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MULTIPLE INTELLIGENCE BASED CURRICULUM TO ENHANCE INCLUSIVE EDUCATION TO BRING OUT HUMAN POTENTIAL

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Abstract

There are multiple ways of learning and knowing. Each brain has a profile of Multiple Intelligence. Theory of Gardner's Multiple Intelligence provides a more holistic and natural profile of human potential. Success of any education system depends upon its own curriculum. The present curriculum for school education doesn't satisfy the needs of all students who possess different sets of Intellectual strengths and weakness. Students with dyslexia, dysgraphia, dyscalculia and slow learners are looked upon as hapless children. So the common school curriculum at present needs a lot of physical adaptations in designing curriculum for inclusive education. Inclusive education is an approach to address the learning needs of all children with a specific focus on those who are vulnerable to marginalization and exclusion. Hence, there is an immediate need for inclusive education. Is it possible to have inclusive education in the present school curriculum? Of course, it is a challenging task for the educationists, professionals and curriculum constructors to bring out an innovative school curriculum to promote inclusive education. So, in the present article the authors suggest that multiple intelligences based common school curriculum allows a wider range of students to successfully participate in mainstream classroom learning and thus enhancing inclusive education at school level.

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Introduction

Howard Gardner's brilliant conception of individual competence is changing the face of education today. Thousands of educators, parents and researches have explored the practical implication of MI theory-the powerful notion that there are separate human capacities ranging from musical intelligence to the intelligence involved in understanding one self. MI theory in practice brings together previously published and original work by Gardner at project zero to provide a coherent picture about the educational applications of MI theory in schools and formal research over the last decade. Do you know your different students' best learning styles? How to understand their different learning styles and find out their interest? We can solve problems and provide a stimulating, challenging and happy class room with achieving pupils led by a successful teacher. All the students will benefit from this MI based teaching and could reach higher standards. We want well motivated and enthusiastic pupils and a less stressful day. With students succeeding, the teacher will reduce the stress of teaching. Students will be highly motivated and their individual aptitude developed to the full. Among the student community, we might have even a future Mozart, Freud, Wolf or Gandhi in a classroom. With the tools of multiple intelligence we learn the secrets of how to be more confident in our approach and clearer about, 'why are doing and what we do'. With increased knowledge and power at our finger tips, teaching will be a pleasure. Quality teaching requires deep knowledge of content and extensive knowledge how students learn that content and also the knowledge about how to teach the content. In the case of teaching reading, quality teaching involves knowledge of how students learn to read, knowledge of how to assess reading

proficiency and growth. Content of both in-service and pre-service teacher education should be informed by a thorough knowledge of "What works, why it works, and how it works."

There are multiple, independent intelligences.

There are three parts to this claim, and it is important to appreciate all three. First, Gardner offers a new definition of intelligence, describing it as "a bio-psychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture." Previous definitions were limited to cognition or thought; one was intelligent to the extent that one could solve problems and adapt effectively to one's environment using thinking skills. Gardner self-consciously broadens the definition to include effective use of the body and thinking skills relevant to the social world. He also extends the functionality of intelligence to include the crafting of useful products, not just the solving of problems. Second, Gardner claims to have identified some (but not all) of the several types of intelligence. Third, he claims that these multiple intelligences operate independently of one another. 20th century, many psychometricians did in fact think of intelligence as a unitary trait, just as Gardner now claims. The thinking at that time was articulated by Charles Spearman, who suggested that a single factor (he called it *g*, for general) underlay all intelligent behavior. If you had a lot of *g*, you were smart; if you didn't, you weren't. However, by the 1930s some researchers (notably Louis L. Turnstone) were already arguing for a multifaceted view of intelligence. One might be intelligent in the use of words, for example, but unintelligent mathematically. From the 1950s on, many psychometricians proposed hierarchical models, which may be thought of as a mixture of the single-factor and multiple-factor models. Except for a few holdouts, most psychologists now favor the hierarchical model. We are at the end of this millennium looking forward to the expectations and excitement, the next millennium is going to offer. Lot of changes has taken place leading one to guess the type of changes that are going to take place in the next century. The world has become very competitive. The competition has also ushered in huge opportunities for anyone who is willing to prepare oneself to exploit the same. In this context, the issue of preparing our students to meet the challenges of the next millennium becomes very critical. World over, the emphasis on education has been shifting from not only academic excellence but also to overall excellence. In this context, the concept of Multiple Intelligence is very crucial. To meet the challenges of change, pupils should be developed in various parameters. Lot of research has taken place in understanding the human excellence. The brain which becomes the centre of command for the human system has been studied from various perspectives. One of the-researchers is Dr. Howard Gardner, who has done extensive research on human excellence. He defines intelligence as "the ability to solve problems that counters in real life and the ability to generate new problems to solve. He says, the human mind should also have the ability to make something or offer a service that is valued within one's culture. He focuses on eight types of intelligences as follows:

(i) **Linguistic intelligence:** It is the ability of a student to express ideas and concepts in words. Communication is going to play a very vital role in the years to come and students should be in a position to express them clearly and succinctly so that they are able to convert their knowledge into usable products. Students who have high level of linguistic intelligence perform very well as writers, speakers and journalists.

(ii) **Logical-Mathematical intelligence:** It is the ability to concentrate on mathematical problems, hypotheses and to think logically. Scientists, accountants, engineers, computer programmers, researchers all have a high level of this intelligence.

(iii) **Spatial intelligence:** This is a very important skill which will enable a person to think in a three dimensional perspective. It calls for a high level of visual constructed images and creativity in oneself. Students with spatial intelligence have the capacity to become architects, painters or pilots, which call for this skill in the day-to-day application of their work.

(iv) **Bodily-Kinesthetic intelligence:** This intelligence is the ability to manipulate various things and objects. It also calls for fine-tuning physical skills. One would appreciate the extent to which athletes and sportspersons manipulate their body. If this

Intelligence is developed properly; the students will be able to shine well as sportspersons, dancers or surgeons.

(v) **Musical intelligence:** The brain has two halves viz., the left hemisphere and right hemisphere. The left hemisphere is logical, mathematical and linguistic. On the other hand, the right hemisphere is the hemisphere where the music and creativity talents are developed. Students who have a high degree of musical intelligence are right brain driven. These students demonstrate their ability to understand and contribute to music. They can appreciate the parameters such as pitch, melody, rhythm or tone. The students who excel in this become leading composers, music directors, music critics or instrument makers. If this intelligence is developed among students, their right brain is activated and they start thinking creatively.

(vi) **Inter-personal intelligence:** This is the capacity to improve the rapport and people management skills. In the life of anybody, whatever may be the intelligence and knowledge; if one cannot connect with others they will not be very effective. In this context, inter-personal intelligence becomes very important. Students who excel in interpersonal intelligence do well as teachers, social workers, politicians or anyone who has to interact with public at large.

(vii) **Intra-personal intelligence:** It is the ability to introspect and understand oneself in newer dimensions. It also includes the ability to plan ahead and direct one's life. Students with a very high level of intra-personal intelligence are able to understand their strengths and weaknesses. Students who have this ability will become theologians, psychologists, philosophers or original thinkers.

(viii) **Naturalistic intelligence:** It is the ability to understand nature and use the gifts of nature for one's own development. Students with high level of naturalistic intelligence do well as agriculturists, farmers, landscapers, etc. It is possible in an educational institution to develop the above eight types of intelligences.

REVIEW OF FEW RESEARCHERS

With the unfolding of the next century, the opportunities are going to be very wide. **Howard Gardner's** (1983) theory of multiple intelligences has been applied to many school environments to provide a variety of learning options for students to make best use of their potential abilities.

Intelligence, according to **Gardner**, is a biological and psychological potential; that potential is capable of being realized to a greater or lesser extent as a consequence of the experiential, cultural, and motivational factors that affect a person." an intelligence is applied through use of 'component processes' (**Gardner**, 1995) to particular content in a particular cultural environment. While the processes used in one intelligence may appear to be most appropriate for certain activities or topics, they are not exclusive. "Nearly all cultural roles exploit more than one intelligence" (**Gardner**, 1983). A photographer, for example, might be spatially aware but will probably also need some interpersonal abilities to work with people being photographed.

Both **Eisner and Sternberg (1994)** argue that the context of learning and the tasks assigned are important in how each person's configuration of abilities is manifested. Reimer expanded on the concept of intelligence offered by **Gardner**, emphasizing the importance of roles in understanding the intelligences. Reimer's view of musical intelligence is less general, in order to "illuminate the diverse roles operative within and essential to the domain of music".

