

## Interrelation of Multiple Intelligences and their Correlation with Students' Academic Achievements: A Case Study of Southern Region, Khyber Pakhtunkhwa

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This survey study aimed to investigate the interrelation of multiple intelligences and their correlation to students' academic achievement. Using Armstrong's standardized multiple intelligences inventory, data was collected randomly from 905 students of secondary school of southern districts of Khyber Pakhtunkhwa, through proportion allocation technique. Mean, Standard Deviation, and Pearson Coefficient Correlation were used analyzing the data. Results of the study showed that moderate inter-correlation exists between verbal/linguistic and logical/mathematical intelligences and academic achievement. It was suggested that teacher may use all the multiple intelligences during the teaching-learning process to promote their development. This study provides important information regarding multiple intelligences of the students and adds a composite scale of multiple intelligences to the existing literature.

*Key words:* Multiple intelligences, correlation, academic achievement, IQ test

Allah has given man intelligence, which is the cause of superiority among all other creatures. Intelligence is of paramount importance in a person's life. Therefore the topic of intelligence is of substantial curiosity and interest to researchers and lay people (Mackintosh, 1998). General, interpersonal, fluid, crystalized and many other types of intelligence have been discovered.

Gardner stretches the word intelligence beyond its customary application in psychology (Gardner & Hatch, 1989), and defines it as a bio-psychological ability of processing information, that can be activated to handle a problem properly, and creating such a products that are valued in a cultural setting. He developed theory of multiple intelligences and asserted that each individual has not only one general intelligence, but multiple intelligences. Multiple intelligences theory promotes the idea that every individual is capable of learning through the range of different intelligences. He initially proposed seven intelligences, but then added three additional intelligences (Gardner, 1999). These intelligences are:

1.

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

2. Logical/mathematical: 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).

3. Visual/spatial: This is 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). A person having this type of intelligence watches 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, 2002, 2008)
4. Musical: This intelligence enables a person to compose or generate music, sweet and melodious voice. A person having this type of intelligence enjoys and appreciates music (Smith, 2002, 2008).
5. Bodily/kinesthetic: This intelligence enables an individual to use the different parts of the body skillfully, to integrate mental ideas to body movements. Athletes, dancers, choreographers etc. are good examples of this type of intelligence.
6. Interpersonal: It is the ability to understand other people; their wishes, intentions and motivations. These types of people work well in a group, rather than to work individually. Political leaders, religious leaders, sales people, counselors, teachers all need this type of intelligence (Smith, 2002, 2008).
7. Intrapersonal: This is the potential which enables an individual to understand its own strengths, weaknesses, motivations and feelings and to channelize them properly (Smith, 2002, 2008).
8. Naturalist: This intelligence refers to the ability to discriminate and understand the characteristic of living things for example plants and animals (Gardner, 1999). A person having this type of intelligence take interest and remains very sensitive towards different phenomena of natural world (Smith, 2002, 2008).

9. Existential: This intelligence refers to the ability to pose questions regarding human life and human existence for example the meaning of human life, happenings after death, the meaning of love, the relation of Creator to creatures.

Howard Gardner has some hesitation about formally inclusion of existential intelligence to the list; because this intelligence could not meet 100% Gardner's criteria of intelligence at least for now. However Gardner called existential intelligence half intelligence (Gardner, 1999: 66). Gardner believes that individuals vary in their profile of intelligences – for example an individual can have very high linguistic intelligence, but average musical intelligence (Eid & Alizh, 2004; Shearer, 2004).

Gardner asserted that individual differences reflect multiple intelligences of human beings; and through these intelligences an individual tries to understand the world, these are personal strengths through which a person comprehend the world (Arnold & Fonseca, 2004). What the Multiple intelligences theory offers is not only significant from a theoretical perspective, but also has important practical implications for teaching practice. Teacher should consider various multiple intelligences of the students during their teaching; and should persuade the students to use their different intelligences in their learning (Gen, 2000), as Larsen-Freeman (2000) suggested improving quality of teaching and learning teacher and learner should take into account different multiple intelligences. Regarding their career, learners' multidimensionality should be celebrated and all intellectual abilities may be enhanced (Cohen, 2003).

Gardner (2006) argued that due to the multiple intelligences individuals are truly human being. Each has a unique profile of intelligences of varying strengths. . Although no one intelligence was considered to be superior to other types, according to Gardner (2003) all intelligence are required for an individual, in order to participate, act purposefully and creatively in the society.

