Intelligent System Using MI In E-Learning Environment

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Abstract—Multiple Intelligence (MI) hypothesis can be connected into advanced education foundations and stance challenges for educators to smear these insights under their educating support. Utilization of MI gives a legitimate type of procedures to address the issues of learners and guarantees accomplishment for an online courses. The use of multiple intelligence continues to open the minds of instructors and learners with an aim of how learning and educating can be changed thus all people might be guided to achieve their most extreme potential. The reason for this is, MI is multifold and covers multiple dimensions, for example, there is the instructing angle that depicts how educator plans to convey the substance to the learners and also the learning aspect to cover how the learner absorbs the e-learning content. This research proposed a framework that will help the educator to evaluate learners (students) various insight, qualities and shortcomings. The reason being is, each of learners has the capabilities yet in fluctuating degrees of qualities and skills, if accommodated, can bring about enhanced mentalities toward learning and an expansion in efficiency, scholarly accomplishment and creativity. Furthermore this research presents sophisticated empirical, theoretical and contradictory findings to assimilate of how an instructor should deliver online instructions that meet individual needs and strengths and also how an Instructor should be assess student's performance based on the individual student's MI strength.

Keywords—Multiple Intelligence; Distance Learning; E- Learning.

I. INTRODUCTION

E-learning has presented different inclinations, for instance, versatility, inaccessible operability, charge sufficiency, ease, consistency and some more. The people group model of E-learning involves genuine constituents: instructional and learning approaches, and Utilizing Theory of Multiple Intelligence [1], Pedagogical models the issue with E-learning systems are that understudies are frequently given learning practices that don't facilitate singular aptitudes. In view of the technique, every understudy has diverse aptitudes and capacities. Human capacities and possibilities are immediate proof that numerous insights exist, and these insights can be completely used either separately or consolidated. Real impartial of instruction is to give critical learning to every single individual for advance in all territories.

Different Intelligences hypothesis offer chances to meet the understudy needs, yet posture challenges for educators to apply the insights in instructing [3]. Hence, the main research inspiration was to expand showing adequacy through the consolidation of different insights instructing into online training. Various insights couldn't just furnish educators with more decisions in instructing and appraisal techniques additionally permit understudies to exhibit what they have realized in a wide variety of ways. Another exploration inspiration is to utilize numerous insights educating as a methods for grown-up understudies to investigate their knowledge qualities. Since the different elegance of learning proposed by numerous insights hypothesis can uncover the qualities and shortcomings of understudies, it helps the educators see every understudy better and give particular bolster where fundamental. In addition to that it also helps understudies in exceeding expectations in their ranges of quality and to concentrate the learning distinction.

The examination purpose the following significant usage of Multiple Intelligences;

1. Utilization of research inspiration Multiple Intelligences hypothesis to separated instructional procedures in E-learning environment.

2. How understudies can be included in recognizing their MI qualities, the appraisal of understudies and how course exercises can be connected to MI hypothesis.

3. The part and preparing requirements for educators in using MI hypothesis alongside the difficulties for teachers to make an outlook change to apply and rehearse MI to meet individual requirements of all understudies. Another fundamental constituent in E-learning environment are Pedagogical models and other technological issues that is past the scope of this exploration.

This paper has been divided into VI sections including the current section Introduction. Section II covers Literature review related to the multiple intelligence used in E-learning. Section III describe, Implementation of MI in E-learning. Section IV presents the Methodology proposed to use MI in E-learning. Section V states Results and Section VI presents Conclusion and possible future work.

II. LITERATURE REVIEW

E-learning

E-learning is essentially any instructive related exercises by means of web, system or standalone PC or rather in today's brilliant world; it is learning action accessible on electronic medium at wherever, whenever for any individual on any keen web empowered gadget. E-learning is for the most part connected with exercises including PCs and intuitive systems at the same time. A personal computer (PC) does not should be the focal component of the action or give learning content. In any case, the PC and the system must hold a noteworthy inclusion in the learning action. E-learning contains a few sub sorts, for example, electronic, on the web and separation learning exercises. E-learning has offered various favorable circumstances, for example, adaptability, remote operability, cost viability, straightforwardness, and consistency. Innovative headways increment the speed of basic leadership; however the essential necessity is to have critical thinking capacity in person [1, 2].

