Impact of Multiple Intelligence on learning styles – A study among the students of higher education of Kishkinda University and BITM Bellary-Karnataka.

By

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Abstract.

The idea of Howard Gardner's multiple intelligence need elaborate and critical discussion from the point of view of students, academicians and practioners of psychology. John .B.Watson (1913) presented the concept of behaviourism, which views that all behaviours are the result of learning process. The early 20th century witnessed the dominance of Behaviourism, resulted in the emergence of three major branches of Psychology, i.e humanistic psychology, biological psychology and Cognitive psychology.

The present study aims at identifying the dominant, moderate and dormant domains of multiple intelligence & its impact on learning styles among the students of higher education of Kishkinda University and BITM Bellary-Karnataka.

The study also aims to describe gender differences and the relationship between learning styles and multiple intelligences of the students in comparison with their respective stream of education. The study involves 300 students, comprising 50 MBA, MCA and Engineering students from BITM, 50 MBA, MCA and Engineering students from Kishkinda University. The relationship between eight types of multiple intelligence and learning styles such as Visual learners, auditory learners, kinaesthetic learners, tactile learners, individual learners and group learners is verified by using independent sample t test, multiple correlation and regression analysis. The conceptual model depicting the relationship between MI and styles is further verified by using multiple regression analysis. Douglas and Harm's questionnaire of multiple intelligences is used collect the data.

Key words: *Multiple intelligence, Learning styles, Humanistic psychology, Biological psychology and Cognitive psychology.* SEM analysis.

Introduction:

The present research study is based on two theoretical concepts, theory of Multiple Intelligence (Gardner. H, 1983) and Theory of learning styles ***(Checkley, 1997; Saban, 2003, Nilgün Yenice 2010)***. Every individual can be possessed with certain highly developed domains of intelligence and it is interconnected with different types of learning styles, which are affected by their own learning style preferences ***(Gardner.H, 1983; Checkly1997; Saban 2003).***

Carl Jung's (1927) theory of personality is mainly focussed on different styles of learning based on their level of intelligence/s, called as a set of multiple intelligences. The conceptual blend of both the theories are cited by several researchers ***(Isabel Myers, Katherine Briggs, 1977, Gardner. H, 1983, Jaftiyatur, 2017)*** to emphasise the relationship between personality development, leadership and learning styles.

Howard Gardner posits that each and every individual is recognised with unique and distinct cognitive profile, based on the varying level of intelligences such as verbal-linguistic, musical-rhythmic, logical-mathematical, visual- spatial, bodily-kinaesthetic, intrapersonal, interpersonal, naturalist and existential intelligences ***(Karim Hajhashemi 2011)***.Gardner argue that intelligence is not the mere ability to be measured or assessed by using pen and paper examination ,or few metric scores in a specific subject. It is noted that, traditional intelligence tests cannot measure the abilities of a chess player, an athlete or a violinist, an artist, a painter, a classical singer or an Olympic Games champion. Frames of Mind (***Gardner.H 1983***), incorporates too many abilities not to be explained by a single factor, which is a far beyond the traditional concept of intelligence.

The skills, intelligence and learning styles are greatly associated with the factors of environmental stimuli. The learning inventory model suggested by ***Dunn and Dunn 1993, 1999, 2001,*** maintains that, if a student is not learning the way teacher is doing, then the teacher must teach the student, the way he learns. It is proposed that various factors such as emotional, sociological, physiological psychological preferences of one's ability to learn and process his levels of intelligence.

Gardner defined eight different types of intelligences, later one more component is added; Existential intelligence ***(Gardner, 2004).***

Types of Multiple intelligence

Verbal – Linguistic Intelligence

This intelligence is mainly concerned with the ability to comprehend and compose language efficaciously both orally and in writing. Poets, writers, linguists, journalists, language teachers, etc. are the example of people who have the verbal-linguistic intelligence. Sensitivity to the written and spoken language determines the ability of Verbal – Linguistic Intelligence *(Gardner.H 1999).*

Logical/mathematical intelligence:

This intelligence is the ability to calculate and comprehend situations or conditions systematically and logically. Students who have this type of intelligence are good at exploring patterns and relationships, problem solving, and reasoning *(Gardner, 1999).* This intelligence type can be connected with deductive reasoning. People who work in the scientific and mathematical fields are supposed to have this type of intelligence.

