

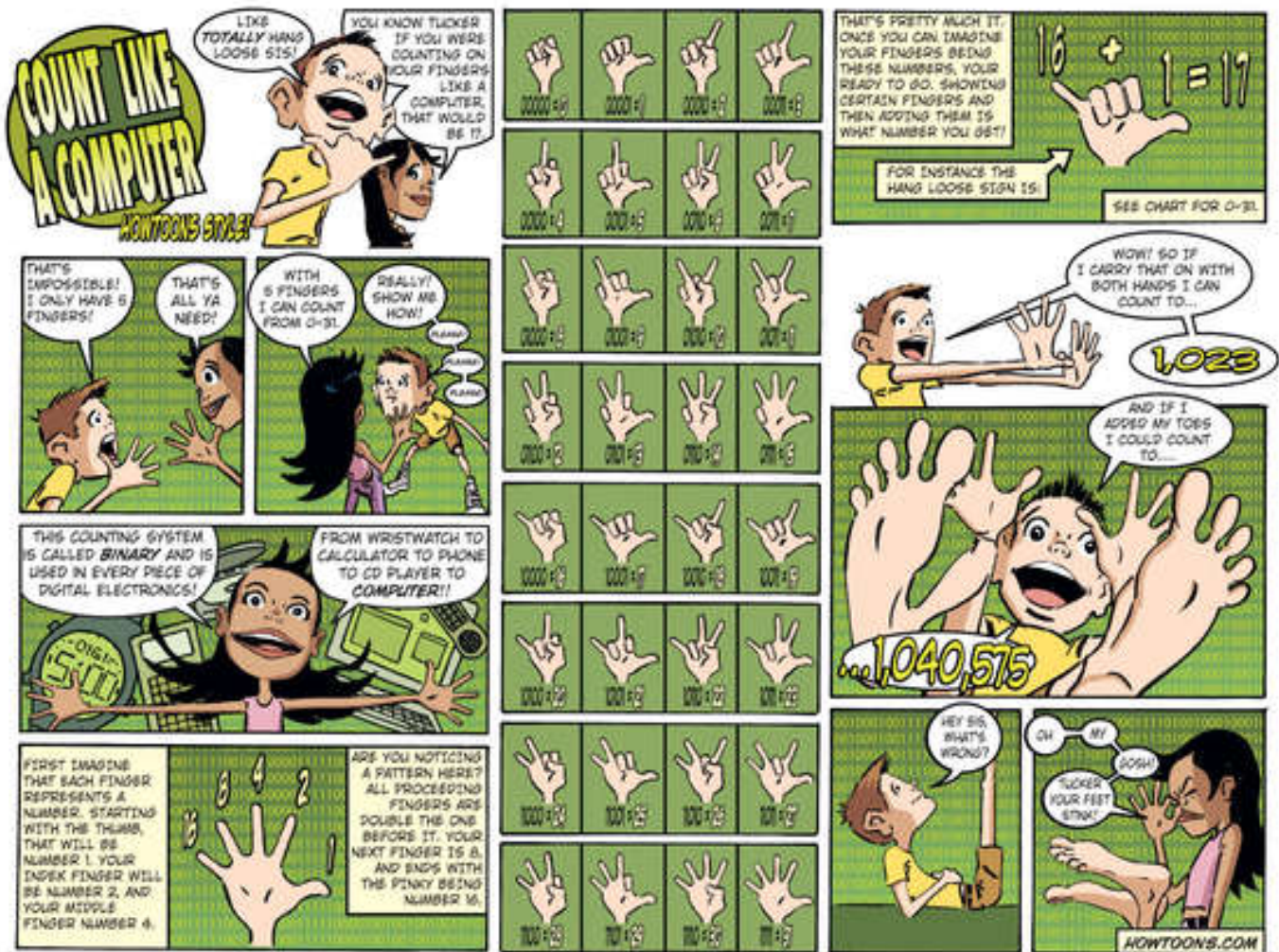


INSTRUCTION

Quality instruction by Optimizing e-Learning using Problem Oriented Project Pedagogy

COURSE HANDBOOK

In cooperation with
FACULTY OF TECHNOLOGY AND INFORMATION SCIENCE
CENTRE FOR GENERAL STUDIES
FACULTY OF EDUCATION



Howtoons, in LIFE & TECH Sept 22, 2005

Compiled, Edited & Reviewed
by:

Rossen Din
Associate Professor Dr. Mohamad Shanudin Zakaria
Associate Professor Dr. Khairul Anwar Mastor



يونيورسيتي كيمسان مليسيا

a multidisciplinary curriculum designed in cooperation with:

**FACULTY OF TECHNOLOGY AND INFORMATION SCIENCE
CENTRE FOR GENERAL STUDIES
FACULTY OF EDUCATION**

COURSE OUTLINE

INSTRUCTION

Quality instruction by Optimizing e-Learning using Problem Oriented Project Pedagogy

PROGRAM:

CODE:

COORDINATOR:

INSTRUCTION

Quality instruction by Optimizing e-Learning using Problem Oriented Project Pedagogy

- Course Facilitator** : Rosseni Din (email:rosseni@yahoo.com; blog:www.rosseni.wordpress)
Time & Place : TBA in a Computer Lab (14sessions @150mins each / 7sessions@ 5 hours each/
5 sessions at 7 hours each / a single 6 hours lecture and computer lab sessions
with a few flexible self learning sessions.
Office : Room 2.13, Post-Graduate Building, Faculty of Technology & Info. Science, UKM.

Course Overview:

This course uses examples in computer training delivery to demonstrate the delivery of quality instruction for various technical and non-technical courses at university level. It is design with flexibility to cater for various interest groups with differences in learning preferences to achieve the same goal; that is to improve instruction, particularly for delivery of computer subjects or training that uses computer for delivery or in the learning processes. The course can be customized to meet the needs of post-graduate computer education students, computer professionals, teachers and undergraduates from computer science or other disciplines with a good to fair computer ability, enterprising attitude and genuine interests in teaching computer or using computer in teaching and learning for human development and long life learning. It is a course on principles and foundation of computer education which can be generalized to other subject areas. Target participants are those who are interested in learning, sharing and disseminate knowledge about new technology and methods in teaching computer or other subjects in schools, higher level institutions and computer training institutions or to become an entrepreneur in the computer training and services area. A hybrid learning system consisting of print, CD-based and web-based media will be used with problem oriented project pedagogy to deliver the course via a combination of face-to-face, online and self-directed learning strategy.

Course Synopsis:

The global objective of the course is to expose participants to a real life teaching and learning situation in the area of instruction using a computer mediated communication tool. Participants will have to synthesis prior knowledge, skills and experience in multidisciplinary area through individual and group collaboration. This course emphasizes acquisition of knowledge and skills in instruction/training delivery as well as the social, affective, and cognitive factors playing a role in computer education. The interactive lecture, online seminar and field work will highlight the importance of (i) e-Learning technology for teaching, learning and reflective practices, (ii) learning theories, methods and strategy for effective instruction/training delivery, (iii) individual differences in personality, learning and cognitive style for curriculum planning and (iii) instructional design and development of an individualized module/courseware/system for a problem oriented project based learning environment to facilitate a self-directed learning culture.

General Learning Objectives:

This course is design to provide participants with basic understanding of fundamental principles and methods in instruction. The course specifically seeks to develop abilities to work individually and in groups to prosper development of good intrapersonal, interpersonal and communication skills. As such, it is hope that the course will contribute attributes where participants would be able to:

- i. apply the knowledge acquired in the area of e-Learning, computer management learning system, human development, computer training delivery and instructional analysis, design and development.
- ii. develop self-reliant skills on deciding what to learn, where and how to find the data/information and concepts needed
- iii. develop social skills in how to cooperate and communicate effectively with others
- iv. be in continued close dialogue with "the real world"
- v. think in a strategic way about target group and intended use of project's findings
- vi. get used to critically assess what is needed for knowledge making

Course Delivery:

The course format requires active participation of all participants. As an experiential course, it is structured around discussion and small group activities. Therefore, it is critical that all participants keep up with the readings and actively participate in class. Participants should be prepared to discuss the content of the readings in relation to teaching students with different types of personality, intelligences and learning style as well as to ask questions for clarification, exploration, or discussion. In order to meet the needs of varied learning styles

and needs, the course uses a combination of instructional methods and technologies. These methods include: instructor-guided presentations (i.e., lectures assisted by PowerPoint or other visuals such as web and blog links); student-guided presentations; multimedia presentations; facilitated discussions that promote critical thinking; cooperative learning (i.e., small group structure emphasizing learning from and with others); collaborative learning (i.e., heterogeneous groups in an interdisciplinary context); and field work as well as the use of a Learning Management System/weblogs for group discussions and reflective practices.

Learning Matrix:

Learning Outcomes	Learning Process	Assessment
Participants should be able to demonstrate the ability to apply fundamental theories and principles of instructional design and meaningful computer training delivery.	Guided student presentation	<ul style="list-style-type: none"> ▪ Lesson plan ▪ Teaching media ▪ Teaching method ▪ Teaching strategy ▪ Teaching Approach ▪ Pedagogical content knowledge
Participants should be able to apply knowledge and skills in information and communication technology articulately and develop critical thinking, interpersonal and communication skills through working in large and small multi-discipline and/or multi-cultural group.	<ul style="list-style-type: none"> ▪ Identify, explore and select knowledge from various databases and resources and integrates them with prior knowledge and experience to create and organize new knowledge that can be assessed by peer and moderators. ▪ Participants will work individually or cooperatively within their small group to design and develop a weblog and collaborate with other groups to achieve a shared goal. 	<ul style="list-style-type: none"> ▪ Reflective journal ▪ Online forum ▪ Individual/group blogs
<p>Participants as an autonomous learner and trainer are responsible:</p> <ul style="list-style-type: none"> ▪ to promote, protect and enhance social values, cultural diversity and beliefs ▪ to adhere to the global netiquette for their benefit as well as for the participants, institution and society at large. 	<ul style="list-style-type: none"> ▪ Presentation and workshops ▪ Practical Training/micro teaching/macro teaching ▪ Blogging activities ▪ Online discussion 	<ul style="list-style-type: none"> ▪ Class participation ▪ Field work ▪ Field report ▪ Reflective journal ▪ Weekly forums
<ul style="list-style-type: none"> ▪ Participants are to maintain records of activities for critical reflections and improvement. 	<ul style="list-style-type: none"> ▪ Critical reflection 	<ul style="list-style-type: none"> ▪ Reflective journal
<ul style="list-style-type: none"> ▪ Able to do feasibility and need analysis study to identify real world problems in media development and come up with a project to solve the problem. 	<ul style="list-style-type: none"> ▪ SWOT analysis ▪ Identification and application of an instructional design model ▪ Problem oriented project pedagogy 	<ul style="list-style-type: none"> ▪ An instructional media for computer training
<ul style="list-style-type: none"> ▪ Able to identify global trends and suggest a short term curriculum for a computer integrated course at a competitive price yet able to break-even. ▪ Able to create creative and innovative brochure to market the course. 	<ul style="list-style-type: none"> ▪ Workshop ▪ Cooperative and collaborative group work 	<ul style="list-style-type: none"> ▪ An eye-catching brochure

Class Assignments & Assessment:

	Project	Goal	% of Grade	Due Date
1	e-Journal (reflection) and participation (attendance and integration of reading assignments into F2F & online participation) - <i>individual work with group effort</i>	Participants are expected to write a weekly reflective journal by actively participating in every F2F sessions, as well as in online discussions or personal email if necessary; by critically analyzing, asking, or making observations about reading materials, thereby indicating that they have thoroughly prepared and reflected their contribution to learning in this course.	25% (will be graded individually)	Every week (every day for short courses)
2	Theory, Method & Strategy: Paper Presentation (post your Lesson Plan or presentation outline & Presentation media/slides and handouts) - <i>group work</i>	Participants are expected to demonstrate the ability to create a lesson plan with a multidisciplinary perspective on a topic from the core curriculum by integrating computer skills, pedagogical content knowledge, noble values and fine culture.	25% (will be graded individually 5% by peers and 10% by facilitator)	Week 08 (last day for short courses)
3	Instructional Media - <i>group work</i>	Participants are expected to develop self-reliant skills on deciding what to teach and learn, where and how to get computer tools and applications and which instructional design model to follow. The design and product should reveal participants' ability to analyze and synthesize previous knowledge and decide on the most appropriate theory, method and strategy to use with the developed module.	25% This project shall be treated as the mid-term exam and will be graded individually .	Week 09 (first draft) Week 11 (final draft) (for short courses: day 3– first draft last day– final draft)
4	e-Portfolio Individual work	Participants are expected to develop a digital portfolio as a tool for reflection, enhancing communication and collaboration and for sharing experiences and resources. It should contain previous works as a showcase demonstrating student's skills and development.	25% This project shall be treated as the final exam and will be graded individually .	Week 17 (7-14 days after the last day of short courses)

Course Environment:

This course makes extensive use of the following computer applications/software:

- Internet Browser and Email
- WordPress blogging software and related applications
- Yahoo Messenger
- LMS (LearningCare/Moodle)
- Word, Power Point and Multimedia editing applications when needed
- Video capture, editing and presentation packages

However, this is not merely a hands-on computer course. Although most assignments involve hands-on work, continuous assessment will be conducted mainly on the content of concepts, theories and models applied and presented in online and face-to-face discussions, participations, reflections, design, analysis and development of media and methods plus presentations and report writing.

Consultation and Communication:

Please check your email regularly and make the Pendidikan Komputer Blog (www.rosseni.wordpress.com) as an RSS feed in your blog.

TO GAIN A PASS, A MARK OF AT LEAST 55% MUST BE OBTAINED FOR POSTGRADUATE CREDIT AND AT LEAST 45 FOR UNDERGRADUATE CREDIT. NOTE THAT A **B** IS THE MINIMUM PASSING GRADE FOR A POST-GRADUATE COURSE. PARTICIPANTS OF SHORT COURSES WHO ACHIEVED BELOW 50% WILL ONLY RECEIVE A CERTIFICATE OF PARTICIPATION.

The grading scheme use is as follows:

Postgraduate Credit		Non-credit/Non-Graduating Student		Undergraduate Credit	
A	85 -100	High Distinction	85 -100	A	85 -100
A-	75 - 84	Distinction	70 - 84	A-	75 - 84
B+	65 - 74	Credit	60 - 74	B+	70 - 74
B	55 - 59	Pass	50 - 59	B	65 - 69
B-	50 - 54	Conceded Pass	35 - 49	B-	60 - 64
C+	45 - 49	Fail	34 and below	C+	55 - 59
C	50 - 54			C	50 - 54
C-	40 - 49			C-	45 - 49
D	35 - 39			D	35 - 39
F	34 and below			F	34 and below

Presentation of Assignments

1. Student/Participant must retain a copy of all assignments
2. All assignments must be attached to an assignment cover sheet which must be signed and dated by the student before submission. A sample cover sheet is as in appendix 13 and a template will be made available in the Pendidikan Komputer Blog under category Pendidikan Komputer/assignment.
3. Student/Participant must not submit work for an assignment that has previously been submitted for this course or any other course without prior approval from the course coordinator.
4. Assignments that are submitted one day late will receive a 10% penalty.

Return of Assignments and Feedback:

Assignments will be commented within one week of the due date (daily for short courses) with written feedbacks. Peer assessment are most welcome. You should review, edit and make amendments where appropriate before submitting them again into your e-Portfolio for final grading.

Course Results

Final results for the course will be available before the start of a new semester. University staffs are not permitted to provide results to participants over the telephone or by email. When results are approved and finalized they are available through the SMP (*Sistem Maklumat Pelajar*), the Faculty's Postgraduate Office or the PPA office.

Plagiarism and Misconducts

Plagiarism is a serious act of academic misconduct. The faculty adheres strictly to the University's policies on examination and assessment. Any deliberate deception, fabrication of results, plagiarism, and conduct outside the norm of scientific behavior will be brought up in the faculty meeting and will be judge accordingly by the university's examination board.

Examination

The e-Portfolio project is the alternative summative assessment method undertaken as the final exam. All other assignments are the alternative assessment methods use in this course for formative evaluations in place of the traditional quizzes and mid-term exam. It is each participant's responsibility to read the course outline, assignment and project sheets/handouts and online postings. Misreading any information is not accepted as grounds for granting an extension and participant should not make any arrangement to be absent on the day assignments and projects are due. Participants may use any dictionaries, thesaurus and academic publications provided credit is given where credit is due.

Extensions

Extensions may be granted without penalty on the following grounds: medical, compassionate and academic.

Medical Grounds

- Anyone who cannot submit a major assignment/project due to illness must submit the appropriate letter/form/certificate.
- Student must apply within seven days of the occurrence of their problem and/or within five working days of assignment/project's due date. Student's intending to apply for a medical extension should visit their medical practitioner no later than the day of the occurrence of the problem.

Compassionate Grounds

- Anyone who cannot submit a major assignment/project due to compassionate reasons beyond their control must submit the appropriate letter/form/certificate.
- Student must apply within seven days of the occurrence of their problem and/or within five working days of assignment/project's due date.

Notes on Assessment

The course will meet face-to-face and will confer on-line via the facilitator's blog at <http://rosseni.wordpress.com/>. Some reference materials may be found in the computer training portfolio of the university's LearningCare system. This course requires participants to:

1. Attend all class sessions.
2. Have a working knowledge of both the Internet and e-mail.
3. Complete all assignments on time. Assignments submitted past the deadline will be marked down, unless special arrangements have been made with the instructor in advance. A packet containing the specific descriptions and evaluation criteria for the course requirements is attached.
4. Participate actively during large and small group discussions and activities.
5. Participate in weekly discussions and assignments online. Entries should be topical and include information from the texts for discussion points. If entries do not relate to the course, they do not receive credit

Course Content:

SESSION	SESSION	LEARNING PROCESS & ASSIGNMENT
<p>1 (08:00-09:00)</p>	<p>TECHNOLOGY AS FACILITATOR OF COMPUTER TRAINING: OVERVIEW</p> <p>MEANINGFUL LEARNING ATTRIBUTES</p> <p>Required Reading</p> <ol style="list-style-type: none"> Technology as Facilitator of Quality Education: A Model. William P. Callahan and Thomas J. Switzer (Appendix 1: CTD Handbook) Jonassen, D. H. 1999. Meaningful Learning Attributes. In Jonassen, D. H., Peck, K.L. & Wilson, B. G. Eds. <i>Learning with technology: a constructivist perspective</i>. N.J.: Pice-Hall. (Appendix 12: CTD Handbook) <i>Bab 1: Komputer dalam Pendidikan</i> (Text) 	<p>WordPress Workshop</p> <ul style="list-style-type: none"> - Why WordPress? - Nettiquette & The 7 blogging virtues (Appendix 4 & 5:CTD Handbook) <p>Task 1: Register and create your blog Task 2: Ice Breaking exercise in your blog</p> <p>Reference: WordPress Documentation (available as a link in the <i>Pendidikan Komputer</i> Blog under category <i>Belajar Komputer</i> at http://rosseni.wordpress.com/)</p> <p>Assignment 1a: (☺due weekly☺) Activity 1: eForum-A in my blog Activity 2: Reflection-A in your blog</p>
<p>2 (9:30-10:30)</p>	<p>TECHNOLOGY AS FACILITATOR OF QUALITY TRAINING</p> <ul style="list-style-type: none"> - Principles Of Learning - Pedagogical Content Knowledge <p>4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY (Power Point Slides in Appendix 6:CTD Handbook)</p> <p>Required Reading</p> <ol style="list-style-type: none"> <i>Bab 9: Falsafah dan Pendidikan Bersepadu dalam Pendidikan Komputer</i> (Text) Principles Of Learning (Appendix 2: CTD Handbook) Pedagogical content knowledge (Appendix 3: CTD Handbook) <i>Bab 10: Teori-teori Pembelajaran</i> (Text) <i>Bab 9: Kaedah Pengajaran</i> (Text) <p>Supplementary readings:</p> <ol style="list-style-type: none"> SeDAAP learning strategy in <i>Huraian Sukatan Pelajaran ICT KBSM</i> at http://myschoolnet.ppk.kpm.my/kuri_tm/it_sp_hsp.pdf <i>Pusat Perkembangan Kurikulum's module: Konstruktivisme, Pembelajaran Masteri, Pembelajaran Konstektual</i> at http://myschoolnet.ppk.kpm.my/indexg.htm 	<p>LearningCare Workshop</p> <ul style="list-style-type: none"> - Why LearningCare? - Registration and Subscription - MyDesktop and MyPortfolio - Documents and Links <p>Task 1: Register to LearningCare System Task 2: Subscribe appropriate portfolios and look up for links and previous presentations</p> <p>Reference:</p> <ol style="list-style-type: none"> <i>e-Buku Pembelajaran Maya di UKM</i> (available for a 7-days loan in print or CD- ROM format) LearningCare notes (available in the LearningCare system under portfolio GE6353 <i>Asas Pendidikan Komputer</i> in the Documents Section) <p>Assignment 1b: (☺due weekly☺) Activity 1: eForum-B in my blog Activity 2: Reflection-B in your blog</p> <p>Assignment 2 (☺due week 8☺) Choose your theme for paper presentation on "Theory, Method and Strategy" from the following list, reflect and write the theory's implication to your own teaching practice.</p> <ol style="list-style-type: none"> Cognitive Load Theory Minimalist Social Constructivism Zone of Proximal Development

SESSION	SESSION	LEARNING PROCESS & ASSIGNMENT
	3. Theories in Psychology database at http://tip.psychology.org/	5. Adult Learning & Andragogy 6. Problem Oriented Project Pedagogy (POPP)/POPBL 7. Information Processing 8. Situated learning 9. Cognitive flexibility
3 (self-learning)	<p>COMPUTER MEDIATED COMMUNICATION</p> <ul style="list-style-type: none"> - computer as a thinking tool <p>Required Reading:</p> <ol style="list-style-type: none"> a. <i>Bab 4: Komunikasi Berperantaraan Komputer</i> (Text) b. Kanuka, H. (2005). An exploration into facilitating higher levels of learning in a text-based internet learning environment using diverse instructional strategies. <i>Journal of Computer-Mediated Communication</i>, 10(3), article 8. (Appendix 7: CTD Handbook) 	<p>Assignment 1c: (☺due weekly☺) Activity 1: eForum-C in my blog Activity 2: Reflection-C in your blog</p> <p>Supplementary Reading:</p> <ol style="list-style-type: none"> 1. <i>Modul Kemahiran Berfikir</i> PPK at http://myschoolnet.ppk.kpm.my/indexg.htm 2. Jonassen, D. H. 1996. Computer Mediated Communication. In <i>Jonassen D.H. Computers in the classroom: mindtools for critical thinking</i>. New Jersey: Prentice-Hall
4 (10:30-11:30)	<p>MULTIPLE INTELLIGENCES</p> <ul style="list-style-type: none"> ▪ using student's strongest intelligence's to guide their learning <p>Required Reading:</p> <ol style="list-style-type: none"> a. <i>Bab 2: Penggunaan Komputer Dalam P&P</i>(Text) b. <i>Bab 3: Komputer dalam P&P Sains dan Matematik menggunakan BI</i> (Text) c. <i>Bab 5:Kepelbagaian Pelajar</i> (Text) d. <i>Bab 6: Kepelbagaian Pelajar</i> (Text) 	<p>MI WORKSHOP Identifying your strongest intelligence</p> <p>Assignment 1d: Activity 1: eForum-D in my blog Activity 2: Reflection-D in your blog</p> <p>Web References</p> <ol style="list-style-type: none"> 1. Modul Kepelbagaian Kecerdasan PPK at http://myschoolnet.ppk.kpm.my/indexg.htm 2. http://pzweb.harvard.edu/ 3. http://www.ncsall.net/ Meg Constanzo (NCSALL) report on using teaching with MI based approaches using project based learning (Appendix 8: CTD Handbook)
5 (11:30-12:30)	<p>TYPES OF PERSONALITY</p> <p>Required Reading:</p> <ol style="list-style-type: none"> a. MBTI Basics (Appendix 11: CTD Handbook) b. <i>Bab 7: Personaliti</i> 	<p>MBTI WORKSHOP Identifying your strongest intelligence</p> <ul style="list-style-type: none"> - The MBTI preferences - Effects of preferences on work situations - Preferred methods pf communications - <p>Assignment 1e: Activity 1: eForum-E in my blog Activity 2: Reflection-E in your blog</p>

SESSION	SESSION	LEARNING PROCESS & ASSIGNMENT
6 (2:00-3:00)	LEARNING STYLE	<p><u>LEARNING STYLE WORKSHOP</u> Identifying your learning style VAK Instrument</p> <p><u>Assignment 1f:</u> Activity 1: eForum-F in my blog Activity 2: Reflection-F in your blog</p> <p><u>Required Reading</u> 1. Learning Style (Appendix 9: CTD Handbook) 2. GSU Master Teacher Program: On Learning Styles (Appendix 10: CTD Handbook) 3. Bab 8:Kepelbagaian Gaya Belajar (Text)</p>
7 (3:00-3:30)	<p>INSTRUCTIONAL DESIGN MODELS</p> <p><u>Required Reading</u> <i>Bab 12: Metodologi Pembinaan Sistem</i> (Text)</p>	<p><u>MODULE DEVELOPMENT WORKSHOP</u> - Metodologi kajian pembinaan - Model reka bentuk pengajaran</p> <p><u>Assignment 1g:</u> Activity 1: eForum-D in my blog Activity 2: Reflection-D in your blog</p>
8 (4:00-5:00)	<p><u>Assignment 3:</u> INDIVIDUALIZED COMPUTER INTEGRATED LEARNING MODULE FOR EFFECTIVE INSTRUCTION Group work</p> <p><u>Assignment 4</u> ePortfolio Individual/pair/group blog</p>	<p><u>MODULE DEVELOPMENT WORKSHOP</u> - Usability/Formative Evaluation of Module's Final Draft - First Formative Training Evaluation</p> <p><u>Assignment 1h:</u> Activity 1: eForum-E in my blog Activity 2: Reflection-E in your blog</p>

Basic Reading:

- Rossen Din. 2007. Deraf Manuskrip Prinsip Asas Pendidikan Komputer. Bangi: Fakulti Teknologi dan Sains Maklumat. Universiti Kebangsaan Malaysia.
- Alessi, S. M. & Trollip, S. R. 2001. *Multimedia for Learning: Methods and Development*. Ed. Ke 3. Boston: Allyn and Bacon.
- Jonassen, D. H. 2000. *Computers as mindtools for school: engaging critical thinking*. Ed. ke 2. New Jersey: Prentice-Hall.
- Jonassen, D. H., Peck, K.L. & Wilson, B. G. 1999. *Learning with technology: a constructivist perspective*. New Jersey: Prentice-Hall.
- Kementerian Pendidikan Malaysian. 2006. Huraian Sukatan Pelajaran Teknologi Maklumat. Pusat Perkembangan Kurikulum.
- Laman web INTIME di alamat URL: <http://www.intime.uni.edu/model/modelarticle.html>

APPENDIX 1

This paper was reformatted for normal text reading from the web format in

<http://www.intime.uni.edu/model/modelarticle.html>,

Copyright©: INTIME 1999-2001

APPENDIX 1

This paper was reformatted for normal text reading from the web format in <http://www.intime.uni.edu/model/modelarticle.html>,

Copyright©:INTIME 1999-2001

Technology as Facilitator of Quality Education: A Model

William P. Callahan and Thomas J. Switzer
College of Education, University of Northern Iowa

Note: The authors would like to thank the following graduate students for their work on the project: Alex Spatariu; Corina Cimpoeru; Simona Boroianu; Madalina Tincu; Marius Boboc; Michelle Matz; and Nadia Solukhina.