Theory of Mmultiple Intelligence

To manage genuine issues, a specific level of knowledge is fundamental for each person. People in various limits hereditarily accomplish insight yet the consequences of numerous specialists have demonstrated that fitting preparing and advancement techniques can expand the level of knowledge by using instructional advances [3]. There are different hypotheses created by numerous analysts to distinguish the sorts of insight. Dr. Howard Gardner created Theory of Multiple Intelligence [6] which characterizes insight as potential capacity to prepare a specific kind of data. Gardner has distinguished nine insights however there is likewise a probability of numerous different sorts of knowledge in people [4, 5].

The hypothesis of Multiple Intelligent [7] states that every learner has an alternate fitness to learning. The subjective fitness of a human can be partitioned into nine elements; Verbal Linguistic Intelligence, Logical Mathematical Intelligence, Musical Rhythmic Intelligence, Bodily Kinesthetic Intelligence, Visual Spatial Intelligence, Interpersonal Intelligence, Intrapersonal Intelligence, Naturalist Intelligence, and Existential Intelligence. From all of the factors, each person should have a different or unique intellectual score. Moreover, Gardner further divided these factors into three sub groups:
1) Analytic skill
2) Interactive skill
3) Introspective skill

TABLE-1 MI ASSOCIATED ACTIVITIES

MI	ACTIVITIES
Linguistic	auditory skills, writing ,listening, explaining
Mathematical	Calculations, experiments, evaluations
Spatial Intelligence	Design ,presentation ,projects, graphs
Bodily-Kinesthetic Intelligence	Activities, audio visual assignment & Presentation
Musical Intelligence	Sound based presentation
Interpersonal	Group discussion ,chat, feedback & tutoring
Intrapersonal	Making Posters,slides,illustration & concept mapping

Learning is divided as exercises which involve a few capacities, for example, it is biochemical action in the mind and is generally lasting change in conduct. It is data handling, recollecting and reviewing furthermore social transaction.

Likewise, it is intuition abilities and development of information and calculated change. It is the way toward exchanging information from the instructional setting to another specific situation. It is dynamic and experiential. It is the nature of disseminating changes among the group. It is adjustment of one's observations to quick environment and with this it is likewise a capricious and a self-sorting out wonder [1].

Gardner [8] anticipated as ahead of schedule as 1983 that the potential utility of PCs during the time spent coordinating people to methods of direction is considerable "and that" the PC can be crucial facilitator in the real procedure of guideline. Kunjan B. Mankad [1] has given another theoretical model of E-learning incorporating the hypothesis of various insights. A case is introduced which speaks to that specific arrangement of insight specifically limits are required to accomplish e-adapting proficiently.

Faultfinders take a gander at a portion of the insight classifications, and question how Gardner [6] can consider some as genuine insights, i.e. substantial kinesthetic, melodic, and spatial as really insight criteria, and not abilities or aptitudes. Gardner battles that everybody is conceived having the seven insights. By the by, all understudies will come into the

classroom with various arrangements of created insights.

E. C. Tyler [3] guaranteed that Multiple Intelligences hypothesis offer chances to meet these understudy needs, however posture challenges for educators to apply these insights in instructing on the web classes. He concentrated the part of educators, showing systems, appraisal of understudies, exercises including understudies by utilizing MI hypothesis and reason that the future utilization of Multiple Intelligences to advanced education online direction holds much guarantee since it gives a honest to goodness type of separated guideline to meet the individual needs of grown-ups to guarantee their prosperity for online courses.