In order to be successful in educating all students, teachers should be aware of the students' individual differences; individual learning styles and multiple intelligence profiles. In schools logical and linguistic intelligences are emphasized in teaching. Students who are more developed in other intelligence dimensions are often ignored. Identifying and knowing students' intelligence profile is important and has implications for instruction (Shalk, 2002). For example, if a student has limited success with verbal and mathematical intelligences, more success may be achieved by using some of the other intelligences (Oddleifson, 1994). Multiple intelligences approach has a very useful suggestions for providing a more reasonable and practical approach to schooling (Eisner, 1994). Furthermore, since intelligence strengths and weaknesses are not static, they may be improved with different educational experiences. For this reason, multiple intelligences theory approach supports continuous assessment of intelligences starting at an early age (Shalk, 2002).

Since Gardner (1983) has supposed multiple intelligences theory in his book 'Frames of Mind', teachers

have been using it in their schools. Multiple intelligences teaching approach was recognized as a means of adapting instruction to meet the learning needs of the students and acknowledged that students can learn in many different ways apart from the logical/mathematical and verbal/linguistic modes. This recognizes that individuals multiple talents can be utilized to be used in the classroom. Some of the educationists consider the theory of multiple intelligences the solution of many of the current problems present in the system of education, how this theory should be used but they are agree on the point, that multiple intelligences teaching and learning should be adopted in educational institutions. This theory provoke and attract different multiple intelligences of an individual instead of just linguistic and logical intelligences. Self awareness, musical activities, visual/spatial capabilities and many other non-traditional ways of learning are equally important means of developing student knowledge, skills and attitudes Shearer, 1999).

Some researchers have found in their studies, intelligence as a cause of academic performance (Habibollah, et al., 2008). A close connection by some of the psychologists between intelligence and academic achievement was discovered. Some say that there is cause and effect relationship between the two variables. According to Laidra, Pullmann & Allik (2007) academic achievement of the students is reliant on their cognitive abilities through all grade levels.

#### **Statement of the Problem**

MI theory is assuming an important place in the recognition of the diversity of ways that learners approach the curriculum; it helps teachers and learners to successfully programme for individualized instruction. Consequently, many researchers stress the importance of identifying the profiles of the learners and empowering them with recognition of their intelligences, in order to enhance and develop learning (Gurbuz & Gurbuz 2010; Natasa 2010; Netoa, Ruiza & Furnham 2008; Wu & Alrabah 2009). Thus, it seems necessary to recognize the students' intelligences in order to consider them, when designing for the teaching and learning process to enhance the students learning performance.

Numerous research studies have explored the effects of different variables on students' academic achievement. Little attention was paid in Pakistan to the interrelationship of multiple intelligences and with academic achievement. This current study explored this relationship using public secondary school student as participants from the southern region of Khyber Pakhtunkhwa, Pakistan.

#### **Objectives of the Study**

- 1- Determining students' perceived levels of multiple intelligences.
- 2- Identifying the interrelationship of multiple intelligences, and the correlation between multiple intelligences and academic achievement.

### Research Questions

- 1- What is the level of multiple intelligences of secondary school students?
- 2- Is there any interrelationship between multiple intelligences?
- 3- What is the relationship between students' multiple intelligences and their academic achievement?

## Method

### Research Design

This was a descriptive study using a survey approach, exploring the students' multiple intelligences and the interrelationship of the intelligences.

### Population

Khyber Pakhtunkhwa is one of the constitutional provinces of Pakistan. Districts situated in the south of Khyber Pakhtunkhwa are called southern districts or southern region. Students of public secondary school of southern region were taken as population of the study.

### Sample

In the beginning 18094 students studying in 521 public secondary schools in southern districts were recognized as a sampling frame. In the second stage 115 schools were chosen, through proportion allocation technique, at third stage 905 students were randomly selected from the selected schools, as a sample of the study.

### Instrument

Armstrong's inventory (1994) short form, of multiple intelligences consisting 45 statements was used as data collection tool. This inventory is a standardized inventory, describing Gardner's eight multiple intelligences verbal/linguistic-logical/mathematical-visual/spatial-musical-bodily/kinesthetic-interpersonal-intrapersonal-naturalistic- and existential intelligence. For the measurement of existential intelligence McKenzie (1999) inventory was used. Each intelligence was measured through five statements. The composite inventory was translated into Urdu with the help of research and language expert, in order to make it understandable for students.

