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Relationship between Multiple Intelligence Categories and Learning Styles of Students in Pakistan

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Abstract

The study designed to build on foundations laid down by other investigators particularly Gardner (1993), Linda & Campbell (1999), Chen, Krechevsky & Viens (1998). This was co relational in nature, and used survey format. The study conducted in six girls' secondary schools of Islamabad. 354 students of grade X participated in the study. The modified version of multiple intelligence assessment scale and modified Version of VAK learning styles inventory used as instrument. The finding revealed that different learners have different type of intelligence learning styles. The study did not found any relationship between learning styles and multiple intelligence.

The results showed that mostly students have auditory and kinesthetic learning style and it has relationship with multiple intelligence categories. The study recommended that curriculum may be designed keeping in view students' intelligence categories and learning styles.

Key words: Multiple intelligence; learning styles; VAK learning inventory; multiple intelligence inventory

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Khush Bakht Hina, Muhammad Ajmal, Ph.D., Fazalur Rahman and Nabi Bux Jumani, Ph.D.
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INTRODUCTION

The theory of multiple intelligences was developed in 1983 by Dr. Howard Gardner, professor of education at Harvard University. It suggests that the traditional notion of intelligence, based on I.Q. testing, is far too limited. Instead, Dr. Gardner proposed eight different intelligences to account for a broader range of human potential in children and adults (Armstrong, 2009).

In Pakistani context, schools and culture focus most of their attention on linguistic and logical-mathematical intelligence. However, the theory of multiple intelligence says that we should also place equal attention on individuals who show contributions in the other intelligences: the artists, architects, musicians, naturalists, designers, dancers, therapists, entrepreneurs, and others who enrich the world in which we live.

Unfortunately, many children who have these contributions don't receive much support for them in school. Many of these kids, in fact, end up being labeled underachievers, when their unique ways of thinking and learning aren't addressed by a heavily linguistic or logical-mathematical classroom.

The theory of multiple intelligences proposes a major transformation in the way our schools are run. It suggests that teachers be trained to present their lessons in a wide variety of ways using music, cooperative learning, art activities, role play, multimedia, field trips, inner reflection, and much more.

Theoretical Framework of Multiple Intelligences

Multiple Intelligence are tools for learning and problem solving Creating opportunities for all students, by enriching the classroom through multiple techniques and assessment forms, develops students and brings out their strengths. Gardner (1993, 1998) uses eight different criteria to judge whether candidate ability can be counted as intelligence. The criteria consist of each of the following:

- a. Potential isolation by brain damage.
- b. Existence of savants, prodigies, and other exceptional individuals.
- c. An identifiable core set of operations—basic kind of information-processing operations or mechanisms that deal with one specific kind of input
- d. A distinctive developmental history, along with a definite set of “end-state” performances.
- e. An evolutionary history and evolutionary plausibility.
- f. Support from experimental and psychological tasks.
- g. Support form psychometric findings.
- h. Susceptibility to encoding from a symbol system.

Multiple Intelligence Domains

There are three basic domains of intelligence:

- (a) The Interactive Domain. The interactive domain consists of the linguistic, interpersonal, and kinesthetic intelligences. These are the intelligences that learners typically employ to express them and explore environment.
- (b) The Introspective Domain. The introspective domain consists of the existential, intrapersonal and visual intelligences. These are the intelligences that have a distinctly effective component to them.

Guild and Gardner (1998) described multiple intelligence as under:

1. Linguistic intelligence, in which language and words come easily to a person. The person has sophisticated accessibility to language.
2. Logical-mathematical intelligence, in which a person can easily perceive quantitative relationships, particularly related to computations and scientific areas.
3. Spatial intelligence, in which a person has awareness of their own and others' position in space.
4. Bodily kinesthetic intelligence, in which a person has graceful body movements and awareness of positions in space.
5. Musical intelligence, in which a person is particularly sensitive to sound and has an ability to create and communicate through rhythmic patterns.
6. Interpersonal intelligence, in which a person understands and enjoys people, and relates to others easily.
7. Intrapersonal intelligence, in which a person is self-reflective and perceptive about personal abilities.
8. Naturalistic intelligence, in which a person interested in and knowledgeable about the natural world.
9. Existentialist intelligence can be defined as the ability to be sensitive to, or have the capacity for, conceptualizing or tackling deeper or larger questions about human existence, such as the meaning of life, why are we born, why do we die, what is consciousness, or how did we get here.

