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Technology and Multiple Intelligences: The Praxis of Learning Intelligences

Abstract. Practical applications of the theory of multiple intelligences are presented and discussed. The implementation of multiple intelligences strategies can be instituted in the classroom through project-based learning via the utilization of cyber technology.

1. The Failure to Implement the Theory of Multiple Intelligences

Howard Gardner's seminal theory of multiple intelligences was widely hailed and accepted since Gardner presented the theory in 1983 in his book *Frames of Mind: The Theory of Multiple Intelligences*. Educators around the world immediately recognized the truths contained within the concept of multiple intelligences as evidenced from their own learning experiences and from those of their students. People and educators can straight away recognize the salient truths underlying multiple intelligences by simply recalling how they learned to recite the alphabet by way of Wolfgang Amadeus Mozart's melodic tune. The fact that some people, even into adulthood, cannot recite portions of the alphabet without breaking forth into song only serves to underscore the validity of the concept of multiple intelligences.

Gardner has come to recognize eight learning intelligences. The logico-mathematical intelligence suggests that some people learn best through the manipulation of numbers or through a series of logical precepts or through syllogisms. The person who learns

best by utilizing the logico-mathematical intelligence is not necessarily destined to become a scientist, mathematician or an accountant. This person merely learns best through the manipulation of logical precepts or numbers. An effective example of the exploitation of this intelligence by teachers would be to have students investigate the cause-effect relationships of the American Civil War or by analyzing the differences between the economies of North and the South.

The learners who favor the verbal-linguistic intelligence learn best through the manipulation of words and their concepts. Thus mathematics teachers who employ the multiple intelligence strategy have had their students write out in words the processes and theorems involved in solving equations. Narratives have been created that illustrate certain historical periods. The stories of personal struggles against the institution of slavery make alive historical events of the Civil War for learners who favor the employment of language arts in the acquisition of knowledge and facts.

For the learners who are inclined towards the musical intelligence, studying the cultural influences of musical compositions like the "Battle Hymn of the Republic" or "Dixie" would bring understanding of the cultures that influenced this period of American history. Similarly, the visual-spatial learner would be profoundly moved by the compositions of the Civil War photographers or painters. The aesthetic qualities found in films, photographs and paintings create mental images for the spatial intelligence learner. The visual-spatial intelligence learners make meaning for themselves through these visual images. For the kinesthetic learner, participation in re-enactments of specific battles is enlightening. The visitation of Civil War period plantations, museums and forts enliven history for those who wish to experience history tactually, optically and acoustically. To actually walk through the activities of the daily lives of the people

of the period would be the best learning experience the kinesthetic learner could have.

Interpersonal intelligence students learn best through personal interactions with others. Small group activities that investigate the Civil War period stimulate such a learner. A good simulation in which the students take on roles brings to light the human factors surrounding the Civil War period. Taking part in the debates that of that period is a powerful learning experience.

Intrapersonal intelligence students favor personal, reflective learning. Reading and reflection about a Confederate or Union soldier's diary or an abolitionist's pamphlets is educational for these students. They need time to reflect and ponder the lives, arguments and philosophies of that day.

The naturalist intelligence is Gardner's most recent addition to the original seven intelligences introduced in 1983. The naturalist intelligence students are able to recognize large, overarching patterns or structures in nature and in concepts. For example, the ability to see a pattern in a seemingly set of random numbers is key to the understanding of fractals. Similarly, the study of taxonomies and classifications and the construction of hypotheses involving macro-systems are further examples of the naturalist intelligence at work. For the students of the Civil War, naturalist intelligence learners may investigate phenomena of slavery throughout American history or its antecedents in order to understand the institution of slavery in the Ante-bellum South.

Of course, none of these intelligences exist in isolation from the others. Astute learners will use effective combinations to reinforce their lessons. Thus verbal-linguistic intelligence learners might reinforce their book-acquired understanding of the Civil War with a

kinesthetic walk through the battlefield of Gettysburg with period music playing in the background. Such a combination of learning intelligences can create an indelible impression of the period.

The truths underlying Gardner's multiple intelligences are self-evident. Learners favor different intelligences and use different combinations in their acquisition of material and knowledge. This being so - the question must be asked, "Why isn't multiple intelligences being effectively implemented throughout all departments and through the K-16 curricula?" What we see in practice is either total denial of the existence of multiple intelligences or half-hearted attempts at one or two collateral intelligences. There is no genuine attempt to utilize all eight intelligences in our teaching practices. It also appears that the higher the academic ladder a student ascends, the fewer learning intelligences are made available for that student. Perhaps the best examples of multiple intelligences learning taking place in the K-16 arena is in Kindergarten. The Kindergarten room is filled with wonder and surprises to be explored through every learning intelligence. There is singing, story telling, personal-discovery activities, group-discovery activities, number manipulations, jumping, running and sitting learning games, the exploration of patterns, and finger painting. By the time children reach eighth grade, most students experience only the learning intelligence most conducive to the discipline itself. Students create art in art class, but not in science. Students employ numbers in math but not in English. Thus a student dares to ask the question in an eighth grade science class, "Does spelling count? This isn't an English class, Ms. Smith!" Students and teachers have relegated certain skills and intelligences to be used only in certain disciplines. There is very little transference.

