthetic, interpersonal, intrapersonal, naturalistic intelligences were .59, .77, .72, .89, .82, .76, .76, .84 respectively. The Cronbach's alpha coefficients of reliability for the overall 83-item inventory were .93 indicating that the research instrument used were highly reliable for use.

The other variable investigated in the study was academic achievement which was measured using the students' cumulative grade point averages (CGPA) as reported in their transcripts. According to Yusuf (2002), CGPA is the most objective value that estimates students' academic achievements.

When the research instrument was finally administered, a total of 109 questionnaires were returned. The data was then analysed quantitatively using SPSS for windows programme. Statistical analyses such as, descriptive statistics, were used to analyse the data. Among the descriptive statistics used were frequency distribution, measures of central tendency and measures of variability. Mean scores were calculated and standard deviation was used to measure variability. Pearson Correlation Coefficient were used to analyse the relationship between multiple intelligences and academic achievement.

## **FINDINGS AND DISCUSSION**

The study aimed to investigate the perceived multiple intelligences of student teachers in general. The main issue to address was to determine the relationship between multiple intelligences and academic achievements of student teachers. Additionally, it also aimed to address if there were any differences in multiple intelligences between male and female students.

### **Description of demographic profiles**

The population of the study comprised 109 full-time student teachers who were enrolled in a 5-year degree programme in teacher education in one of the teacher training institutes in Sarawak. Out of 109 student teachers, majority of them were female (75.3%) while the remaining 24.7% were males. Approximately 34.9% of them were trained to teach English Language, 33.9% Chinese Language, 13.8% Mathematics and 17.4% Religious Studies. Their CGPA obtained by the students ranged from the lowest score of 2.85 to the highest score of 3.86.

### **Gender Differences in Multiple Intelligences**

The study aimed to study whether there are any differences in multiple intelligences between male and female students. As shown in Table 1, there are slight gender differences in multiple intelligences. Among the eight types of multiple intelligences investigated, male students teachers estimated higher intelligences in four types while female students teachers scored higher in the remaining four multiple intelligences. Males students reported higher intelligences in body/kinesthetic, logical/mathematic, naturalistic and interpersonal while female students reported higher mean score in verbal/linguistic, musical, intrapersonal and visual.

**Table 1.**

***Mean and Standard Deviation of Gender Differences in Multiple Intelligences***

<b>Multiple Intelligences</b>	<b>Gender</b>	<b>Mean</b>	<b>Std.Dev</b>
Verbal/Linguistic	Male	6.14	1.31
	Female	6.63	1.13
Body/Kinesthetic	Male	7.04	1.55
	Female	6.97	1.44
Logical/Mathematic	Male	6.91	1.39
	Female	6.62	1.23
Musical	Male	7.37	1.49
	Female	7.92	1.54
Naturalistic	Male	6.78	1.21
	Female	6.57	1.60
Intrapersonal	Male	6.87	1.13
	Female	6.95	1.13
Interpersonal	Male	6.87	1.40
	Female	6.63	1.31
Visual/Spatial	Male	6.61	1.40
	Female	6.78	1.20

However, upon further investigation, the independent sample t-test analysis displayed in Table 2 showed that there are no significant differences in multiple intelligences between male and female student teachers. The findings contracted reports in most previous studies on gender differences where gender differences were found to be significantly different (Bennett, 2000; Furnham et al., 1999). In this study, although there are differences in multiple differences, however, none of the eight types of MI was found to be statistically significant.

**Table 2.**

***Independent Sample t-test by Gender for Multiple Intelligences***

Multiple Intelligences	Mean Differences	t-value	df	Sig (2 tailed)
Verbal/Linguistic	-0.49	-1.73	91	0.09
Body/Kinesthetic	-0.49	0.20	89	0.84
Logical/Mathematic	0.07	0.95	90	0.35
Musical	0.07	-1.50	90	0.14
Naturalistic	0.30	0.56	90	0.58
Intrapersonal	0.30	-0.29	90	0.77
Interpersonal	-0.55	0.74	91	0.46
Visual/Spatial	-0.55	-0.55	91	0.59

Contrary to reports in most previous studies of gender differences in MI domains (Bennett, 1996; Hogan, 1978; Zang & Gong, 2001), the results of this study indicate that female students obtained a slightly higher mean score on eight of the nine intelligences (i.e. all except interpersonal intelligence). Furnham et.al. (1999) and Shahidi, & Baluch, (2002) reported gender differences only in the case of logical/mathematical and spatial intelligences where males received higher scores; whereas the present study suggest slightly higher naturalistic and Zaree, Mohd Don, Knowles, & Tohidian 258 existential intelligences in girls. This finding also raises doubts about the justifications that men rate themselves higher and are rated higher on the more masculine intelligence domains such bodily/kinesthetic. From a scientific point of view,