### Validity & Reliability

To find out validity of the instrument, 72 statements were pinpointed. They were arranged logically, and the inventory was given to thirty public secondary school students, and twenty research experts for content validity, in the light of their feed back twenty seven statements were rejected and forty five statements were accepted for the inventory.

In order to find out the reliability the inventory was distributed among seventy public secondary students, as a pilot test. The Cronbach's Alpha value found out for different intelligences verbal/linguistic, logical/mathematical, visual/spatial, musical, bodily/kinesthetic, interpersonal, intrapersonal, naturalistic, and existential intelligence were .84, .89, .77, .81, .72, .91, .87, .91 and .89 respectively, the Cronbach's Alpha value for the whole inventory was .95. The overall

sores of the students' academic achievement were obtained from their detailed marks certificates, issued by Dera Ismail Khan, Bannu, Kohat Board of Intermediate & Secondary Education. The five point Likert scale used by Ann Joe (1999) was applied to this study.

### Scale Options

Never	1
Seldom	2
Sometimes	3
Often	4
Always	5

The following range was assigned to the scale.

Very low extent	1.00-1.99
Low extent	2.00-2.99
Moderate extent	3.00-3.99
High extent	4.00-4.99
Very high extent	5.00

## Results

Analysis & interpretation of data were done in this section. The statistical values were calculated carefully. Mean, Standard Deviation, Pearson Coefficient Correlation were used as statistical tests. The data was arranged in 3 tables.

The mean score of the students' existential intelligence was 4.36 and indicated a relatively higher estimate of use in comparison to the other dimensions. All of the other dimensions (except for musical) were in the moderate range (3.00-3.99), whilst the musical intelligence was scored at a lower level (2.02) Table 1.

Table 1

*Self-estimated multiple intelligences of the students (N=905)*

Multiple intelligences	Mean	SD
Existential intelligence	4.36	.57
Interpersonal intelligence	3.63	.70
Logical/Mathematical intelligence	3.54	.86
Visual/Spatial intelligence	3.52	.75
Intrapersonal intelligence	3.51	.61
Naturalistic intelligence	3.41	.80
Verbal/Linguistic intelligence	3.32	.98
Bodily/Kinesthetic intelligence	3.05	.70
Musical intelligence	2.02	.80

Different levels of correlation between multiple intelligences were found. The Coefficient Correlation between self-estimated verbal/linguistic and logical/mathematical intelligence is .466, indicated moderate correlations between the multiple intelligences. The Coefficient Correlation between self-estimated bodily/kinesthetic and visual/spatial intelligence is .39, naturalistic and intrapersonal is .38, mathematical/logical and visual/spatial intelligence is .377, revealed low moderate correlations. The Coefficient Correlation between self-estimated musical and existential intelligence is .06, musical and logical/mathematical intelligence is .08 showed weak but negligible correlations Table 2.

**Table 2**  
*Inter correlation of multiple intelligences (n=905)*

	1	2	3	4	5	6	7	8	9
Verbal/linguistic									
Logical/mathematical	.46								
Visual/spatial	.31	.37							
Musical	.16	.08	.11						
Bodily/kinesthetic	.40	.29	.39	.24					
Interpersonal	.33	.37	.42	.25	.40				
Intrapersonal	.32	.31	.33	.14	.27	.40			
Naturalistic	.31	.37	.42	.16	.45	.38	.31		
Existential	.30	.33	.33	.06	.24	.36	.35	.37	

Correlation is significant  $p < .05$

Moderate correlation ( $r = .39, r = .35$ ) exists between self-estimated verbal/linguistic, logical/mathematical intelligence and academic achievement. Significant but weak correlation ( $r = .17, r = .14, r = .13, r = .12, r = .10$ ) exists between interpersonal, existential, intrapersonal, naturalistic, and bodily/kinesthetic intelligences and academic achievement. Significant but negligible correlation exists between visual/spatial intelligence and academic achievement and no correlation exists between musical intelligence and academic achievement at .05 level of significance. Refers to table 3