The creative high-school teacher who dares to employ a "foreign" intelligence in her class is looked upon with

academic suspicion. How can any self-respecting honors senior English teacher allow her students to write a song in place of writing a term paper? The musical intelligence may be used in a music class but is practically taboo in any other discipline in high school. By the time students reach the college level, any idea of multiple intelligence learning has been largely ignored - even by the discipline that exploits the intelligence the most. How many art departments have relegated the "performing arts" to a status below that of the academic study of art? Art history or music history classes are often considered to be much more serious, rigorous and "academic" when compared to their performing counterparts. At the college level, there emerge only two primary learning intelligences: logico-mathematic and verbal-linguistic. The others are largely abandoned. The traditional mid-term, final and a paper only allow a narrow choice of learning intelligences.

Nearly as appalling a situation are teachers who attempt to utilize multiple intelligences in their disciplines but only through the most unnatural and convoluted means. The singing of the periodic table or the singing of Shakespearean sonnets do not inspire most students. It may at times do something for the musical intelligence students; however, by the time the other learning intelligence students have denigrated the lesson as being insipid, even the musical intelligence students have rejected the lesson.

Most teachers do not even attempt to incorporate the other intelligences into their teaching strategies. The reasons are clear enough to discern. First of all, the established curriculum and the time-honored approaches to the disciplines do not lend themselves to other intelligences in a natural manner. As an example, to teach astronomy through a kinesthetic intelligence seems a bit far-fetched and unnatural to the discipline. How would the average teacher or lecturer begin to

design a lesson with musical considerations that would be readily assimilated by all students in the class? Collaterally, standardized and traditional assessments do not utilize nor recognize any of the intelligences except the logical-mathematic or the verbal-linguistic. And with the recent resurgence of teacher evaluations resting on these high stakes scores, there is little hope that teachers will design many lessons with multiple intelligences in mind.

A second reason why teachers neglect multiple intelligences lies in the pragmatic fact that there is inadequate time to prepare lessons utilizing more than one learning intelligence. With inadequate time to cover even the basically mandated elements of the course, teachers will not "waste" time by covering the same material for students who prefer to learn through another intelligence. Hence the ubiquitous lecture predominates at the higher educational levels. In addition, teachers not only lack the time in their classrooms to utilize other intelligences, they also lack the time to prepare for such lessons. Thirdly, and perhaps the most important explanation why teachers largely ignore multiple intelligences is that it is simply wrong-headed. Teachers do not have the expertise in the other intelligences to produce meaningful lessons using multiple intelligences. It would take too much time and effort to plan and implement such lessons.

However, the concept of multiple intelligences is not about what a teacher does in the classroom, although most pre-service and in-service programs tend to make it so. The concept of multiple intelligences should be about how a person learns not about how a person teaches. The misplaced emphasis on teachers to teach lessons using different intelligences is well intended but practically unattainable.

2. The Implementation of Multiple Intelligences

Teachers should not abandon the implementation of multiple intelligences even though it is impossible for teachers to implement by themselves. The solution rests in the hands of the learners. The emphasis of multiple intelligences needs to shift from teacher to learner. The idea that teachers control multiple intelligences within their classes is nonsensical. Students should be empowered to learn in the method conducive to their learning intelligence. The job of the educator is to supply the opportunity, context and framework in which learning is to take place. The job of the student is to learn by utilizing the intelligences that best suits them for the task at hand. Teachers may utilize multiple intelligences in their class by allowing students to employ the intelligences of their choice in the acquisition of the material. The instructor supplies the context and outlines the content to be covered by the learners. The learners utilize the intelligences of their choice to obtain the material.

As an example, a literature instructor has assigned the novels *Brave New World* by Aldous Huxley and *1984* by George Orwell. The instructor plans to cover not only the literary constructs of the novels but also the concepts of utopianism. The political, social, economic, cultural, educational, and religious aspects of societies will be the topics of discussions as well. The instructor utilizing multiple intelligences will assign a variety of projects from which learners will choose. Each project will be required to cover a basic set of requirements, for example, each project must define the concept of utopia. Each project might be asked to demonstrate an understanding of either the political, social, economic and cultural aspect of societies and to create a model. Each project could be required to either create a utopia or argue the conditions under which a utopia might be possible.