Musical intelligences are described as many, instead of one intelligence because of the many roles and contexts in which the musical intelligences operate. The importance of that context was the point of **Gardner's** own Project Spectrum research, which remains meanings are arrived at through a culture which is a context of learning and growing.

Gardner is opposed to the exclusive emphasis on logical-mathematical and linguistic symbol systems in most schools. He stated that "separate psychological processes appear to be involved" in dealing with the various intelligences (**Gardner and Hatch, 1995**). The conditions for music learning would require a musical context, using musical symbols. The symbol systems used in most MI schools and the creative conditions established in most MI settings are not truly those typically used by creative, artistic children.

Mettetal, Jordan and Harper (1997) investigated the impact of a MI curriculum in an elementary school. They used observation and survey for data collection. On the basis of their analyses of the data, three themes emerged "(a) students, teachers, and parents were very positive about the concept of multiple intelligences; (b) they were positive about school-wide implementation, including flow time, activity room, and enrichment clusters; and (c) classroom implementation of MI concepts was uneven across classrooms". The researchers highlighted the importance of MI in changing the attitudes of both teachers and students.

Kornhaber (1999) investigated three alternative assessments for identifying students who are different in terms of their gift. Each of these assessments was based on the MI theory. Qualitative data were collected and it was found that "no assessment met all eight criteria; each met a different subset of the eight". Kornhaber concluded that enhancing equity for under-served students is a very important goal.

Snyder (2000) sought to determine the relationship between learning styles and academic achievement of high school students were Tactile/Kinesthetic and Global learners. The researcher concluded that an awareness of how students learn is in fact indispensable to successful classroom

Chan (2001) conducted a study to "assess the variability of the use of a self-report checklist identifying aspects of giftedness in a sample of 192 Chinese secondary students from a multiple intelligences perspective". In order to compare the students, their IQs, creativity, and leadership characteristics were also assessed. It was found that estimates of the various intelligences almost as distinct.

A sample of 648 Lebanese and 252 Indian students estimated their intelligences based on Gardner's Multiple Intelligences. Males rated higher their body kinesthetic and religious dimension (spiritual) while females rated higher their verbal and intra-personal estimates of intelligence. Using the educational level of the parent, no significant correlation with self-estimates of intelligence for each of the national samples was reported. Differences appeared between Indian and Lebanese samples on the cognitive components of intelligences, namely, verbal, spatial and logical abilities.

Intrapersonal intelligences and weaknesses in visual-spatial and bodily-kinesthetic intelligences were generally reported. When age was held constant, arts/music/sports teachers reported to have greater strengths in musical intelligence compared with language and social studies teachers, and guidance teachers also were found to have greater strengths in intrapersonal and interpersonal intelligence. Utilizing the eight intelligences as predictors, interpersonal intelligence was found to be a significant predictor of the teacher's self-efficacy in helping other individuals. Chan discussed the implications of the finding in light of the current Hong Kong education reform movement and the inadequacy of teacher education programs in Hong Kong.

Mbuva (2003), focused on the implementation of the MI theory in 21st century teaching and learning environment. He suggested that MI theory is an effective teaching and learning tool at all levels. Mbuva examined various types of intelligences, offered a definition of MI and discussed the historical developments of MI. He further argued about the application of the MI into the classroom social environment. The researcher concluded that "traditional ways of understanding pedagogy, and static methods of teaching, are giving way to the new classroom examination and application of the MI". He also noted that teachers should take account of the cognition, language, and culture of each of their student.

BACKGROUND OF THE PROBLEM

Inclusive education is an approach to address the learning needs of all children with a specific focus on those who are vulnerable to marginalization and exclusion. It implies all learners who learn differently like students with dyslexia, dysgraphia, dyscalculia and slow learners. Inclusion is an effort to make sure students who are differently able are allowed to learn together in mainstream classroom learning. In the recent years the appropriateness of having separate system in the form of special schools has been questioned, both from the human rights Perspective and from the effectiveness point. Thus inclusive education lays the foundation to an inclusive society accepting, respecting and celebrating diversity, where each child is a unique learner. Is it possible to have inclusive education in the present school curriculum? Our schools follow the curriculum designed without considering the needs of children who are differently able.