Speakers ought to be inventive when outlining their showing materials or exercises to empower understudies to utilize their insight in the classroom. With the intelligent and appropriate showing materials and exercises in class, understudy consideration can be held and enhance speaker's enthusiasm and inspiration to educate and get ready instructing materials [2].

Multiple Intelligence gives elective intends to teacher evaluation of understudy execution in light of the qualities of understudies as opposed to depending on a conventional IQ. However its use accomplishment for separated guideline will rely on upon the level of responsibility and preparing by educators to execute Multiple Intelligences [3]. Tyler [3] investigates that little has been composed on how these Multiple Intelligences hypothesis can be connected to separated instructional techniques for the training of grown-ups in establishments of advanced education. He additionally asserted that with a pattern of more classes being offered on the web, frequently understudies learn about left for the course exercises to meet their individual needs. Various Intelligences hypothesis offer chances to meet these understudy needs, however posture challenges for educators to apply these insights in online classes [4,5].

Different reactions incorporate the idea that MI hypothesis is not observational, but rather it widens the build of knowledge so generally as to render it good for nothing. Gardner [6] staunchly safeguards the induction of the hypothesis by alluding to the various research center and field information that added to its improvement and the continuous re-conceptualization of the hypothesis in light of new logical information. In addition he stresses two extra focuses about appraisal that are basic. The first is that the appraisal of insight ought to include different measures. Depending on a solitary IQ score from a WISC-III (Wechsler Intelligence Scale for Children) without substantiating the discoveries through other information sources does the individual examinee damage and creates inadequate data for the individuals who give intercessions. Also, all appraisals and coming about mediations must be touchy to individual contrasts and formative levels. At last, Gardner is agreeable to evaluation for the main

role of helping understudies as opposed to characterizing or positioning them [6, 7, 8].

Moreover, inquire about by Jingchen Xie and Ruilin Lin [4] went for intertwining the various insights speculations with the educating of one picked course: shading hypothesis.

Two gatherings of understudies from a polytechnic college in focal Taiwan were picked as research subjects. An examination was composed and performed to investigate the impacts of different insights educating on the exploratory gathering versus that of conventional instructing on the control amass. Understudies from the trial bunch performed fundamentally superior to anything understudies in the control gather on a real hands-on configuration extend task and found that instructing and evaluation of different insights had obvious impact on learning adequacy. This implies various insight educating and appraisal gave them more outline motivations and more approaches to communicate, consequently enhancing learning adequacy [9, 10].

III. IMPLEMENTATION

The proposed research is separated into three parts, include:

- Multiple Intelligence Teaching
- Multiple Intelligence Assessments
- Learning Process Module

Multiple intelligences teaching involve:

(**1**) *Academic measurements***:** The educators can perceive prevailing strengths both in himself / herself and in the understudies, yet here is a question as what amount a teachers can use Multiple Intelligences in conveying instruction that would meet each understudies needs and would it be a good impression for them to gain strengths? An Instructor usage will rely upon the educator duty and showing encounters in using Multiple Intelligences hypothesis for online class direction and ought to offer understudies a more noteworthy shot for accomplishment than using a solitary measure of intelligent quotient for understudy test taking abilities.

(**2**) *Utilization:* The instructor ought to use his/her own particular intelligence to guide understudies in their learning and support their strengths. The educators' most critical part is to persuade understudies. This characteristic of instructor is several of the time acts like an impetus however it would challenge for instructor to begin with looking over understudies' numerous knowledge by directing a Multiple Intelligence tests and along be given a choice of exercises that matches their strengths.

(**3**) **Encouragement:** The instructor should repetitively stimulate students' main intelligences and multiple intelligences.