Visual/Spatial intelligence:

This type of intelligence is described as the ability of perceiving, modifying and creating images. Artists, designers, architects, sculptors have highly this type of intelligence.

Musical intelligence:

This type of intelligence is the ability to identify pitch, rhythm, and emotional side of sound. It is exemplified by musicians, singers, composers, and people who are interested in music.

Bodily /Kinaesthetic intelligence:

Kinaesthetic Intelligence is the ability to use one's body with great precision**.** This type of intelligence refers to use the body for expression. It is also described as the potential of using the body and its parts in mastering problems or creation of products. Athletes, professional dancers, mechanics, physical education instructors are in this group.

Intrapersonal intelligence:

The ability to have self-knowledge and recognize people's similarities and differences among them. *Gardner (1999)* adds that it involves the ability to understand oneself, and to interpret and appreciate own feelings, emotions, desires, strengths, and motivations.

Interpersonal intelligence:

The ability to identify, comprehend and appreciate the emotions, intentions, motivations, desires, and beliefs of other people. Teachers, therapists, salespersons, political leaders have high interpersonal intelligence. Interpersonal intelligent people are friendly and participate in social activities. These people prefer cooperative learning, exchanging information, and studying in groups *(Teele's-2000).*

Naturalistic intelligence:

This type of intelligence is the ability to identify and classify the natural world around people. Teele (2000) states that these people live in harmony with the nature and enjoy the nature by its very basic creation and curious to develop rational measures to understand the natural phenomena. Some occupations need a well-developed form of this intelligence, like astronomers, Physicists, biologists, and zoologists. Generally these people are of snooping mindset. Gardner added this intelligence as the eighth one, after the first publication of the model.

Existential intelligence:

This intelligence suggests the ability to question about the existence of human, death, the meaning of life and the reason for existence (Armstrong, 2009). Generally these people are either philosophers, Scientists or Sages of higher order enlightenment.

Learning Styles

Learning styles are defined as the manner in which individuals perceive and process information in learning situations (Brown 2000).Learning styles are the general approaches —for example, global or analytic, auditory or visual—that students use in acquiring a new language or in learning any other subject or a new concept (Celcia-Murcia 2001). The manner in which a learner perceives, interacts with, and responds to the learning environment. Learning style is sometimes defined as the characteristic cognitive, affective, social, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (McKerracher, 2004, p. 71).There are six learning styles as the way in which people comprehend and process information in learning situations. Visual learning, auditory learning, kinaesthetic learning, tactile learning, group learning, and individual learning:

Students possess different kinds of minds and therefore learn, remember, perform, and understand in different ways. (Gardner.H 1983)

The characteristic of different learner types are listed below:

1. Visual learners: Visual learners learn best in images. They are careful about teachers' body language, and are able to understand the situations, or conditions. They prefer sitting in front of the class.

2. Auditory learners: Auditory learners prefer processing information through listening and interpreting via pitch, emphasis, and speed. These learners favour reading aloud in the classroom

3. Kinaesthetic learners: These individuals discover information through active "hands-on" approach. They gain knowledge from interaction with the physical world. They have difficulty in focusing on the situation.