Abstract

Few people would argue with the idea that information technologies have a major impact on how we view schooling, teaching, and learning at this point in time. If technology is indeed a facilitator of quality education, how will it be used? How can developments in information technology facilitate an education appropriate for the 21st century while enhancing student achievement in core areas deemed important to our democratic society? This chapter describes the Technology as Facilitator of Quality Education (TFQE) model currently being developed at the University of Northern Iowa. This model includes seven major dimensions: students at the center of their own learning; principles of good learning; aspects of information processing; standards from content disciplines; tenets of effective citizenship in a democratic society; teacher knowledge and behavior; and technology.

Few people would argue with the idea that information technologies have a major impact on how we view schooling, teaching, and learning. They may, however, argue about the kind of impact that we currently feel from the use of technology in our classrooms. Opinions range from those who see technology as the driving force for all that will be good about education in the future, to those who see information technology as a force that will destroy education as we now know it, driving us toward all of the negative aspects of consumerism.

Like most complicated technological developments and their associated social changes, the potential impact of information technology on education is somewhere between these two extreme positions. Decision making is, of course, still the key to the impact that technology will have on education. One would hope that informed human beings would find a way to capitalize on the best of what information technology has to offer, while preserving the core components of our educational system. This blending of the new with the old is most likely to serve us well in the future and provide us with a foundation for effective citizenship in a democratic society.

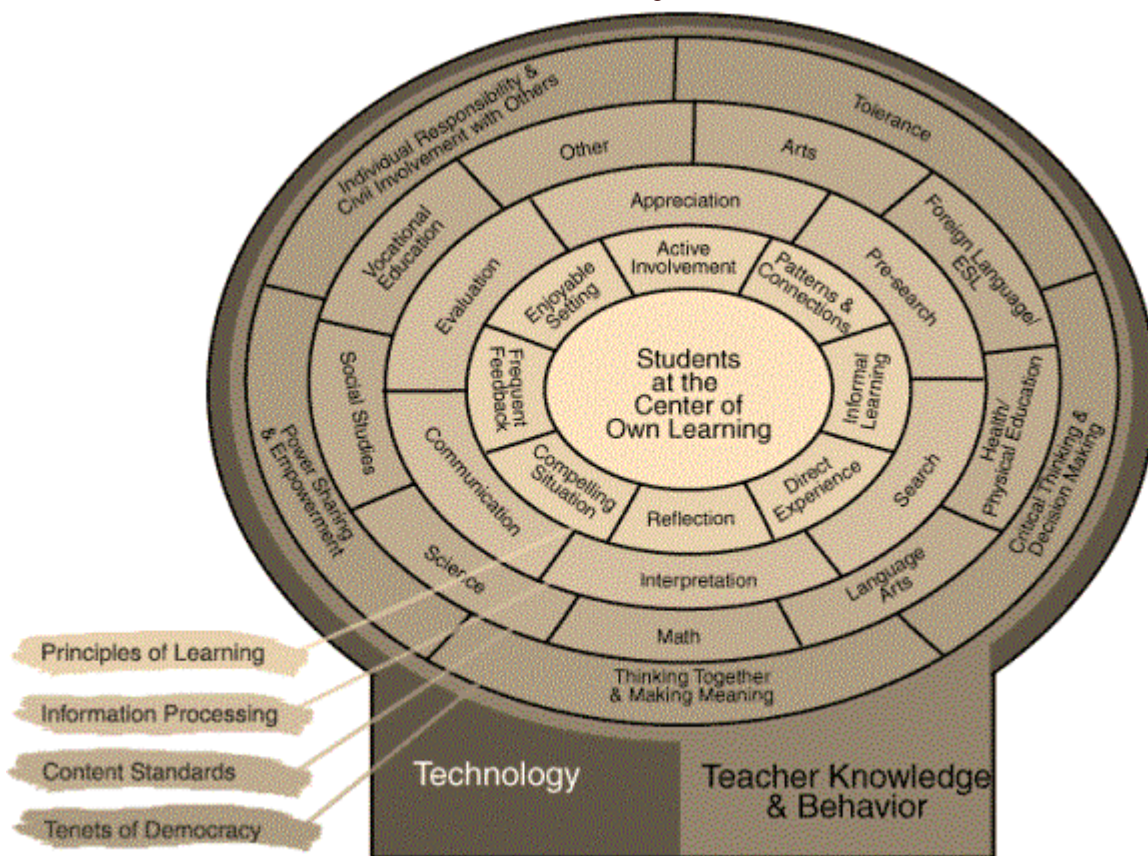
People who fear the consequences of developments in information technology frequently do so not out of ignorance, but from the realization that these technologies present the possibility of a fundamental shift in how we think about the nature of schooling, teaching, and learning. They question the consequences of such a shift. Unfortunately, those who advocate this shift have not developed a persuasive rationale for their position. In their rush to support technology, they have failed to show how the shift can actually promote the core values of education in a democratic society.

If technology is indeed a facilitator of quality education, how will it be used? How can developments in information technology facilitate an education appropriate for the 21st century, while enhancing student achievement in core areas deemed important to our democratic society? Technology as Facilitator of Quality Education (TFQE) is a model currently being developed at the University of Northern Iowa. It includes seven major dimensions:

1. Students at the center of their own learning
2. Principles of good learning
3. Aspects of information processing
4. Standards from content disciplines
5. Tenets of effective citizenship in a democratic society
6. Teacher knowledge and behavior
7. Technology

The seven dimensions of the model provide a way for educators to view the integration of technology-related tools into a robust educational environment and thus answer the hard questions regarding support for the shift in our educational activities toward technology. The model sets up a framework for this robust educational environment and identifies key points at which technology should be implemented and evaluated to determine its impact. It simultaneously allows for the integration of new research findings, while maintaining the structure to evaluate the impact of technology tools on these new findings as part of an ongoing evaluation process. In so doing, the model allows a variety of stakeholders to see the complex process that is education and how technology is affecting that process.

Figure 1



To understand how technology can facilitate quality education, we need to define the essential elements of quality education and the impact of technology on each of them.

Students at the Center of Their Own Learning

Student-centered learning (SCL) places the student (learner) in the center of the learning process. In student-centered learning, students are active participants in their learning rather than passive recipients; students are more intrinsically than extrinsically motivated; learning is more individualized than standardized. Student-centered learning develops “learning how to learn” skills such as problem solving, critical thinking, and reflective thinking. Student-centered learning accounts for and adapts to different learning styles of students. Student-centered learning is distinguished from teacher-centered learning or instruction, which is characterized by the transmission of information from a knowledge expert (teacher) to a relatively passive recipient (student/learner) or consumer. When we put students at the center of their own learning, we blend these various components into a unique learning system, one that allows us to view the complicated process that encompasses learning and its individual parts.

Although the focus is on students at the center of their own learning, this does not mean learning by oneself. Learning and self-esteem are heightened when individuals are in respectful and caring relationships with others who see their potential, genuinely appreciate their unique talents, and accept them as individuals. The experience then challenges personal beliefs. Thoughts and understandings resulting from learning and

interpretations become the individual's basis for constructing reality and interpreting life experiences; this cannot occur when one is alone. Learners must spend the larger part of their time in activities with others who ask them to do thought-provoking tasks such as explaining, making generalizations, and, ultimately, applying their understanding on their own. And they must do these things in a thoughtful way, with appropriate feedback to help them do better. (Blythe & Associates, 1998, p.7).

In order for student-centered learning to occur, there needs to be high quality classroom management. According to Woolfolk (2001), there are at least, three reasons why this is important: to allocate more time for learning, to give more access to learning, and to help students develop self-management. "Students learn self-control by making choices and dealing with the consequences, setting goals and priorities, managing time, collaborating to learn, mediating disputes and making peace, and developing trusting relations with trustworthy teachers and classmates (Rogers & Frieberg, as cited in Woolfolk, 2001, p. 439). Encouraging self-management requires extra time, but teaching students how to take responsibility is an investment well worth the effort. When elementary and secondary teachers have very effective class management systems but neglect to set student self-management as a goal, their students often find that they have trouble working independently after they graduate from these well-managed classes (Woolfolk, 2001, p.17).

Principles of Good Learning

The second major dimension of the TFQE model is principles of good learning. The model focuses on the following eight principles:

1. Active involvement
2. Patterns and connections
3. Informal learning
4. Direct experience
5. Compelling situation
6. Reflection
7. Frequent feedback
8. Enjoyable setting

A decade of path-breaking research in the field of cognitive science suggests that major differences exist between knowledge based on recall and knowledge based on deeper forms of understanding. That research tells us that learning that is a product of the latter type of knowledge is rich, complex, and occasionally unpredictable. Building effective environments to foster it must rest on collective knowledge and active discussion of this complexity. Drawn from research in cognitive science, the following eight insights about learning itself seem particularly compelling as starting points for our attention:

Active Involvement

The learner is not a "receptacle" of knowledge, but rather creates his or her learning actively and uniquely (Ewell, 1997b, p. 6). Learning is an essentially creative act. Its proof lies in the learner's ability to go beyond the simple "reproduction" of knowledge to engage in fundamentally new forms of understanding. Psychologist Jerome Bruner strikingly portrays learners as "epistemologists"--actively engaged in constructing unique ways of knowing and finding things out, even as they add to a particular stock of knowledge. This characterization of learning, of course, is quite at odds with our dominant instructional models, which stress additive content transmission (Ewell, 1997a, p. 2).

Patterns and Connections

Learning is about making meaning for learners as they establish and rework patterns, relationships, and connections. Cognitive science tells us that individual brains "learn to make themselves work" actively and individually by establishing new patterns of synaptic connection. The result is a unique set of "mental models" that each of us uses to make meaning out of specific situations.

Informal Learning

"Every student learns all the time, both with us and despite us" (Ewell, 1997, p.2). Synaptic connection making occurs constantly and not just in formal learning situations. Most of the resulting learning, moreover, is implicit--arising out of direct interaction with complex environments and a range of cues given by peers and mentors. This insight helps explain the common research finding that college students learn a lot outside of class. It also admonishes us to take conscious advantage of every available setting as an opportunity for learning.

Direct Experience

Direct experience decisively shapes individual understanding. Cognitive science also tells us that the brain's activity is in direct proportion to its engagement with actively stimulating environments. In a debate sometimes cited as the "situated learning controversy," disagreement remains about the extent to which individual learners can generalize what they learn from discrete and different environments. This insight regarding brain activity lends credence to our efforts to create active student engagement in any teaching situation (Ewell, 1997b, p. 8).

Compelling Situation

Learning occurs best in the context of a compelling "presenting problem." Maximum learning tends to occur when people are confronted with specific, identifiable problems that they want to and are able to solve. The first condition, the desire to solve, emphasizes the strong role of "thinking dispositions" that determine when students will actually invest energy in learning. The second, the ability to solve, compels attention to creating learning situations that carefully manage the levels of challenge provided: too much, and the brain simply "turns itself off" (Ewell, 1977a, p. 3).

Reflection

Beyond stimulation, learning requires reflection. Brain research tells us that high challenge produces major surges in short-term neural activity (termed "beta-level" activity). But building lasting cognitive connections requires considerable periods of reflective ("alpha-level") activity as well. Absent reflection, solving "presenting problems" usually ends learning encounters at a point well short of the cognitive reorganization that deep learning requires. Effective learning situations thus need to encompass time for thinking (Ewell, 1997b, p. 9).

Frequent Feedback

Frequent feedback provides opportunities for students to practice what they have previously learned. Because the brain wants to deal with the most pressing matters, it is necessary to practice those things that we wish to retain and to receive feedback that includes "explicit cues about how to do better, such as that provided deliberately (or unconsciously)" by a teacher or peer (Ewell, 1997b, p. 9). Feedback influences learning by virtue of its frequency (i.e., number of interactions with a particular environmental stimulus such as a person or a task) and its quality. Quality feedback would reveal "specific, readily-correctable, mistakes or discrepancies in current practices, or in the 'mental models' that lie behind them" (Ewell, 1997b, p. 9). Without frequent feedback and opportunities for practice, particularly in areas like mathematics and foreign language, "even well-learned abilities go away though recovery is not as difficult as initial acquisition" (Ewell, 1997b, p. 9).

Enjoyable Setting

Learning occurs best in a cultural context that provides both enjoyable interaction and substantial personal support. New insights into the ways traditional cultures gain and transmit knowledge (drawn from sociobiology and anthropology) remind us that effective learning is social and interactive. Key features of the necessary social milieu that we should be mindful of in creating new learning situations are direct personal support for manageable risk taking (and its occasional negative consequences) and frequent opportunities for peer interaction and feedback (Ewell, 1977a, p. 3).

Aspects of Information Processing

If modern classrooms focus on students at the center of their own learning and demonstrate the best principles of learning, those classrooms can develop the skills and dispositions necessary for students to process information. The TFQE model addresses the following dimensions of information processing:

1. Appreciation
2. Presearch
3. Search
4. Interpretation
5. Communication
6. Evaluation

As vast amounts of information become available to individual citizens, the ability of each person to intelligently process that information takes on increased importance. Developing the dispositions and skills necessary for informed information processing then becomes a necessary component of education in an information age. Although several information-processing models have been developed, the Pathways to Knowledge model

developed by Marjorie L. Pappas and Ann E. Tepe is a well-conceived and well documented model. (Switzer, Callahan, & Quinn, 1999, p. 3)

The Pappas and Tepe model, described below, allows one not only to look at individual students and how contemporary technology influences them, but also to view them as a coherent part of the TFQE model.

Appreciation

According to the Pathways Model (Pappas & Tepe, 1997), appreciation is the first stage of information processing. Appreciation may take place through firsthand experience or through various media--print, visual media such as film or paintings, audio media such as recordings, etc. "Appreciation often fosters curiosity and imagination that can be a prelude to a discovery phase in an information seeking activity. As learners proceed through the stages of information seeking their appreciation grows and matures throughout the process." A learner may not always engage in the appreciation stage, but it can greatly enhance stages of the process.

Presearch

During the presearch stage learners make a connection between what they want to know and what they already know. Through exploratory searching, learners develop a broad overview of their topic as well as a general understanding of the relationships among subtopics. "Presearch provides searchers with strategies to narrow their focus and develop specific questions or define information needs" (Pappas & Tepe, 1997).

Search

The search stage is comprised of identifying suitable information sources, developing a search plan, and carrying it out (Pappas & Tepe, 1997).

Interpretation

In the interpretation stage, learners assess and reflect on the data they have collected. Instructional activities or units must first be designed to require students to engage in critical thinking or problem solving. If critical thinking is not a part of the learning plan, there is no need to interpret information and searchers are stuck at the knowledge level of learning (Pappas & Tepe, 1997).

Communication

This stage permits learners to organize and present their findings in an appropriate format. Pappas and Tepe (1997) recommend that teachers and school library media specialists allow learners to select the appropriate communication format rather than specifying the format. This process, they believe, will enable learners to become more critical viewers and users of multiple information formats.

Evaluation

Evaluation is an integral part of every stage of information processing. By continuously evaluating and revising, learners develop and improve their information-seeking techniques (Pappas & Tepe, 1997).

Content Standards

In recent years, content standards have been developed for almost all of the discipline areas, either by teams representing the disciplines or by agencies in various states. These content standards serve as a third dimension of our model (Switzer et al., 1999). Typical content areas include the arts; foreign language/ ESL; health/ P.E.; language arts; math; social studies; science; career technical education; other areas.

A content standard in education is a statement that can be used to judge the quality of curriculum content or as part of a method of evaluation. Content standards articulate an essential core of knowledge and skills that students should master. Standards clarify what students are expected to know and be able to do at various points in their K-12 academic career.

As content knowledge continues its unparalleled growth and as students continue to change, the standards must grow and change with them. Clearly, technology provides a means to manage, update, and distribute standards in a timely and useful fashion. Moreover, technology will enable us to accommodate for the wide variance in student ability and interest. We must be able to quickly and easily select appropriate content for students in both a horizontal (within a given level of knowledge and skill) and a vertical (across levels of knowledge and skills) fashion.

Tenets of Effective Citizenship in a Democratic Society

As we integrate the tenets of democracy into a coherent picture of a robust learning environment, we find similarities between what we know about good classrooms and what we know about democracy. The context in which these tenets will be applied in the future is rich in technology applications. And it is technology that can vividly portray the need for such skills and understandings, as we consider these five tenets: tolerance; critical thinking and decision making; thinking together and making meaning; power sharing and empowerment; individual responsibility and civil involvement with others

Tolerance

Tolerance is defined as the capacity for or the practice of recognizing and respecting the beliefs or practices of others (The American Heritage Dictionary, 1982) or "sympathy or indulgence for beliefs or practices differing from or conflicting with one's own; the act of allowing something" (Webster's Ninth New Collegiate Dictionary, 1991).

The following steps can help individuals develop tolerance:

1. Learning about the background of another individual by asking that individual to tell his/her story
2. Listening without making judgments
3. Asking questions to be sure of one's understanding, comparing one's own belief system to the other individual's belief system
4. Identifying similarities and differences between the belief systems
5. Evaluating the differences
6. Determining through advocacy and inquiry if one belief or the other is open to change
7. Testing the legality and ethics of both positions

Critical Thinking and Decision Making

Widely agreed to be an important goal of education, critical thinking is closely associated with goals such as rationality, autonomy, and perhaps, creativity and intelligence. People who think critically proceed on the basis of careful evaluation of the premises and evidence and come to conclusions as objectively as possible by considering all pertinent factors and using valid logical procedures (Good, 1973). Siegel (as cited in Husen & Postlethwaite, 1994) proposed a justification of critical thinking in education in the following terms:

- a) the ideal of respect for others requires respect for a student's right to question, to seek reasons, explanations, and justification;
- b) critical thinking is necessary to develop a student's independent judgment required for self-sufficiency in adulthood;
- c) critical thinking fosters in students these previously stated (a. and b.) dispositions, attitudes, and skills; and
- d) critical thinking is central to the kind of intelligent judgment required by citizens in a democracy (pp. 1206-1207)

Citizens must gather necessary information to think critically. To do this, they must use inquiry skills (observation, description, comparison, identification, etc.). They must also think logically to use critical thinking, avoiding common problems in logic such as getting personal, making false comparisons, saying things everyone will like, arguing in circles, etc. (Callahan, 1998).

Students then must decide on the reliability of the information that they use as evidence to support their positions on complex social problems. From competing claims to truth, they must decide what to believe. They must learn to distinguish claims to truth that have validity from those that do not.

Decision making in a democracy is a process of reaching agreement in group situations through dialogue, discussion, debate, and analysis. In an open and dynamic society, individual citizens are privileged to play the deciding role in its governance. Citizens in a democracy make a host of decisions that affect their own welfare as well as the welfare of others. Common mistakes are made when simple rubrics (standard operating procedures, old sayings, using similar situations, etc.) are used to make complex decisions (Callahan, 1998). These problems get in the way when we try to tell ourselves the truth about the things we are doing and the decisions we are making. Citizens need to recognize these problems and be prepared to deal with them.

Thinking Together and Making Meaning

Citizens must decide how to deal with complex social problems: how to define the problem, what values should be pursued, what public policies should be supported, what candidates should be elected to office, what actions should be taken with respect to social concerns (Engle & Ochoa, 1988, p. 61). They can be assisted in doing this by the following actions:

- Dialoging about the situation with others
- Checking to see if they have enough of the right information and if there is any bias in their thinking
- Relating the situation to their personal beliefs to assure value and personal appreciation
- Using emotions to indicate importance, but not as the only basis of behavior,
- Differentiating between the problem and the possible solutions (separating means from ends)
- Thinking of different ways to proceed
- Analyzing collaboratively different ways to proceed, deciding which ways are the best and what should be done next (Callahan, 1998)

Power Sharing and Empowerment

Education for power sharing and empowerment aims to provide young people with the understanding, abilities, and commitments with which they can identify and act upon their interests. Empowerment is "the opportunity and means to effectively participate and share authority" (Bastian, Fruchter, Gittell, Greer, & Haskins, as cited in Simon, 1987, p. 374). A pedagogy of empowerment is important in valuing and legitimizing the expression of student voice. "It recognizes that a student voice is a discourse that constitutes a necessary logic of identity--a cultural logic that anchors subjectivity" (Bastian et al., as cited in Simon, 1987, p. 377).

Empowerment can lead to rapid intellectual growth (Hill, 2000). Intellectual growth in the form of increased awareness, understanding, and ability to deal with complexity, uncertainty, and ambiguity is more likely to occur, and to occur rapidly, in contexts that allow students to experience powerful emotional and intellectual challenges within a supportive context. These contexts must also allow students to engage in a continuing cycle in which meaningful practice is built upon theory and is reflected upon with peers and tutors within a critical framework. In such contexts, the combination of support and challenge is more likely to foster the conditions for conceptual change, leading to a valuing of the new ideas and manifested in improved practice (Hill, 2000, p. 61).

Individual Responsibility and Civil Involvement with Others

Another key ingredient in this process is responsibility: the state or fact of being responsible for something or somebody, for doing something. Responsibility can encompass the following:

- having the job or duty of doing something or caring for somebody/something so that you may be blamed if something goes wrong;
- being capable of being trusted, reliable, and sensible (Oxford, 1996);
- being liable in a legal sense for the normal legal consequences of the action;
- being morally responsible for what you do which could result in praise or blame, whichever is appropriate to the action in question; and
- being responsible for your actions through your ability to control what you do, being held to legal consequences or to moral blame. (Hart, 1967, p. 19)

Individual responsibility and civil involvement with others are traits that grow with the opportunities in a democracy to share mutual tasks for the orderliness and welfare of the group as well as for personal independence (Good, 1973). Individual, or personal, responsibility implies a sensitivity to group needs and group problems. Someone with personal responsibility calls the group's attention to conditions and situations detrimental to group welfare. That person may propose changes in group procedures that promote the best interests of the group. Individual responsibility is a conscious and voluntary obedience to all procedures the group adopts that represent group attempts to solve group problems. "It is not passive submission to group demands prompted by a desire to escape group displeasure; it is rather active participation prompted by a desire to aid in promoting the best interests of the group" (Hollingshead, 1941, pp. 43-44).

Teacher Knowledge and Behavior

To be effective teachers must not only be knowledgeable about the content area. They must also have the skills and abilities to communicate that knowledge, which necessitates an understanding of student characteristics, pedagogy, and classroom management.

Student Characteristics

Research has revealed the importance of adjusting learning activities to the learner. The closer the match between students' learning styles and their teachers' teaching styles, the higher the grade point average (Dunn, Griggs, Olson, Gorman, & Beasley, 1995). According to Dunn and Griggs' (1995) Learning Style Model, students are affected by five main factors:

1. Their immediate environment (sound, light, temperature and furniture/setting design)
2. Their own emotionality (motivation, persistence, responsibility, or the opportunity to do things in their own way)
3. Their sociological preferences (learning alone or in different-sized groups)
4. Their physiological characteristics (perceptual strengths represented by auditory visual, actual, kinesthetic, and sequenced characteristics)
5. Their processing inclination (global/analytical, right/left, impulsive/reflective)

Accommodating instruction to these styles is much easier with the rich resources available through various technologies. Practitioners throughout the United States have reported statistically higher test scores or grade point averages for students who changed from traditional teaching to learning-style teaching at all levels--elementary, secondary, and college. For instance, the Frontier, NY, school district's special education high school program applied the Learning Style Model. After the first year (1987-1988), the percentage of successful students increased to 66 %. During the second year (1988-1989), 91% of the district's population was successful; in the third year (1989-1990) the results remained constant at 90% (Brunner & Majewski, 1990).

Finally, a U.S. Department of Education four-year investigation that included on-site visits, interviews, observations, and examinations of national test data concluded that attending to learning styles was one of the few strategies that had a positive impact on the achievement of special education students throughout the nation (Alberg, Cook, Fiore, Friend, & Sano, 1992).

In-Depth Content Knowledge

To teach all students according to today's standards, teachers need to understand subject matter deeply and flexibly so they can help students create useful cognitive maps, relate one idea to another, and address misconceptions. Teachers need to see how ideas connect across fields and to everyday life and then assist their students in seeing these connections. This kind of understanding provides a foundation for pedagogical content knowledge that enables teachers to make ideas accessible to others (Shulman, 1987).