(**4**) **Regularity of interaction and speedy comebacks:** The way to effective on-line direction for each one of numerous insight exercises is number of times the teacher's interact with students and cooperation with understudy. Some other components of multiple intelligence teaching are: (1) Originality & imagination (2) Desire and urge (3) Audacity (4) Creativity and skills (5) Generosity and tolerance (6) Keen observations [11].
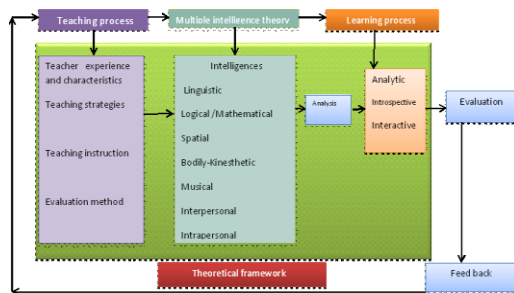

Fig. 1.   *Frame work for the research*

As indicated by Armstrong [12], there are various showing materials and techniques accessible in MI past the customary teacher as instructor mode. Educators ought to first assess their own understanding before doing various insight instructing and utilize their predominant knowledge in arranging materials and lesson plans. Furthermore they ought to likewise monitor understudy's performance with perceptions and composed records, this can evaluate every understudy's strengths and give support accordingly. Furthermore, Gardner thought physics, biology, humans, products, self-understanding and understanding of the world are very important educational objectives, so therefore teachers should make clear, the lesson's key points and contents and teach with practical and interesting materials to enrich the lessons and reinforce learning. Lastly, there is neither right nor wrong with the multiple intelligences theory itself; the key is to understand and adopt the most constructive method for students [13].

Multiple Intelligence Assessments

Multiple intelligences assessment emphasizes "learn by doing, evaluate in learning. Keep in mind the end aim to remain fair, as expressed by the hypothesis, the appraisals ought to be done by understudies' information and execution. s. This makes the evaluations more intuitive and fair than customary appraisals. The evaluation of different insights ought to be (1) Forming: Designed to unfurl, allure, or animate qualities in understudies. (2) Variety: Offering understudies an extensive range of chances to exhibit what they know. (3) Substantially useful: Through assessments, help understudies enhance natural quality or upgrade understanding in both themselves and the scholarly subjects.

Learning Process Module

The Learning process Module is the unit that stores learning contents which derives from the analysis of 7 Multiple Intelligences and divided into 3 groups;
1) Analytic content used with learners who have analytical and mathematical aptitude.
2) Introspective content used with learners who have the imaginative and artistic aptitude.
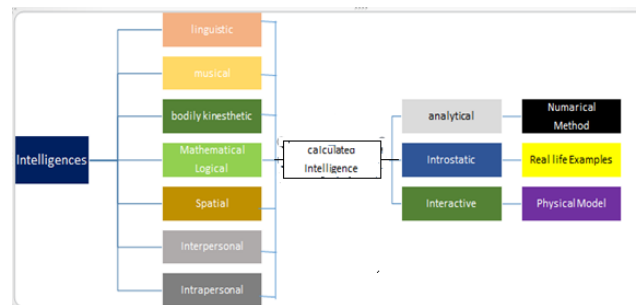3) Interactive content used with learners who have the skills of communication and interactive aptitude to others.

Fig.2. *Seven MI analyses divided into three groups.*

IV. METHODOLOGY

This research chose the three classes of students Class A, Class B and Class C, from an engineering university that falls under the analytical, introspective and interactive categories. An experimental plan was performed to assimilate multiple intelligences instruction and assessment into the theory course to discern any influence on learning effectiveness. The research believes that learning effectiveness between students could be different, depending on the teaching method, teacher characteristics and experience, or nature of the course material. The number of learners in each group was kept equal. The students in each of the three groups were all from the same major, same grade level, had the same textbooks, same course content, same design project, same assessment tools, and same instructors, but the students of group Class A had Analytic group Class B had Introspective kind of aptitude and group Class C had Interactive aptitude. The two assessment was conducted on these three groups by three changed instructors, first test was conducted before midterm exam , where each of these groups were taught by traditional teaching methods and second exam was conducted before final examination after the integration of MI theory where each of these group were taught by multiple intelligences supplementary material. All the described experiment was done in pure E-learning environment. The feedback option were kept for any suggestions and queries from students that can later be used by the instructor as a input to teaching process

RESEARCH INSTRUMENTS:

The research instruments include:

(1) Teaching materials: The teaching materials were compiled by each instructor according to the ability of the group. The material provided by the instructor to Class A was based on pure analytical examples, numerical and mathematical calculations. The material provided to Class B contains real life examples. The material contains model based approach and physical model examples that were given to Class C.