However, Gardner has identified eight intelligences. In Gardner's theory the word intelligence is used two senses.

- a. Intelligence can denote a species-specific characteristic; homo-sapiens is that species which can exercise these eight intelligences.
- b. Intelligence can also denote an individual difference. While all humans possess those eight intelligences, each person has his/her own particular blend or amalgam of the intelligences.

The details of eight categories of intelligence are as follows:

i. Linguistic Intelligence

Linguistic Intelligence is the intelligence that is usually tested that most by educators. The writer's ability to effectively communicate to the reader, in this instance, is an example of Linguistic intelligence. Learners who have a high level of linguistics intelligence have the ability to communicate effectively. Thus, oral presentations, writing assignments, foreign languages, and vocabulary learning are some examples of how educators and learners can improve their linguistic intelligence.

Checkely (1997) states that linguistic Intelligence is the capacity to use language, your native language, and perhaps other languages, to express to express what's on your mind and to understand other people (p. 12).

Gardner, 1995 states that linguistic intelligence allows individuals to communicate and make sense of the world through language. Poets exemplify this intelligence in its mature form. Students who enjoy playing with rhymes, who pun, who always have a story to tell, who quickly acquires other languages, including sign language, all exhibit linguistic intelligence.

Lazaer, (2002) agree with the Gardner and states that linguistic Intelligence also known as ("word smart") The "word smart" people learn best through language including speaking, writing, reading, and listening. They use language to express what is on their minds and to understand other people. They are able to explain, convince, and express themselves verbally or in writing. They enjoy writing and creating with words.

Gardner (1999) presents the core features of Linguistic intelligence include the ability to use words effectively for reading, writing and speaking. Linguistic skill is important for providing explanations, descriptions and expressiveness. Gardner describes the poet as the epitome of Linguistic ability. Other career fields requiring skill in this area include teaching, journalism, and psychology. Convergent aspects of Linguistic intelligence assess by standard intelligence tests include vocabulary and reading comprehension. Activities requiring divergent thinking include story telling, persuasive speech, and creative writing.

ii. Logical-Mathematical Intelligence

Logical-mathematical intelligence enables individuals to use and appreciate abstract relations. Scientists, mathematicians, and philosophers all rely on this intelligence. So do the students who "Live" baseball statistics or who carefully analyze the components of problems—either personal or school-related—before systematically testing solutions.

Checkely (1999) states that people with a highly developed logical-mathematical intelligence understand the underlying principals of some kind of a casual system, the way a scientist or a logician does; or can manipulate numbers, quantities, and operations, the way a mathematician does (p.12).

A student with a high logical-mathematical intelligence can understand the method that how to solve any formula, not only how to apply any method, side by side learner also know how it works. The learner who has a high logical-mathematical intelligence most likely be a person who can see the next logical step in instruction.

Lazaer (2002) expanded Grader views about logical-mathematical intelligence are also know as (“number/reasoning smart”) The “number smart” people learn best through numbers, reasoning, and problem solving. They are able to create and manipulate visuals and mental pictures form various perspectives. They like to weigh, measure, calculate, and organize data. They are good at making an analogy or debating an issue.

iii. Musical Intelligence

Gardner (1999) describe that musical intelligence allows people to create, communicate, and understand meanings made out of sound. While composers and instrumentalists clearly exhibit this intelligence, so do the students who seem particularly attracted by the birds singing outside the classroom window or who constantly tap out intricate rhythms on the desk with their pencils.