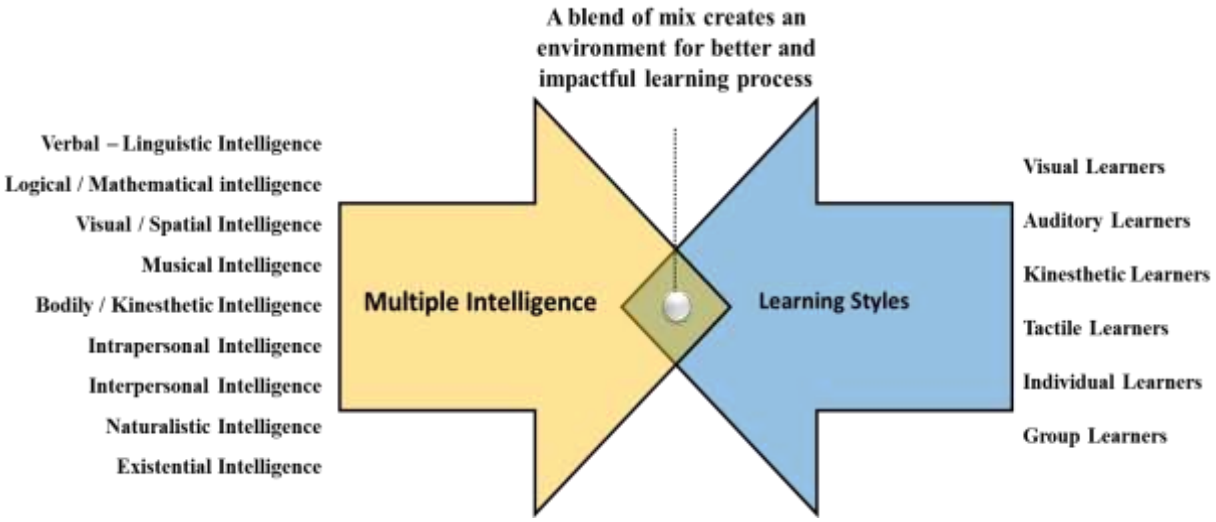
4. Tactile learners: This type of learners learn best by using their hands. They prefer touching things to learn about them. They often underline what they read, take notes during listening, and keep in other ways.

5. Individual learners: When people like their privacy and are independent, and introspective, they are probably individual learners. Learners with individual preference often can focus on the issues well, be aware of their own thinking, and analyse in a different way what they think and feel.

6. Group learners: These individuals are good at communicating well with people, both verbally and non-verbally. They prefer mentoring and counselling others.

Theories of Multiple Intelligence and Learning styles advocates for a change in traditional education, learning and learner centered education, Instead of the standard curriculum, they propose a comprehensive approach with essence, depth and quality, promote individual difference and interact with various disciplines, breaking silos of rigid, monopolistic subject specific learning.

Diagrammatic Representation of Relationship between Multiple Intelligence and Learning Styles



Source: Compiled by researchers

Literature Review.

Lubna Qutab et.al (2024) conducted an investigation to study the Relationship of Multiple Intelligence and Students' Learning Styles. The research study argues that, in the context of diverse range of intelligences, it's logical to assume that students can succeed in different subjects, with their preferred learning methods influenced by their dominant type of intelligence. This is why multiple intelligences are closely related to learning styles. While multiple intelligences highlight an individual's abilities, learning styles focus on the way each person prefers to learn and absorb information. The study proves a strong link between students' academic achievement, their multiple intelligences, and their learning preferences and dominant intelligence types. It is suggested that teachers should design instructional strategies that align with the varied learning preferences of their students.

Fathor Rakhman,et.al (2023) demonstrated education management system based on multiple intelligence for developing the potential of students.The National education system Governed by Law No. 20 of 2003, which states that education is a deliberate and planned effort to create a learning environment and learning process so that students actively develop

their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and the skills required by the society, state and the Nation. The end means of education to develop human assets useful for the society in the long-term.

The research study proposes that education must be included in the holistic strategy of personality development with multiple skills. The dimension of Human Resource Development is to shape quality human beings, which characterises the concept of holistic education.

Rani Gul et.al (2017) examined teachers preferred approaches towards Multiple Intelligence Teaching. It is observed that teachers equipped with modern teaching strategies plays a pivotal role in the ultimate progress of students' academic and educational performance. The modern teaching strategies are sufficed by strong levels of Multiple Intelligence. It is observed that Teachers at secondary school level with high professional qualification were highly adept at teaching with existentialistic, linguistic, and interpersonal teaching strategies. They are not good at teaching with visual and musical teaching strategies

Aysha .et.al (2017) examined multiple intelligence and learning styles as two sides of the same coin.The researchers argue that the individual differences of learning styles as well as the level of of intelligences are to be understood so that class room instructions are planned. It is argued that students can learn ,but learn differently.Therefore it is stated that it is imperative for the educators to design to determine each student's unique learning styles and multiple intelligence to help the teaching –learning process.The study advocates to merge both the theories, theory of learning styles and multiple intelligence to improve student learning. From the study it is found that there is a significant correlation between multiple intelligence and learning styles. It is revealed that auditory intelligence resulted in Musical intelligence, followed by Bodily-Kinaesthetic Intelligence was reflected among the students with painting skills, sports performance and other artistic and crafting skills.