(2) Multiple intelligences test: The research used tests developed by Gardener as a basis but reformed to suit the education system in Pakistan. Experts and Scholars were requested to review this test, which was then used.

(3) Evaluation: The difference in learning effectiveness for each group of learners were calculated, the marks before mid-term exam based on traditional methods were compared to the marks before final exam based on MI methods.

(4) Analyzing tool: SPSS ver. 16 was used as a analyzing tool to analyze the difference in learning.

TABLE-2 MI TEST RESULTS

STRENGTHS	Group A	GROUP B	GROUP C
Mathematical/Logical	53.75%	52%	40.5%
Linguistic	21.25% s	55%	43.5%
Musical	57.5%	42%	41.5%
Spatial	42.5%	63%	41%
Bodily-kinesthetic	35 %	53%	46.5%
Inter-personal	20%	53%	43%
Intra-personal	46.25%	73%	44%

V. RESULTS

The research follows the resulting steps in order to find end results:

(1) Each instructor integrated his own intelligences and experience into lessons and evaluating students, and guide students according to their creativity strengths.

(2) Pretest examination was conducted during midterm session that was based on traditional teaching material. The tests were graded for the three groups of each n= 20 students, according to traditional method named test1.
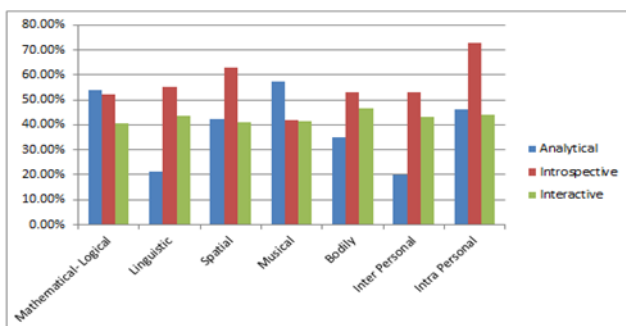

Fig.3. *Graph-1 Calculated Intelligence in graph*

(3) MI test was conducted and calculated. The calculated percentage of seven strengths of each

three groups are shown in Table-2.The results establish that the Class A contained analytical aptitude, Class B contained introspective aptitude and Class C contained interactive kind of aptitude according to which the lessons by each instructor were prepared so as to meet the requirements of students.

(4) The research conducted multiple intelligence centered posttest during remaining half of the session to observe the learning effectiveness by multiple intelligence teaching named test 2.

TABLE-3 STATISTICAL PARAMETERS OF TEST RESULT

	Analytic Test1	Analytic Test2	Introspective Test 1	Introspective Test 2	Interactive Test 1	Interactive Test 2
mean	43.7000	54.0000	44.4000	51.6000	39.4000	46.9000
t value	2.846	14.265	2.555	10.270	-.261	2.386

(5) The study of the difference between pre MI test and post MI test taken by the students' shows that the students perform better on posttest.