Checkely (1999) states that musical intelligence is the capacity to think in music, to be able to hear patterns, recognize them, remember them, and perhaps manipulate them” (p.12). While Campbell (1992) suggests that educators who want to enhance musical intelligence can sing a rap or a song that explains the topic (p.18). Lazaer (2002) describes that musical intelligence as “music smart” people think in music, hearing patterns, recognizing, remembering, and manipulating them. They learn best through sounds including listening and making sounds such as songs, rhythms, patterns, and other types of auditory expression. They are able to use inductive and deductive reasoning and identify relationships in data.

iv. Spatial Intelligence

Checkley (1999) states that spatial Intelligence refers to the ability to represent the spatial world internally in your mind – the way a sailor or airplane pilot navigates the large spatial world (p.12).

On the other hand, Gardner (1999) describes the Spatial intelligence includes the ability to perceive the visual world accurately and to perform transformations and modifications upon one’s own initial perceptions via mental imagery.

Functional aspects of spatial intelligence include artistic design, map reading, and working with objects. Visual artists and interior designers exemplify creative spatial thinking, and a successful architect will need both the creative abilities as well as technical accomplishment. An automobile mechanic or engineer, on the other hand, does not need creative and artistic abilities to find the solution to a malfunctioning engine.

Lazaer (2002) observed that because of spatial intelligence the “picture smart” people have the ability to represent the spatial world in their minds. So, they learn best visually and tend to organize their thinking spatially. They like to think and create pictures. They are also drawn to information that is presented in a visual form.

In education spatial intelligence has great importance because it makes possible for people to perceive visual or spatial information, to transform this information, and to recreate visual images from memory. Architects, sculptors, and engineer’s are needed well-developed spatial capacities for the work. The students who turn first to the graphs, charts, and pictures in their textbooks, who like to “web” their ideas before writing a paper, and who fill the blank space around their notes with intricate patterns are also using their spatial intelligence.

v. Bodily-Kinesthetic Intelligence

Gardner (1999) describes that bodily-kinesthetic intelligence allows individuals to use all or part of the body to create products or solve problems. Athletes, surgeons, dancers, choreographers, and crafts people all use bodily-kinesthetic intelligence. The capacity is also evident in students who relish gym class and school dances, who prefer to carry out class projects by making models rather than writing reports, and who toss crumpled paper with frequency and accuracy into wastebaskets across the room. Checkley (1999) states that bodily Kinesthetic intelligence is the capacity to use your whole body or parts of your body hand, fingers, arms to solve a problem, make something, or put on some kind of production (p.12).

Lazaer (2000) highlights the kinesthetic intelligence ability to use one’s body in differentiated ways for both expressible (e.g., dance, acting) and goal-directed activities (e.g., athletics, working with one’s hands). Well-developed kinesthetic ability for innovative movement is required for success in professions such as choreography, acting, and directing movies or plays. Precision, control, and agility are the hallmarks of athletes such as karate masters, professional soccer players, and gymnasts.

vi. Interpersonal Intelligence

Gardner (1999) Interpersonal intelligence enables individuals to recognize and make distinctions about others’ feelings and intentions. Teachers, parents, politicians, psychologists and sales people rely on interpersonal intelligence. Students exhibit this intelligence when they thrive on small-group work, when they notice and react to the moods of their friends and classmates, and

when they tactfully convince the teacher of their need for extra time to complete the homework assignment.

Checkley (1999) stated that interpersonal intelligence understands other people. It's an ability we all need, but is at a premium if you are a teacher, clinician, salesperson, or politician. Anyone who deals with other people has to be skilled in the interpersonal sphere (p.12).

Students who have a high intrapersonal intelligence have the ability to reflect on past experiences, in order to manipulate future experiences. A learner who has a high intrapersonal intelligence would be a good at writing fiction stories. People who are intrapersonal tend to be very imaginative.