Shulman (1986) introduced the phrase pedagogical content knowledge and sparked a new wave of scholarly articles on teachers' knowledge of their subject matter and the importance of this knowledge for successful teaching. In Shulman's theoretical framework, teachers need to master two types of knowledge: (a) content, also known as "deep" knowledge of the subject itself and (b) knowledge of curricular development. Content knowledge encompasses what Bruner (as cited in Shulman, 1992) called the "structure of knowledge" --the theories, principles, and concepts of a particular discipline. Especially important is content knowledge that deals with the child and with the teaching process, including the most useful forms of representing and communicating content and how students best learn the specific concepts and topics of a subject. "If beginning teachers are to be successful, they must wrestle simultaneously with issues of pedagogical content (or knowledge) as well as general pedagogy (or generic teaching principles)" (Grossman, as cited in Ornstein, Thomas, & Lasley, 2000, p. 508).

A skillful teacher figures out what students know and believe about a topic and how learners are likely to "hook into" new ideas. Teaching in ways that connect with students also requires an understanding of differences that may arise from culture, family experiences, developed intelligences, and approaches to learning. Teachers need to build a foundation of pedagogical learner knowledge (Grimmet & Mackinnon, 1992).

To help all students learn, teachers need several kinds of knowledge about learning. They need to think about what it means to learn different kinds of material for different purposes and how to decide which kinds of learning are most necessary in different contexts. Teachers must be able to identify the strengths and weaknesses of different learners and must have the knowledge to work with students who have specific learning disabilities or needs. Teachers need to know about curriculum resources and technologies to connect their students with sources of information and knowledge that allow them to explore ideas, acquire and synthesize information, and frame and solve problems. And, teachers need to know about collaboration--how to structure interactions among students so that more powerful shared learning can occur; how to collaborate with other teachers; and how to work with parents to learn more about their children and to shape supportive experiences at school and home (Shulman, 1992).

Acquiring this sophisticated knowledge and developing a practice different from what teachers themselves experienced as students requires learning opportunities for teachers that are more powerful than simply reading and talking about new pedagogical ideas (Ball & Cohen, 1996). Teachers learn best by studying, by doing and reflecting, by collaborating with other teachers, by looking closely at students and their work, and by sharing what they see.

Classroom Management

School and classroom management aims at encouraging and establishing student self-control through a process of promoting positive student achievement and behavior. Thus, academic achievement, teacher efficacy, and teacher and student behavior are directly linked with the concept of school and classroom management. Classroom management focuses on three major components: **content management**, **conduct management**, and **covenant management**.

Not surprisingly, a high incidence of classroom disciplinary problems has a significant impact on the effectiveness of teaching and learning. Teachers facing such issues often fail to plan and design appropriate instructional tasks. They also tend to neglect variety in lesson plans and rarely prompt students to discuss or evaluate the materials they are learning. In addition, student comprehension or seatwork is not monitored on a regular basis. In contrast, strong and consistent management and organizational skills have been identified as leading to fewer classroom discipline problems. In this light, content management "does not refer to skills peculiar to teaching a particular subject but rather to those skills that cut across subjects and activities" (Froyen & Iverson, 1999). Doyle (as cited in Froyen & Iverson, 1999) stressed the core of instructional management is **gaining and maintaining student cooperation in learning activities**.

Conduct management is centered on **one's beliefs about the nature of people**. By integrating knowledge about human **diversity** (and **individuality**, at the same time) into a particular instructional philosophy, teachers manage their classrooms in a better, more effective way. Teachers need to assist students in learning and displaying positive behaviors. In planning classroom management, teachers should consider using an assertive communication style and behavior. In addition, they should always know what they want their students to do and involve them in the respective learning activities, under the general conditions of clearly and explicitly stated schoolwide and classroom rules. Iverson and Froyen (1999) describe conduct management as essential to the creation of a foundation for **"an orderly, task-oriented approach to teaching and learning,"** thus leading to granting students greater independence and autonomy through socialization.

Covenant management stresses the **classroom group as a social system**. Teacher and student roles and expectations shape the classroom into an environment conducive to learning. In other words, the culture of any given school is particular. However, it is directly influenced by the culture of the larger community whose educational goals are to be met. A strong connection between school-community is to be constantly revised and modified according to the requirements of societal dynamism. As schools become very diverse, teachers and students should become aware of how to approach and integrate diversity into an effective school/classroom social group.

Pedagogy.

The professional teaching standards represent the teaching profession's consensus on the critical aspects of the art and science of teaching (pedagogy) that characterize accomplished teachers in various fields. Cast in terms of actions that teachers take to advance student outcomes, these standards also incorporate the

essential knowledge, skills, dispositions, and commitments that allow teachers to practice at a high level. The standards rest on a fundamental philosophical foundation comprised of five core propositions:

1. Teachers are committed to their students and their learning.
2. Teachers know the subjects they teach and how to teach those subjects to students.
3. Teachers are responsible for managing and monitoring student learning.
4. Teachers think systematically about their practice and learn from experience.
5. Teachers are members of learning communities.

Effective teachers display skills at creating curriculum designed to build on students' present knowledge and understanding and move them to more sophisticated and in-depth abilities, knowledge, concepts, and performances. They calibrate their responses to students, designing activities to the students' "proximal zone" for learning and development. Teachers employ a range of instructional strategies and resources to match the variety of student skills and to provide each student several ways of exploring important ideas, skills, and concepts. They understand how to work as facilitators, coaches, models, evaluators, managers, and advocates. They know how to utilize various forms of play, different strategies for grouping students, and different types of media and materials. Teachers observe and assess students in the context of ongoing classroom life. They are skilled in collecting and interpreting a variety of types of evidence to evaluate where each student is in a sequence or continuum of learning and development. They know how to move from assessment to decisions about curriculum, social support, and teaching strategies, to increase the prospects for successful learning. Teachers understand and respect the diverse cultures, values, languages, and family backgrounds of their students, use community people and settings as resources for learning, and involve parents and families as active partners in the students' total development.

Technology

Technology is neither hardware nor software. It is a set of powerful tools that the teacher and learner can use to facilitate his/her own learning process. Technology resources can provide opportunities for learning and can create the "conditions that optimize learning" (Switzer et al., 1999). Technology provides the means for the teacher to re-examine the nature of the classroom environment. The teacher is no longer the fount of all knowledge because technology can provide access to sources beyond the classroom and textbooks. The teacher can become the facilitator of learning, incorporating a host of strategies to guide learners. Technology opens the door to the world, allowing learners to access libraries, other learners and experts, and a vast array of resources. Technology-related learning activities can range from operating a computer or other equipment, to understanding ethical issues associated with technology in society, to learning how technology can assist the disabled.

As the model "Technology as Facilitator of Quality Education" implies, technology plays an essential role in facilitating quality education. Technology can be used to develop information-processing skills and dispositions. Databases, simulations, and access to the Internet can provide rich experiences and information as students acquire the skills and knowledge represented by the content standards. Students can also practice the tenets of democracy while engaging in technology-mediated activities (Switzer et al., 1999, p. 8).

To ensure that technology is used to facilitate quality education, its key elements need to be matched with a set of standards for its appropriate uses. The University of Northern Iowa (UNI) Teacher Education Faculty has developed the Preservice Teacher Technology Competencies, which are performance-based competencies modeled on several national standards documents. These include the International Society for Technology in Education (ISTE) Recommended Foundations in Technology for All Teachers, which have been adopted by the National Council for Accreditation of Teacher Education (NCATE); ISTE's National Educational Technology Standards for Students; and the American Association of School Librarians and Association for Educational Communications and Technology Information Literacy Standards for Student Learning. The competencies serve as a taxonomy to guide understanding of this area. They have three sections:

1. Basic technology equipment operations and concepts
2. Technology resources and tools for information literacy
3. Technology resources and tools for content areas

The first section deals with basic operational skills that enable us to use technology to process information and solve problems. In the second section, the focus is on technology tools that are necessary to support information literacy (the ability to gather, analyze, and communicate information) for personal and professional

reasons as well as for instructional purposes. Discipline-specific technology tools are taken up in the third section. For example, mathematics teachers need to know how to integrate the graphing calculator into instruction. The competencies help teachers assess where their strengths and weaknesses lie so that they can then address the weaknesses identified.

Each competency is written with five defined levels of proficiency: (a) pre-novice, (b) novice/awareness, (c) apprentice/professional skill, (d) practitioner/curricular integration, and (e) expert/reflection. In all cases, pre-novice means no experience; novice means minimal experience; apprentice means experience doing something on a personal level; practitioner means experience using these resources to create learning opportunities; and expert means reflection upon the use of these resources to create learning opportunities.

Conclusion

The TFQE model allows us to view the integration of technology as an essential set of tools being used appropriately in a robust educational environment, a democratic setting in which students are at the center of their own learning. Addressing deficiencies in the use of technology in K-12 education using the TFQE model, a consortium of schools have developed the INTIME project (Integrating New Technologies Into the Methods of Education, <http://www.intime.uni.edu/>), funded by a Catalyst grant from the U.S. Department of Education.

The purpose of the three-year project is to provide the necessary resources for methods faculty to revise their courses, model technology integration, and require preservice teachers to integrate technology, along with components of quality education, in their lessons and units. A consortium of five participating universities has come together in this project to create new learning resources and implement new standards for technology integration in preservice teacher preparation. Participating universities from the Renaissance Group, a consortium of universities dedicated to quality in teacher education, include Eastern Michigan University, Emporia State University, Longwood College, Norfolk State University, and Southeast Missouri State University.

Drawing on the TFQE model, this project is intended to produce change in teacher education programs in three ways. First, new learning resources on the Web will be generated to support new teaching and learning processes in education methods courses. These resources will include development of video scenarios of preK-12 teachers effectively integrating technology, along with components of quality education, in a variety of grade levels and content areas. The videos will be stored on a video server already in place at the University of Northern Iowa and made accessible on-line nationwide.

Second, methods faculty will revise their courses to model technology integration using the video scenarios and on-line discussion forum, require students to apply technology, and implement the Preservice Teacher Technology Competencies as exit criteria for their courses. Finally, methods faculty will share strategies for integrating technology and course revisions with other faculty involved in the grant through a variety of activities. Each participating university will ensure that faculty members have access to adequate resources that support the integration of technology into methods courses, providing one-on-one technical support to those faculty members who are revising their courses to integrate technology. Methods faculty members will also participate in faculty development programs to revise their methods courses to incorporate new learning resources and new standards. A professional evaluation team will assess the overall effects of the project on teaching and learning, as new learning resources are developed and implemented, along with new standards, into methods courses.

The Technology as Facilitator of Quality Education model within the context of the INTIME project is intended to provide teachers and instructors of teaching methods classes with a rich resource for integrating technology throughout the school curriculum. It is only through full integration and use throughout the curriculum that the full potential of technology will be realized.

References

- Alberg, J., Cook, L., Fiore, T., Friend, M., & Sano, S. (1992). Educational approaches and options for integrating students with disabilities: A decision tool. Triangle Park, NC: Research Triangle Institute.
- The American Heritage Dictionary. (1982). (2nd College ed.). Boston: Houghton, Mifflin.
- Ball, D. L., & Cohen, D. K. (1996). Reform by the book: What is--or might be--the role of curriculum materials in teacher learning and instructional reform? *Educational Researcher*, 25 (9), 6-8.

- Blythe, T., & Associates (1998). *The teaching for understanding guide*. San Francisco: Jossey-Bass.
- Brunner, C. E., & Majewski, W. S. (1990). Mildly handicapped students can succeed with learning styles. *Educational Leadership*, 48 (2), 21-23.
- Callahan, W. P. (1998). Common mistakes made when we make decisions [On-line]. Available: <http://www.uni.edu/coe/admin/decisionmkg.html> [1999, December]
- Dunn, R., & Griggs, S. A. (1995). *Learning styles: Quiet revolution in American secondary schools*. Westport, CT: Praeger.
- Dunn, R., Griggs, S. A., Olson, J., Gorman, B., & Beasley, M. (1995). A meta-analytical validation of the Dunn and Dunn learning styles model. *Journal of Educational Research*, 88 (6), 353-361.
- Engle, S. H., & Ochoa, A. S. (1988). *Education for democratic citizenship: Decision making in the social studies*. New York: Teachers College Press.
- Ewell, P. T. (1997a, December). Organizing for learning: A new imperative. *AAHE Bulletin*, 3-6 [On-line]. Available: http://www.aahe.org/members_only/bul-dec1.htm [2000, May 17].
- Ewell, P. T. (1997b). Organizing for learning: A Point of Entry [On-line]. Available: http://www.intime.uni.edu/model/learning/learn_summary.html
- Froyen, L. A., & Iverson, A. M. (1999). *School wide and classroom management. The reflective educator-leader* (3rd ed.). Upper Saddle River, NJ: Prentice-Hall.
- Good, C. V. (Ed.). (1973). *Dictionary of education*. New York: McGraw Hill.
- Grimmet, P., & MacKinnon, A. (1992). Craft knowledge and the education of teachers. In G. Grant (Ed.), *Review of research in education 18*. Washington, DC: AERA.
- Hart, H. L. A. (1967). Varieties of responsibility. In J. Glover (Ed.), *Responsibility* (p. 19). New York: Humanities Press.
- Hill, L. (2000). *Journal of Teacher Education*, 51 (1), 53, 61.
- Hollingshead, A. D. (1941). *Guidance in democratic living*. New York: D. Appleton-Century.
- Husen, T., & Postlethwaite, T. N. (Eds.). (1994). *The international encyclopedia of education* (2nd ed.) (Vol. 2, pp. 1206-1207; Vol. 4, pp. 1980-1984). New York: Pergamon.
- Ornstein, A. C., Thomas, J., & Lasley, I. (2000). *Strategies for effective teaching*. New York: McGraw-Hill.
- Oxford advanced learner's dictionary of current English. (1996). Oxford: Oxford University Press.
- Pappas, M. L. & Tepe, A.E. (1997). *Pathways to knowledge* ®: Follett's Information Skills Model (3rd ed.). McHenry, IL: Follett Software [On-line]. Available: <http://www.pathwaysmodel.com> [2000, September 9]
- Shulman, L. (1986, March-April). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 4-14.
- Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57 (1), 1-22.
- Shulman, L. (1992, Sept.-Oct). Ways of seeing, ways of knowing, ways of teaching, ways of learning about teaching. *Journal of Curriculum Studies*, 393-396.
- Simon, R. I. (Ed.). (1987). Empowerment as a pedagogy of possibility. *Language Arts*, 64 (4), 374, 377.
- Switzer, T. J., Callahan, W. P., & Quinn, L. (1999, March). Technology as facilitator of quality education: An unfinished model. Paper presented at Society of Information Technology and Teacher Education, San Antonio.
- Webster's Ninth New Collegiate Dictionary. (1991). Springfield, MA: Merriam Webster.
- Woolfolk, A. (2001). *Educational psychology*. Needham Heights, MA: Allyn & Bacon.
- William Callahan is the Associate Dean of the College of Education at the University of Northern Iowa. He has served as Executive Director of the Renaissance Group and as a professor in the Department of Special Education. As a consultant, he has worked in both the public and private sector improving professional performance and organizational learning.
- Thomas Switzer is a Professor of Curriculum and Instruction and Dean of the College of Education at the University of Northern Iowa. As Dean of the College of Education at UNI, Switzer has served on the Board of Directors for the American Association of Colleges for Teacher Education (AACTE), as President of the Teacher Education Council of State Colleges and Universities (TECSCU), as Chair of the Technology Committee for AACTE, and on numerous state boards and commissions.

APPENDIX 2

This summary was adapted from P.T. Ewell's Organizing for Learning: A Point of Entry, a draft prepared for discussion at the 1997 AAHE Summer Academy at Snowbird National Center for Higher Education Management Systems (NCHEMS) and made available by INTIME at <http://www.intime.uni.edu/model/learning/lear.html>

APPENDIX 2

This summary was adapted from P.T. Ewell's Organizing for Learning: A Point of Entry, a draft prepared for discussion at the 1997 AAHE Summer Academy at Snowbird National Center for Higher Education Management Systems (NCHEMS) and made available by INTIME at <http://www.intime.uni.edu/model/learning/lear.html>

PRINCIPLES OF LEARNING

The latest gains in the field of brain research cast a new light upon the learning process, which impacts curriculum design, teacher preparation, and classroom practices (Bransford, Brown, & Cocking, 1999). The model we have developed to illustrate the Principles of Learning, which we consider to have a significant influence upon knowledge acquisition, skill enhancement and competence development when applied to both classroom settings and communities, has evolved from developments in the study of learning. Knowing how humans learn has helped us design the model we propose, which demonstrates the practical applications of research into educational settings. A variety of research approaches and techniques have been developed that seek to alter the old conceptions about learning and focus on learning with understanding. Herbert Simon, Nobel laureate, stated that the meaning of "knowing" has shifted from being able to stock information and repeat it to being able to critically make use of it. Peter Ewell's article, "Organizing for Learning: A Point of Entry," is consistent with the INTIME vision of effective learning for the following reasons: (a) It brings insights into what is known about how learning occurs and lasts; (b) it shares our belief in the impact of the use of instructional technology; and (c) it suggests ways to change the instructional process with consideration given to the cognitive science and human learning research tradition. Our eight learning components are adapted from Ewell's understandings of the richness and complexity of learning based on the converging evidence from neuroscience, cognitive psychology, and developmental research.

- First and foremost, the student is **Actively Involved** and participates in his or her instruction. Information is not delivered to him or her, rather the student creates it.
- Thus, students have the opportunity to establish, test, and rework **Patterns and Connections** as they "make meaning" out of learning situations.
- Learning does not occur in classroom settings only, nor is it contained within the time frame of a lesson. Learning is **Informal** and it can be acquired anywhere, at any time.
- Because students are actively involved in creating their own patterns and connections and because learning occurs in informal settings, besides the classroom, it is inevitable that we will have misconceptions. **Direct Experience** in a real context is required in order to change or alter these preconceived notions.
- If a learning situation is a **Compelling Situation**, which goes beyond a direct experience in that the situation involves real consequences, then the learning will be more challenging and interesting for the students.
- Ewell stresses the importance of the incentive as well as the corrective role of **Frequent Feedback**, which students should get from instructors and peers throughout the learning process; without opportunity for practice, even well-learned abilities will go away.
- Following the point about frequent feedback, Ewell emphasizes that the feedback will be most effective if it is delivered in an **Enjoyable Setting** that involves personal interactions and a considerable level of personal support.
- Ewell presents **Reflection**, our eighth principle of learning, as a subcomponent of Compelling Situation because as a learner discovers new connections while involved in a compelling situation, Reflection is necessary to reach the point of deeper learning required for this information to be used in future situations. In our model, Reflection becomes one of the primary elements of learning because we feel that through reflection students can take control of their own learning. The practice of reflection enhances self-assessment skills that lead to recognizing what has worked and what needs to be improved. All of this leads to transfer of learning to new settings and for long-term impact (Bransford et al., 1999, ch. 3).

Ewell also included a Readiness to Learn element in his principles of learning, which we feel overlaps all eight elements of Learning in our Model. Therefore, we created a separate component within the center of the Model, Students at the Center of Their Own Learning. Since "readiness to learn" has an implicit impact upon all the other components of learning, it fits within this center circle, upon which all of the learning principles are based.

References:

Bransford, J., Brown, A., & Cocking, R. (1999). How people learn: Brain, mind, experience, and school [Online]. Available: <http://stills.nap.edu/html/howpeople1/> [2000, October 4]

APPENDIX 3

This article was extracted from <http://www.intime.uni.edu/model/teacher/teac2.html#Checklist>

Copyrighted: INTIME 1999-2001

APPENDIX 3

This article was extracted from <http://www.intime.uni.edu/model/teacher/teac2.html#Checklist>

Copyrighted: INTIME 1999-2001

PEDAGOGICAL CONTENT KNOWLEDGE TEACHERS IN-DEPTH CONTENT KNOWLEDGE: DEFINITION & CHECKLIST

Definition

"Pedagogical content knowledge identifies the distinctive bodies of knowledge for teaching. It represents the blending of content and pedagogy into an understanding of how particular topics, problems or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction. Pedagogical content knowledge is the category most likely to distinguish the understanding of the content specialist from that of the pedagogue" (Shulman, 1987, p. 4).

Checklist of Observable Behaviors

- ___ 1. Comprehension: To teach is to understand.
 - ___ Purposes
 - ___ Subject-matter structures
 - ___ Ideas within and outside the discipline
- ___ 2. Transformation: Comprehended ideas must be transformed in some manner if they are to be taught. Transformations require some combinations or ordering of the following processes:
 - ___ Preparation (of the given text material)
 - ___ Representation of the ideas in the form of analogies, metaphors
 - ___ Instructional selections from among an array of teaching methods and models
 - ___ Adaptation to the characteristics of the students
 - ___ Tailoring the adaptations to the specific students in the classroom
- ___ 3. Instruction: The variety of teaching acts includes the following:
 - ___ Management
 - ___ Presentations
 - ___ Interactions
 - ___ Group work
 - ___ Discipline
 - ___ Humor
 - ___ Questioning
 - ___ Discovery and inquiry instruction
- ___ 4. Evaluation: This process ensures that the teacher checks for understanding and misunderstanding during interactive teaching. As a result, the teacher evaluates his or her own performance and makes adjustments for experience.
- ___ 5. Reflection: This process includes a series of steps, including reviewing, reconstructing, reenacting, and critically analyzing one's teaching to improve.
- ___ 6. New comprehensions: The expectation is that through acts of teaching the teacher achieves a new understanding of purposes, subject matter, students, teaching, and self.

Reference

Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. Harvard Educational Review, 57(1), 1-22.

Examples

Comprehension

To teach for understanding, a teacher needs to create a few central goals that are significant for both the teacher and the student. These goals need to be clear, stated explicitly, and posted in the classroom. For instance, a fifth grade teacher starts her lesson about friction, mass, and force by reminding her students what they studied last class to help them understand that they will add more information to their prior knowledge. The teacher tells the students that the first unit discussed was on motion and the second unit was on friction. Before introducing them to the third new unit about force, the teacher checks for students' understanding of the previous units.

Transformation

The same fifth grade science teacher explains to her students the relationship between mass, force, and inertia. To demonstrate those concepts, the teacher provides the students with an analogy that transforms the idea into an example the students can understand. She asks the students to determine if it would take more force to push her or a kindergarten student in a swing. She points out that it is easier to push someone once they are in motion. The teacher then asks the students who would be easier to stop once they were in motion herself or the kindergarten student? She relates their answers to the time it takes large trucks to stop; on a highway compared to compact cars. Because several of the students are school crossing guards, the teacher personalizes her analogy by discussing what they learned in their crossing guard training about the force of different-sized vehicles.

Instruction

For the same lesson, the teacher uses an instructional method that incorporates group work. The students are engaged in cooperative learning in groups of three, in which each of them has to take care of a physical component of an experiment. For instance, while doing the experiment, one student records the mass, the second one the distance, and the third one the force. In this way, the teacher assures interaction between students, peer tutoring, and communication, which definitely increases students learning.

Evaluation

The same teacher uses an ongoing strategy of evaluation and performance assessment. This assessment serves as an instructional tool to help teachers meet students' needs. Using the evaluation form, the teacher continually checks students' understanding of the subject matter.

The evaluation form includes a chart divided into two sections to assess problem solving and communication. The students receive from 0-3 points for their efforts. Here is how the teacher would assess student skills:

<u>Score</u>	<u>Problem solving</u>	<u>Communication</u>
0	Totally misunderstood information	Explanation is not clear
1	Understanding of material not yet at appropriate level	Explanations have some clarity
2	Student understanding of task at appropriate level	Explanations are mostly clear and logical
3	Beyond appropriate level of understanding and analyzing the task	Explanations are logical and appropriate

Reflection

This example shows a student teacher's inner thoughts and reflections on her experiences as a teacher.

My cooperating teacher has the gift of gab. It seems that most of the other excellent teachers I have worked with also have this gift. This gift can be very important in the classroom because it brings learning to the level of the children. Connecting book facts to real life situations empowers kids and helps build true knowledge. Stories or anecdotes relating to the topic of study help bridge the gap between school life and outside of school life. Children begin to see that their daily experiences are important and have connections to what they learn in school.

At this point in my teaching career, I stay right on track and often avoid branching out using stories related to the subject of study. I do include further discussion and exploration of all subjects, but I have never been a storyteller. This is something I suppose I will learn over time. As I have more and more experiences and as I see more and more connections between everyday life and the curriculum I am teaching I hope that I will begin to provide my students with a more personal learning experience through the use of stories which might help them see parallels in their lives and their learning (Naumann, 1997a).

New Comprehension

The following example shows how a teacher acquires new meanings from his teaching experiences to help in his future teaching career.

One of the most valuable lessons I learned is the importance of doing everything one step at a time, slowly. Luckily, I learned this my first day on the job. I was trying to help the fourth graders organize their binders according to classroom policy. I whipped right through my directions and explanations. The kids just didn't get it. It was at this time that I began to realize how the mind of a 9-year-old works so differently from my own 25-year-old mind.

Children can't remember a list of directions. They must have them written down so they can go back and be able to reread them. Often if children are told how to do something, they will be unable to complete the task unless they are shown how to do it.

Quickly, I learned that in order for these children to accomplish just about anything, it was necessary to provide them with very detailed instructions and often step-by-step guidance. It was a revelation for me to realize that these kids don't use their minds to reason things through but rather they wait to be told how to do something. Their world is very black and white. They often can only see one way of doing things, the right way. (Naumann, 1997b)

References

- Naumann, K. (1997a). Student teaching reflection: Real life is the best teacher of book knowledge [On-line].
Naumann, K. (1997b). Student teaching reflection: They look so grown up but they're not [On-line].