Jonathan Glazzard (2015) conducted a critical analysis of Learning Styles and Multiple Intelligences and their Contribution to Inclusive Education. The proposed study attempts to analyse learning style theory and Gardner's theory of multiple intelligences, both of which have significantly impacted educational practice in recent years. These theories have been seen as potential solutions for addressing issues like student disengagement and underachievement. While Gardner emphasizes that the multiple intelligences primarily operate independently, it is evident that most activities engage several intelligences at once. Although Gardner recognizes that certain intelligences may overlap or be related, this diminishes his assertion that they are distinct entities. Although Gardner presents examples of geniuses, many of these individuals excel in multiple domains or only within a specific subset of a domain, rather than demonstrating consistent high performance across an entire domain.

Many geniuses do not fit neatly into Gardner's categories of intelligence, and since geniuses are quite rare, these examples are not particularly useful for shaping educational practices. This limitation undermines Gardner's framework. Lack of empirical evidence serves as the major limitation of theory of multiple intelligence.

Traditional measures of intelligence, such as IQ tests, are based on a body of research that has been scrutinized and validated over time. In contrast, Gardner's theory lacks robust experimental data, making it difficult to test or prove its claims. Critics argue that without empirical validation, it is hard to assess whether different intelligences truly exist as independent domains.

While assessing and verifying variety of human abilities, the practical and empirical limitations reduce its overall applicability, particularly in educational settings. No scientific evidence to support the existence of distinct intelligences as Gardner describes them. Further overlapping intelligences, ambiguity in definitions, overall negligence of general intelligence, and educational and practical implementation challenges demands deeper investigation of the concept of multiple intelligence.

Yaghoob Raissi Ahvan et.al (2016) analysed the relationship between correlation of multiple intelligences and achievement motivation of secondary students in Iran. From the study it is found that the multiple intelligences are interconnected and influence in determining academic performance and achievement motivation. The evidence proved that the multiple intelligences are interconnected and support each other during performance. The verbal-linguistic and visual-spatial intelligences are moderately, interpersonal, intrapersonal, naturalistic, and bodily-kinaesthetic intelligences are weakly correlated and musical intelligence is not correlated to academic achievement.

Karim Hajhashemi et.al (2011) examined the relationship beteen Multiple Intelligence Scores and use of Learning Strategies among the high school students in Iran. It is observed that each individual is made up of unique cognitive profile, defined by set of multiple intelligences. From the study it is revealed that there is a is a low, positive correlation

between the cognitive profile of multiple intelligence and language learning strategies adopted by the learner to assist in the acquisition, storage, retrieval, and the use of information. The cognitive profiles of the students are need to be mapped with that language learning strategies.

Nerguz Bulut Serina, et.al (2009) discusesed the relationship between the primary teachers teaching strategies and their strenths in Multiple Intelligences.It is noted that there is no single and absolute method in the process of teaching.The theory of Multiple Intellligence provides practical evidences to recognise the multiple potential abilities of every student and enable them to be successful in every aspect of learning.

The purpose of the study aims to investigate the relationship between the multiple intelligences of teachers and their teaching strategies in Turkey. The study concludes that there is a significant mean difference in level of multiple intelligences among the male and female primary school teachers. Female teachers have greater inclination towards multiple intelligence and teaching styles. In Aggregate the mean scores of multiple intelligence among teachers is significantly high.

The multiple regression analysis shows that there is a significant positive relationship between spatial/visual, naturalistic, and interpersonal variables showed a significant predictive on teaching styles. However, the intrapersonal, logical/mathematical, bodily/kinaesthetic, musical/rhythmic, and verbal/linguistic variables depicted not depicted significant effects on teaching styles at the level of primary school education. A longitudinal study is recommended to evaluate the teacher's upskilling and enhancing their multiple intelligences.

Objectives:

1. To assess the level of maturity of Multiple intelligences among the university students
2. To assess the impact of Multiple Intelligences on the learning styles of students.

Hypotheses of the study

Hypothesis: 1

H (0): The level of maturity of multiple intelligences among the university students do not differ significantly.

H (1): The level of maturity of multiple intelligences among the university students differ significantly.