The traditionalist learner who is also probably a verbal-linguistic intelligence learner will choose to write a term

paper. The logico-mathematical intelligence learner might choose to create economic models of a utopia illustrating perfectly controlled economies of supply and demand. The naturalist intelligence learner may choose to create a paradigm of how utopian ideas have come about in the past and why they have failed. The musical and kinesthetic intelligence learners may pool resources and utilize the companion interpersonal intelligence to create a musical play based upon one of the novels. The intrapersonal intelligence learner may choose to investigate the writings of Thomas More's Utopia and create a comparative study of More's writings with the two novels. Or perhaps the intrapersonal learner may wish to explore the history of utopianism through film. The visual-spatial intelligence writer may attempt to design architecturally the hatchery building so described in Brave New World. By using projects, students may choose the intelligence best suited for their learning intelligence and determine the projects that will demonstrate their understanding and mastery of the subject. Educational institutions need to break away from the standardized and traditional assessments of exams, essays, and term papers.

3. Technology as a Means for Implementation

Technology is a way to allow the utilization of various intelligences. Technology can provide students with the proper medium through which they may demonstrate and present their mastery of the subject through technology-based project learning. With so many media available in today's classrooms, the utilization of technology as a means to demonstrate mastery of content becomes not only convenient but also effective as a teaching/learning tool. The learners become teachers in their presentations and teachers become true advisers and mentors to student learning.

The verbal-linguistic intelligence students today may create not only the traditional term papers, but they may

also present their learning and papers on the Internet through web pages. The papers and projects created on the web becomes a resource for future students who will also investigate these topics. Web pages may be created and archived through HTML or the traditionally generated papers may be stored on the Internet through Adobe Acrobat's PDF for convenient, universal accessibility. The sharing of knowledge and the management of knowledge becomes a necessary skill for the modern-day teacher and learner. The Internet is a means to begin to manage this deluge of information.

For the logico-mathematic intelligence student who will demonstrate economic models, the use of spreadsheet or statistics programs will become essential to illustrate economic scenarios based on certain market factors. The results of these models may be shared on various presentation programs such as PowerPoint, HyperStudio, or Corel's WordPerfect's presentation maker program. Presentation programs may also be stored on the Internet as well.

For the kinesthetic and musical intelligence learners, they may produce their musical play in animation or with real performers. Either of these performances may be captured on CD-ROMs. A number of animation programs may be utilized. One currently popular animation program is Macromedia's Flash. Performances with human actors may be digitized with digital cameras or analog tapes may be digitized by computers. These digital images are conveniently stored on CD-ROMs which can be inexpensively reproduced. The kinesthetic and musical intelligence learners may also organize and create virtual tours or presentations of their topics.

The naturalist intelligence learners may need to catalog historical utopian ideas and group similar ideas together and yet note their differences as well. These past ideas can be created and indexed with various programs. A

popular, powerful program is Adobe's Acrobat. Once the learner has collected these ideas, indexes and catalogues may be created for quick searches to compare and contrast ideas. From these indexes, the naturalist intelligence learners will be able to discern patterns of ideas and recognize commonalities between various thoughts of utopianism throughout the history of thought.

The interpersonal intelligence learners will be able to collaborate effectively by utilizing groupware programs. Various group programs are available that facilitate small group work. Groupware allows each member of the group to share his or her ideas while still retaining a workable structure and timeline.

For the visual-spatial intelligence learners who wish to design the hatchery building described in the beginning of the novel *Brave New World*, programs such as a Computer- Aided Design (CAD) would be very useful. Various drawing programs such as Adobe Illustrator or Macromedia's Fireworks will also assist these students.

The intrapersonal intelligence learners may wish to compile various films of utopian concepts and narrate their own documentary of utopianism. This may be performed through either analog or digital technology. Modern technology provides these reflective learners access to resources beyond the traditionally printed media.

4. Conclusion

The use of multiple intelligences in classrooms is the choice of instructors and their institutions. Instructors must first recognize the need to go beyond the verbal-linguistic and logico-mathematic intelligences. While these two intelligences have dominated academe traditionally, other intelligences should not be ignored. Once having recognized the need to reach out to

learners who favor the other intelligences, instructors need to release and empower their students to use these intelligences to learn. While modern technology is not essential for the utilization of these learning intelligences, technologies can certainly make their demonstration and implementation more accessible in the classroom setting. Institutions must also adapt to the age of information and recognize academic work in iterations other than the traditional ink and paper forms of essays, term papers and exams. Authentic academic work can take many creative forms in the age of information and cyber technology.

For examples of student work using multiple intelligences in project-based assessments, please see <http://www.genconnection.com/students/welcome.htm>.

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