APPENDIX 4

This article was reformatted for normal text reading from the web format in <http://www.albion.com/netiquette/rule1.html> extracted from the Virginia Shea's [Netiquette](#) book

APPENDIX 4

This article was reformatted for normal text reading from the web format in <http://www.albion.com/netiquette/rule1.html> extracted from the Virginia Shea's *Netiquette* book



RULE 1: REMEMBER THE HUMAN

The golden rule your parents and your kindergarten teacher taught you was pretty simple: Do unto others as you'd have others do unto you. Imagine how you'd feel if you were in the other person's shoes. Stand up for yourself, but try not to hurt people's feelings.

In cyberspace, we state this in an even more basic manner: Remember the human.

When you communicate electronically, all you see is a computer screen. You don't have the opportunity to use facial expressions, gestures, and tone of voice to communicate your meaning; words -- lonely written words -- are all you've got. And that goes for your correspondent as well.

When you're holding a conversation online -- whether it's an email exchange or a response to a discussion group posting -- it's easy to misinterpret your correspondent's meaning. And it's frighteningly easy to forget that your correspondent is a person with feelings more or less like your own.

It's ironic, really. Computer networks bring people together who'd otherwise never meet. But the impersonality of the medium changes that meeting to something less -- well, less personal. Humans exchanging email often behave the way some people behind the wheel of a car do: They curse at other drivers, make obscene gestures, and generally behave like savages. Most of them would never act that way at work or at home. But the interposition of the machine seems to make it acceptable.

The message of Netiquette is that it's not acceptable. Yes, use your network connections to express yourself freely, explore strange new worlds, and boldly go where you've never gone before. But remember the Prime Directive of Netiquette: Those are real people out there. Would you say it to the person's face? Writer and Macintosh evangelist Guy Kawasaki tells a story about getting email from some fellow he's never met. Online, this fellow tells Guy that he's a bad writer with nothing interesting to say.

Unbelievably rude? Yes, but unfortunately, it happens all the time in cyberspace. Maybe it's the awesome power of being able to send mail directly to a well-known writer like Guy. Maybe it's the fact that you can't see his face crumple in misery as he reads your cruel words. Whatever the reason, it's incredibly common.

Guy proposes a useful test for anything you're about to post or mail: Ask yourself, "Would I say this to the person's face?" If the answer is no, rewrite and reread. Repeat the process till you feel sure that you'd feel as comfortable saying these words to the live person as you do sending them through cyberspace. Of course, it's possible that you'd feel great about saying something extremely rude to the person's face. In that case, Netiquette can't help you. Go get a copy of Miss Manners' Guide to Excruciatingly Correct Behavior.

Another reason not to be offensive online

When you communicate through cyberspace -- via email or on discussion groups -- your words are written. And chances are they're stored somewhere where you have no control over them. In other words, there's a good chance they can come back to haunt you. Never forget the story of famous email user Oliver North. Ollie, you'll remember, was a great devotee of the White House email system, PROFS. He diligently deleted all incriminating notes he sent or received. What he didn't realize was that, somewhere else in the White House, computer room staff were equally diligently backing up the mainframe where his messages were stored. When he went on trial, all those handy backup tapes were readily available as evidence against him.

You don't have to be engaged in criminal activity to want to be careful. Any message you send could be saved or forwarded by its recipient. You have no control over where it goes.

RULE 2: ADHERE TO THE SAME STANDARDS OF BEHAVIOR ONLINE THAT YOU FOLLOW IN REAL LIFE

In real life, most people are fairly law-abiding, either by disposition or because we're afraid of getting caught. In cyberspace, the chances of getting caught sometimes seem slim. And, perhaps because people sometimes forget that there's a human being on the other side of the computer, some people think that a lower standard of ethics or personal behavior is acceptable in cyberspace.

The confusion may be understandable, but these people are mistaken. Standards of behavior may be different in some areas of cyberspace, but they are not lower than in real life.

Be ethical

Don't believe anyone who says, "The only ethics out there are what you can get away with." This is a book about manners, not about ethics. But if you encounter an ethical dilemma in cyberspace, consult the code you follow in real life. Chances are good you'll find the answer.

One more point on Netiquette ethics: If you use shareware, pay for it. Paying for shareware encourages more people to write shareware. The few dollars probably won't mean much to you, and they benefit all of cyberspace in the long run.

Breaking the law is bad Netiquette

If you're tempted to do something that's illegal in cyberspace, chances are it's also bad Netiquette.

Some laws are obscure or complicated enough that it's hard to know how to follow them. And in some cases, we're still establishing how the law applies to cyberspace. Two examples are the laws on privacy (see Rule 8 and "Email Privacy -- a Grand Illusion" on page 125) and copyright (see "Copyright in Cyberspace" on page 133).

Again, this is a book on manners, not a legal manual. But Netiquette mandates that you do your best to act within the laws of society and cyberspace.

RULE 3: KNOW WHERE YOU ARE IN CYBERSPACE

Netiquette varies from domain to domain

What's perfectly acceptable in one area may be dreadfully rude in another. For example, in most TV discussion groups, passing on idle gossip is perfectly permissible. But throwing around unsubstantiated rumors in a journalists' mailing list will make you very unpopular there.

And because Netiquette is different in different places, it's important to know where you are. Thus the next corollary:

Lurk before you leap

When you enter a domain of cyberspace that's new to you, take a look around. Spend a while listening to the chat or reading the archives. Get a sense of how the people who are already there act. Then go ahead and participate.

RULE 4: RESPECT OTHER PEOPLE'S TIME AND BANDWIDTH

It's a cliché that people today seem to have less time than ever before, even though (or perhaps because) we sleep less and have more labor-saving devices than our grandparents did. When you send email or post to a discussion group, you're taking up other people's time (or hoping to). It's your responsibility to ensure that the time they spend reading your posting isn't wasted.

The word "bandwidth" is sometimes used synonymously with time, but it's really a different thing. Bandwidth is the information-carrying capacity of the wires and channels that connect everyone in cyberspace. There's a limit to the amount of data that any piece of wiring can carry at any given moment -- even a state-of-the-art fiber-optic cable. The word "bandwidth" is also sometimes used to refer to the storage capacity of a host system. When you accidentally post the same note to the same newsgroup five times, you are wasting both time (of the people who check all five copies of the posting) and bandwidth (by sending repetitive information over the wires and requiring it to be stored somewhere).

You are not the center of cyberspace

Presumably, this reminder will be superfluous to most readers. But I include it anyway, because when you're working hard on a project and deeply involved in it, it's easy to forget that other people have concerns other than yours. So don't expect instant responses to all your questions, and don't assume that all readers will agree with -- or care about -- your passionate arguments.

Rules for discussion groups

Rule 4 has a number of implications for discussion group users. Most discussion group readers are already spending too much time sitting at the computer; their significant others, families, and roommates are drumming their fingers, wondering when to serve dinner, while those network maniacs are catching up on the latest way to housebreak a puppy or cook zucchini.

And many news-reading programs are slow, so just opening a posted note or article can take a while. Then the reader has to wade through all the header information to get to the meat of the message. No one is pleased when it turns out not to be worth the trouble. See "Netiquette for Discussion Groups" on page 65 for detailed rules.

To whom should messages be directed? (Or why "mailing list" could become a dirty word)

In the old days, people made copies with carbon paper. You could only make about five legible copies. So you thought good and hard about who you wanted to send those five copies to.

Today, it's as easy to copy practically anyone on your mail as it is not to. And we sometimes find ourselves copying people almost out of habit. In general, this is rude. People have less time than ever today, precisely because they have so much information to absorb. Before you copy people on your messages, ask yourself whether they really need to know. If the answer is no, don't waste their time. If the answer is maybe, think twice before you hit the send key.

RULE 5: MAKE YOURSELF LOOK GOOD ONLINE

Take advantage of your anonymity

I don't want to give the impression that the net is a cold, cruel place full of people who just can't wait to insult each other. As in the world at large, most people who communicate online just want to be liked. Networks -- particularly discussion groups -- let you reach out to people you'd otherwise never meet. And none of them can see you. You won't be judged by the color of your skin, eyes, or hair, your weight, your age, or your clothing.

You will, however, be judged by the quality of your writing. For most people who choose to communicate online, this is an advantage; if they didn't enjoy using the written word, they wouldn't be there. So spelling and grammar do count.

If you're spending a lot of time on the net and you're shaky in these areas, it's worth brushing up on them. There are plenty of books available, but you'll learn more -- and possibly have more fun -- if you take a course. If you're an older adult, you don't have to take a "bonehead grammar" course with a bunch of bored teenagers. Instead, look for courses on proofreading and copyediting; they usually cover the basic rules of grammar pretty thoroughly, and they'll be filled with motivated students who are there because they want to be. Check your local community college and university extension catalogs -- you'll be amazed at what they offer. A side benefit is that taking courses involves meeting people you can actually see.

Know what you're talking about and make sense

Pay attention to the content of your writing. Be sure you know what you're talking about -- when you see yourself writing "it's my understanding that" or "I believe it's the case," ask yourself whether you really want to post this note before checking your facts. Bad information propagates like wildfire on the net. And once it's been through two or three iterations, you get the same distortion effect as in the party game "Operator": Whatever you originally said may be unrecognizable. (Of course, you could take this as a reason not to worry about the accuracy of your postings. But you're only responsible for what you post yourself, not for what anyone else does with it.)

In addition, make sure your notes are clear and logical. It's perfectly possible to write a paragraph that contains no errors in grammar or spelling, but still makes no sense whatsoever. This is most likely to happen when you're trying to impress someone by using a lot of long words that you don't really understand yourself. Trust me -- no one worth impressing will be impressed. It's better to keep it simple.

Don't post flame-bait

Finally, be pleasant and polite. Don't use offensive language, and don't be confrontational for the sake of confrontation.

Q. Is swearing acceptable on the net?

Only in those areas where sewage is considered an art form, e.g., the USENET newsgroup alt.tasteless. Usually, if you feel that cursing in some form is required, it's preferable to use amusing euphemisms like "effing" and "sugar." You may also use the classic asterisk filler -- for example, s***. The archness is somehow appropriate to the net, and you avoid offending anyone needlessly. And everyone will know exactly what you mean.

RULE 6: SHARE EXPERT KNOWLEDGE

Finally, after all that negativity, some positive advice.

The strength of cyberspace is in its numbers. The reason asking questions online works is that a lot of knowledgeable people are reading the questions. And if even a few of them offer intelligent answers, the sum total of world knowledge increases. The Internet itself was founded and grew because scientists wanted to share information. Gradually, the rest of us got in on the act.

So do your part. Despite the long lists of no-no's in this book, you do have something to offer. Don't be afraid to share what you know.

It's especially polite to share the results of your questions with others. When you anticipate that you'll get a lot of answers to a question, or when you post a question to a discussion group that you don't visit often, it's customary to request replies by email instead of to the group. When you get all those responses, write up a summary and post it to the discussion group. That way, everyone benefits from the experts who took the time to write to you.

If you're an expert yourself, there's even more you can do. Many people freely post all kinds of resource lists and bibliographies, from lists of online legal resources to lists of popular UNIX books. If you're a leading participant in a discussion group that lacks a FAQ, consider writing one. If you've researched a topic that you think would be of interest to others, write it up and post it. See "Copyright in Cyberspace" on page 133 for a few words on the copyright implications of posting research.

Sharing your knowledge is fun. It's a long-time net tradition. And it makes the world a better place.

RULE 7: HELP KEEP FLAME WARS UNDER CONTROL

"Flaming" is what people do when they express a strongly held opinion without holding back any emotion. It's the kind of message that makes people respond, "Oh come on, tell us how you really feel." Tact is not its objective.

Does Netiquette forbid flaming? Not at all. Flaming is a long-standing network tradition (and Netiquette never messes with tradition). Flames can be lots of fun, both to write and to read. And the recipients of flames sometimes deserve the heat.

But Netiquette does forbid the perpetuation of flame wars -- series of angry letters, most of them from two or three people directed toward each other, that can dominate the tone and destroy the camaraderie of a discussion group. It's unfair to the other members of the group. And while flame wars can initially be amusing, they get boring very quickly to people who aren't involved in them. They're an unfair monopolization of bandwidth.

RULE 8: RESPECT OTHER PEOPLE'S PRIVACY

Of course, you'd never dream of going through your colleagues' desk drawers. So naturally you wouldn't read their email either.

Unfortunately, a lot of people would. This topic actually rates a separate section. For now, here's a cautionary tale. I call it

The case of the snoopy foreign correspondent

In 1993, a highly regarded foreign correspondent in the Moscow bureau of the Los Angeles Times was caught reading his coworkers' email. His colleagues became suspicious when system records showed that someone had logged in to check their email at times when they knew they hadn't been near the computer. So they set up a sting operation. They planted false information in messages from another one of the paper's foreign bureaus. The reporter read the notes and later asked colleagues about the false information. Bingo! As a disciplinary measure, he was immediately reassigned to another position at the paper's Los Angeles bureau.

The moral: Failing to respect other people's privacy is not just bad Netiquette. It could also cost you your job.

RULE 9: DON'T ABUSE YOUR POWER

Some people in cyberspace have more power than others. There are wizards in MUDs (multi-user dungeons), experts in every office, and system administrators in every system.

Knowing more than others, or having more power than they do, does not give you the right to take advantage of them. For example, sysadmins should never read private email.

RULE 10: BE FORGIVING OF OTHER PEOPLE'S MISTAKES

Everyone was a network newbie once. And not everyone has had the benefit of reading this book. So when someone makes a mistake -- whether it's a spelling error or a spelling flame, a stupid question or an unnecessarily long answer -- be kind about it. If it's a minor error, you may not need to say anything. Even if you feel strongly about it, think twice before reacting. Having good manners yourself doesn't give you license to correct everyone else.

If you do decide to inform someone of a mistake, point it out politely, and preferably by private email rather than in public. Give people the benefit of the doubt; assume they just don't know any better. And never be arrogant or self-righteous about it. Just as it's a law of nature that spelling flames always contain spelling errors, notes pointing out Netiquette violations are often examples of poor Netiquette.

APPENDIX 5

THE SEVEN BLOGGING VIRTUES

Notes from the SXSWi 2007 Global Microbrand panel

The Seven Blogging *Virtues* for building a Global Microbrand

Notes from the SXSW1 2007 Global Microbrand panel

Disclaimer

This is not about how you should blog.

It's about one possible path to getting more readers when you're trying to build a Global Microbrand.

You should always blog for **yourself**, but if you want more readers, you should **also** blog for **them**.

"Global Microbrand" is a concept of Hugh MacLeod. To learn more, visit his site: gapingvoid.com

The 7 Virtues

- ☼ **Be Grateful**
- ☼ **Be Humble**
- ☼ **Be Patient**
- ☼ **Be Generous**
- ☼ **Show Respect**
- ☼ **Be Motivating**
- ☼ **Be Brave**

37

Be Grateful



Be Grateful

 **Technorati™**
tracks 55 million blogs

Our readers' time and attention is a gift. Out of all the possible things that our readers could be doing (or reading), the fact that anyone comes to our blog at all is incredible. We must be grateful and try to give something of value in return.



Be Humble

Be Humble

Unless you're one of the rare "cult personalities" on the internet, people aren't reading your blog because of **you**... they're reading it because of what it can do for **them**.

An **All About Me** blog is fine, but not if you want more readers. What we do and think isn't nearly as interesting to potential readers as it is to us.

A little name-dropping is OK, but is knowing that you just had dinner with [insert web celeb] worth your readers' time?

Which would you rather hear in a user's product review?

That product is brilliant!



A. They talk about your **PRODUCT**

That company is brilliant!



B. They talk about your **COMPANY**

Secret Answer C:

I'm brilliant!



Our job is to help make the **reader** brilliant, not to get readers to think **we're** brilliant.

Be Patient



Be Patient

It's not going to happen overnight.

Don't be in a hurry for big numbers...it's better if people discover your blog **after** you've already made a lot of useful, helpful posts. That way, when new readers **DO** come, they'll see that there's a reason to come back... that you're more than just a one-hit wonder.

Be Generous



Be Generous

Give away whatever knowledge you can.
Teach people to do what you do.
Don't hoard your "secret sauce."

Remember, they're giving you a very precious gift of their scarce attention—it's up to you to give something of value in return.

Give them superpowers



Show Respect

Show that you appreciate the value of their time.

Don't post for quantity, post for quality. If you don't have something that you believe is worth the reader's time, think twice about posting.

One example of showing respect: I use graphics in my posts so that readers don't have to take the time to read the whole post... they can get 90% from the graphic.

39

Be Motivating

Sometimes people just want to hear someone else say what they've been thinking (or trying to tell people).

A reader might want to use one of your posts to help make a point with others. ("Outside Expert Syndrome")

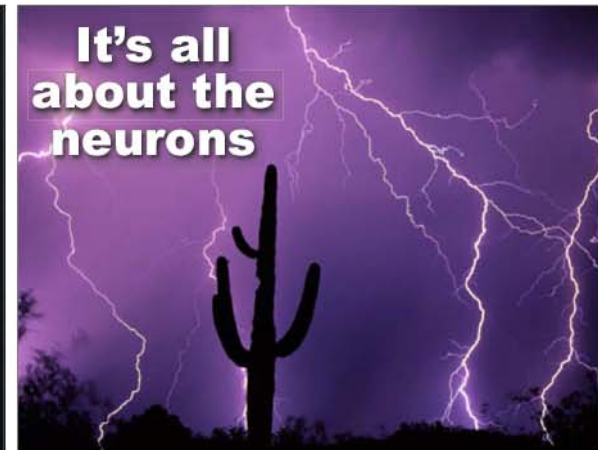
Inspiration and motivation are a gift you can give your readers.

Help light a fire in their brain.



Talk to their
BRAIN not just
their mind.

It's all
about the
neurons





Be Brave

Writing for your readers is not the same thing as writing only what readers want to hear.

If **everyone** loves everything you write, it's probably mediocre.

The more readers you get, the more critics you'll get. Some will have valid points. Others will be frustrated or jealous a**holes with too much time on their hands.

Death by risk aversion



Bottom line:



Don't blog the cat

It's not about YOU.

The good news is... you can do this
without a big (or any) marketing budget.


Out-spend or **Out-teach**



APPENDIX 6

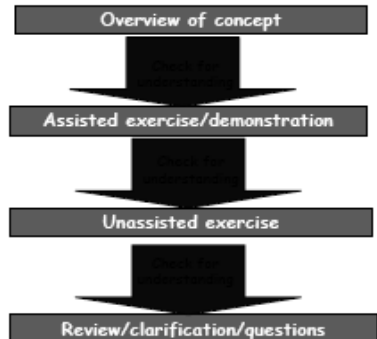
4 Steps to Effective Computer Training Delivery

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY



ROSSINI DIN
ASSOCIATE PROFESSOR DR. MOHAMAD SHANUDIN ZAKARIA
ASSOCIATE PROF. DR. KHAIRUL ANWAR MASTOR
a multidisciplinary presentation in cooperation of
Faculty of Science and Information Technology, Center for General Studies and Faculty of Education,
Universiti Kebangsaan Malaysia

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

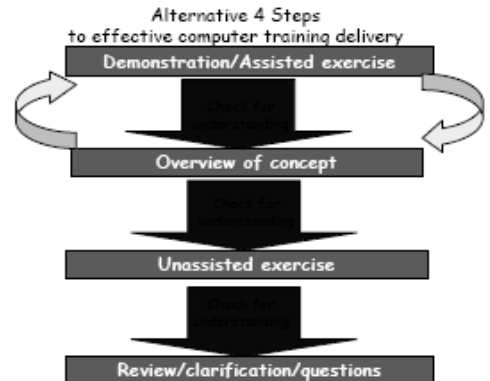


```

graph TD
    A[Overview of concept] --> B[Assisted exercise/demonstration]
    B --> C[Unassisted exercise]
    C --> D[Review/clarification/questions]
  
```

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Alternative 4 Steps to effective computer training delivery



```

graph TD
    A[Alternative 4 Steps to effective computer training delivery] --> B[Overview of concept]
    B --> C[Unassisted exercise]
    C --> D[Review/clarification/questions]
    D --> A
  
```

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Creating A Training Guide

- TEACH IN OUR OWN UNIQUE WAY**
follow sequence of topics from a book or courseware, but use own examples and explanations -> returning to it for exercises and practice sessions
- USE COURSEWARE OR BOOK AS A GUIDE**
all relevant topics are covered in the right order
- CREATE A PRACTICAL TRAINING GUIDE**
Chapter# (pg#)
- main topics/concepts ----- **DATA FILE**
exercises-----pg#
- USE THE TRAINING GUIDE TO WRITE UP A LIST OF OBJECTIVES AS AN APPROACH TO HOLISTIC TEACHING**

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

10 Questions in Planning A Class

1. What are the objectives for the class?
2. What are the core concepts your learners need to understand?
3. What diagrams could help clarify these concepts?

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

10 Questions in Planning A Class

4. What new vocabulary is to be introduces.
5. What are the time frame you plan to spend on each topic, task or lesson?
6. What kind of exercises have you prepared for different levels of learners?

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

10 Questions in Planning A Class

7. Would a cheat-sheet or quick reference for procedures help?
8. Who are the learners, what are their abilities, and what might their concerns be?
9. What instructional media do you have to use?
10. What energizers, quizzes, or learning games could you include?

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Being prepared is half the battle...

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Gesticulate

- 90% of communication is non-verbal
- Hands gesture
- emphasize concept
- painting pictures in the air
- Produce memorable image
- Assist verbal explanation

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Teaching with visual aids

- Graphical user interfaces (GUIs): people response better to pictures, symbols and icons than words.
- why do we insist to use words to teach these software?
- use visual ways such as a simple diagram to explain concept
 - easier to grasp
 - much more memorable

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Whiteboard - Courseware

- Legible and easy to read handwriting/font
- Simple
 - points x wordy
 - most important features x details
- Organized
 - courseware have consistent headings, subheadings, diagrams and captions
 - whiteboard have a place for name of a topic, step-b-step procedural steps, shortcut keys, new vocabulary, things to cover later
- Consistent

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Varying Presentation

OHP/PPT, demos & assisted exercises

Maximum hands-on; exercises & worksheets

OHP/PPT, flip chart, practice exercises (1-1 help)

↓

develop creativity
increase enthusiasm
an extra training edge

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Verbalize Concepts

The diagram shows a large downward arrow pointing to a box labeled 'review'. From the 'review' box, a downward arrow points to another box labeled 'Discovering gaps in understanding → Generate participation'. Two curved arrows on the left and right sides of the 'review' box point back to the top of the 'review' box, indicating a feedback loop.

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Linking

- children assimilate new ideas quickly
- adult; relevance & usefulness

New information must fit into a structured pattern if it is to be successfully remembered. Perhaps the most important contribution the teacher can make is to select, organize, present and translate the new material in such a way that the learner can appreciate its relationship with ideas he already has clearly established in his memory

Lowell on Adult Learning

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Picture, patterns & structure

Overall structure/Mental image/Big picture (+new vocabulary+)

The diagram shows two boxes. The left box is labeled 'Copy' and contains 'Discovering gaps in understanding' and 'Generate participation'. The right box is labeled 'Paste' and contains 'Adult learning', 'Discovering gaps in understanding', and 'Andragogy vs Pedagogy'. A 'Clipboard' box is positioned between them, with curved arrows pointing from the left box to the clipboard and from the clipboard to the right box.

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Picture, patterns & structure

Overall structure/Mental image/Big picture (+new vocabulary+)

- emphasize concept
- painting pictures in the air
- Produce memorable image
- Assist verbal explanation

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Four Steps to Learning Computer Literacy

The flowchart consists of four rectangular boxes stacked vertically, connected by downward-pointing arrows. The boxes are: 'Perceiving an image or pattern of information', 'Gaining a conceptual understanding', 'Carrying out the procedures', and 'Review & clarification'. On the left and right sides of the flowchart, there are curved arrows pointing upwards, indicating a feedback loop from later steps back to earlier ones.

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Incremental vs Linear

- Sequential Training (cover all the basic topics → put everything together and assess students understanding through guided/non-guided exercises)
 - Computer books and documentation
 - Handouts on software application
- Web-based tutorial/Hypermedia courseware
- Driving course
- Face to face HTML tags → building a web page

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Using Analogies

- include on the right side of your training guide/ cheat sheet for each concept to be covered
- make up on the spot based on learner's background
- guidelines:
 1. as visual as possible: see/visualize → remember easily
 2. Relate to most people's experiences
 3. Simple and clear
 4. A little bizarre and unusual

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Multi-sensory

- use more visual images
 - data displays, overheads, ppt, pictures on the whiteboard and courseware, wall posters and gesticulations
- use more kinesthetic work
 - moving the mouse, typing on the keyboard, writing shortcuts and drawing diagrams
- put some emphasis and emotion into words for energy, passion, enthusiasm and vigor to multiply its effectiveness

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Training Delivery: Mind Breaks

- Recall vs. Time w/o breaks and Recall vs. Time with 5 min breaks
- A change of focus :-
 - Do nothing for the next 5 minutes
 - Pair work/ learner-learner interaction or try an exercise
 - Tell them a humorous story
 - Ask how the discussion relates to their work
 - Kinesiology exercises - Cross crawl & Cook's Hookup

Table 1: Hemispheric Differences

Logic (Left)	Gestalt (Right)
Sees the pieces first	Sees whole picture first
Parts of language	Language comprehension
Syntax, semantics	Image, emotion, meaning
Letters, sentences	Rhythm, flow, dialect
Numbers	Image, intuition
Analysis - linear	Intuition - estimates
Looks at differences	Looks at similarities
Controls feelings	Free with feelings
Planned, structured	Spontaneous, fluid
Sequential thinking	Simultaneous thinking
Language-oriented	Feelings, experience-oriented
Future-oriented	Now-oriented
Technique	Flow and movement
Sports (eye, hand, foot placement)	Sports (flow and rhythm)
Art (media, tool use, how to)	Art (image, emotion, flow)
Music (notes, beat, tempo)	Music (passion, rhythm, image)

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

6 Courseware Types

1. Reference Manuals

Comprehensive and detailed covering most of the function in a standard courseware

Not advised for an instructor-led-training use

An important resource for a learner

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

6 Courseware & Documentation Types

2. Teach Yourself Books

Structured, step-by-step approach to learning basics.