Lazaer (2002) observed that in interpersonal intelligence the “social smart” people learn best through interaction with other people through discussions, cooperative work, or social activities. They are able to create synergy in a room by being aware of the feelings and motives of others. They can be excellent leaders because they enjoy being a part of group.

vii. Intrapersonal Intelligence

Gardner (1999) says that intrapersonal intelligence helps individuals to distinguish among their own fallings, to build accurate mental models of themselves, and to draw on these moles to make decisions about their lives. Although it is difficult to assess who has this capacity and to what degree, evidence can be sought in students' uses of their other intelligences—how well they seem to be capitalizing on their strengths, how cognizant they are of their weaknesses, and how thoughtful they are about the decisions and choices they make.

Checkley (1999) states that intrapersonal intelligence refers to having an understanding of yourself, of knowing who you are, what you can do, what you want to do, how your react to things, which things to avoid, and which things to gravitate toward (p.12)

Lazaer (2002) observes that the “self smart” people have a good understanding of themselves. Because they know who they are, what they can do, and what they want to do, they tend not to screw up. They learn best through meta-cognitive practices such as getting in touch with their feelings and self-motivation. They are able to concentrate and be mindful. They prefer solitary activities.

It may be concluded that intrapersonal intelligence includes accurate self-appraisal, goal setting, self-monitoring/correction, and emotional self-management.

viii. Naturalist Intelligence

Gardner (1999) Found that naturalist intelligence includes the “nature” people have sensitivity to other features of the natural world. So, they learn best through the interactions with the

environment including outdoor activities, field trips, and involvement with plants and animals. They see the subtle meanings and patterns in nature and the world around them.

Naturalist intelligence allows people to distinguish among, classify, and use features of the environment. Farmers, gardeners, botanists, geologists, florists, and archaeologists all exhibit this intelligence, as do students who can name and describe the features of every make of car around them.

Checkley (1999) states that naturalist intelligence designates the human ability to discriminate among living things (plants, animals) as well as sensitivity to other features of the natural world.

Recently Gardner (2003) added the two new intelligence categories, spiritual intelligence and Existential intelligence. He was of the view that human beings make efforts to understand the ultimate questions and meaning of life: who am I? Where do I come from? Do I exist? Etc.

Spirituality is the sphere of life in which to attain an ultimate truth, rather than intelligence to solve or produce something.

The next one is Existentialist. These “wondering” people question about “ultimate issues,” such as the significance of human life, the meaning of death, love of other people, the fate of human beings, etc (Gardner, 1999; p.60). This intelligence can be a cognitive strand of the spiritual. They learn best through seeing the “big picture” of human existence by asking philosophical questions about the world.

Multiple Intelligences and Role of Teacher

Gardner’s theory of multiple intelligence has several implications for teachers in terms of classroom instruction. The theory states that all seven intelligences are needed for productively function in society. Teachers, therefore, should think o all intelligences as equally important. This is in great contrast to traditional education system that typically places a strong emphasis on the development and the use of verbal and mathematical intelligences.

Armstrong (2001) while exploring another implication for teachers concluded that teachers should structure the presentation of material in a style, which engages most or all of the intelligence. Visual presentation and students involvement not only excites students about learning, but it also allows a teacher to reinforce the same material in a variety of ways. By activating a wide assortment of intelligences, teaching in this manner can facilitate a deeper understanding of the subject material.

Gardner (1999) emphasizes on diversity of students’ intelligence; thus, it promotes diverse approaches to learning. Every child possesses inborn creativity, but many children lose interests in learning due to rigid educational curriculum that is only focused on verbal/Linguistic and

logical/mathematical intelligence. In order to develop each child's uniqueness, educators should be able to look at the inner-world of children. Teachers need to be aware of these differences.

Lazaer (2002) & Armstrong (2003) concluded that understanding the theory of multiple intelligence will help teachers to understand the differences of each student and develop each one's talents. Therefore Teachers' commitment would make difference in students' learning, and multiple intelligence would provide opportunity to know their learning style. Bouton (1997) recommended that educators should learn to apply MI theory to today's learners and it will enhance team building; assessment, productivity, and knowledge about learners of all ages.