**Table 3**  
*Correlation between Multiple intelligences and Academic achievement (no= 905)*

Intelligences	Correlation	Significance
Verbal/Linguistic	.39	.00
Logical/Mathematical	.35	.00
Interpersonal	.17	.00
Existential	.14	.00
Intrapersonal	.13	.00
Naturalistic	.12	.00
Bodily/Kinesthetic	.10	.00
Visual/Spatial	.08	.01
Musical	.03	.34

Correlation is significant  $p < .05$  (except musical intelligence  $p > .05$ )

### Discussion

The finding of the study showed that students have multiple intelligences with different levels. Existential intelligence got a mean rating to high extent. Verbal/linguistic, logical/mathematical, visual/spatial, bodily/kinesthetic, interpersonal, intrapersonal and naturalist intelligence got a mean rating to moderate extent; musical intelligence got a mean rating to a low extent.

The findings of the study approved and confirmed Gardner assertion, that multiple intelligences are possessed by every person. Results of the study also align with the previous researches indicating that every

individual has different types of intelligences with different levels.

Study provided evidence that existential intelligence is the students' highest intelligence and musical intelligence is the students' lowest intelligence. It can be due to the opportunities, environment available for the nourishment of an intelligence; it is quite possible that existential intelligence might have developed due to the environment available to it, and musical and other intelligences might have remained underdeveloped or moderately developed because encouraging environment is not available to them. The southern districts is underdeveloped students have least chances to enhance their multiple intelligences. It may be also due to the practice and non-application of the theory of multiple intelligences in teaching learning process. Neither pedagogical strategies are planned, nor students are encouraged to use various intelligences in their learning, therefore an unbalanced development of multiple intelligences might have been occurred. Basic facilities like computer, net, multimedia are hardly available in schools teachers and students have fewer opportunities to develop their multiple intelligences. Another reason can be that different culture value different intelligences, especially in Khyber Pakhtunkhwa existential intelligence is highly valued and musical intelligence is discouraged. This may explain the relatively high level of existential learning and the lower levels of musical and moderate level of other dimensions.

The researcher also found that the multiple intelligences are interconnected. Here too results of the study confirmed the claim of Gardner. He says that although multiple intelligences are separate units but they support each other whenever a job is performed.

The researcher also found a moderate association between verbal/linguistic, logical/mathematical intelligence and academic achievement. Result of the study is in consonance with, Siti, M. et al (2013), he found in his study a significant positive correlation between perceived verbal/linguistic, logic/mathematical intelligences and academic achievement of the students. Overall, there is a significant positive correlation between perceived verbal-linguistic, bodily/kinesthetic, visual-spatial, musical intelligence and academic achievement of the students and it shows moderate correlation.

This result is also inconsonance with the results of Deary, et al., (2007), who discovered strong and positive relationship between logical/mathematical intelligence and academic achievement. Furnham, Hosoe, & Tang (2002), found in their research, that the respondents considered that verbal, logical and spatial intelligence exemplify true intelligence. The Hypothesis no 7 developed by the above researchers in their study, which states that verbal, logical and spatial intelligences are the best predictors of overall IQ scores also supported by the results of this study. It can be also said that results of the study is reflection of our traditional teaching, in the schools of southern region/districts of Khyber Pakhtunkhwa which

focus on verbal/linguistic and logical/mathematical dimensions only.

### Conclusion

Existential intelligence is the students' most dominant and musical intelligence is the students' least dominant intelligences. The evidence proved that the multiple intelligences are interconnected and support each other during performance. The verbal/linguistic and logical/mathematical intelligence are moderately, interpersonal, existential, intrapersonal, naturalistic, and bodily/kinesthetic intelligences are weakly correlated and musical intelligence is not correlated to academic achievement.

### Application

i. Multiple intelligences theory needs to be incorporated in teaching, learning process, formally in Pakistan, especially in schools of southern region of Khyber Pakhtunkhwa; so the students may have the opportunities to develop all intelligence not just existential intelligence.

ii. Teacher should create such an environment, which is favorable for the development of all the intelligences, keeping in view individual differences of the students.

iii. Teachers need professional development in multiple intelligences theory (MIT), so that they can use it effectively. Lesson planning, teaching & learning activities, should be planned around the MI Theory, in order to provide opportunities for the enrichment of all the intelligences. Teachers should encourage students to use their multiple strengths to improve their academic performance.

### Recommendation

Additional research is needed. For example, experimental studies may be conducted on students of different ages in different localities in order to compare the results and find out the actual correlation between multiple intelligences and with academic achievement.

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