May be used for an instructor-led-training use

Published by software companies

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

6 Courseware Types

3. Classroom courseware

Covers specific topics, tasks, and features, and usually divided into levels or modules

Written with class objectives and time constraint in mind

Includes practice exercise and scenarios

May be used for self-teaching manual

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

6 Courseware Types

4. Handouts

Include anything that focuses on a specific task, topic or feature.

Can be used to teach or illustrate a particular area

Used as a supplement or to teach a class that highlights only one or two topics

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

6 Courseware Types

5. Job aids

Simple memory aids with shortcuts, reminders or procedures

design to help users get the job done

cheat sheet

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

6 Courseware Types

6. Online Documentation

Internet accessed

prevalent for high volume of learning and training

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

11 Questions in Choosing a Courseware

1. What function must the courseware serve?
2. Is the courseware to be used in a classroom, as a reference, or in a self-study environment?
3. How experienced are the users - what level of detail is required? If they are very familiar with the computer environment they are currently using, they might not need courseware that gives directions like, "...and then press Enter."

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

11 Questions in Choosing a Courseware

4. Should the courseware be more procedural or conceptual? Do you need to concentrate on users understanding the "big picture," or do you want to focus on specific procedural steps?
5. Does the courseware cover all the topics you need to teach?
6. Do you need to be able to customize your courseware?

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

11 Questions in Choosing a Courseware

7. Do your users have some preference? Perform a need analysis &/ courseware evaluation.
8. Does the courseware includes relevant examples and exercises?
9. Are there enough hands-on exercises and examples? Are these relevant to their experiences?

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

11 Questions in Choosing a Courseware

10. Is the courseware well-designed and easy to read?
11. Is it well-produced? Is information easy to locate? Does it has lots of white space, screen shots and diagrams? Does it have an index and table of contents?

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

Don't let courseware dominate your training!

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

Designing effective exercise

A critical part of a computer training class is the unassisted exercise, when the learner is asked to complete a task without explicit directions from trainer. This is done from the courseware or a questionsheet.

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

Designing effective exercise

The purpose is to see if learners can carry out the necessary procedures without direct assistance.

It gives the learner opportunity to practice Skills and clear up any confusion.

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

Designing effective exercise

The exercises should be designed to test understanding and application, not simply remembering keystrokes, mouse clicks or directions.

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

Designing effective exercise

Sample exercise #1:

1. Click on file and then open.
2. Choose ariff.doc from the list of files and click ok.
3. Press <ctrl><end> to go back to the end of the document

Sample exercise #2:

1. Open the file ariff.doc.
2. Move to the end of the document.

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

Designing effective exercise

If exercises from the courseware and documentation are the step by step type, create some new ones to encourage learners to think, look at their notes, use the HELP menu and use other resources available, before helping them.

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

Designing effective exercise

Choose questions that are relevant to the learners experiences.

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

Guidelines for creating your own courseware

Schedule enough time.

It is not something you do in your spare time
It needs plan, design, test and rewriting

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

Guidelines for creating your own courseware

Keep it consistent.

Use a template for heading, subheading, caption and practice exercises

Choose only two fonts and not more than 3 colors

Have a consistent convention to show typed entries, functions keys, or menu commands.

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

4 steps to effective teaching

Training Guide

Planning

Training Delivery

Courseware and documentation

Designing effective exercises

Guidelines for creating your own courseware

Use diagrams and screen shots.

Learner wants to see what happens
NOT read an explanation of what happens.

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Guidelines for creating your own courseware

Use white space.

- Large margin on the left-hand page for notes
- enough blank spaces in between explanations to make it look interesting and inviting.

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Guidelines for creating your own courseware

Right amount of details.

Rewrite the following:

1. Click File, then Page setup
2. Click the Margin tab
3. Change the left margin to 1.5"

To simply:

Change the left margin to 1.5"

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Guidelines for creating your own courseware

State the objectives for each module.

To give the learners a quick overview of what information to be covered and what skills they might expect to learn

Also useful for instructors to review what is going to be covered

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Guidelines for creating your own courseware

"3 times Rule"

Tell them what you are about to tell them.

Tell them.

Tell them what you've told them.

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Guidelines for creating your own courseware

Explain concepts.

"Big picture"

Procedural steps are not that useful unless the underlying concepts are understood.

Use diagrams if at all possible.

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

4 STEPS TO EFFECTIVE COMPUTER TRAINING DELIVERY

Guidelines for creating your own courseware

- Show procedures clearly
- Provide appropriate exercises for diverse learners
- Include a quick reference (cheat sheet)
- Include a glossary for terms and vocabulary
- Include a table of contents and index
- Add headers and footers
- Use spiral binding
- Consider adding appendices
- Fine tune and start doing needed maintenance

4 steps to effective teaching
Training Guide
Planning
Training Delivery
Courseware and documentation
Designing effective exercises

APPENDIX 7

Kanuka, H. (2005). An exploration into facilitating higher levels of learning in a text-based internet learning environment using diverse instructional strategies. *Journal of Computer-Mediated Communication*, 10(3), article 8.
<http://jcmc.indiana.edu/vol10/issue3/kanuka.html>

APPENDIX 7

Kanuka, H. (2005). An exploration into facilitating higher levels of learning in a text-based internet learning environment using diverse instructional strategies. *Journal of Computer-Mediated Communication*, 10(3), article 8. <http://jcmc.indiana.edu/vol10/issue3/kanuka.html>

An Exploration into Facilitating Higher Levels of Learning in a Text-Based Internet Learning Environment Using Diverse Instructional Strategies

Heather Kanuka

Centre for Distance Education, Athabasca University

Abstract

The purpose of this action-research study was to explore how well various instructional strategies translate to a text-based Internet learning environment and facilitate higher levels of learning. The participants were 19 adult learners enrolled in an online degree program at a Western Canadian research university. The results of the study provide support for the position that text-based Internet communication technologies can facilitate effective learning environments through the use of certain instructional strategies, resulting in the ability to facilitate higher levels of learning. The outcomes may be useful to those involved in the design and/or instruction of online learning in postsecondary settings.

The Problem

For more than a decade, institutions of higher education have been exploring ways to improve teaching and learning practices through creative and innovative uses of Internet technology. By and large, reasons for past and present explorations stem from a persistent belief that Internet information and communication tools are effective at removing geographical and situational learning barriers, provide opportunities for increased interaction between and among instructors and learners, and can increase the quality of learning experiences (Bates, 1995, 1997; Garrison & Anderson, 2003; McGreal, 1998). There is evidence that these perceptions are growing as Internet technology becomes more pervasive and transparent. For example, a survey conducted by McGraw-Hill Ryerson (see Saundercook & Cooper, 2003), completed by 1177 Canadian and 975 American faculty members, revealed that 57% of the survey participants believe that web-based technology has a positive impact on content, course delivery, and student learning. This percentage is up from 22% in 1999. The survey participants further expressed that the use of Internet technology is effective at achieving greater student participation and greater student interest: "over a third of 'extremely or very satisfied' faculty say they are so because their students are satisfied" (Saundercook & Cooper, 2003, p. iii). Of particular significance are the findings on higher levels of learning, which reveal the faculty members' perception that "web-based technology allows the opportunity to ♦ improve critical thinking"—the *sine qua non* of higher education (Saundercook & Cooper, 2003, pp. 17-18).

Concurrent with the results of the McGraw-Hill Ryerson survey, related literature has suggested that web-based learning can transform learning experiences in positive ways, increasing the quality of the learning experiences with respect to the development of higher order thinking skills (Garrison & Anderson, 2003; Heckman & Annabi, 2005; McKnight, 2001). Other positive views presented in the literature have included the opinion that text-based Internet communication tools facilitate the development of argument formation capabilities, increased written communication skills, greater complex problem solving abilities, and increased opportunities for reflective deliberation (Abrami & Bures, 1996; Garrison, Anderson, & Archer, 2001; Hawkes, 2001; Winkelmann, 1995). Underpinning these beliefs is the assumption that asynchronous text-based Internet communication technology, by its very nature, can facilitate higher levels of learning (i.e., critical and creative thinking skills). For example, Lapadat (2002) argues that with asynchronous text-based Internet technology, learners have the means to carefully compose their ideas and thoughts into a written form of communication. This, according to Garrison and Anderson (2003; see also Harasim, 1993)—in combination with the time-lag inherent in asynchronous communication—provides learners with opportunities for critical reflection, which is necessary for higher ordered learning.

In an effort to legitimize these claims, research has been conducted on the effectiveness of learning in the online classroom. However, there is as yet no consistent and reliable body of knowledge indicating that higher levels of learning are an outcome of the use of Internet technology—nor many details as to what works, why, in what ways, and under what conditions (Naidu, Cunnington, & Jansen, 2002). Perhaps the only consistent finding is that deep and meaningful learning is not easily achieved in the online classroom (e.g., Garrison et al., 2001; Gunawardena, Lowe, & Anderson, 1997; Kanuka & Anderson, 1998). Even if it is shown that Internet technology can bring about higher levels of learning (e.g., Klemm & Snell, 1996), much remains to be understood about implementing online learning activities to facilitate the development of a meaningful educational experience (Kanuka & Garrison, 2004). As Murphy (2004) notes, "there remains an imperative to determine whether or not these potential benefits are actually being realized" (p. 6).

The survey conducted by McGraw-Hill Ryerson (Saundercook & Cooper, 2003) provides empirical evidence of this problem. Specifically, while more than half of those surveyed perceive web-based technology to be capable of facilitating

critical thinking, survey participants also expressed that they "still need considerable support for more advanced uses such as creating online learning activities that encourage critical thinking and students' engagement with course content" (p. 12). Of those surveyed, only 1% indicated they are able to use web resources to help improve critical thinking. Moreover, the survey respondents ranked "promoting critical thinking" as the number one area where support is required. At present, then, achieving higher levels of learning (i.e., critical thinking, problem-solving skills and knowledge construction) remains an elusive goal within text-based Internet learning environments (Laurillard, 2002).

Yet in spite of the evidence that higher levels of learning are difficult to achieve in the online classroom, interest in its use in higher education continues to grow. Given the expanding interest and demand for online learning, there is a critical need to advance our understanding of how to facilitate effective online learning activities.

Background to the Study and Guiding Theoretical Framework

Prior research has revealed that the application of educational technology theory to the design and delivery of online learning plays a critical role in facilitating higher levels of learning (Kanuka, 2002a). A key finding in this prior research is that online group conversations/discussions, in and of themselves, tend not to be effective at facilitating higher levels of learning. Similarly, a qualitative discourse analysis by Pawan, Paulus, Yalcin, and Chang (2003) concluded that "discussions do not automatically become interactive and collaborative simply by virtue of being an anytime/anywhere asynchronous medium" (p. 137). An explanation for this lack of effectiveness is that group discussions often keep both instructors and learners in their comfort zones, resulting in a trivialized (e.g., sharing, comparing, and agreeing) group conversation (Garrison & Kanuka, 2004; Gunawardena et al., 1997; Kanuka, 2002b; Kanuka & Anderson, 1998; Klemm & Snell, 1996).

A problem with asynchronous text-based discussion was first observed by Henri (1992) over a decade ago, and was explained as an inability to deal with the abundance of information or to interpret the elements of meaning that have significance within the learning process. Building on Henri's work, Gunawardena et al. (1997) observed similar problems. Their explanation was that the use of the Internet has surpassed the development of theory on which to base such uses. More recent investigations continue to reveal the pressing need for further research in understanding how to facilitate effective online learning environments (e.g., Murphy, 2004; Pawan et al., 2003). In particular, research has indicated a need for students to ground their academic knowledge in meaningful practice, and to do so in diverse ways from diverse perspectives (e.g., Jonassen, 1997, 2000). Diverse ways of learning, in turn, can be effectively facilitated by using diverse instructional strategies.

Instructional strategies are deliberate, planned goal-oriented learning activities that can be used to move learners from low levels of learning (e.g., rote learning or memorization of data and facts) to higher levels of learning (e.g., understanding of complex and abstracted phenomenon through critical and creative thinking skills). Instructional strategies are effective at facilitating higher levels of learning because they actively involve learners in ways that force them to use diverse ways of thinking and learning. As Clark's seminal article (1983; see also Clark, 1994) notes, it is the quality of the instructional design that creates the conditions that can facilitate effective learning environments. There is evidence to suggest that students who use active and diverse learning strategies are more likely to acquire a sophisticated level of understanding than students who do not use such strategies (Williams, 2002).

The literature has maintained that many instructional methods effectively translate to text-based Internet environments, and in some cases, are even more effective online than face-to-face (Collette, Kanuka, Blanchette, & Goodale, 1999; Hiltz & Turoff, 1987; Paulsen, 1995). Prior research by the author of this article also explored issues of how, when, why, and in what ways to use diverse instructional strategies effectively in the online classroom. The outcome of this prior research was the development of an empirically validated framework comprised of principles to guide the design of web-based learning. Using the Delphi Technique, this prior study asked a panel of experts (26 scholars from across North America who are practitioners and researchers of web-based instruction) to identify constructs which they believe are necessary to use in order to facilitate higher levels of learning in web-based distance delivered learning environments (Kanuka, 2002a). A follow-up question to this same panel of experts asked them to identify specific activities (i.e., instructional strategies) that they believe could support the guiding principles they had identified (Kanuka, 2002b). Table 1 summarizes the results of these studies.

Principle	Instructional Strategies
Engagement with abstracted phenomena. Higher levels of learning involve active and purposeful engagement with complex abstracted Phenomena.	Case study; Role plays; Semantic webbing; Concept webbing
Multiplicity of perspectives. Higher levels of learning include diverse and/or multiple perspectives about the issues(s) or problems(s) presented.	Debates; Guided hypertext with annotations; Multiple information sources; Sequenced content databases
Relatedness. Higher levels of learning involve phenomena that have relevance to the learners.	Press conference / debate with invited expert; Online case histories with raw data

Learning methods. Higher levels of learning include diverse ways of knowing.

Open-ended questioning; WebQuest
Problem-based learning; Delphi or nominal group technique

Responsibility. Higher levels of learning require learners to assume greater responsibility in the learning process.

Group cooperative projects; Active self assessment rubrics & presentations

Meaning making. Higher levels of learning require learners to build meaning into the issues and problems presented.

Antithetical questions; Scaffold discussion; Reflective question posing

Reconstruction. Higher levels of learning require learners to understand that their own world view is not the only one (or necessarily the correct one).

Role reversal questions; Brainstorming
Heterogeneous groupings

Table 1. Principles of teaching and learning (adapted from Kanuka, 2002a, 2002b)

While these previous studies provide a useful heuristic for facilitating higher levels of learning, further exploration is needed to establish whether or not the suggested instructional strategies can, first, be facilitated effectively with text-based Internet communication tools and, second, whether these diverse instructional strategies are in fact capable of facilitating higher levels of learning in postsecondary settings.

Experimenting with diverse instructional strategies can be problematic in higher education settings, however, as teaching and learning can be high-risk activities for both instructors and learners. For instructors, unsuccessful exploration may negatively impact teaching performance and end-of-course evaluation forms, which, in turn, may negatively impact promotion and tenure decisions. For students, unsuccessful exploration may negatively impact grades and motivation. The degree of risk is magnified in the online classroom because teaching and learning online are much more permanent, visible, and open processes than face-to-face classroom instruction. Complicating these issues is that the application of many of the suggested instructional strategies requires sophisticated knowledge of, and skill in, the use of educational methods, as well as a solid understanding of the use of Internet communication media as a teaching and learning platform. Many postsecondary educators do not possess this knowledge and skill.

Objectives of the Study

The objectives of the present study were to explore (1) how well various instructional strategies transfer to text-based Internet learning environments, and (2) the effectiveness of various instructional strategies in facilitating higher levels of learning. One instructional strategy was selected from the guiding principles in Table 1 for each of five corresponding units within the course studied, as not all the suggested instructional strategies could be accommodated in a single course. The instructional strategies explored in this study were the nominal group technique, synchronous brainstorming, debate, invited guest, and WebQuest (which also included role playing and a case study). The anticipated outcome of this applied study was to provide a description of whether the activities investigated can be adapted effectively to the online classroom in ways that support higher levels of learning. Researcher observation notes, position papers by the course participants, and the SOLO taxonomy (Biggs, 1999) were used to evaluate each of the instructional strategies' effectiveness.

Participants

The participants in this study were 19 students enrolled in a fourth-year undergraduate course (13 weeks) in an outreach Bachelor of Education Degree Program at a Western Canadian research university. To be admitted into the degree program, students must be involved in adult education within the postsecondary sector (e.g., technical training/trades institutes, academic upgrading, administration). Because of this requirement, all participants were mature learners (between the ages of 25-65) with most falling between the ages of 35 and 55. All participants in the program have postsecondary training (e.g., certificate, diplomas, journeyman tickets), and some of the students also have undergraduate Bachelor Degrees (e.g., Nursing, Liberal Arts). This program was delivered as a cohort-based degree program using WebCT. During this study, there was no face-to-face contact among the students or between the students and the instructor. For most of the course participants, this was their second course in the program. The course title was Distance Education for Adult Learning.

An important assumption in this study was that the course participants would be able to provide useful insights with respect to the effectiveness of the instructional strategies under investigation, due to their experience as instructors in the postsecondary sector. The combination of a course where the content was about distance education, with course participants who were practicing postsecondary instructors, and who were also students in a distance delivered program, provided a unique opportunity for this study to be conducted.

Method

The method used in this study was action research. There are two broad approaches to action research (Bogdan & Biklen,

2003). There is political action research, where citizen-activists who are concerned with power relationships conduct research with the aim of bringing about social change. The other kind of action research is participatory or practitioner research, where practitioners conduct a research project with the aim of making recommendations for changing and/or improving practice. This study uses the practitioner-researcher model as described by Jarvis (1999), where the primary approach is applied research resulting in outcomes intended to offer guidance and recommendations for the design and development of text-based Internet learning environments.

While action research raises a number of well-known challenges (e.g., issues with validity, problems associated with generalizability, value-laden documentation and reporting of the findings), this method was selected because the fundamental aim of action research is to improve practice by means of practitioner's actions and practitioner's reflection upon the effects of those actions (Ebbut, 1985), which is congruent with the objective of this investigation. Of particular importance is that action research is concerned with understanding and changing particular situations; "researchers who are not in and of the situation are not in a position to do either" (Bryant, 1996, p. 114). Hence, "reflective practitioners are *ipso facto* researchers into their own practice" (p. 115).

Following the practitioner-researcher model of Jarvis (1999), this study focused on understanding the relationship among practice, practical knowledge, and the guiding theoretical framework. While most of us would agree that theory should be applied to practice, the act of applying theory to practice is increasingly being recognized as "an oversimplification, at the least, and at the most, as false" (Jarvis, 1999, p. 3). As a practitioner-researcher, the author was able to observe and reflect on aspects of online teaching practices at a depth that traditional quantitative forms of research tend not to capture.

Using the action research spiral as described by Carr and Kemmis (1986; see also Zuber-Skerritt, 1992), the author planned and implemented a repertoire of instructional strategies as a means of providing online learning activities with the aim of moving the students to higher levels of learning. The methodology of action research involves a spiral of steps that includes *planning, acting, observing, and reflecting*. The course was designed (*planning*) using the framework developed in prior research (Kanuka, 2002b) and the following instructional strategies: nominal group technique, debate, brainstorming, invited guest, and WebQuest, which also included role playing and a case scenario (*acting*). Data for this study were collected through observer notes (*observation*) kept by the practitioner-researcher, another instructor's perspective using the SOLO taxonomy to assess levels of learning, and feedback by the course participants in the form of position papers (*reflecting*).

The purpose of having another instructor assess the students' position papers using the SOLO taxonomy, as well as collecting data in the form of student feedback (position papers) and instructor observation notes, was to provide verification from multiple views. To ensure trustworthiness of the data in naturalistic inquiry, data triangulation is often used to provide corroborating evidence (Creswell, 1998). Establishing structural corroboration is achieved by testing datum and interpretation against others to be certain that there are no internal conflicts or contradictions (Guba, 1981). In this qualitative study, the corroborating evidence for determining the effectiveness of each instructional strategy was consistency among the multiple lenses provided by the students' experiences, the practitioner-researcher's observation notes, and another instructor's assessment of the levels of learning.

Assessing the Levels of Learning: Data Analysis

About three decades ago, researchers in the field of higher education first began to tackle how to investigate students' learning (e.g., Biggs, 1979; Entwistle & Ramsden, 1983; Marton & Sjölj, 1976). These researchers observed that students take two different approaches to learning: deep or surface approaches. Students who adopt deep approaches to their learning do so to gain greater understandings of the subject being taught. They use such strategies as reading widely and discussing the course material with their peers, with the aim of seeking to make sense of new knowledge in terms of what they already know. In contrast, students who adopt surface approaches to their learning are primarily interested in meeting the course requirements, or do only what is required to satisfy the assessment requirements of the course, relying primarily on rote learning to achieve this goal. The studies also revealed that few students are strongly attached to one approach and most are capable of using both approaches effectively. In practice, most students simply select the approach they deem appropriate for the circumstances.

Considerable research has been conducted since then on the effects of students who use deep learning approaches versus surface learning approaches. Overall, the "results show very clearly that a deep approach is always associated with higher-quality learning outcomes. Students who take a deep approach retain knowledge longer, have better understanding, produce logical and coherent work, and can make more connections between different topics" (Toohey, 1999, p. 11; see for examples, Prosser & Trigwell, 1991; Trigwell & Prosser, 1991). Also interesting to note is that two decades ago—similar to recent findings in online learning—lower levels of learning (or "surface" learning approaches) were found to be most common by students in higher education (Ramsden, 1983). In fact, research conducted by Biggs (1982, 1987), who surveyed more than 2000 university students, resulted in the discouraging finding that as students progressed in their studies they were more likely to adopt surface approaches to their learning. Similar findings were found in a study

conducted by Ramsden (1983). It would seem, then, that "the university or college experience itself pushes students towards a more superficial and instrumental approach to their studies" (Toohey, 1999, p. 13). Gibbs (1992) and Biggs (1995) cited heavy workloads, high contact hours, excessive material, emphasis on coverage, and an assessment system that tests and rewards low level outcomes (e.g., recall exams) as pushing students towards surface approaches. Clearly, alternative classroom work and activities are needed to encourage students to adopt deep approaches to their studies.

Building on these studies, John Biggs (Biggs & Collis, 1982) developed a system for classifying student work according to its quality, called the SOLO (Structure of the Observed Learning Outcome) taxonomy. The SOLO taxonomy is an orderly way of describing a hierarchy of complexity through which learners show mastery of academic work. The main strength of the SOLO taxonomy, relative to other educational hierarchies, is its generality: it is not content-dependent, making it useable across a number of subject areas. The SOLO taxonomy has five levels of sophistication that can be encountered in learners' responses to academic tasks (Biggs, 1999):

The study had three objectives:

Prestructural -- the task is not attacked appropriately; the student hasn't understood the point

Unistructural -- one or a few aspects of the task are picked up and used (understanding as nominal)

Multi-structural -- several aspects of the task are learned but are treated separately (understanding as knowing about)

Relational -- the components are integrated into a coherent whole, with each part contributing to the overall meaning (understanding as appreciating relationships)

Extended abstract -- the integrated whole at the relational level is reconceptualized at a higher level of abstraction, which enables generalization to a new topic or area, or is turned reflexively on oneself (understanding as far as transfer and as involving metacognition)

The SOLO taxonomy has been widely adopted by teachers in postsecondary settings because it fits well with conceptions of grade standards (Toohey, 1999). It has also been used successfully both to classify students' work and to identify approaches taken to learning course material in postsecondary settings (e.g., Van Rossum & Schenek, 1984). For these reasons, the SOLO taxonomy was selected to assess students' levels of learning for this investigation.

In keeping with the taxonomy, higher levels of learning were assessed based on the students' increasing ability to make connections and relationships among the concepts covered in the course. Levels of learning were assessed by the author and another course instructor who had previously taught the course for many years and was knowledgeable about the course content. The course itself was designed using the concept of experiential learning. The rationale underpinning the use of the experiential learning concept was to provide a safe environment to explore various activities. As they progressed through the course activities, the students were advised to keep in mind that these activities were planned to expose them to possibilities and problems that many distance education instructors and students never experience.

Because teaching is such a high-risk activity, many instructors choose to use a limited selection of instructional methods—namely, those that afford the lowest risk. This course was designed to provide a low-risk environment in which to explore and extend our experiences when teaching and learning at a distance. This was achieved by not assigning grades to course participation when exploring the instructional strategies under investigation. However, during each unit activity the students were asked to reflect on their learning in the form of a reflective position paper, which did count as part of their course grade. If students did not participate in the online activities, they would not be able to write a reflective position paper and thus would not receive corresponding grades. The reflective position papers asked the course participants to reflect on each of the instructional strategies used during the course and to take a position on whether they perceived the activity as successful in the online classroom. With respect to both their role as a learner and their role as an instructor, they were also asked to address the following questions in their papers: What worked? What did not? Why? They were also asked to remember that learning has an affective component and to relate this experience to the way they teach in their classrooms.

Table 2 provides the rubric used to assess the students' position papers. The key features provided for each level of the SOLO taxonomy are cues for assessing student's written work. Samples drawn from the course participants' papers are provided as examples of each level of the SOLO taxonomy.

Levels of learning

Key features of written work

EXAMPLE. The following are samples of students' written assignments for the first unit, which uses the nominal group technique (NGT). All assignments were set to invite extended abstract responses.

Assignment: Discuss and support your position for how the NGT worked for this unit. Set your position from the perspectives of (1) an adult learner and an adult education instructor and (2) in the context of general theories of adult development and distance

education.