Multiple Intelligence and Learning Styles

Hoerr, T. (2004) describes the learning style as "a student in terms of those educational conditions under which he is most likely to learn" (p.27). Dunn (2001) concluded that Multiple Intelligence addresses about what is taught on the other hand, Learning Style is about how a concept is taught. Research literature described the importance of multiple intelligence and learning style. It further indicated that individuals who incorporate multiple intelligences in their teaching and learning practice are more effective in knowledge transfer. Gardner (1999) identified seven different intelligences or seven different ways that a person can learn as opposed to the three learning styles discussed above. Each person is born with certain preferences toward particular styles, but culture, experience, and development influence these preferences.

VAK (Visual-Auditory-Kinesthetic) Learning Style Categories

Keller, (2003) Visual-Auditory-Kinesthetic learning styles model or 'inventory', usually abbreviated to VAK. Alternatively the model is referred to Visual-Auditory-Tactile/Kinesthetic.

VAK learning styles scale first time developed by psychologists and teaching specialists such as Fernald, Keller, Orton, Gillingham, Stillman and Montessori, beginning in the 1920's.

The VAK concept was originally concerned with teaching of early grades children. The early VAK specialists recognized that people learn in different ways: as a very simple example, a child who could not easily learn words and letters by reading (visually) might for instance learn more easily by tracing letter shapes with their finger kinesthetic.

The VAK learning styles model provides a very easy and quick reference inventory to assess people's preferred learning styles, and then most importantly, to design learning methods and experiences that match people's preferences.

i. Visual Learning Style

Visual learning style involves the use of seen or observed things, including pictures, diagrams, demonstrations, displays, handouts, films, flip-chart, etc. Visual learners process information

most effectively when the information is seen. Charts, graphs, flow charts, all the symbolic arrows, circles, hierarchies and other devices that instructors can use to represent what could have been presented in worlds.

Perkins (2005) describes that these learners think in pictures and have vivid imaginations. According to him, most people are classified as visual learners. If students are visual learner then they focus on the use of visual aids to increase information processing.

Silver (2000) suggested that visual learners have two sub channels – linguistic and spatial. Learners, who are visual-linguistic, like to learn through written language such as reading and writing tasks. They remember what has been written down, even if they do not read it more than once. They like to write down directions and pay better attention to lectures if they watch them.

Learners who are visual spatial usually have difficulty with written language and do better with charts, demonstrations, videos, and other visual materials. They easily visualize faces and places by using their imagination and seldom get lost in new surroundings. To integrate this style into the learning environment teacher can use following strategies:

- (a) Use graphs, charts, illustrations, etc.
- (b) Include outlines, agendas, handouts, etc. for reading and taking notes on.
- (c) Emphasize key points to cue when to take notes.

ii. Auditory Learning Style

Auditory learning style involves the transfer of information through listening: to the spoken word, of self or others, of sounds and noises. Aural learners process information most effectively when spoken or heard. These learners respond well to lectures and discussions and are excellent listeners. They also like to talk and enjoy music and dramas. When trying to recall information aural learners can often “hear” the way someone told them the information. If students are an aural learners, their focuses on discusses the new improvements points to the benefits of obtaining information in an oral language format. Homan (2005) describes that auditory learners usually talk to themselves a lot. They also may move their lips and read out loud. They may have difficulty with reading and writing tasks. They often do better talking to a colleague or a tape recorder and hearing what was said.