(6) Statistical sample t- test of analyzing tool shown in Table-3 confirmed that the post test results were significantly superior to pretest results.
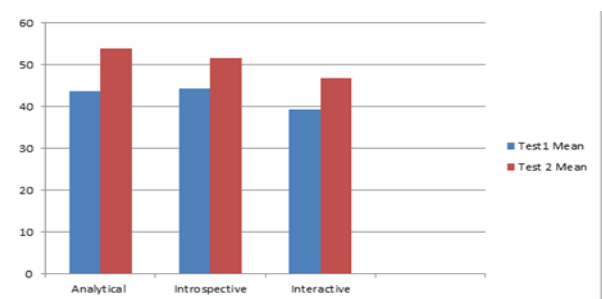

Fig. 4. *Graph-2 Comparison of Mean value of the pretest and post test.*

(7) The plot shown figure 4, in graph-2 for the pretest and posttest also provide the evidence that on the average the posttests results were much superior to pretest results.

VI. CONCLUSION AND FUTURE WORK

The independent sample t-test of SPSS16 was utilized to measure the distinction on learning results on each group of understudies. The outcomes demonstrated that the learning viability of understudies subsequent to applying MI hypothesis was remarkably superior to that of the pretest comes about. This infers after an entire semester of instructing and learning of different insights, understudies in every class were intensely influenced. It is at extended last reasoned that educators and understudies ought to must first know their qualities and uses them in educating and learning. The educator ought to have a definite learning of MI hypothesis before uses it in teaching plans, teaching techniques and evaluation strategies. The instructor ought to integrate multiple strengths into course material and activities. The teacher ought

to include understudies in course exercises that match exactly to the aptitude of understudies for better outcomes and more noteworthy sense of accomplishments.

MI can be applied to the common population of any age and the individual performs well if he or she has an opportunity to   fully utilize their dominant intelligence. It is suggested that the fusion of instruction and evaluation of multiple intelligences into technical, non-technical, design and arts related subjects to develop more creative lesson plans that can rouse students adequately and motivate them effectively to efficiently utilize their strengths in correct directions. This methodology will help researchers understand some of the challenges the subjects may experience during the integration of multiple intelligences teaching.

REFERENCES

[1] K. B. Mankad. "The Role of Multiple Intelligence in E-Learning", IJSRD - International Journal for Scientific Research & Development .Vol. 3, Issue 05, 2015.

[2] S. Salam, S. N. Mahfuzah. "The Designing of Online Multiple Intelligence Tools for Lecturers at Polytechnic", The International Journal of Soft Computing and Software Engineering, Vol. 3, No. 3. 2014.

[3] E. C. Tyler, G. Loventhal. "Can Multiple Intelligences Enhance Learning For Higher Education On-Line Instruction?", E-Leader Vietnam 2011.

[4] J. Xie, R. Lin, "Research on Multiple Intelligences Teaching and Assessment", Asian Journal of Management and Humanity Sciences, Vol. 4, No. 2-3, 2009, pp. 106-124.

[5] T. Kaewkiriya1, N. Utakrit, and M. Tiantong, "Design of an E-Learning Content Model for Student Guidance Based on Multiple Intelligence", International Journal of the Computer, the Internet and Management, Vol.24 No.1, April, 2016, pp. 47-50.

[6] H. Gardner, Intelligence reframed. New York, NY: Basic Books, 1999, pp. 33-34.

[7] H. Gardner, S. Korth , "A framework for learning to work in teams", Journal of Education for Business, Vol. 74, No. 1, 2010.

[8] H. Gardner, Frames of mind: The theory of multiple intelligences. New York, NY: eBasic Books, 1983.

[9] H. Gardner, Reflections on Multiple Intelligences: Myths and Messages, 1995.

[10] H. Gardner, Multiple Intelligences: The Theory in Practice, New York: Basic Books, 1993.

[11] A. C. Rockwood, Bodily-kinesthetic intelligence as praxis: A test of its instructional effectiveness, State University of New York at Buffalo, USA. 2003.

 [12] T. Armstrong, Multiple Intelligences in the Classroom, 3rd ed. Alexandria Virginia USA, 2009.

[13] C. Seefchak, Factors that influence achievement and self-efficacy in developmental university students. Educational Research Review , Vol 6, Iissue 02, December 2011, pp. 95-108.