1. Pre-structural responses	Little or no understanding has been demonstrated; Does not address the question; Restates the question; Makes personally based associations with the unit or course text; Does not relate various concepts covered in the unit to each other; States a series of unrelated facts; Uses a small amount of information available; Does not reach a supported conclusion	This example illustrates a dumping of information that was provided in the course unit notes followed by re-stating the directions for the nominal group activity. No conclusion has been reached that leads to an informed position. There are only fragments of unconnected information that have no organization in relation to the whole. <i>The nominal group technique is intended for use where judgmental decisions require creative solutions. It can be beneficial for both the learner and educator. It supports learner-focused education and the potential to be an effective activity in online learning. In our course, everyone posted a statement and took a position on how distance education should be labeled. The next step was to read all postings and rank the top three labels. Later in the day the instructor removed the extreme labels and the final step was selecting the first choice. I think positive results can come from this exercise. These are my perspectives as an instructor and learner.</i>
2. Uni-structural responses	Addresses the question, but in a limited manner Defines and accurately describes problems/issues Selects one or two main concepts from unit notes and/or course text Does not adequately link the information selected If a conclusion is reached, it is based limited information	This example begins to address the assignment by identifying some insights into the issues. Information has been provided from the unit notes and text. However, the information is not linked to the problems identified and no final position is reached. Simple and obvious connections are made, but their significance is not understood. <i>This activity allowed the group to generate a considerable range of individual thoughts. We were able to narrow our ideas by elaborating, clarifying, and voting on the perspectives of the group. Historically, we have seen the Delphi implemented in 1970, which allowed for the exchange of ideas before taking a vote. But is it effective online? For the nominal group technique to be effective, and whether or not I would use it, I would need to have the option of making the senders name invisible to the other participants in the conference. If this can be done, then each participant will feel less reluctant to express themselves freely and might then be an effective activity.</i>
3. Multi-structural responses	Uses two or more data/information sources but fails to explain the links/relationships between the data sources Begins to provide explanations about problems and issues - but is inconsistent with other information and misses important information available Does not notice inconsistencies in argument formation Mainly descriptive style writing - but there is evidence of basic cause and effect links	This example, again, is largely descriptive but there is an effort to address the question and provide explanations for the problems that have been identified. However, there is inconsistency between the argument formation and the conclusion drawn at the end. A number of connections could have also been made, but have been missed in relation to their significance to the whole. <i>The nominal group technique is a learner-centered activity that involves a democratic voting process. This was a new process for me as both a learner and an instructor - even though it has a history of more than three decades within the field of adult education. The discussion for this activity reflected the various perspectives of the participants. A problem with the NGT was that individual input was based on personal perceptions, issues, or experiences rather than the idea of a more inclusive subject to be studied. It seemed we danced around the problem a bit making me think that this activity would be more effective if aliases were used. It should also be more teacher-directed. As an educator I see this technique as being useful for drawing the learners into a decision-making</i>

<p>4. Relational responses</p>	<p>There are multiple information sources with coherent links made Substantiated positions are reached that are consistent with the information provided Begins to provide explanations or theories resulting from the linking of information Evidence of cause and effect judgments Movement from descriptive to explanative</p>	<p><i>discussion. But my position is that a "live chat session" would have been a more effective and efficient activity.</i></p> <p>This example begins to be qualitatively and quantitatively different from the prior three examples. It attempts to explain relationships among various information sources and provides judgment with supporting arguments. There is evidence that the student is able to appreciate the significance of the parts in relation to the whole. <i>The NGT is a consensus planning tool that helps prioritize issues (ref). Research on the NGT shows that in numerous circumstances the process produces better results than unstructured group interactions (ref). Research has also revealed that minimizing interaction between group members increases creativity and stimulates more ideas (ref). At the onset, it appeared that, as the above cited research indicates, this kind of structured discussion was effective. However, as the discussion progressed it became obvious that we began addressing two distinctly different problems. From my own experiences using this technique in my face-to-face classroom, I know that focusing on a second issue that emerges is manageable. But, online, I felt focusing on only one problem would have made the process more productive. As an adult instructor, I have used this technique in my face-to-face courses and experienced many of the benefits cited in the literature - with very few organizational, management, or procedural difficulties. However this experience, as an online learner, helped me recognize some of the potential problems that can arise when teaching online. I must note that I am more aware of these potential problems only because of having experienced them as an online learner. As Carl Rogers theorized: "The only learning that significantly influences behavior is self-discovery, self-appropriated learning."</i></p>
<p>5. Extended abstract responses</p>	<p>Information is used to support positions from resources provided in the course (e.g., text; course notes) as well as outside resources (e.g., prior course information; journal articles; books) Possible explanations, theories and hypotheses have been generated and substantiated using resources cited and reflections Conceptualizations are at a level extending beyond what has been provided in the course content Recognition of the multiplicity of perspectives given the complexity of the problem resulting in a number of possible positions on the issue</p>	<p>In this example, the student has made connections in not only the given subject area, but is also able to transfer the principles and ideas underlying the specific problem presented. <i>NGT is an instructional method that facilitates decision-building skills in a learner-centered group setting (ref). The NGT provides a structured and interactive learning environment where, as the activity unfolds, no individual is able to dominate the discussion; each person must present an opinion, making the activity inclusive and democratic. These are ideals consistent with some adult education learning theories (e.g., refs) and certain distance education theories (e.g., refs). As the activity progresses, learners assume greater responsibility and the facilitator's role becomes secondary. This, in turn, provides the opportunity for learners to feel a sense of empowerment because each learner has played an active role in finding a solution. Learner-centered activities, whereby learners are active and assume greater responsibility are consistent with constructivist learning theory (ref). Constructivism underpins much of the current literature and research in distance education (e.g., refs). One drawback to the NGT is that ideas external to the problem presented are seldom explored. For example, we worked as a group to establish a list of priorities.</i></p>

Once the list was finalized, we then focused our attention only on those priorities to form consensus. In a sense, then, this activity supports an isolationist process (complicated by our 'physical' isolation) and refutes the concept of exploring and exchanging ideas in search of consensus. Would I use the NGT in my own practice? Probably not. Good teaching is complicated, but at a minimum it includes the ability to make the content being taught stimulating and interesting, presented at the right level of understanding that is also engaging (ref). The NGT is a worthy activity for use, as it supports engaged and active learning. However, as a trade instructor, the objectives and outcomes of the NGT and my course objectives and outcomes would not be consistent.

Table 2. Assessment guide for levels of understanding displayed (SOLO taxonomy, adapted from Biggs, 1995, 1999)

As Table 2 illustrates, when learners are conducting academic tasks at levels four and five, they can be considered to be functioning at higher levels of learning. Levels four and five are qualitatively different from the lower levels in that they require the learner to integrate new knowledge and skills into a coherent structure (Biggs, 1991), resulting in the construction of new knowledge—the defining characteristic of higher levels of learning. These levels are recognized as the targets for teaching. Using the SOLO taxonomy, it is possible to identify the students' current level of learning for a particular task through written responses.

It is also important to note that if the instructor wishes to have students working at the highest level of the SOLO taxonomy, assignments must be directed to that level. For example, if an assignment asks students to *describe* the outcomes of an instructional strategy and *outline* the procedures for implementation, the instructor is setting the assignment at the pre-structural or uni-structural level. Alternatively, assignments at the **extended abstract** level will ask students to **conceptualize issues that incorporate what has been taught, as well as make connections** (generalize or transfer) beyond what has been taught. Thus, setting assignments that invite extended abstract responses is essential to encouraging higher-level responses from the students.

Results and Discussion

The results of this study reveal that (1) the instructional strategies under investigation can be effectively translated to the online classroom and (2) certain instructional strategies are more effective than others at creating the conditions necessary to facilitate higher levels of learning. As Table 3 indicates, the WebQuest appears to be the most effective instructional strategy for facilitating higher levels of learning. Following is a discussion of each of the learning strategies.

Levels of Complexity (SOLO Taxonomy)

	Prestructural	Unistructural	Multi-structural	Relational	Extended Abstract
Nominal Group	1	4	7	5	2
Debate	1	3	10	5	--
Brainstorming	--	--	8	10	1
Invited Guest	--	1	14	2	2
WebQuest	--	--	2	11	6

Table 3. Assessment of levels of learning for instructional methods (n = 19 participants)

Nominal Group Technique

The nominal group technique is an instructional strategy that facilitates problem solving in a large group setting; it is a learner-centered and democratic decision-building process. The strength of this technique is derived from the energy of individuals—each person generating, exploring, and communicating ideas. As the nominal group technique demands closure, it is particularly effective at facilitating **decision-building learning activities** (Korhnen, 1998). Seaman and Fellenz (1989) describe the process as beginning with the presentation of a well-formed problem in the form of a question posed to the learners. Learners are then asked to **generate and prioritize** their ideas about the problem's solution individually. Learners publicly list their ideas and ranking through a round-robin process until all ideas have been exhausted. The course facilitator then asks those learners with extreme views to **reconsider** their responses. It is assumed that this kind of questioning and response presentation will prompt the learners falling outside the group consensus to reflect on issues they might have disregarded as insignificant. Those participants who continue to hold strong convictions are then asked to **persuade** the group to revise their responses in light of the rationale presented. If a convergence of opinion does

not occur, then a voting system is initiated and a decision is forced through a numerical ranking process.

It has been suggested that the nominal group technique is very effective in an online environment (Hiltz & Turoff, 1978). The rationale for this position stems from the ability of a text-based asynchronous platform to remove the awkwardness of silent moments that occur in face-to-face settings and reduced time between consensus rounds. This technique has been shown to be as effective online as face-to-face with respect to expressed satisfaction with the technical and socio-emotional aspects (Sheffield & McQueen, 1990).

From the author's perspective as the course instructor, the nominal group technique translated well to the online classroom. However, students expressed little satisfaction during this activity (in conflict with Sheffield & McQueen, 1990). In addition, the nominal group technique appeared to be only modestly effective at achieving a meaningful understanding of the problem presented. As Table 3 shows, the majority of course participants' position papers were at the multi-structural level: several aspects about the unit concepts were learned, but (with a few exceptions) were treated independently of other environmental factors, such as adult learning theory and their practice as adult educators.

The likely reasons for this were that, first, the nominal group technique begins with a well-formed problem, eliminating the need for the course participants to discover for themselves the issues involved and hence removing the need to search for a deeper understanding of the unit topic being covered. Second, while the nominal group technique is facilitated through a large group round-robin format, it is an individual process in which course participants must convince their peers to accept their point of view. This individual process did not support a collaborative and/or collegial learning environment. This point was also made by a number of the course participants in their position papers. For example, one student stated that, "this particular technique creates an environment where there is a limited sense of personal interaction ♦ I found that I was feeling detached from the other group members, no sense of community existed."

However, it must be noted that the lack of sense of community may have been due, in part, to the timing of this activity within the course structure. The nominal group technique was the first activity of the course and, as such, group cohesiveness was not yet well developed. This may have contributed to feelings of detachment and a perceived absence of community.

Perhaps more disconcertingly, during this activity there were tensions at times in the online discussion when some course participants refused to move from their position. This tension was expressed in the position papers. As one participant observed, "it was interesting how some of the participants felt so passionately about their position and appeared reluctant to let go of it ♦ I found this to be a bit uncomfortable at a certain point."

The observations of both the course participants and the instructor suggest that the nominal group technique is not an instructional strategy that builds a collegial, collaborative, and trusting online learning environment between course participants; nor is it effective at facilitating high levels of learning.

Debate

Debates can be an effective way to present conflicting phenomena that promote thinking and reflection, especially if learners are expected to take a position that may be contrary to their own. There is literature that supports the position that debates can achieve this effect in both face-to-face and online learning environments. According to Renner (1999), the desired learning outcome of a debate is to force learners to confront conflicting phenomena that challenge the learner to acquire better understandings. Seaman and Fellenz (1985) explain a debate in terms of a "structured discussion during which two sides of an issue are presented and argued by two or more individuals within a given time period" (p. 65). Instructors have traditionally used debates to enhance learners' confidence and ability to express viewpoints as well as help them to develop coherent organization and precise expression of ideas structured in a manner that matches the speaker's (or writer's) purpose and intended audience (Kanuka & Kreber, 1999). Debates have proven to be effective at forcing learners to confront situations that result in contradictions; this, in turn, challenges the learner to acquire better understandings. Paulsen (1995) specifically asserts that debates can be effectively facilitated using text-based Internet communication tools.

Overall, the results of the present study indicate that the debate activity was adequately effective at achieving the unit objectives. However, this activity required considerable work to investigate the topic and coordinate the group, to integrate the findings, and to formulate the arguments for the debate and the ensuing rebuttals. Some students expressed in their position papers that they resented the lack of recognition for assuming a leadership role and the extra effort required to organize the argument presentation; others stated that the research required on the topic was too demanding and time-consuming. Two major criticisms of this activity expressed by the course participants in their position papers were (1) the amount of reading required (both online postings and outside research) and (2) group coordination costs.

Furthermore, despite the time and effort put forth by the students, Table 3 reveals that the course participants did not

exhibit high levels of learning resulting from the debate activity—although it was somewhat better than the nominal group technique. These results conflict with the author's observation notes. The rationale in the observation notes for thinking that this activity was effective at facilitating higher levels of learning was twofold: (1) The debate was very demanding of the students with respect to the need to research the topic, and (2) the debate process demanded the students to organize themselves through collaborative group work. Yet in spite of the demanding process, the majority of the position papers fell within the multi-structural level, indicating that while most of the students were, in fact, able to deal with several aspects of the unit concepts, they conceptualized the concepts independently of one another.

Given the demanding process of confronting and defending alternative and conflicting perspectives on a complex concept, it is difficult to understand why this activity did not facilitate high levels of learning. It is possible that the class size (19 course participants) was too large for an online debate. Because a debate requires considerable argumentation / justification / clarification, the number of online postings became onerous and burdensome. Moreover, because of the rather large group size, a few of the participants stated in their position papers that they felt intimidated by the process and withdrew from the debate. For these reasons, this activity would probably run more smoothly with an online group size not larger than 8-10 students (4-5 students per group).

Brainstorming

The research literature has suggested that brainstorming is an effective means for creating an equitable and democratic environment, such as is necessary for the negotiation of meaning. Jones, Valdez, Nowakowski, and Rasmussen (1996), for example, argue that "knowledge-building strategies—such as brainstorming—pool the knowledge and experiences of the group, thereby creating more equitable learning conditions for everyone and giving everyone access to the aggregate knowledge" (p. 7).

Hiltz and Turoff (1978) suggest a modification of the brainstorming method for online environments: brainwriting. Brainwriting can be adapted to computer-mediated conferencing through writing down an idea and sending the message to a co-learner, who must add to it. The message is posted to co-learners until everyone has commented. Collett et al. (1999) have also suggested that brainstorming can be effectively facilitated with online conferencing systems. However, they note that one of the characteristics of brainstorming is a spontaneous and rapid pooling of ideas—and that the time delays in asynchronous interaction can interfere with this process. The result can be a loss of idea generation and dynamic group synergy. To maintain these characteristics of brainstorming, it has been suggested that synchronous text-based interaction should be used instead of asynchronous communication tools. The reasoning behind this position is that synchronous discussions can foster much of the same sense of excitement and dynamic synergy as in face-to-face settings. Based on this rationale, the synchronous "chat" feature of WebCT was used for the brainstorming activity.

Overall, the course participants enjoyed the brainstorming synchronous forum and found it to be an effective method for sharing ideas and developing an understanding of the unit topic. One student noted in his position paper, "the small groups and tight time frame led to a free flow of ideas ♦ The quick flow of the round robin in my own case required more honest answers." Course participants also noted in their position papers that this activity met some of their social needs, and brought in spontaneous and lively discussion such as is found in face-to-face classrooms, but is often absent in the asynchronous online classroom. Some students stated that they got to know their peers much better in the synchronous discussion. However, it was also noted that typing skills were an issue in contributing effectively to the synchronous forum. As one student observed, "due to the need to work at a relatively fast rate due to time constraints, the faster typists took over the discussions." Arranging a group time to participate in this activity was also a problem for a few students, with the result that two students were unable to participate in the brainstorming activity.

As the course instructor, the author was pleased that the students enjoyed the synchronous brainstorming activity. However, the author's observation was that this activity tended to be a simple pooling of what the students already knew. Because the process of brainstorming emphasizes the quantity, not quality, of ideas, the pooled ideas tended to appear rather superficial, making it difficult for the students to deal with the complex problem being discussed in meaningful ways. Moreover, most participants were simply putting down ideas that they had come up with already, and were not building on ideas that were brought forward. Finally, because the students did the brainstorming activity in a round-robin forum, there appeared to be pressure to have the next idea ready to go when it was their turn, rather than improving and building upon the ideas that went before. Thus, while this activity translates well to the online environment, and the students enjoyed the dynamic and rapid nature of synchronous Internet exchanges, the discontinuous nature of synchronous online discussions makes it difficult for users to build on others' ideas, which is an essential aspect of achieving the aims of brainstorming. In addition, students with poor typing skills are unable to contribute effectively in this rapid same-time communication environment. Given the difficulty of controlling the speed of transfer between messages or the typing skills of course participants, these limitations of online synchronous brainstorming are difficult to overcome.

In spite of these difficulties, evidence of higher levels of learning resulted from this activity. As Table 3 indicates, the majority of the students' papers were ranked at the relational learning level. In particular, there was evidence in the

position papers that the majority of students were able to integrate the unit concepts into a coherent whole, with individual concepts contributing to the overall meaning. An explanation for this might be that the brainstorming activity supported not only the sharing of ideas in a risk-free setting, but also required the students to make sense of the pool of ideas through organizing and creating relationships. These findings also support the belief by educational technology theorists who have argued that social presence is an important aspect to effective online learning (e.g., Garrison, Anderson, & Archer, 2000) and that text-based Internet communication tools have the capacity to support a high level of socio-emotional interpersonal communication (Rourke, Anderson, Archer, & Garrison, 1999).

Invited Guest

Inviting an expert to enhance the learning experience can be effective in that the guest can contribute timely information and share relevant experiences. In addition, Internet conferencing tools can provide access to experts who might be inaccessible through other forms of communication. However, just bringing an expert to join the online discussion is not enough. Many instructors make arrangements and then hope that the guest will share his/her experience and have teaching skills (Renner, 1999). Unfortunately, this is not always the case, and the learners gain little benefit from the expert's experience(s). For an invited expert format to be successful, the expert's presentation should involve the learners in every phase of the presentation, ensure that the presentation fits into the course agenda, and that there is productive interaction between the guest and the course participants (Renner, 1999). To achieve this, instructors should take a proactive approach and organize a structured online discussion format. Designing the activity with the invited expert also reduces the pressure on the invited guest to generate dynamic online discussions.

The course participants enjoyed the invited guest activity. The questions generated by the students were good at facilitating discussion, and the invited guest responded in a timely and relevant way that was appreciated by the course participants. As one student noted in her reflective position paper, "the benefit of having an invited expert was the ability for me to pose probing questions, which contributed to my own perspectives and my own teaching experiences." As the course instructor, the author felt this activity translated well to the online classroom. However, the author did not observe much evidence of the course participants achieving meaningful understandings on the topic presented. For this activity, the students were required to read background information in both the course unit and text, in addition to a position paper written by the invited guest. Additionally, while the students were required to prepare probing questions within small groups for the invited guest, they did not have to assess and apply, and/or evaluate, the unit material. Thus the students tended to stay in their comfort zones, while the invited expert provided the value and applicability of the topic. One student summed this up in his position paper with the following statement: "The best part was, for a change, I did not have to spend much time finding background information and determining if it was useful in my own practice. The invited expert was there for me, right at my fingertips!" The students' position papers also provided evidence that this activity was not effective at facilitating higher levels of learning. As Table 3 reveals, the invited guest activity did not move many of the course participants into the relational or extended abstract levels of learning.

WebQuest

WebQuests are a unique web-based activity originally inspired by Bernie Dodge (Dodge, 1995). WebQuests are an inquiry-oriented activity in which information that the learners use comes from resources on the Internet. WebQuests have six critical attributes that include: an introduction to a complex problem (or case scenario; critical incident), engaging tasks (doable and interesting), a description of the process, multiple online sources and perspectives of data to discover the non-obvious, followed by evaluation, and conclusions. The benefits of case studies, which are integrated into WebQuests as an introduction to a complex problem, have been well documented in the adult and postsecondary literature over the last two decades. Specifically, it has been argued that the use of case studies in the instructional process provides a learning environment that seeks to present the complex reality of any issue with its concomitant ambiguity and multidimensionality, thus providing a strong image of the multifaceted nature of most subject areas (Lacey & Merseth, 1993). Moreover, according to MacNeil (1998), the use of case studies can facilitate the acquisition of analytical skills and the ability to think clearly in ambiguous situations. It has also been argued that the Web's hypertext linking ability can offer similar kinds of benefits. Specifically, web links can provide opportunities to support learning environments that have the ability to allow learners to gain access to complex concepts from multiple perspectives, for various purposes, and via different learning strategies (Lanza, 1991).

With respect to the design of WebQuests, most are organized in ways that require learners to work in groups. For this course, the students were divided into four groups and provided a web document containing an introduction and background information, as well as group task and information sources (web links) that were needed to complete the task (see [Appendix 5](#)). There was a description of the process that the learners should proceed through that included a case study and role playing, as well as guidance on how to organize the information they acquired on the Internet. A closure activity required the learners to reflect on what they had learned and to extend the experience to other domains. Unlike other collaborative group activities, the WebQuest tended to eliminate issues of uneven workloads across group participants. One course participant expressed this in his reflective position paper: "this activity provided the opportunity for collaborative learning contrary to typical online collaborative group work, where one person usually ends up doing all the work. The WebQuest allowed each member to do their part by playing a specific role." There was also agreement among the students that this activity encouraged exploration of the unit topic from multiple perspectives, through role

playing, resulting in gaining diverse insights that would inform their practice. One student wrote, "the experiential component of the Webquest exercise provided me with an opportunity to participate in this creative learning environment as a student, and to derive beneficial knowledge, skills and attitudes as an adult educator."

From the perspective of the instructor, the author felt this activity was highly effective at achieving the unit objectives, which were to identify and apply multiple perspectives on the unit topic. Perhaps the most valuable aspect of the WebQuest was the combination of the case study and role-playing with the web-links inherent in a WebQuest. The case study was very effective as an introduction to a complex scenario, while the role-playing required the students to be active and interactive through debate and discussion, understanding their peers' points of view and articulating their own. There was also evidence that the role-playing motivated the course participants to seek out relevant information to support their assigned role and solve the presented problem. As one student noted on her position paper, "I really got into my role and was very motivated to find supporting arguments for my assigned character. I not only had fun doing this activity, but I also believe I learned a lot about motivation theory."

Thus, the use of case studies, in combination with role-playing and access to online links, appeared to facilitate the development of a deeper and more meaningful understanding of the unit topic. Consistent with my own observations on the effectiveness of this activity, Table 3 indicates that the WebQuest was the most effective instructional strategy at facilitating higher levels of learning. This activity moved the majority of students into the relational level and others to the extended abstract level.

Conclusions, Limitations of the Study and Future Research

Intuitively, most teachers know that their students learn effectively through active and engaged learning—which requires the students to understand and accept alternative points of view, and articulate their own. It has been suggested in the literature that collaborative instructional strategies encourage deeper learning, due primarily to their ability to engage students dynamically in the learning process (Marjanovic, 1999) and to foster the development of interpersonal and teamwork skills which motivates students to work harder and read more widely in order to benefit the group (Hiltz, 1997; Rimmershaw, 1999). The findings of the present study support these views, as well as the belief that text-based Internet communication technologies can offer effective collaborative and cooperative learning environments that have the potential to facilitate higher levels of learning. The results of this investigation also indicate that the use of WebQuests, and to a lesser extent, brainstorming and debates, are effective activities at encouraging students to approach their learning in deeper ways, and to achieve higher levels of learning. While it was not the aim of this study to provide best practices for online learning, these findings can be used to make revisions to the existing format of online courses offered in higher education, and can guide for future course development and research.

While the practitioner-researcher method used in this study produced useful insights with respect to the effectiveness of specific instructional strategies, it has a number of limitations. First, this type of study does not represent a large, randomly-selected population; as such, the outcomes should be transferred with caution. In addition, the researcher for this study was also the course instructor. A common (and valid) criticism is that this method gives prominence to teachers' knowledge above other views. The "privileging of teachers' knowledge masks the assumption that significant improvement in classrooms can be accomplished in the absence of broader patterns of community support and social change" (Kemmis & McTaggart, 2000, p. 570). Finally, from a positivist perspective, this study lacked a methodological control, especially in regard to validity. It must be acknowledged that the data are contextually bound. Second-order effects including, for example, learner motivation, intention, culture, gender, prior knowledge, and age, are all factors that can impact the teaching-learning experience. As such, the findings in this study cannot reliably be extended beyond the course described. Further, while form and control can be applied to action research, such as by using Winter's (1989) six principles for assessing the validity of action research, the "nature of the relationship between research and reflection still remains problematic" (Bryant, 1996, p. 114).

Given these limitations, future research needs to continue to investigate the effectiveness of various collaborative and cooperative instructional strategies to support higher levels of learning. Prior research has helped us extend our understanding of online learning, as well as providing outcomes that offer recommendations for change. However, whenever we introduce change, we need to reflect on it. It is only through continued reflection and research on the use of diverse and collaborative instructional strategies that we will begin to see emerging patterns resulting in an ability to achieve greater insights on what works, why, in what ways, and under what conditions in the online classroom.

Notes

Appendices 1-5 describe how each method was facilitated.

References

- Abrami, P. C., & Bures, E. M. (1996). Computer-supported collaborative learning and distance education. *American Journal of Distance Education*, 10 (2), 37-42.
- Bates, A. W. (1995). *Technology, Open Learning and Distance Education*. New York: Routledge Studies in Distance

Education.