- (a) Begin new material with a brief explanation of what is coming. Conclude with a summary of what has been covered. This is the old adage of “tell them what they are going to learn, teach them, and tell them what they have learned.”
- (b) Use the Socratic method of lecturing by questioning learners to draw as much information from them as possible and then fill in the gaps with your own expertise.
- (c) Include auditory activities, such as brainstorming, buzz groups, etc.

iii. Kinesthetic Learning Style

The word ‘kinesthetic’ describes the sense of using muscular movement – physical sense in other words. Kinesthesia and kinesthesis derived from the Greek word kineo meaning move, and aesthesis meaning sensation. Kinesthetic therefore describes a learning style, which involves the stimulation of nerves in the body’s muscles, joints and tendons. This relates to the colloquial expression ‘touchy-feely’. Kinesthetic/Tactile learners process information actively through physical means. Kinesthetic learning refers to whole body movement while tactile learning refers only to sense of touch.

Homan (2005) found that these learners use gesture when speaking, are poor listeners, and lose interest in long speeches. Most students that do not perform well in school are kinesthetic/tactile learners. The crux of this learning style is that the learner is connected to his situations through experience, example, practice, or simulation. If student is a kinesthetic/tactile learner, learner utilizes “hands on” demonstrations and field experiences.

Table 1 VAK Learning Style

Seeing – Visual	Hearing - Auditory	Doing - Kinesthetic
Mind sometimes strays during verbal activities	Talks to self aloud	In motion most of the time/fidgety
Observes, rather than talks or acts; may be quiet by nature	Outgoing by nature	Outgoing by nature; expresses emotions by physical means.
Organized in approach to tasks	Whispers to self while reading, many hum or sing while working	Taps pencil or foot/fiddles with objects while studying
Likes to read	Likes to be read to	Reading is not a priority
Usually a good speller	May be particular about the exact choice of words	May find spelling difficult
Memorizes by creating mental images	Memories by steps in a sequence	Likes to solve problems by physically working through them
Thinks in pictures	Very aware of rhythm	Very good body control, good timing and reflexes
Easily put off by visual distractions	Easily distracted by noises	Is affected by touch or lack of it
Finds verbal instructions difficult	May have difficulty with written instructions	Likes physical rewards
Remembers faces	Remembers names	Remembers what they have done rather than seen/heard
Strong on first impressions	May assess people by the sound of their voice	May assess people and situations by what ‘feels right’
Likes drawing and	Enjoys music and the	Enjoys handling objects

doodling, may have good handwriting	sounds of words	
Enjoys using colour	Enjoys talking and listening	Enjoys doing activities
Notices details	Can remember – and often mimic – speech by picking up rhythm of the sentence	Likes to use gestures and touch people while talking to them
Often a quick thinker	May need time to think (ie discuss it with myself)	May need time to think (ie process the actions involved)
May focus on the ‘big picture’ and use advanced planning	May assess a situation on ‘how it sounds’ to them	Will try new things – likes to get involved

Homan, Perkins, Pirkle, and Traylor (2005) Kinesthetic learners do best while touching and moving. It also has two sub channels – kinesthetic (movement) and tactile (touch) they tend to lose concentration if there is little or no external stimulation or movement. When listening to lectures they may want to take notes. When reading, they like to scan the material first, and then focus in on the details (get the big picture first). They typically use color highlighters and take notes by drawing pictures, diagrams, or doodling. To integrate this style into the learning environment:

- (a) Use activities that get the learners up and moving.
- (b) Use colored markers to emphasize key points on flipcharts or white boards.
- (c) Play music, when appropriate, during activities.

Learning Styles and Different Categories of Learners

Lazaer (1999) recommends that as children do not learn in the same way, they cannot be assessed in a uniform fashion. Therefore, it is important that a teacher create an “intelligence profiles” for each student. Knowing how each student learns will allow the teacher to properly assess the child’s progress this individualized evaluation practice will allow a teacher to make more informed decisions on what to teach and how to present information.

Felder-Silverman (1999) gives types of learner, he states that learning styles and strategies can help to explore the multiple intelligence and the learning styles of the learners. Therefore there are different types of learners.