Hence to facilitate and upgrade living standards of students with different sets of intellectual strength and weakness an inclusive curriculum should be designed. Educators generally agree that there are three main learning styles - visual, auditory and tactile/kinesthetic. No student uses one of the styles exclusively, and there is usually significant overlap in learning styles. Each student is born with tendencies toward one main style. The dominant style may not always be the same. It may vary or be combined with others, according to the nature of the activity. As learning style includes how students prefer to connect with or group information through sensors and intuitions; receive sensory input through visual, verbal and kinesthetic systems; make information meaningful to oneself through reflection and observation using reasoning, logic and independent analysis and develop a pattern of understanding through a sequential pattern or a global pattern of understanding. But, what has not been established is matching the instructional style to individual learning strength and weakness to improve their learning abilities. Here come Gardner's multiple intelligences, to cater the needs of different types of learners who possess differential learning styles. Multiple intelligences provide multiple ways for the learner to learn a concept. Further, it is possible that the student can learn according to his/her own learning style. Adapting this technique can help students and teachers to develop a deeper understanding of their abilities and talents. Besides, this approach and assessing learning based on their multiple intelligences allows a wider range of students to successfully participate in classroom learning. According to Gardner's multiple intelligences, teaching and learning is possible in eight different ways like verbal or linguistic intelligence, logic-mathematical intelligence, bodily-kinesthetic intelligence, visual-spatial intelligence, musical-intelligence, inter-personal intelligence, intra-personal intelligence and naturalistic intelligence. This new outlook on intelligence differs greatly from the traditional view which usually recognizes only two intelligences verbal and computational. Nevertheless, all students will come into the classroom with different sets of developed intelligences. These sets determine how easy (or difficult) it is for a student to learn information when it is presented in a particular manner. This is commonly referred to as learning style. Many learning styles can be found within one classroom. The teacher should identify the subtypes of intelligences which dominate on a student. So, that the teacher can show students how to use their more developed intelligences to assist in the understanding of a subject which normally employs their weaker intelligences.

Multiple Intelligence based School curriculum -A perfect blend for inclusive education

Multiple intelligences based school curriculum ensures that each student receives individual attention, learning accommodation and supports, which would result in meaningful learning, less stress on students, time spent on reading text books and Teachers must not thinly "cover" large amounts of material in every subject area. Competition and grades have to be minimized. There must be less tracking or leveling of students into ability groups. More

emphasize on higher order thinking and learning the key concepts and principles of a subject and more in depth study of a smaller number of topics. These are the areas which should be focused. Our schools need to be inclusive schools, using inclusive schooling practices in curriculum and pedagogy. Child-centered teaching, open-ended projects, cross curricular activities, independent study, learning centre activities, multi-modal work, group projects, discovering learning and authentic assessment are some of the techniques which promotes multiple intelligences based school curriculum as means to enhance inclusive education. Moreover, multiple intelligences based curriculum provides theoretical foundation for recognizing the different abilities and talents of students who are differently able. Inclusive education is a development approach seeking to address the learning needs of all children with a specific focus on those who are differently able in reading, writing and arithmetic. Multiple intelligence based curriculum not only satisfy the needs of cognitive domain, but it also deals with affective and psychomotor domains of learners. In classes, teachers use conventional mode of instructional system which focuses only on cognitive skills, which are different among students who are differently able. But, it is possible to make the students feel interesting when the teacher teaches using an innovative school curriculum to cater the needs of different types of learners, who possess differential learning styles. Thus, Gardner's Multiple Intelligences based curriculum paves way to enhance inclusive education at school level. Hence, in this article, the authors believe that multiple intelligences based school curriculum can promote inclusive education by providing inclusion to children who are differently abler in all available mainstream setting.

MODEL CURRICULUM BASED ON MULTIPLE INTELLIGENCE:

Intelligence Area	Objectives	Content	Teaching Learning Methods	Learning Experiences	Evaluation Performance
Verbal/ Linguistic	Enable the pupils to learn mother tongues and any other foreign languages of their own interest.	Based on the concerned subject	Books, tapes, paper, diaries, writing tools, dialogue, discussions, debates, stores etc	Word games choral reading storytelling, journal writing, discussion, debates etc.	Performance Assessment in language like telling stories and writing poems etc.
Mathematical/ Logical	Enable the students to involve in numerical aspects and logical methods	Based on the concerned subject	Things to think about and explore, science materials, manipulative, trips to the planetarium and science museum etc	Brainteasers problem solving, science experiments, mental calculation, number games, critical thinking etc	Performance assessment in math's / numerical aspects
Visual/ Spatial	Make the learners ability associated with artistic approach	Based on the concerned subject	Video, movies, slides, art, imagination games, mazes, puzzles, illustrated book, trips to art museum etc	Working with pictures and colors, imagination games, drawing mind- mapping etc	Art and painting competitions.
Bodily / Kinesthetic	To bring out the ability of learners through their physical movements / activities	Based on the concerned subject	Role-play, drama, things to build, movement, sports and physical games, tactile experiences hands-on learning, etc.	Hands on learning, drama, dance, sports that teach, tactile experiences, role play etc.	Sports events, constructing the models of building images etc
Musical	To enable the learners more interest in rhythmic patterns and auditory perception	Based on the concerned subject	Sing-along time, trips to concerts, music playing at home and school, musical instruments etc	Rhythmic learning's, singing, melody, listening too music, using songs that teach.	Slogans, bajans related to the subject matter could be created

Interpersonal	Make learners to understand and interact effectively with others	Based on the concerned subject	Friends, group games, social gatherings, community events, clubs mentors / apprenticeships etc	Comparative learning, peer tutoring, community involvement, social gatherings, stimulations etc	Problem solving among the peer group, task to induce creativity
Intrapersonal	To do with introspective and self-reflective capacities	Based on the concerned subject	Secret places, time alone, self-paced projects, choices etc	Individualized instruction, independent study, options in course of study, self-esteem, building activities etc.	Short answer type test, task to motivate pupils self confidence
Naturalistic	Enable the learners to be interested in nature/ surrounding	Based on the concerned subject	Order, same /different connections to real life and science issues patterns	Nature study, ecological awareness, case of animals	Group tasks to find out the pupils care for plants and animals; environment

Common school curriculum for inclusive education should lay emphasis on Gardner eight different Pathways (areas) of Multiple Intelligences. The features of multiple intelligences based school curriculum in different areas are - In verbal area, activities could include creative writing, literature circles, classroom library activities, and independent reading, journaling and research projects. The mathematical intelligence can be developed with projects, scientific-thinking, diagrams, problem. solving, manipulative and logic problems. Visual learners appreciate mapping, imagination, labeling, and role playing and drawing. Kinesthetic learners benefit from drama, games, sports, movements, hands on activities and experiments. Musical learners enjoy rhymes, song, instruments, sound and charts. Inter-personal learners love group work, discussions, role-playing, partner activities and feedback. Intra-personal learners benefit from reflection, writing, learning activities, observation activities, autobiography, goal setting and meta-cognitive practices. The naturalistic learner appreciates outdoor experiences, recording information in observation notebooks, creating scenes, observing the environment and using tools such as telescopes, microscopes, magnifying glasses and binoculars. Thus each subtype of multiple intelligences has its own quality.

USE IN EDUCATION

Gardner defines an intelligence as "biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture". According to Gardner, there are more ways to do this than just through logical and linguistic intelligence. Gardner believes that the purpose of schooling "should be to develop intelligences and to help people reach vocational and a vocational goal that are appropriate to their particular spectrum of intelligences. People, who are helped to do so, feel more engaged and competent and therefore more inclined to serve society in a constructive way."

We cannot assess or predict a person's ability to learn, to assimilate new information, or to solve new problems." Gardner's theory argues that students will be better served by a broader vision of education, wherein teachers use different methodologies, exercises and activities to teach all students, not just those who excel at linguistic and logical intelligence. It challenges educators to find "ways that will work for this student learning this topic". George, a prominent cognitive psychologist, wrote in The New York Times Book Review that Gardner's argument consisted of "hunch and opinion". Jerome Bruner called Gardner's "intelligences" "at best useful fictions," and Charles Murray and Richard J. Herrnstein in The Bell Curve (1994) called Gardner's theory "uniquely devoid of psychometric or other quantitative evidence." Thomas Armstrong argues that Waldorf education engages all of Gardner's original seven intelligences. In spite of its lack of general acceptance in the psychological community, Gardner's theory has been adopted by many schools, where it is often used to underpin discussion about learning styles and hundreds of books have been written about its applications in education.