- Bates, T. (1997). The future of educational technology. *Learning Quarterly*, 1 (2), 7-16.
- Biggs, J. B. (1982). Student motivation and study strategies in university and college of advanced education populations. *Higher Education Research and Development*, 1 (1), 33-55.
- Biggs, J. B. (1995). Student approaches to learning, constructivism, and student centred learning. Paper presented at *the Twentieth International Conference on Improving University Teaching*. Hong Kong. July 10-13.
- Biggs, J. B. (1996). Enhancing teaching through constructive alignment. *Higher Education*, 32 (3), 347-364.
- Biggs, J. B. (1999). *Teaching for Quality Learning at University*. Buckingham: SRHE and Open University Press.
- Biggs, J. B. (1979). Individual differences in study processes and the quality of learning outcomes. *Higher Education*, 8 (4), 381-394.
- Biggs, J. B., & Collis, K. F. (1982). *Evaluating the Quality of Learning: The SOLO Taxonomy*, New York: Academic Press.
- Bogdan, R. C., & Biklen, S. K. (2003). *Qualitative Research for Education. An Introduction to Theories and Methods* (4th ed.). New York: Allyn and Bacon.
- Bryant, I. (1996). Action research and reflective practice. In D. Scott & R. Usher (Eds.), *Understanding Educational Research* (pp. 106-119). New York: Routledge.
- Carr, W., & Kemmis, S. (1986). *Becoming Critical: Education, Knowledge and Action Research*. London: Falmer Press.
- Clark, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research*, 53 (4), 445-459.
- Clark, R. E. (1994). Media will never influence learning. *Educational Technology Research and Development*, 42 (2), 21-29.
- Collett, D., Kanuka, H., Blanchette, J., & Goodale, C. (1999) *Learning Technologies in Adult Distance Education*. Edmonton, AB: University of Alberta.
- Creswell, J. (1998). *Qualitative Inquiry and Research Design. Choosing Among Five Traditions*. London: Sage Publications.
- Dodge, B. (1995, 1997). Some thoughts about Webquests. Retrieved January 5, 2004, from http://edWeb.sdsu.edu/courses/edtec596/about_Webquests.html.
- Elliot, J. (1991). *Action Research for Educational Change*. Milton Keynes: Open University Press.
- Entwhistle, N. J., & Ramsden, P. (1983). *Understanding Student Learning*. London: Croom Helm.
- Garrison, D. R., & Anderson, T. (2003). *E-Learning in the 21st Century: A Framework for Research and Practice*. London: Routledge/Falmer.
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2 (2/3), 87-105.
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence and computer conferencing in distance education. *American Journal of Distance Education*, 15 (1), 7-23.
- Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, 7 (2), 95-105.
- Gibbs, G. (1992). Improving the quality of student learning through course design. In R. Barnett (Ed.). *Learning to Effect* (pp. 149-165). Buckingham: SRHE and Open University Press.
- Guba, E. G. (1981). Criteria for assessing the trustworthiness for naturalistic inquiries. *ERIC/ECTJ Annual Review Paper*, 29 (2), 75-91.
- Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research*, 17 (4), 397-431.
- Harasim, L. (1993). *Global Networks: Computers and International Communication*. Cambridge, MA: MIT Press.
- Hawkes, M. (2001). Variables of interest in exploring the reflective outcomes of network-based communication. *Journal of Research on Computing in Education*, 33 (3), 299-315.
- Heckman, R., & Annabi, H. (2005). A content analytic comparison of learning processes in online and face-to-face case study discussions. *Journal of Computer Mediated Communication*, 10 (2). Retrieved February 13, 2005, from <http://jcmc.indiana.edu/vol10/issue2/heckman.html>
- Henri, F. (1992). Computer conferencing and content analysis. In A. R. Kaye (Ed.), *Collaborative Learning Through Computer Conferencing* (pp. 117-136). Berlin: Springer-Verlag.
- Hiltz, S. R. (1997). Impacts of college level courses via asynchronous learning networks: some preliminary results. *Journal of Asynchronous Learning Networks*, 1 (2). Retrieved January 5, 2004, from http://www.sloan-c.org/publications/jaln/v1n2/v1n2_hiltz.asp
- Hiltz, S. R., & Turoff, M. (1987). *The Network Nation: Human Communication via Computer*. London: Addison-Wesley Publishing Company.
- Jarvis, P. (1999). *The Practitioner-researchers. Developing Theory from Practice*. San Francisco: Jossey-Bass.
- Jonassen, D. H. (1997). Instructional design models for well-structured and ill-structured problem-solving learning outcomes. *Educational Technology: Research and Development*, 45 (1), 65-95.
- Jonassen, D. H. (2000). Toward a meta-theory of problem solving. *Educational Technology: Research & Development*, 48 (4), 63-85.
- Jones, B. F., Valdez, G., Nowakowski, J., & Rasmussen, C. (1996). *Plugging In: Choosing and Using Educational Technology*. Washington, DC: Council for Educational Development and Research North Central Regional Educational Laboratory. Retrieved January 5, 2004, from <http://www.ncrel.org/sdrs/edtalk/toc.htm>
- Kanuka, H. (2002a). Guiding principles for facilitating higher levels of Web-based distance learning in post-secondary

- settings. *Distance Education*, 23 (1), 163-182.
- Kanuka, H. (2002b). A principled approach to facilitating diverse strategies for web-based distance education. *Journal of Distance Education*, 17 (2), 71-87.
- Kanuka, H., & Anderson, T. (1998). On-line social interchange, discord, and knowledge construction. *Journal of Distance Education*, 13 (1), 57-74.
- Kanuka, H., & Garrison, D. R. (2004). Cognitive presence in online learning. *Journal of Computing in Higher Education*, 15 (2), 30-49.
- Kanuka, H., & Kreber, C. (1999). Knowledge construction in the virtual classroom. Paper presented at the 18th National Conference of the Canadian Association for the Study of Adult Education, Sherbrooke, Quebec. Retrieved February 13, 2005 from <http://www.oise.utoronto.ca/CASAE/cnf99/kanuca.htm>
- Kemmis, S., & McTaggart, R. (2000). Participatory action research. In N. Denzin & Y. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 567-605). Thousand Oaks, CA: Sage.
- Klemm, W. R., & Snell, J. R. (1996). Enriching computer-mediated group learning by coupling constructivism with collaborative learning. *Journal of Instructional Science and Technology*, 1 (2). Retrieved March 29, 2004, from <http://www.usq.edu.au/electpub/e-jist/docs/old/vol1no2/contents.htm>
- Korhonen, L. J. (1998). Nominal group technique. In M. W. Galbraith (Ed.), *Adult Learning Methods* (pp. 219-233). Malabar, FL: Krieger Publishing Company.
- Lapadat, J. C. (2002). Written interaction: A key component in online learning. *Journal of Computer Mediated Communication*, 7 (4). Retrieved March 10, 2005, from <http://jcmc.indiana.edu/vol7/issue4/lapadat.html>
- Lacey, C. A., & Merseth, K. K. (1993). Cases, hypermedia and computer networks: Three curricular innovations for teacher education. *Journal of Curriculum Studies*, 25 (6), 543-551.
- Laurillard, D. (2002). *Rethinking University Teaching*. London: Routledge Falmer.
- MacNeil, A. J. (1998). Case study method and electronic meeting system for principal preparation. *Journal of Information Technology for Teacher Education*, 7 (3). Retrieved May 11, 2004 from <http://www.triangle.co.uk/pdf/viewpdf.asp?j=jit&vol=7&issue=3&year=1998&article=am&id=136.159.109.60>
- Marjanovic, O. (1999). Learning and teaching in a synchronous collaborative environment. *Journal of Computer Assisted Learning*, 15 (2), 129-138.
- Marton, F., & Sjöström, R. (1976). On qualitative differences in learning: Outcome and process. *British Journal of Educational Psychology*, 46, 4-11.
- McGreal, R. (1998). Integrated distributed learning environments (IDLEs) on the Internet: A survey. *Educational Technology Review, Spring/Summer*, 25-31.
- McKnight, C. B. (2001). Supporting critical thinking in interactive learning environments. *Computers in the Schools*, 17 (3/4), 17-32.
- Murphy, E. (2004). Identifying and measuring ill-structured problem formulation and resolution in online asynchronous discussions. *Canadian Journal of Learning and Technology*, 30 (1), 5-20.
- Naidu, S., Cunnington, D., & Jansen, C. (2002). The experience of practitioners with technology-enhanced teaching and learning. *Educational Technology and Society*, 5 (1). Retrieved December 12, 2003, from http://ifets.ieee.org/periodical/vol_1_2002/naidu.html
- Paulsen, M. F. (1995). Online report on pedagogical techniques for computer-mediated communication. Retrieved January 5, 2004, from <http://www.nettskolen.com/pub/artikkel.xsql?artid=123>
- Pawan, F., Paulus, T. M., Yalcin, S., & Chang, C-F. (2003). Online learning: Patterns of engagement and interaction among in-service teachers. *Language Learning & Technology*, 7 (3), 119-140. Retrieved March 10, 2005, from <http://ilt.msu.edu/vol7num3/pdf/pawan.pdf>
- Prosser, M., & Trigwell, K. (1991). Student evaluations of teaching and courses: Student learning approaches and outcomes as criteria of validity. *Contemporary Educational Psychology*, 16, 269-301.
- Renner, P. (1999) *The Art of Teaching Adults: How to Become an Exceptional Instructor and Facilitator*. Vancouver, BC: The Training Associates.
- Rimmershaw, R. (1999). Using conferencing to support a culture of collaborative study, *Journal of Computer Assisted Learning*, 15 (3), 189-200.
- Rourke, L., Anderson, T., Archer, W., & Garrison, D. R. (1999). Assessing social presence in asynchronous, text-based computer conferences. *Journal of Distance Education*, 14 (3), 51-70.
- Saunderscook, J., & Cooper, P. M. (2003). *4th Annual Technology and Student Success in Higher Education. A Research Study on Faculty Perceptions of Technology and Student Success*. Toronto, ON: McGraw-Hill Ryerson.
- Seaman, D. F., & Fellenz, R. A. (1989). *Effective Strategies for Teaching Adults*. Columbus, OH: Merrill Publishing Company.
- Sheffield, J., & McQueen, R. J. (1990). Groupware and management education: Matching communication medium to task requirements. *Proceedings of the Third Guelph Symposium on Computer Mediated Communication* (pp. 181-192). Guelph, ON: University of Guelph.
- Toohy, S. (1999). *Designing Courses for Higher Education*. Philadelphia PA: The Society for Research into Higher Education & Open University Press.
- Trigwell, K., & Prosser, M. (1991). Relating approaches to study and quality of learning outcomes at the course level. *British Journal of Educational Psychology*, 61, 265-275.
- Van Rossum, E. J., & Schenk, S. M. (1984). The relationship between learning conception, study strategy and learning

outcome. *British Journal of Educational Psychology*, 54, 73-83.

Williams, C. (2002). Learning on-line: A review of recent literature in a rapidly expanding field. *Journal of Further and Higher Education*, 26 (3), 263-272.

Winkelmann, C. L. (1995). Electronic literacy, critical pedagogy, and collaboration: A case for cyborg writing. *Computers and the Humanities*, 29 (6), 431-448.

Winter, R. (1989). *Learning from Experience: Principles and Practice in Action-Research*. Lewes: Falmer.

Zuber-Skerritt, O. (1992). *Action Research in Higher Education. Examples and Reflections*. London: Kogan Page.

Appendix 1

Nominal Group Technique

Nominal Group Technique. The nominal group technique is an instructional method that facilitates decision-building learning activities. It begins with a well-formed problem.

The problem. In your course text, the author attempts to define distance learning (p. 4-5), and concedes that, due to the proliferation of new communication technologies (e.g., computer conferencing technologies), the concept of distance education can be difficult to define and label. Even your instructor is at odds as to what it should be labeled (e.g., 'distance learning' vs. 'distance education').

How will we decide what label should be used throughout this course?

Well, perhaps that the decision should be both learner centered and democratic based on group consensus. The use of the 'nominal group technique' can achieve this aim.

The process for the Nominal Group Technique.

On Friday, [date] you will post your position (in five sentences or less) of how you think distance education should be correctly labeled (distance education, distance learning, distributed learning, flexible learning, distance training, telelearning, online learning, e-learning, technology-mediated distance learning, etc.) and why. You will have the weekend to post your position (not later than Sunday, [date]).

The following Monday and Tuesday [date] everyone will post a second message and publicly list their ranking of the top three labels posted the day before (this message will ONLY contain your top three label preferences - not explanations of why).

That evening (Tuesday, [date]) I will remove the extreme labels (selecting the most frequently preferred labels) and present them to you again.

At this point you will be requested to rank your number one choice from the narrowed list, this time with an explanation of why - no more than five sentences on Wednesday, [date]. You also have an opportunity at this point to try to persuade your colleagues of your view and why distance education should be labeled as such. The aim of the discussion this day is to achieve consensus on a label to use throughout the course.

If a convergence of opinion does not occur, then a voting system will be initiated the following day (Thursday, [date]). You will email me directly with your label preference and a decision will be forced through a numerical ranking process. The label that gets the most votes will be used for the remainder of this course to describe distance education. This label will be used in both WebCT discussions, as well as your written assignments for the remainder of the course.

Appendix 2

Debate

Online debate. The desired learning outcome of a debate is to force learners to confront situations that result in contradictions that challenge the learner to acquire better understandings. Debates can also provide learners with the opportunity to improve analytical communication skills through the need to formulate arguments, defend positions and critique counter positions. This process helps learners to actively challenge their understandings by searching out new information and experiences, of which they have little working knowledge, resulting in acquiring multiple perspectives.

The issue. Which is a better way to design and develop distance learning activities: instructivism or constructivism?

The process. On Thursday, you will be divided (randomly) into two groups. One group will argue for instructivism, the other group for constructivism. You will work in your groups until Monday, to formulate your arguments for your assigned position. You will also decide on a spokesperson for your group.

We will have an invited guest who has expertise in the design and development of distance learning activities to act as an impartial evaluator for the debate.

On Monday, group one will present their arguments.

On Tuesday, group two will present their arguments.

On Wednesday, group one will present counter arguments by the group spokesperson.

On Thursday, group two will present their counter arguments by their group spokesperson.

On Friday, all group members may present counter arguments (free-for-all).

On Monday, the evaluator will declare a winner of the debate!

Appendix 3

Brainstorming

Brainstorming. Brainstorming is an effective instructional method to create an equitable environment that is necessary for the negotiation of meaning, creating more equitable learning conditions for everyone, and giving everyone access to the

aggregated knowledge.

The issue. As mentioned in the course notes, in order to make best use of Internet communication tools, instructors must relinquish control and learners must assume greater responsibility for their learning. This is, of course, much easier said than done - especially in a distance learning environment! What learning activities do you think might help learners to assume greater responsibility?

The process. One of the characteristics of brainstorming is a spontaneous and rapid pooling of ideas. The time lag inherent in asynchronous text-based interaction can interfere with this process. There is also a tendency in asynchronous interactions to skip over the generative portion of the activity and move into the discussion phase too soon. In order to create a sense of synergy in the online environment, synchronous text-based interaction will be used for this activity, as synchronous discussions can foster much of the same sense of excitement and dynamic synergy necessary for brainstorming to be effective.

On Tuesday you will be divided (randomly) into five groups. I will post the groups on the WebCT conferencing forum. You will then decide, through email with your group members, a time where all group members can join in a synchronous discussion on either Wednesday or Thursday.

Please send an email to me indicating your group's time and day.

I will not participate in the synchronous discussions, but will be observing each group's process.

Prior to the synchronous discussion, you should decide who will lead the brainstorming session (ensure everyone is online, who is missing, and when to begin). During the brainstorming process, I would suggest you use a "round robin" format in order to ensure that each group member has an opportunity to contribute to the pooling of ideas. The discussion leader should decide the order and post it accordingly.

It is also a good idea to begin with a few 'ground rules'. The group leader can decide on these rules and post them to all members accordingly. Ground rules usually include the assigning of recorders, call time, and when to review and evaluate. Whatever rules you decide on, brainstorming should (drawn from Renner, 1999):

Focus on quantity - generate as many ideas as possible.

Remember that any idea is valid - and piggy-backing on what others have said is part of the process.

Don't judge ideas. The crazier, the better!

Keep responses simple - short and snappy is best.

Before closing the synchronous session, decide as a group on the three best ideas and accompany them with a brief explanation (not more than 3-5 sentences) of why your group thinks these strategies would be effective at helping adult learners assume greater responsibility for their learning.

On Friday, the group leader will post their group's ideas on the WebCT conferencing forum. You will then have an opportunity to read and comment on each group's suggestions.

Appendix 4

Invited Guest (drawn from Renner, 1999)

Invited Guest. There are points in the learning process when inviting an outside expert to contribute timely information and valuable experience can facilitate relevance. This activity is most effective when learners are asked to apply the ideas presented by the authority in a context that each finds personally meaningful. Web-based conferencing can provide access to experts that might be inaccessible by other forms of communication.

The issue. As mentioned in this unit, self-directed learning is one of the most important skills that adult educators can help their learners to acquire. However, this is often very difficult to achieve, as many instructors have difficulty 'letting go of the helm' and many learners resist assuming greater responsibility. How, then, can we (as instructors) help our learners to become more self directed - especially in distance learning?

We will be inviting [name of invited guest], who is an expert on the topic of adult self-directed learning and distance education as our invited expert.

The Process. Just bringing the expert (an invited guest) is not enough. In particular, many instructors make arrangements and then *hope* that the invited expert will share his/her experience *and* have teaching skills. Unfortunately, this is not always the case, leaving the learners to gain little benefit from the expert's experience(s). For an invited expert format to be successful, the process should

involve the course participants in every aspect of the planning,

ensure the expert's presentation fits into the course objectives, and

ensure there is meaningful interaction between the guest and the course participants.

To achieve this, we will be taking a pro-active approach and organizing an online press conference type format (better known as a 'scrum').

As you read chapter six and this unit, consider one question that you would like to ask the invited expert on the topic of '*how to facilitate adult learners to become self-directed learners in distance education*'. If (or when) the invited guest responds to your question, be prepared to follow up on the response with 'probes' (follow-up questions)—before your colleagues ask their questions!

On [date] we will have a 'scrum' with the invited expert.

The purpose of this kind of format, with prepared questions asked by the learners, is to reduce the pressure on the invited guest to try to generate dynamic online discussions in what is typically an unfamiliar environment, and at the same time involve the whole group.

Appendix 5

WebQuest

WebQuest. WebQuests are, as the name implies, a unique Web-based activity originally inspired by Bernie Dodge in 1995. Essentially, WebQuests are an inquiry-oriented activity in which information that the learners use comes from the resources on the Internet. WebQuests have six critical attributes that include: 1. an introduction to a complex problem; 2. engaging tasks (doable and interesting); 3. a description of the process with guidance in the forms of concept maps, timelines, or cause-and-effect diagrams; 4. multiple online sources and perspectives of data to discover the non-obvious; followed by 5. evaluation, and 6. conclusions.

If you need/want more information on WebQuests, visit the WebQuest web site at

<http://edweb.sdsu.edu/webquest/webquest.html>

The issue. As we see from the unit notes workload is a problem for adult distance learners. What are some strategies that distance educators can use to overcome this problem?

The Process. The forms that a WebQuest might take are limited only to the instructor's imagination. This WebQuest is designed in a way that will require you to work in groups. I will assign you to your groups. The groups will be posted on the WebCT conferencing forum on [date].

Each of the groups will be provided with a web document [see below] that provides an introduction and background information, as well as a group task and information sources (web links) that are needed to complete the task. The URL will be posted on the WebCT conferencing forum. The web resources will be anchors pointing to information on the Web, and might include raw data, experts, searchable databases, books, or other related documents available on the Internet relating the above issue (workload for distance learners). There will also be a description of the process that the groups should proceed through. Each group will also draw a conclusion that brings closure to the group activity.

Closure of this activity will be [date].

WEBQUEST

Workload and Motivation for Distance Learners

Adapted from "A WebQuest about WebQuests" (Dodge, 1999)

<http://www.biopoint.com/WebQuests/webquest2.html>

Introduction (case scenario)

You have just been hired as a team member for distance education services in your institution. While you are thrilled to have been offered this job, you suspect something is amiss because you are the fourth team member to be assigned in as many months. You have been told that your first task as a team member is to resolve the student enrollment issues. At first glance you are delighted to see the enrollment is so high in the distance delivered courses—then you become alarmed when you see the attrition rates.

This is definitely a problem that needs to be addressed. You know from your prior undergraduate learning that learners working at a distance tend to describe their workload as heavy or excessive. You recall that excessive workloads have been cited as a major cause of non-completion in distance learning. The course notes described McClusky's (1970) theory of margin as one way to explain why many distance learners do not complete their distance learning activities. But are there other motivational theories that might also explain (or better explain) the high attrition in distance education? And, do these theories perhaps have greater explanatory power than McClusky's theory? How might motivational theories be used to help understand learner attrition and implement strategies to overcome the high rates of attrition in distance education? And what strategies can both distance instructors and learners use to help with this issue? From now until [date], you are going to grapple with these questions—with your team members.

The Task

To acquire an understanding of attrition issues, we need to develop an understanding of motivation theory and teaching and learning strategies. One way for us to get a better understanding is to critically analyze web sites that relate to these issues and discuss them from multiple perspectives. As a team member, this is your task in this exercise: By the end of

this activity, you and your group will answer these questions:

What motivation theory(ies) helps us to best understand the adult distance learner—and why?

Based on your group's chosen motivation theory, what factor (or factors) is most influential in ensuring adult distance learners succeed in their distance learning studies? Of course, to answer this question, we also need to know what success means.

What teaching and learning strategies are effective in helping adult distance learners to experience success in their studies?

Resources

Here is a list of web sites for your group to access to help in answering the questions presented.

Teaching Strategies: <http://www.cdiponline.org/dlinfo/cdlp1/distance/teaching/teachable.html>

Strategies for Learning: <http://www.cdiponline.org/dlinfo/cdlp1/distance/strategies/strattable.html>

The Learning Strategies Database: <http://www.muskingum.edu/~cal/database/introduction.html>

Motivation: <http://chiron.valdosta.edu/whuitt/col/motivation/motivate.html>

Principles of Motivation:

<http://www.hcc.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/motivate.htm>

Methods of Motivation:

http://www.ferris.edu/htmls/academics/course.offerings/doylet/methods_of_motivation.htm

A Theory of Human Motivation: <http://psychclassics.yorku.ca/Maslow/motivation.htm>

Summary of Motivation Literature:

http://www.ferris.edu/htmls/academics/course.offerings/doylet/summary_of_motivation_literature.htm

Motivation-Where to Begin?:

http://www.ferris.edu/htmls/academics/course.offerings/doylet/Practical_Steps_to_Motivating_Students.htm

Keller's Model: http://www.ferris.edu/htmls/academics/course.offerings/doylet/kellers_model.htm

Intrinsic Motivation: http://www.ferris.edu/htmls/academics/course.offerings/doylet/intrinsic_motivation.htm

Control Theory-William Glasser:

http://www.ferris.edu/htmls/academics/course.offerings/doylet/Control_Theory.htm

Attribution Theory:

http://www.ferris.edu/htmls/academics/course.offerings/doylet/according_to_attribution_theory.htm

The Process - Role Playing (Dodge (1999) at

<http://www.biopoint.com/WebQuests/webquest2.html>)

You will address the above questions in a group format—you will be divided into groups of four. There will be three 'critics' that will float between the groups. In keeping with the spirit of Webquests, each of you will take on one of the following roles (note: I will assign each person a role):

The Organizer: You value time a great deal—and think these busy adult learners do too—as they try to juggle their work responsibilities and family life in between their learning. You believe that too much time is wasted in distance education on unfocused activity and learners not knowing what they should be doing at any given moment. To you, a good distance education course is one that delivers the most learning bang for the buck. If it's a short, unambitious activity that teaches a small thing well, then you like it. If it's a longterm activity, it had better deliver a deep understanding of the topic it covers, in your view. You would consider streamlining the course content, the provision of precise and explicit directions, with a firm and inflexible timeline as a good way to start to solve the problems of excessive workloads and the ensuing motivational problems that result in high attrition. You'd like to see the elimination of online conferencing forums used for discussion and group activities—this is really the biggest waste of time!

The Collaborator: To you, the best learning activities are those in which students learn to work together. Cooperative group work that forces collaboration and creates a need for discussion and consensus are the best in your view. Distance learning activities done by a student working alone, leaves you cold. Moreover, when learners are working in groups, rather than in isolation, you see this as being very motivating, as well as providing peer-to-peer support for the heavy workloads. Finally, building a sense of community and an online culture is a valuable aspect in the distance learning process. This provides a sense of belongingness to the learners, which is, again, very motivating.

The Intellectual: Higher levels of thinking and learning is everything to you. The only justification for bringing technology mediated distance delivered instruction into adult education is if the integration of technologies are used in ways to force learners to analyze information, synthesize multiple perspectives, and take a stance on the merits of something. You value activities that allow for some creative expression on the part of the learner. You see the need to have deep levels of discourse to facilitate critical, creative, and complex thinking skills. Furthermore, you value heavy, and meaningful, workloads as necessary to push students to their potential. Heavy workloads are very motivating to learners when high levels of learning and thinking are achieved.

The Technocrat: You love this technocratic era we are living in. You could techno-babble all day long. To you, the best kind of learning is the kind that makes the best use of the technology—so technology-mediated distance and/or distributed learning is right up your ally! If a technology can deliver instruction that has attractive colors, animated graphics, entertaining and lots of links to interesting sites, you love it. After all, if it isn't fun—why bother?! All educators should be looking at trying to achieve an 'infotainment' learning environment. Distance learning activities should be

designed with simulations and gaming environments. And, hey, what could be more motivating than playing while you're learning?!

The Critic: You seem to be the only one who REALLY knows what's going on with respect to workloads, motivation and distance learning. You think everyone needs a reality check. Let's just say it like it is: the only reason anyone participates in credentialled distance learning is for—can anyone guess??—yes!—the 'credentials'!! You bet—if it means a promotion and/or more money, distance learners will persevere through the courses to complete the program, irrespective of workloads.