### **Relationship between Multiple Intelligences and Academic Achievements**

The main focus of the study was to investigate the relationship between multiple intelligences and academic achievement. Table 3 displayed the Pearson Correlation Coefficients of Multiple Intelligences and Academic Achievement. Based on the data, the overall MI had a weak correlation with academic achievement (.137). All the 8 types of MI also had a weak correlation with academic achievements. However, data also reviewed that verbal/linguistic, logical mathematical, visual/spatial, musical, interpersonal, intrapersonal and naturalistic intelligence are not significantly linked to academic achievements. The findings contradicted previous related studies that multiple intelligence has a positive impact on students' academic achievements (Campbell, 1991; Amrstrong, 2009, Beecher & Sweeny, 2008; Douglas, Burton & Reese-Durham, 2008; Kornhaber, Fierros & Veenema, 2004; Gulap Shahzada, Umar Ali Khan, Fakhr ul Islam and Khan Faqir,2014).

Findings of the study revealed that among all the 8 types of multiple intelligences, only body/kinesthetic intelligence was found to be significantly related with academic achievement at .05 level of significance. The correlation was found to be negative and rather weak correlation (-.228). Gulap Shahzada, Umar Ali Khan, Fakhr ul Islam and Khan Faqir (2014), also reported significant correlation between body/kinesthetic intelligence and academic achievements. However, the relationship was found to be positive. This finding raises contradictions on the myriad of studies that students who received adequate amounts of physical activity throughout the school day tend to perform better academically. The findings of this study has shown little or no consistency with previous work. Possible factors may explain why it differs from those in other contexts.

Factors such as societal expectations and culture could play a role in explaining this difference. Today, students are brought up in a restrictive learning environment where private tutoring, drilling on answering past year examination papers and mastering examination skills are considered a normal norm if one wants to excel academically (Cheung, 2009) depriving them of physical activity, which is often considered a waste of time activity. More and more students are enrolling in crammed private tuition centres that has not only mushroomed in and around the learning environment but has become a highly profitable business in the teaching industry today. The students expected to be taught on public examination syllabi and techniques to help



them improve their performance in public examinations and could secure good grades. They are brought up in an environment where better grades means higher chances of getting a paper qualification, fulfil their career aspiration and consequently be able to secure a better life in the future.

**Table 3.**

***Pearson's Correlation Coefficients between Multiple Intelligences and Academic Achievements***

Multiple Intelligences	Correlation
Verbal/Linguistic	.026
Body/Kinesthetic	-.228*
Logical/Mathematic	.036
Musical	-.077
Naturalistic	-.157
Intrapersonal	.012
Interpersonal	-.024
Visual/Spatial	-.106
Overall MI	-.137

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

**IMPLICATIONS AND RECOMMENDATIONS**

The study has revealed that male and female students teachers self-rated themselves differently in levels of intelligence with male students exhibiting higher intelligences in four aspects while female students reported higher intelligences in the other four aspects. However, statistically, the results revealed that there is no gender differences in multiple intelligences. Thus, it implies that though there exist differences in multiple intelligences but there is no significant difference between male and female student teachers. They are merely different in their self estimates of multiple intelligences, which supported the theory that there are individual differences existed among students and these differences should be considered by educators and above all, the education system in general. Multiple Intelligence Theory needs to be incorporated in the teaching and learning process. Teachers might need to attend professional development courses on multiple intelligences theory so that they could see it more effectively. Lesson planning, teaching and learning activities, should be planned around the MI theory. Teachers should also use a variety of teaching approaches, strategies and methods in the classroom in order to cater for existing individual differences.

In relation to academic achievements, among the eight types of intelligences investigated, the findings of the study revealed a weak negative association between body/kinesthetic intelligence with students' achievements. The other seven types of intelligences were not significantly related to academic achievements. The results provided empirical evidence that multiple intelligences and academic achievement are not highly correlated.

The interrelationship between body/kinesthetic and academic achievements implied that student teachers who were not actively involved in sports or physically activities performed better in their academic achievements. This results contradicted most studies in the past that in order to excel, students need to participate and get involved physically. However, additional research to further validate this findings need to be conducted as this study did not contribute much to explain the contribution of multiple intelligences to academic achievement. Perhaps qualitative research could be conducted to shed more light on the results of this study and to give more vivid details on the reasons for these inconsistencies. In addition, the same study could be replicated in

different teaching institutions in other parts of Sarawak to further validate the findings of the study.