Hypothesis: 2

H (0): There is no significant relationship between Multiple Intelligences and learning styles of students

H (1): There is a significant impact of Multiple Intelligences on the learning styles of students.

Research methodology.

The study has adopted descriptive research design in which the Engineering, MBA and MCA students in Kishkinda University and BITM-Bellary Institute of Technology and Management, constitutes the sample for the study.

Sample Size and its Distribution.

Proportionate sampling techniques are used for the study. The sample constitutes subgroups such as students from Kishkinda University and Bellary Institute of Technology and Management. Further 50 students each from engineering, MBA and MCA are selected based on convenient sampling method. Thus a total of 300 constitutes the sample size of the study.

Table 1	Kishkinda University	BITM
Engineering	50	50
MBA	50	50
MCA	50	50
Total	150	150

Data Collection Instrument

A questionnaire of consisting of 6 levels multiple intelligence, Physical Intelligence or Physical Quotient: (PQ), Mental/Intellectual Intelligence (IQ), Creative intelligence (CQ): Emotional Intelligence (EQ), Social intelligence (Social Quotient (SQ) and Moral and ethical intelligence (MQ) and learning styles involving, interactions, collaborations, debates, discussions, limb, eye , body timing and its movements, playing with words,puzzels, spatio-temporal patterns of music, processing of images ,videos, equations and reasoning abilities are used in developing the questionnaire.

Data Analysis and interpretation

Demographic profile

Table2
Gender * Education qualification * KU_BITM Cross tabulation

KU_BITM				Education qualification			Total
				Engineering	MBA	MCA	
Kishkinda University	Gender	Male	F	18	24	25	67
			%	12.0	16.0	16.7	44.7
		Female	F	32	26	25	83
			%	21.3	17.3	16.7	55.3
	Total		F	50	50	50	150
			%	33.3	33.3	33.3	100.0
BITM	Gender	Male	F	14	20	25	59
			%	9.3	13.3	16.7	39.3
		Female	F	36	30	25	91
			%	24.0	20.0	16.7	60.7
	Total		F	50	50	50	150
			%	33.3	33.3	33.3	100.0
Total	Gender	Male	F	32	44	50	126
			%	10.7	14.7	16.7	42.0
		Female	F	68	56	50	174
			%	22.7	18.7	16.7	58.0
	Total		F	100	100	100	300
			%	33.3	33.3	33.3	100.0

Table 2 presents the sampling distribution of students by gender and educational qualification (Engineering, MBA, and MCA) across two institutions: Kishkinda University (KU) and BITM (Ballari Institute of Technology and Management). The gender distribution indicates that both KU and BITM have a higher number of female students than male students. However, the proportion of male students is slightly higher at KU (44.7%) compared to BITM (39.3%). Overall, across both institutions, 58% of the students are female and 42% are male.

Regarding the distribution of educational qualifications, both KU and BITM have an equal distribution (33.33%) of students in each qualification (Engineering, MBA, and MCA). The MCA program has an equal gender distribution at both KU and BITM, with 25 males and 25 females in each institution. Engineering, on the other hand, has a higher proportion of female students than male students in both universities, while MCA and MBA maintain a more balanced gender distribution.

At KU, the MCA program is equally distributed between male and female students. However, the Engineering program has more females (32) than males (18), indicating a stronger preference for Engineering among female students. At BITM, the Engineering program also has more females (36) than males (14), and the MBA program shows a similar trend with more females (30) than males (20). The MCA program at BITM has an equal distribution of 25 males and 25 females. In conclusion, both institutions exhibit a higher number of female students, with BITM showing a particularly large female student population.

Objective 1:

To assess the level of maturity of multiple intelligences among the university students

Hypothesis: 1

H (0): The level of maturity of multiple intelligences among the university students do not differ significantly.

H (1): The level of maturity of multiple intelligences among the university students differ significantly.

The objective to assess the level of maturity of multiple intelligences is designed to explore multiple intelligences such as Physical intelligence quotient (PQ), Mental or Intellectual quotient (IQ), Emotional Quotient (EQ), Social Intelligence quotient (SQ), Creative Intelligence quotient (CQ) ,Moral and ethical intelligence quotient (MQ) among the university students. Mean and SD measures are developed to assess the level of maturity of multiple intelligence among KU and BITM students of engineering, MBA and MCA students. ANOVA is used to verify the hypothesis: the level of maturity of multiple intelligences among the university students do not differ significantly.