HOW EXCELLENT TEACHERS APPLY THE MULTIPLE INTELLIGENCES

While there are no clear boundaries for the applications of each intelligence to teaching, it is evident that excellent teachers apply a variety of intelligences which support and encourage student learning. Each intelligence will be considered independently, though connections to other intelligences should be seen within the context of a whole teaching/learning environment. Excellent teachers select words to convey their message, to inspire and to extend their students. Well written course or unit outlines, study guides and assessment requirements are appreciated by the students. This intelligence combines with interpersonal knowledge of their students so they talk with rather than do them. Sharing jokes with students sets a comfortable atmosphere in the classroom and often involves the juxtaposition of words. The use of words to suggest an image or use of words as metaphors provides a connection with spatial intelligence. Musical intelligence also relates to language presentation. One of the excellent teachers was reported to burst into song on occasions. However, musical intelligence does not appear to be a major feature of excellent teaching reported by the students. Though it may be present in the ambience of timbre (tone) and pitch and rhythm, which is present in the class. What strikes is the teacher's enthusiasm. Being in class with the teacher is fun not only because s/he is kind of goofy - like s/he will break out in song and that just makes class fun. It fosters a comfortable classroom setting. Interactions which occur in the classroom between teacher and students and students and students create a rhythmic pattern with tonal and pitch changes. Many students remarked that the excellent teachers did not 'read' their lecture. The spoken message presentation is a combination of linguistic, musical and bodily-kinesthetic intelligences.

Few teachers are aware of the classroom spaces and have an overview of the learning environment which they are providing for their students. Often when students are presenting seminars their teacher will sit with the students rather than apart from them. Movement of students into different groupings also changes the spatial environment. Like a chess player, they have an overview of the content of each lesson or part of a lesson and its place within a series of classes which make up the whole subject and how this subject fits within a whole course. Clothing and stance are other important features where spatial intelligence is applied in a visual form. Excellent teachers move around the classroom as they teach and use facial expressions which reflect their enthusiasm for the subject and acknowledgment of the students' presence. The teacher will write as she lectures, just having the graphic emphasis going along with her verbal presentation even makes it more imprinted on students mind. Experiences involving student activity both in class and during field trips ensure students are using their bodily-kinesthetic intelligence: It's better to participate in what you are doing, you learn more by doing than by sitting there and writing down examples. Few teachers have reflected on their personal learning and recall insights of their trials and frustrations. This self-knowledge is reflected in the empathy they have for their students learning. Knowledge of their subject gives these teachers a solid foundation from which they teach and are able to answer questions at many different levels. The excellent teacher indicates that their students are significant others through showing empathy and understanding of student needs and present perspectives. The students feel like peers and treat their excellent teacher as a significant other while formulating their own sense of self. Students often see their excellent teacher as a mentor or role-model for their own life. Through engaging with the professor and peers, a student compares his/her own values and way of exploring information with perceptions of others. Excellent teachers have empathy for their students as they seem to understand their fears, their concerns, and their interests: Students are given the opportunity to experience a sense of self when their teachers offer support and opportunities to explore concepts in relation to interest areas important to them. When teachers show high expectation of student success the student is likely to achieve beyond personal expectations. Opportunities are provided in assessment, seminars and other class interactions for students to get to know other people and to engage with others. Interpersonal intelligence operates in conjunction with other intelligences to create a powerful learning environment.

LEARNING STYLE DIFFERS WITH INDIVIDUAL

Style elements are relatively persistent qualities in the behavior of individual learners. They reflect genetic coding, personality, development, motivation, and environmental adaptation. Second only to the more flexible teacher role, the assessment of student learning style, more than any other element, establishes the foundation for a personalized approach to schooling: for student advisement and placement, for appropriate retraining of student cognitive skills, for adaptive instructional strategy, and for the authentic evaluation of learning. Some learners respond best in instructional environments based on an analysis of their perceptual and environmental style preferences. Most individualized and personalized teaching methods reflect this point of view. Other learners, however, need help to function successfully in any learning environment. If a youngster cannot cope under conventional instruction, enhancing his cognitive skills may make successful achievement possible. Many of the student learning problems that learning style diagnosis attempts to solve relate directly to elements of the human information processing system. Processes such as attention, perception and memory, and operations such as integration and retrieval of information are internal to the system. Any hope for improving student learning necessarily involves an

understanding and application of information processing theory. Learning style assessment is an important window to understanding and managing this process. Some research evaluating teaching styles and learning styles, however, has found that congruent groups have no significant differences in achievement from incongruent groups (Spoon & Schell, 1998). Furthermore, learning style in this study varied by demography, specifically by age, suggesting a change in learning style as one gets older and acquires more experience.

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