- (a) Active And Reflective Learners
- (b) Sensing And Intuitive Learners
- (c) Visual And Verbal Learners
- (d) Sequential And Global Learners

Objectives of the Study

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Khush Bakht Hina, Muhammad Ajmal, Ph.D., Fazalur Rahman and Nabi Bux Jumani, Ph.D.
Relationship between Multiple Intelligence Categories and Learning Styles of Students in Pakistan

The main objective of the present study was to investigate the relationship between multiple intelligence categories and learning styles of secondary school students.

Methodology and Procedure

This study was designed to investigate the relationship between multiple intelligence categories and learning styles of secondary school students. This study was co relational in nature, and used survey format. For collection of information survey method was used to explore the interrelationship between two or more variables.

Participants

For this study simple random sampling technique was used. The study was conducted in 6 girls' secondary schools of Islamabad. 354 students of grade X participated in the study.

Instruments for Study

Instruments used to collect data for this study were:

1. Modified version of multiple intelligence assessment scale (Adam, 2004)
2. Modified Version VAK learning styles scale (Pride Company 2002).

1. Multiple Intelligence Assessment Scale (MIAS)

Multiple intelligence scale was measured by the MI of the secondary schools learners developed by Adam (2004) This scale contained 100 items, measuring nine intelligence levels of secondary schools students, these Linguistic intelligence, Logical-mathematical intelligence, Musical intelligence, Bodily-kinesthetic intelligence, Spatial intelligence, Interpersonal intelligence, Intrapersonal intelligence, Naturalist intelligence, Spiritual intelligence.

Respondents answered items in this scale according to five-point scale with response choices ranging from (very much like, considerably like somewhat like, not much like, nothing like). The responses were scored as 1,2,3,4,5, for (very much like, considerably like somewhat like, not much like, nothing like) consecutively.

Sub-Scale of MIAS

1. Linguistic Intelligence
2. Logical-mathematical Intelligence
3. Musical Intelligence
4. Bodily-kinesthetic Intelligence
5. Spatial Intelligence

6. Interpersonal Intelligence
7. Intrapersonal Intelligence
8. Naturalist Intelligence
9. Existentialist Intelligence

2. VAK Learning Styles Scale (VAK)

VAK learning style scale was developed by Ld. Pride Company (2004). VAK learning styles scale consists of 30 items. Each question has four possible options that are:

(Very little like me, Little like me, Like me, A little like me).

The 30 items scale represented the following categories:

- a. Visual Learning style
Visual learning style involves the use of seen or observed things, including pictures, diagrams, demonstrations, displays, handouts, films, flip-chart, etc.
- b. Aural/Auditory Learning Style
Auditory learning style involves the transfer of information through listening: to the spoken word, of self or others, of sounds and noises.
- c. Kinesthetic Learning
Kinesthetic learning involves physical experience, touching, feeling, holding, doing, and practical hands-on experiences.

Data Analysis

Table 2 Alpha reliability of MIAS Inventory (N=354)

Subscales of MI	No of Items	Reliability Coefficient
Linguistic Intelligence	13	.84
Logical-mathematical intelligence	13	.90
Musical Intelligence,	10	.80
Bodily-kinesthetic Intelligence,	10	.75
Spatial Intelligence,	11	.72
Interpersonal Intelligence,	11	.82
Intrapersonal Intelligence	11	.92
Naturalist Intelligence,	10	.79
Existentialist Intelligence	11	.80

The reliability analysis of the multiple intelligence scales of categories and the total scale shows that alpha coefficient of the Multiple Intelligence categories ranges between 0.72 to 0.92.

Table 3 Distribution of sample according to type of Multiple Intelligence

Multiple Intelligence Categories	No of Students
Linguistic Intelligence	55
Logical-mathematical Intelligence	70
Musical Intelligence	28
Bodily-kinesthetic Intelligence	20
Spatial Intelligence	32
Interpersonal Intelligence	43
Intrapersonal Intelligence	24
Naturalist Intelligence	22
Existentialist Intelligence	52
Total: 354	346

This table presents the summary of students Multiple Intelligence categories results. Results showing how many students' fall indifferent type of Multiple Intelligence Categories. However 8 students did not fall in any kind of intelligence category that indicated that these students did not fulfill the criteria given by Adam (2002). The table 3 further showed that greater number of students fall in the category of logical mathematical. Further less number for students fall in bodily kinesthetic intelligence category.