## REFERENCE

- Armstrong, T. (2000). *Multiple intelligences in the classroom* (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.
- Armstrong, T. (2009). *Multiple intelligences in the classroom* (3rd ed.). Alexandria, VA: Association for Supervision and Curriculum Development
- Beecher, M. & Sweeny, S. (2008). Closing the achievement gap with curriculum enrichment and differentiation: One school's story. *Journal of Advanced Academics*, 19, 502-530.
- Bennett, M. (1996). Men's and women's self-estimates of intelligence. *Journal of Social Psychology*, 136(3), 411-412.
- Campbell, B. (1992). Multiple intelligences in action. *Childhood Education*, 197-202.
- Campbell, L. (1991). Multiple intelligences in the classroom. *The Learning Revolution*, 27, 2-13.
- Cash, R. (2011). *Advancing differentiation: Thinking and learning for the 21st century*. Minneapolis, MN: Free Spirit.
- Cheung, C.W.J (2009). Risk culture of late modernity? Mass tutoring enrolment of Hong Kong's senior secondary students. Retrieved from: [http://commons.in.edu.hk/cgi/viewcontent.cgi?article=1006&context=soc\\_etd](http://commons.in.edu.hk/cgi/viewcontent.cgi?article=1006&context=soc_etd)
- Douglas, O., Burton, K., & Reese-Durham, N. (2008). The effects of the multiple intelligence teaching strategy on the academic achievement of eighth grade math students. *Journal of Instructional Psychology*, 35, 182-187.
- Dunn, R. (1990). Rita Dnn answers questions on learning styles. *Educational Leadership*, 48(2), 15-19.
- Fasko, D. (2001). An analysis of multiple intelligences theory and its use with the gifted and talented. *Roeper Review*, 23(3), 126-130.
- Furnham, A. & Rawles, R. (1999). Correlations between self-estimated and psychometrically measured IQ. *The Journal of Social Psychology*, 139(4), 405-410.
- Gardner, H. (1983). Frames of mind. *The theory multiple intelligences*. New York, USA: Basic Books Inc.
- Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21<sup>st</sup> Century*. New York, USA: Basic Books Inc.
- Gardner, H. (2000). The complete tutor. *Technos*, 9(3), 10-13.
- Goodnough, K.C. (2001). Multiple intelligence theory: A framework for personalizing science curriculum, *School Science and Mathematics*, 101(4), 180-193.

- Gulap Shahzada, Umar Ali Khan, Fakhr ul Islam & Khan Faqir (2014). Interrelation of multiple intelligences and their correlation with students' academic achievements: A case study of Southern Region, Khyber Pakhtunkhwa. *FWU Journal of Social Sciences*, 8(2), 59-64.
- Hoerr, T. (2000). *Becoming a multiple intelligence school*. Alexandria, VA: Association for Supervision and Curriculum Development
- Hogan, H. (1978). IQ self-estimates of males and females. *The Journal of Social Psychology*, 106(1), 137-138.
- Kornhaber, M.L., Fierros, E., & Veenema, S. (2004). *Multiple intelligences: Best ideas from theory and practices*. Needham Heights, MA: Allyn & Bacon.
- Larzen-Freeman, D. (2000). *Techniques and principles in language teaching*. Oxford: Oxford University Press.
- Lazer, D. (1999). *Eight ways of teaching: The artistry of teaching with multiple intelligences*. Palatine, IL: IRI Skylight.
- Perrin, J. (1990). The learning styles project for potential dropouts. *Educational Leadership*, 48(2), 23-24.
- Rammstedt, B. & Rammsayer, T. H. (2000). Sex differences in self-estimates of different aspects of intelligence. *Personality and Individual Difference*, 29(5), 869-880.
- Saban, A. (2009). Content analysis of Turkish studies about the multiple intelligences theory. *Educational Science: Theory and Practice*, 9(2), 859-876.
- Silver, H. F., Strong, R. W., & Perini, M. J. (2000). *So each may learn: Integrated learning styles and multiple intelligences*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Smith, M.K. (2008). Howard Gardner and multiple intelligences. *The Encyclopedia of Informal Education*. Retrieved from <http://www.infed.org/thinkers/gardner.htm>
- Zare-ee, A., Mohd Don, Z., Knowles, G., & Tohidian, I. (2015). Gender differences in self-estimates of multiple intelligences among learners of English. *International Online Journal of Education and Teaching (IOJET)*, 2(4). 249-264.
- Zhang, Y. & Gong, Y. (2001). Self-estimated intelligence and its related factor. *Chinese Journal of Clinical Psychology*, 9(3), 193–195.