	Table 3													
	Kishkinda University						BITM (VTU Affiliated)						ANOVA	
	Engineering		**MBA**		**MCA**		**Engineering**		**MBA**		**MCA**		**F ratio**	**P Value**
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
PQ	3.28	0.61	3.70	0.54	3.08	0.44	3.36	0.63	3.54	0.79	3.04	0.45	7.87	0.00** H(0): Rejected
IQ	3.34	0.52	3.56	0.54	3.50	0.51	3.36	0.53	3.50	0.54	3.56	0.50	1.92	0.15 H(0): Accepted
EQ	3.88	0.82	4.08	0.70	3.80	0.53	3.92	0.75	3.96	0.67	3.04	0.45	0.11	0.89 H(0):Accepted
SQ	3.98	0.65	3.98	0.59	3.62	0.49	4.06	0.65	3.96	0.64	3.68	0.47	5.52	0.00** H(0): Rejected
CQ	3.70	0.81	3.86	0.64	3.54	0.50	3.76	0.82	3.82	0.63	3.64	0.48	0.96	0.38 H(0): Accepted
MQ	3.92	0.67	3.92	0.63	3.62	0.49	3.98	0.68	3.88	0.80	3.64	0.48	3.41	0.04* H(0): Rejected

Table No. 2 provides a comprehensive analysis of the data, showcasing the mean and standard deviation (SD) values that compare six different types of intelligence: PQ (Physical Intelligence Quotient), IQ (Intellectual Intelligence Quotient), EQ (Emotional Intelligence Quotient), SQ (Social Quotient), CQ (Creative Intelligence Quotient), and MQ (Moral, Ethical, and Human Values Intelligence Quotient). The data is presented for students from both Kishkinda University and BITM**,** across three academic programs: Engineering, MBA, and MCA.

The study shows that MBA students consistently achieve the highest scores in Physical Intelligence (PQ), IQ, Emotional Intelligence (EQ), Cultural Intelligence (CQ), and Moral Intelligence (MQ) at both universities, highlighting the comprehensive emphasis on leadership, decision-making, and interpersonal skills within MBA programs.

Engineering students show relatively strong scores in Social Intelligence and Moral Intelligence, but they have lower scores in Practical Intelligence, and Cultural Intelligence compared to MBA students. There is also a slight advantage for engineering students at BITM in some categories (Social intelligence and Moral, Ethical and Human values intelligence).

MCA students generally have the lowest scores in most categories, especially in Emotional Intelligence, indicating that their education prioritizes technical skills over emotional and social development. While MCA students at BITM have slightly higher Physical Intelligence scores than those at Kishkinda, they still rank the lowest in Physical Intelligence among all three groups.

To test the hypothesis that the level of maturity of multiple intelligences does not vary significantly among university students, ANOVA and F tests were conducted. The null hypothesis, which states that there is no significant difference in the maturity levels of multiple intelligences among Engineering, MBA, and MCA students from Kishkinda University and BITM, was rejected for PQ, SQ, and MQ. The differences were found to be statistically significant at the 5% level of significance.

The differences in the level of maturity of multiple intelligences, specifically IQ, EQ, and CQ, among Engineering, MBA, and MCA students from Kishkinda University and BITM, are not statistically significant.

Objective 2:

To assess the impact of Multiple Intelligences on the learning styles of students.

Hypothesis: 2

H (0): There is no significant relationship between Multiple Intelligences and learning styles of students

H (1): There is a significant impact of Multiple Intelligences on the learning styles of students.

The objective of the study is to examine how Multiple Intelligences influence learning styles. Existing research suggests that the diverse learning styles observed in students are shaped by their varying levels of development in different types of intelligences. To test this hypothesis, eight key learning styles are considered:

- LS1: Learning through interactions
- LS2: Learning through collaborations
- LS3: Learning through debates and discussions
- LS4: Learning by analysing one's strengths and weaknesses
- LS5: Learning through interactions with the environment
- LS6: Learning through word play, language, reading, writing, and listening
- LS7: Learning through recognizing musical patterns, songs, sounds, and instruments
- LS8: Learning through visual processing of images, videos, 3D diagrams, drawings, and colours

These learning styles are linked to six types of multiple intelligences using stepwise multiple regression analysis.