Table 4 Alpha reliability of VAK subscales (N=354)

Subscales of VAK	No of Items	Reliability Coefficient
Visual Learning Style	10	.54
Aural Learning Style	10	.66
Kinesthetic Learning Style	10	.57

The reliability analysis of the VAK learning styles categories ranges between 0.54 to 0.66, which shows that its internal consistency was preferably higher.

Table 5 Learning style of the students (N=354)

Learning Style Categories	No of Students
Visual Learning Style	30
Auditory Learning Style	189
Kinesthetic Learning Style	135

Table 5 revealed that majority of the students fall in auditory learning style category.

Conclusions/Discussion

This study was designed to build on the foundations laid down by other investigators particularly Gardner (1993), Linda & Campbell (1999), Chen, Krechevsky & Viens (1998). The finding of the study shows that different learners have different type of intelligence like multiple intelligence. These findings supports the Gardner's theory of the multiple intelligences that is a departure from the view that intelligence is a single, measurable unit (Gardner, 1999). Gardner's theory focuses on eight intelligences, while highlighting the need for problem solving (Campbell, & Dickinson, 1999).

As for as relationship between multiple intelligence and learning styles was concerned, the findings of the study show that visual leaning style does not found any relationship with Multiple Intelligence. This finding confirms the finding of Adam (2000) that if teachers do not use the aids in the classrooms the students preferred learning style will change and it is not linked with the existing intelligence of the students.

The findings from this study indicate that students have different learning styles. This study support that new evidence emerges regularly to support premise that not all children learn in same way (Davis, 1991). It is apparent that an awareness of different learning styles is a significant tool to understand differences and assist with student development (Strong, Silver, & Perini, 2001). In this study results show that students who have aural learning style have a significant relationship with multiple intelligence categories.

In Pakistani context, teachers gave lot of emphasis on speaking and aural learning and this may be the reason why mostly students have aural learning style. This confirmed Gardner (1983) claim that culture plays an important role in the development of intelligence and learning styles. Another finding of the study shows that mostly students have auditory and kinesthetic learning style and it has relationship with multiple intelligence categories. In our culture students having tactile learning style are considered hyper active in the class and mostly teachers discourage them. This relationship with intelligence challenges the popular belief that mental and physical actives are not interrelated (Busato, 1996).

The findings of this study further revealed that there is a significant relationship between tactile learning styles and multiple intelligence categories. In this study the results show highly

significant relationship with logical mathematical intelligence and naturalist intelligence with oral learning style. It shows that students have great interest in math's and naturalist intelligence.

Findings of the study further showed that fewer students have naturalistic Intelligence. This is the type of intelligence for students who learn best through nature. For these students, most learning takes place in outdoor settings. Gardner, 1999 indicated that these students enjoy doing nature projects, such as bird watching, butterfly or insect collecting, tree study, or raising animals. Armstrong (2000) also supported that argued that it is very beneficial for these students to have greater access to developing their naturalistic intelligence inside the school building. So the school's task is to bring the natural world into the classroom and other areas. But our curriculum developers ignore this fact.

However, the study did not show any significant relation between demographic variables, social status and multiple intelligence of students. Same results indicated by Vermont & White, (1982, 1996).

Recommendations

- Curriculum may be designed keeping in view students' intelligence categories (linguistic, logical/mathematical, bodily/kinesthetic, spatial, musical, interpersonal, and intrapersonal) and learning styles.
- The concept of multiple intelligence and learning style may be included in pre-service and in-service teacher training programs.
- In classrooms, environments conducive to active pursuit of learning may be created so the students can adopt their own learning style.
- Awareness program for parents may be arranged.

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