The goodness of fit of regression analysis is interpreted based on the least residual variation and coefficient of determinant ($R^{2)}$ value.

Regression equation 1.

LS1 = 1.04 + 0.458 (SQ) +0.319** (MQ)**

LS1 refers to learning through interactions and discussions. The regression equation highlights that learning through interactions and discussions is influenced significantly by social quotient (SQ) and moral ethical & human values (MQ). The regression coefficients are found significant at 99% level of confidence, with moderate (0.380) value of coefficient of determinant (R2).

Regression equation 2.

LS2 = 0.477 + 0.411 (SQ) +0.489** (MQ) + 0.190** (EQ).**

LS2 refers to learning through Collaborations. The regression equation highlights that learning through Collaborations is significantly influenced by social quotient (SQ) moral ethical & human values (MQ) and emotional intelligence (EQ). The regression coefficients are found significant at 99% level of confidence, with moderate (0.434) value of coefficient of determinant (R^2).

Regression equation 3

LS3 = 0.675 + 0.478 (SQ) +0.335** (MQ) + 0.181** (CQ)**

LS3 refers to learning through debates and Discussions. The regression equation highlights that learning through debates and Discussions is significantly influenced by social quotient (SQ) moral ethical & human values (MQ) and creative intelligence (CQ). The regression coefficients are found significant at 99% level of confidence, with moderate (0.323) value of coefficient of determinant (R^2).

Regression equation 4

LS4 = 0.632 + 0.500 (SQ) + 0.376** (MQ) + 0.251** (EQ)**

LS4 refers to learning by analysing one's strengths and weaknesses .The regression equation highlights that learning by analysing one's strengths and weaknesses is significantly influenced by social quotient (SQ) moral ethical & human values (MQ) and emotional intelligence (EQ). The regression coefficients are found significant at 99% level of confidence, with moderate (0.388) value of coefficient of determinant (R^2).

Regression equation 5

LS5 = 0.298 + 0.391 (SQ) +0.325** (MQ) + 0.242** (EQ)**

LS5 refers to learning through interacting with the environment. The regression equation highlights that learning through interacting with the environment is significantly influenced by social quotient (SQ) moral ethical & human values (MQ) and emotional intelligence (EQ). The regression coefficients are found significant at 99% level of confidence, with moderate (0.485) value of coefficient of determinant (R^2).

Regression equation 6

LS6 = 0.46+ 0.360 (SQ) + 0.304** (MQ) + 0.406** (IQ)**

LS6 refers to learning through playing with words, language, reading, Writing and Listening. The regression equation highlights that learning through playing with words, language, reading, Writing and Listening is significantly influenced by social quotient (SQ) moral ethical & human values (MQ) and intelligence quotient (IQ). The regression coefficients are found significant at 99% level of confidence, with moderate (0.384) value of coefficient of determinant (R^2).

Regression equation 7

LS7 = 0.423+ 0.232 (SQ) + 0.340** (MQ) + 0.248** (EQ) +0.301** PQ**

The above regression model outlines a regression model that examines the factors influencing learning through recognizing spatio-temporal patterns of music, songs, sounds, and instruments (LS7). The model suggests that Social Quotient (SQ)**,** Moral, Ethical & Human Values (MQ)**,** Emotional Quotient (EQ)**,** and Physical Intelligence Quotient (PQ) significantly affect the ability to recognize these patterns. The regression coefficients are significant at 99% confidence level, with a moderate R^2 value of 0.375**.**

Regression equation 8

LS8 = 0.629+ 0.580 (SQ) + 0.289** (EQ) +0.67** (CQ)**

The above regression model aim at understanding the relationship between learning through visual processing (LS8) and several cognitive and emotional factors; i.e. Social Quotient (SQ)**,** Emotional Quotient (EQ) and Creative Intelligence Quotient (CQ).

LS8 refers to learning through visual processing of images, videos, 3D diagrams, drawings and colours. The regression equation highlights that learning through visual processing of images, videos, 3D diagrams, drawings and colours is significantly influenced by social quotient (SQ), emotional quotient (EQ) and Creative intelligence quotient (CQ). The regression coefficients are found significant at 99% level of confidence, with moderate (0.368) value of coefficient of determinant (R^2).

The R^2 value of 0.368 means that about **36.8%** of the variance in learning through visual processing can be explained by the combined influence of SQ, EQ, and CQ. This is considered a moderate effect size, suggesting that while these three factors are significant contributors to visual learning, other factors not included in the model also play a role in determining learning outcomes.

Regression analysis highlights that Social Quotient (SQ)**,** Emotional Quotient (EQ)**,** and Creative Intelligence Quotient (CQ) significantly impact the effectiveness of learning through visual means of teaching learning content. The findings, with a high level of statistical confidence, underscore the importance of emotional, social, and creative factors in the process of visual learning.

Summary of findings and discussions.

The initial part of the study outlines the overall patterns of different intelligence categories, their maturity levels, and how well they are internalized by the students. MBA students consistently demonstrated higher levels of maturity in most intelligence types, especially in Physical Intelligence (PQ), Intellectual Intelligence (IQ), Emotional Intelligence (EQ), Cultural Intelligence (CQ), and Moral Intelligence (MQ). Engineering students performed relatively well in Social

Intelligence, Creative Intelligence, and Moral, Ethical, and Human Values Intelligence. MCA students, however, generally scored the lowest across most intelligence categories, particularly in Emotional Intelligence.

The later part of the study highlights impact of multiple intelligences on different types of learning styles, which are generally adopted by the students. Among all different types of intelligences Social intelligence (SQ) and Moral, Ethical and Human values (MQ) are found consistently vital and significant predictors across all learning types, highlighting their foundational role in learning processes.
Emotional Intelligence (EQ) and Creative Intelligence (CQ) also emerge as key influencers in specific learning types, such as collaborations, environmental interaction, and visual learning. The $\mathbf{R^2}$ values across all models, ranging from 0.323 to 0.485, suggest moderate explanatory power, indicating that while these factors significantly influence learning, other unmeasured variables may also play an important role in learning outcomes.

The statistical findings of the study offer a series of insightful findings. The designing of learning experiences is the primordial importance, which generally involves scientific mapping of multiple intelligences. While designing learning experiences among MBA students it is essential to map a wide range of multiple intelligences, i.e. Physical Intelligence (PQ)**,** Intellectual Intelligence (IQ)**,** Emotional Intelligence (EQ)**,** Creative Intelligence (CQ)**,** and Moral Intelligence, ethics and human values (MQ)**,** in the better interest of their career prospects.

While learning styles among engineering students are considered it is essential to imbibe a broad range of multiple intelligences, prioritising cognitive aspects of general intelligence (IQ), problem solving skills, Social Intelligence (SQ) and Creative Intelligence.

MCA students scored the lowest in most intelligence categories, particularly Emotional Intelligence (EQ). This suggests that technical and specialized programs like MCA may prioritize cognitive and technical skills, leaving less room for the development of emotional and social competencies. The low scores in EQ highlight a potential gap in nurturing interpersonal and emotional management skills, which could impact students' ability to navigate collaborative and professional environments effectively.

Conclusion

Social Intelligence (SQ) and Moral, Ethical, and Human Values Intelligence (MQ) were consistently identified as crucial and significant factors influencing all learning styles. This suggests that learning is not solely based on cognitive skills but also on students' ability to understand and interact with others, as well as their capacity to apply ethical reasoning. Additionally, Emotional Intelligence (EQ) and Creative Intelligence (CQ) were found to play a significant role in specific learning types, such as collaboration, environmental interaction, and visual learning. These results highlight the importance of emotional and creative abilities in enhancing certain learning experiences.

Future scope.

Considering the important role of Emotional Intelligence (EQ) and Social Intelligence (SQ) in collaborative learning, further research could investigate how these intelligences influence group dynamics. Studies could focus on strategies to improve collaborative learning in both academic and professional environments.
Additionally, longitudinal studies could track the development of various intelligences throughout a student's academic journey, offering insights into how these skills evolve over time. Such research could also explore whether specific academic programs or interventions can effectively enhance these intelligences and align them with students' career outcomes.

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