Individually, you will examine each of the sites on the list of resources (above) and jot down some notes of your opinions on the perspective of your role. You will need to examine each site fairly quickly. Don't spend more than 10-15 minutes on any one site.

When everyone in the group has seen all the sites, it's time to get together to answer the questions (you will have to negotiate a time period for this within your group). Try not to wait for more than two days. Once everyone has reviewed the sites, one way to proceed would be to go around and poll each team member for the best responses to the questions from their perspective. Pay attention your team members' perspectives, even if at first you think you might disagree with them.

There will probably not be unanimous agreement, so the next step is to hammer out a consensus about your group's nominations most appropriate answers to each of the above questions. Pool your perspectives and see if you can agree on what's best for the adult distance learner.

One person in each group should record in a word document the group's thoughts. Keep the document to 1-2 pages and send it as a message posted to the group (not an attachment).

Conclusion

Adult educators care about removing barriers to participation, and distance delivered learning is one option to removing certain kinds of barriers (e.g., through place and time shifting). But as most of us know from our own experiences as distance learners, there are many problems associated with distance learning, with two notable examples being attrition and workloads. Most of us involved in distance education are very passionate about our side of the issue and how best to resolve the problems associated with distance and/or distributed learning. However, the most effective resolution to these problems is to acquire and consider as many perspectives on the issues as possible. When we are forced to view things from multiple lenses, we acquire a multiplicity of perspectives and are able to make more informed decisions.

About the Author

[Heather Kanuka](#) is an associate professor in the Centre for Distance Education at Athabasca University. Her areas of research include educational technology, higher education and faculty development. Her current research focuses on the impact of the Internet in higher education settings, with the goal of extending understandings of changes that occur in learning experiences as a result of the use of Internet technology as a communication medium.

Address: Athabasca University, Edmonton Learning Centre, 10030-107 Street, Edmonton, AB, Canada, T5J 3E4

APPENDIX 8

MI

Meg Costanzo

ABSTRACT

Meg Costanzo's primary research concern is how to identify her students' strongest intelligences through an MI assessment in order to guide their learning process. She begins her AMI journey by reflecting on her own intelligences and is then inspired to "encourage students to go through the same type of reflective process." In her small, rural program where learners prepare to take the GED or work on a task-based diploma program, Meg develops an assessment students can use on their own. She then encourages her students to explore their intelligences in greater depth through weekly dialogue journals. She discovers that "students appreciate having their intelligences acknowledged and valued. Many have never had the opportunity to claim their intelligences before this experience." Meg believes this deepened self-knowledge has served to increase her students' self-confidence which, in turn, increases the students' willingness to experiment

RESEARCH CONTEXT

I teach an evening Adult Basic Education (ABE) class at The Tutorial Center in Manchester Center, Vermont. To understand our learning center, you need to know something about our community. Located in southwestern Vermont in Bennington County (population 36,000), the Town of Manchester has a population of about 3,600. The area's two largest industries are tourism and retail trade, two sectors of the economy not traditionally known for creating high paying jobs. Manchester is also a popular retirement spot for out-of-staters. It is an area of contrast, with many very expensive estates and upscale neighborhoods, interspersed with pockets of poverty, especially in the outlying rural settings. My students have ranged in age from 16 to 54. The overwhelming majority are white, female native Vermonters. Most are working in service-oriented occupations; some are staying home to raise families. When asked about their interests and hobbies, my students generally list outdoor activities, natural science, animals, crafts, and family. Adult students come to The Tutorial Center to prepare for the GED tests or to earn a high school degree in the Vermont Adult Diploma Program (VADP). Since we have an open enrollment policy, they can enter the program whenever they wish and remain until they have met their educational goals. This means some students are in the class for a few weeks, while others register for a year or more, depending on their academic abilities. GED students follow a prescribed course of study developed around the tests they need to pass. VADP students work on basic competencies, write autobiographical essays, and work independently on a set of skills assigned by the state. This means that on any given night, each student might be working on a different assignment. Some students may just be beginning the program, while others are in the final stages of completing their work. The program is one that demands a great deal of flexibility on the parts of both the students and the teacher.

In April of 1997, I rewrote my research question and action plan to reflect a shift from group activities to ones where individuals could proceed at their own rate, while still participating in group projects that were more short-term in nature: *How can teacher and student, working collaboratively,*

- a. identify the student's strongest intelligences through MI-based assessment and classroom activities?
- b. use the understanding of these intelligences to guide the learning process?

RESEARCH QUESTION

Intelligence is the ability to solve a problem or to make something... carry something through to completion... being able to do something which is valued in at least one culture or community... There are abilities which either are or are not valued. If they are valued, we call them intelligence; if they're not, then we just ignore them.

Howard Gardner, Ph.D.

Address to the New England
Conference on Multiple
Intelligences in ABE and ESOL
Boston, MA – December 3, 1996

In my first teacher journal entry, written a month after hearing Gardner's address, I commented on how this definition had influenced me as I formulated my research question. From my twenty-three years of experience as an elementary school teacher of grades three to six, I knew the potential educational value of a project-based curriculum – increased participation and engagement in learning and opportunities for students to develop a wide range of skills while displaying their knowledge in a variety of ways. My initial research question reflected my desire to adapt those project-based classroom units and activities that I had found so successful with elementary school students to ones that would interest adult learners.

In *The Art of Classroom Inquiry*, Hubbard and Powers state "...many teachers have to do some wandering to get to their wonderings" (1993, p. 3). This was certainly the case in my research attempts. When I first applied to participate in the Adult Multiple Intelligences (AMI) Project, I was interested in researching how MI theory could inform the teaching of mathematics in adult learning contexts. While at the Institute in December of 1996, I changed the focus of my research to reflect my interest in project-based curriculum. My question then read, "*How can MI Theory guide the development of project-based learning activities that are designed to address the needs and interests of ABE students? b) What skills will be developed in the process and how can they be demonstrated in a résumé?*"

My teacher journal entries from the early months of 1997 chronicle my growing frustration as I attempted to implement my first research action plan. I expressed concern over student attendance, the resultant lack of continuity in lessons, and my inability to gather data relevant to my question. The program's open enrollment policy proved to be a major stumbling block in completing the long-term project work I assigned. Students simply did not stay in the program long enough. One group of students was often left to finish the work of others, and I found that the new students experienced difficulty motivating themselves to complete projects in which they had made no initial investment.

Hubbard and Powers also maintain that classroom inquiry often starts "...with a feeling of tension" (1993, p.3). My level of anxiety mounted steadily. By the end of March 1997, I realized that although I still believed in the advantages of organizing my class around a project-based curriculum, if I were to continue as a participant in the AMI Project, I would have to modify my question. I decided to return to my original area of interest – how MI theory could inform mathematics instruction. Feeling that this might be too limiting, I broadened the area of inquiry to address the learning process in general. This gave me more latitude should the composition of my class change.

In April of 1997, I rewrote my research question and action plan to reflect a shift from group activities to ones where individuals could proceed at their own rate, while still participating in group projects that were more short-term in nature: *How can teacher and student, working collaboratively, a. identify the student's strongest intelligences through MI-based assessment and classroom activities? b. use the understanding of these intelligences to guide the learning process?*

EVOLUTION OF MY WORK AND THINKING

I do not know whether the personal intelligences – or indeed any intelligences – have any absolute priority....But certainly I find the personal intelligences the most intriguing and challenging ones; they tell us the most about other cultures; and, of course, they tell us the most about ourselves.

Howard Gardner
in *Succeeding With
Multiple Intelligences*
(Boggeman et al., 1996, p.viii)

In December 1996, I began my participation in the AMI Project by reading two books simultaneously, *Frames of Mind*, by Howard Gardner, and *Seven Kinds of Smart*, by Thomas Armstrong. These two markedly different pieces of literature served as a foundation for my understanding of MI theory. In reading *Frames of Mind* I developed an awareness of the scope of Gardner's research and was particularly impressed by the numerous criteria he used to isolate and identify each intelligence (1983). Armstrong's book provided a way for me to move from Gardner's realm of the theoretical to the practical. In *Seven Kinds of Smart* Armstrong encourages the readers to:

- a. examine their own abilities as learners.
- b. celebrate their strengths.
- c. investigate their hidden intelligences.
- d. be optimistic about overcoming their weaknesses (1993, p.23-24).

It was during this phase of my research that I spent a lot of time in self-reflection regarding my own MI profile. While the books and articles that I have read helped to give me a foundation for understanding the theory, my own understanding of MI came about through my experiences in applying the theory in practice and my attempts to understand my own intelligences, as well as the intelligences of others whom I know well. These latter efforts probably gave me the most insight into what Gardner was trying to prove in his writings.

I spent a lot of time thinking about my childhood and the things that stood out in my mind – the types of toys with which I enjoyed playing, the activities in which I took part, the school subjects in which I excelled, my relationships with others. I began to reflect on the significance of these memories. These, among many other recollections, gave me an inkling to my own intelligences profile.

Then I started to think about something that I enjoy doing as an adult, something in which others

also recognize my expertise. On March 12th, I shared my reflections with Julie Viens, one of the AMI Research Project Co-Directors, by e-mail.

I also tried assessing my own intelligences in light of something I enjoy doing as an adult. I spend some of my leisure time doing counted cross stitch. I don't know how familiar you are with this craft, but, understandably, it is the kind of needlework that will drive some people out of their minds. Nonetheless, I enjoy it, but why?

At the end of my musings, I concluded my thoughts with this observation:

Intrapersonal - This is my favorite area upon which to reflect. I call my work on these projects 'cheap therapy.' While I am stitching I can focus on those things about which I want to think and block out everything else. I make most of my big decisions this way. New ideas and approaches come to me as I am stitching. I feel cheated when I don't have time to work on my needlework. It's an important part of my day, much like personal journal writing might be to someone else.

After mulling this over, I then decided to analyze how I learned to do something that required ability in an area that is not one of my strengths. I thought about how I learned to ski, a sport that certainly requires a person to draw upon his/her bodily/kinesthetic intelligence, not one of my strengths. My road to becoming a competent skier was a long one. It took me years to gain the confidence to be proficient enough to ski with my friends. Normally I would not have made the effort to achieve a skill level in sports, but in this case I did. I wondered why I had reacted differently in this situation.

After reflecting on why I like to do cross stitch and how I learned to ski, I realized that intrapersonal was indeed my strongest intelligence, and I had used that intelligence to learn about MI! By thinking about my own intelligences, my own strengths and weaknesses, I came to an understanding of what the theory was all about. Although the readings and institute were certainly helpful in clarifying aspects of the theory, it was only when I related it to my own life that I truly began to understand MI. At our March Institute, we received the results of the MIDAS questionnaire. I found it interesting that my MI profile from this assessment scale correlated so closely with the introspective piece I had just written. Once again my strongest intelligence came across as intrapersonal.

At this point in the project, I was inspired to develop an assessment tool which would encourage students to go through the same type of reflective process that I had just experienced. I tried using the "Personal Learning Preferences" form found in Bruce Campbell's *The MI Handbook* (1994, p. 31). Despite our class discussions about MI, I realized that some of my students did not possess the skills necessary to reflect upon their strongest and weakest intelligences. I thought about having the students respond to the checklist found in Armstrong's book (1993, p. 18-23), but felt the type of response it invited was too black or white. For instance, under the category "Linguistic Intelligence," the reader is asked to check whether or not this statement applies to them, "Books are very important to me." I felt a yes/no form of response to this type of statement would not really tell me much about the student as a whole or about linguistic intelligence. After examining C. Branton Shearer's MIDAS questionnaire (1994), I came up with my own AMI Assessment Survey. (See section on "Methods.") The process I went through in developing this tool further helped me to understand MI theory.

While I was working on this assessment tool, I was also reviewing several books that outlined MI-inspired lesson plans. They included *Multiple Intelligences in the Mathematics Classroom*, by Hope Martin; *The MI Handbook*, by Bruce Campbell; and *Seven Ways of Teaching*, by David Lazear. Although they were written basically for teachers at the elementary and middle school level, I felt that many of the plans could be adapted for use with adult students. When I was teaching students in grades three through six, I had used thematic units that involved projects and activities that I now realize had been in the spirit of MI theory. While I had wanted to do similar types of assignments with my adult students, I was reluctant to do so for fear that they would find this type of work too immature. At the March AMI Institute, several of my fellow researchers on this project shared some of the activities they were using with their students. Their success with these same types of assignments I had been considering gave me the encouragement I needed to take a risk and try some of the non-traditional plans I had long wanted to implement in the adult classroom.

In the fall of 1997, I became intrigued with the role the personal intelligences could play in the formation of an effective ABE program. After reading an article from *Educational Leadership* that discussed Daniel Goleman's book, *Emotional Intelligence*, I decided to read the book myself. I began to sense that one of the most important themes that was beginning to emerge from my research centered around the importance of the personal intelligences. When I had first begun studying MI theory, I had subconsciously dismissed interpersonal and intrapersonal intelligence into a subcategory that was less significant than the six other intelligences. Upon reading Goleman's book and rereading the chapter in *Frames of Mind* entitled "Personal Intelligences," I changed my attitude regarding these two intelligences. I was particularly interested in the section of the book that outlined Salovey's subsumation of Gardner's personal intelligences into his definition of emotional intelligence, which he then expanded into five domains:

- Managing emotions
- Knowing one's emotions
- Motivating oneself
- Recognizing emotions in others
- Handling relationships (Goleman, 1997, p. 43-44).

I then read *Succeeding with Multiple Intelligences: Teaching Through the Personal Intelligences*, a guide created by the faculty of The New City School. Besides giving me many interesting ideas for creative lesson planning, the introduction to the book helped to crystallize my beliefs about the personal intelligences. In the "Foreword," Howard Gardner wrote about the controversy surrounding his inclusion of the personal intelligences in MI theory; "When the theory of multiple intelligences was first introduced to the public, the idea of 'personal intelligences' proved especially controversial ...many readers – especially psychologists – balked at the thought that an individual's relation to others, or to herself, could be construed in a cognitive way." Gardner goes on to say that there is "...a growing acceptance of the notion that we need to be intelligent about the world of humans, as well as the world of objects and symbols" (Boggeman et. al, 1996, p. vii).

Further into this same piece, Gardner relates some of his attitudes towards the personal intelligences, indicating the role they can assume as "...vital participants in good education." He also states that:

“...the personal intelligences are more closely related to one another than any two other sets of intelligences....Indeed, I was often hard pressed to decide whether a particular exercise or goal constituted an instance of interpersonal intelligence, intrapersonal intelligence, or both. To a theorist, clarification of the relation between the intelligences remains important; for the practitioner, however, some attention to both is the primary mission” (p. vii-viii).

In addition to the literature cited above, I have listed other resources that had an impact on my research in the bibliography at the end of this paper.

METHODS

I would stress ... the importance of having a viable model of oneself and of being able to draw effectively upon that model in making decisions about one's life.

Howard Gardner
Frames of Mind (p. xviii)

Participants

I worked with seventeen students over the fifteen months of this research project. Only one was with me the entire time. All the students were white and English speakers. Two students had completed 8th grade as their highest level of education; two had finished one year of high school; six had two years of high school and the same number had completed three years. One student had recently received his GED diploma. The following chart shows how the remaining demographics of the group broke down.

	# Male	# Female	Total #
Age			
16 to 24 years	3	7	10
25 to 34 years	1	3	4
35 to 44 years	1	1	2
45 to 54 years	0	1	1

By the end of the research project, six students had met their educational goals; four had shown progress toward meeting theirs by passing at least one test; two were still enrolled, but had not taken any tests; three had moved out of the area, while two others had left for unknown reasons.

Data Collection

I gathered my data from the students, from the classroom and from my teacher journal and classroom plans. The data collection tools that I used with my students included interviews, dialogue journals, surveys and examples of student work which were stored in their personal resource books.

The first tool I introduced to the students was the dialogue journal. At the end of each class, I would set aside ten to fifteen minutes when the students could record their comments about the class in notebooks expressly provided for this purpose. The students could write about anything they chose, but I tried to focus their writings by offering open-ended questions like, "How did you find tonight's math lesson?" or "What type of brainstorming activities work best for you?" I would collect the journals, which were completed voluntarily, and respond to the entries written by the students, offering comments, suggestions and questions for them to ponder.

In the first couple of weeks of attending class, a new student would take the AMI Assessment Survey and plot his/her responses on a profile grid. (See chapter on "Assessment.") Deciding that I needed a way to make the new members of the class familiar with what we were doing in the project, I developed the AMI Assessment Survey and recorded the script on audiocassette tape. In the beginning of the tape I offer the rationale for exploring a student's intelligences, explaining why this information will help the student prepare for the GED exams or earn an adult diploma. Then the student listens to eight selections, each describing someone who might display a given intelligence. The student responds by indicating whether each selection describes him/her "very much," "a lot," "somewhat," "a little" or "hardly at all." The student then plots his/her findings on an "AMI Profile" grid and files this graph in front of his/her dialogue journal.

Although this survey does not give a definitive assessment of the student, it does provide a starting point to begin investigating a student's strengths, and a common vocabulary to use when discussing how the student learns best. The survey also shows my students that I am willing to look at each one of them as an individual. I find that they appreciate my interest, and this, in turn, makes them more willing to try different approaches to learning.

Periodically, I would review student work, looking for student strengths, and share these informal assessments with the student either in class or through comments in the dialogue journal. Each quarter, using a set of semi-structured questions I had designed to elicit information on how the students view themselves as learners, I would interview the students and record the results of our discussions. Additionally, to record data from the classroom, I wrote up anecdotal notes after each session. After writing up these notes, I then prepared a more formal account of the lessons in my teacher journal.

As I began collecting my data, I soon realized that I needed a way to compile it in a more effective manner. I developed another collection instrument which I entitled the "Cumulative MI Assessment Worksheet." I took information that I had gathered on each student and organized it in chart form under the headings "AMI Tape," "Writing/Journal" and "Observations/Interviews/Incidental Conversations." Periodically I would update this worksheet with new data.

I was able to obtain copies of videotaped sessions from Silja Kallenbach, one of the directors of the AMI Project, who videotaped my class in November 1997 and March 1998. I found the data I could glean from them very helpful in assessing my students' involvement in MI-inspired activities. This unexpected resource added a unique perspective to my data collection base.

FINDINGS

My own studies have shown that people love to [construct their own intellectual profiles]. Kids like to do it, adults like to do it. And, as an activity it's perfectly harmless. I get concerned, though, when people think that determining your intellectual profile – or that of someone else – is an end in itself. You have to use the profile to understand the ways in which you seem to learn easily. And, from there, determine how to use those strengths to help you become more successful in other endeavors.

Howard Gardner
Educational Leadership
(Checkley, 1997 pp.10-11)

A. How can teacher and student, working collaboratively, identify the student's strongest intelligences through MI-based assessment and classroom activities?

Evidence of student intelligences can found by:

1. observing how they approach the challenge of solving a problem.
2. examining their writings.
3. discussing their strengths with them.
4. surveying their likes and dislikes.

A. Findings

- Students appreciate having their intelligences acknowledged and valued. Many have never had the opportunity to claim their intelligences.
- Through communication in dialogue journals, many students were able to explore their intelligences in greater depth.

Through the use of surveys, observations of classroom interactions, analyses of work in their resource books, student interviews and interactive journal writings, the students and I were able to develop fairly comprehensive profiles of their strongest intelligences. In the clear majority of cases, the students reported enjoying this experience and found it to be a worthwhile activity. I think it is important to emphasize that the students' profiles were never viewed as something static or definitive; we constantly reviewed our findings and expanded upon the initial profiles as we accumulated further data. How we used the information we gathered is explained in Part B of this section.

On the following pages the reader will find case studies describing four of the students with whom I worked during this research project. All student names have been changed. Their writings have been edited for spelling only.

Finding 1A: Students appreciate having their intelligences acknowledged and valued. Many have never had the opportunity to claim their intelligences.

Roland

Roland was a student in my class when I began working on the AMI Project. He had already taken and passed three sections of the GED exam, but he still needed to work on math and writing. Roland had decided that, since math was his stronger subject, he would first work exclusively in writing.

I introduced MI theory to Roland and another student by writing the word “Intelligence” on the board and asking them to tell me the first thing that came into their minds. Roland’s response was to quickly say, “I.Q.” From there the two students offered responses like “not just having an education,” “common sense,” “the ability to put things together,” “artistic talent,” and “not just reading and writing.” During another class a couple of weeks later, I shared information about Gardner’s theory with the students. My notes from my teacher journal for the night of 1/27/97 indicate how Roland reacted to this information.

During the discussion, while we were looking at the diagram, Roland made the comment that he didn’t fit under any of the categories. It was nice to see both Donna and Libby turn to him and begin to point out areas in which he exhibited strength. This shows what a good rapport the group has – I was proud of them.

At the same time as these discussions were taking place, I also had the class working on a team building exercise. I had posed this challenge to the group – “What can we do, as a class, to make The Tutorial Center a more comfortable environment in which to work and learn?” As a class, the students had decided to requisition a larger white board for the classroom because the one we had was not large enough for all the students to see what was being demonstrated, nor was it big enough for students to work together at the board. Observing how the students reacted to this challenge gave me insight into all their intelligences. In particular, I noted in my teacher journal for the evening of 1/13/97, “Roland immediately jumped up to the present board and began measuring the wall.” I also indicated that he was the first to point out which boards from the catalogue would be too large for the wall space we had available.

When I began gathering data for this project, I had the class fill out Campbell’s questionnaire titled “Your Current Learning Preferences” (1994, p. 31). I met with each student individually afterward to discuss his/her responses. The notes from my meeting with Roland in March 1997 offer some further information that helped us to determine his MI profile.

Roland checked visual as his strongest intelligence. He told me that he can look at something, like an entertainment center, and just know right away how to put it together.

When I asked him if he was surprised by anything new he had realized about himself after answering the questions, he replied that he was now aware of how well he worked with others. I mentioned that he certainly likes to be physically active – fishing, hunting, skiing, hiking, riding. He agreed and said that one of the hardest things he found being in school was sitting still for long periods of time.

When I asked him if he had any questions or comments about the AMI Project, Roland told me that he was glad I had shared the ideas about MI theory with the class. He felt that this information could be helpful because it showed what “we would be good at.” Roland told me that he never knew or had never thought of this definition of intelligence before.

Later that spring, I developed the AMI Assessment Survey and asked the students to respond to it. Roland was one of the first to take the survey.

Name: <u>Roland</u>		Adult Multiple Intelligences Profile						
	Musical	Bodily/ Kinesthetic	Linguistic	Logical/ Mathematical	Visual/ Spatial	Interpersonal	Intrapersonal	Naturalist
Very Much								
A Lot		X			X	X		
Somewhat	X			X			X	
Just a Little								
Hardly at All			X					N/R

From his responses, it is apparent that Roland was very much aware of his strengths – bodily/kinesthetic, visual/spatial and interpersonal. Although I had not yet added a scenario for the naturalist intelligence at this point, I feel confident in saying that he also would have listed this as one of his strongest intelligences.

Our initial theory regarding Roland’s strongest intelligences was further verified when I examined two of his writing pieces for information about his intelligences. In March, Roland wrote an essay about what his ideal day would be like. He wrote about going fishing (and catching more fish than his brother). A few months later, Roland wrote another piece about something he does well. Although he listed fishing, hunting, skiing, socializing, and photography during his initial brainstorming session for this assignment, he chose to write about woodworking. My anecdotal notes from the evening of 6/25/97 provide a rich source of information about Roland’s intelligences.

Complained about having to write 150-200 words – others teased him, ‘Just be quiet and start writing!’ Used self-interviewing technique effectively...Ended up with a web filled with ideas. Wrote the first draft of his essay before leaving class. Mentions learning by watching dad at work. States, ‘I love going into churches to admire the art of woodworking.’ Likes the ‘ruggedness’ of a post and beam structure. Thinks he has a ‘creative mind and a taste for some unusual looking furniture.’

Mentioned that if he won the lottery, he would quit his job and spend his time helping senior citizens with home repair work, free of charge.

Roland’s acceptance of his strongest intelligence and his willingness to apply it to the writing process developed over the course of the semester. In January, he could not find himself in the descriptions of any of the intelligences. By May, he was claiming his intelligence without my prompting, but still not drawing upon it voluntarily when faced with the challenge of a writing

assignment. My teacher journal dated 5/19/97 highlights this lack of connection:

At this point, in the midst of five other students working on different learning activities, we talked about Roland's effort [on his essay]. At first he expressed concern as to whether or not he would be able to complete the GED Writing test within the prescribed time limits. Then he said, 'I'd like to see these people put together a home entertainment center under these conditions.' He questioned our discussions about multiple intelligences. 'What good is it being intelligent this way [spatially]? I might as well stick to woodworking.' I asked Roland if he had used a web to collect his ideas. He told me he hadn't. Roland seemed a little calmer after our talk, and he set to work rewriting his essay. His revised copy was not only better constructed, his handwriting also showed less anger and frustration.

In the "Reflections" section of my notes for the evening, I express my dismay that I had not picked up on something that Roland had said that night during our conversation. "I had been so concerned that Roland had not used a web to plan his essay, that I completely overlooked the fact that he had said something far more significant. He had acknowledged his spatial intelligence" (Personal Journal, 5/19/97). This was a big step in his internalizing his unique profile of strengths.

By June, Roland had recognized that a web was as an effective way for him to gather his ideas before attempting to write an essay. Like many students, it had taken a while for him to internalize this realization. Roland's path to understanding his intelligences was typical of many adults in my class – awareness first, then acceptance and finally willingness to apply what he has learned.

While I was able to gather a lot of information regarding Roland's intelligences from my discussions with him and my observations of him in class, unfortunately I was not able to learn a lot about him from his dialogue journal entries. In my teacher journal I describe him as "a man of few words" (Personal Journal, 1/29/97) On the other hand, I was able to learn about many of my other students by analyzing their dialogue journal entries. Even Mike, who started out writing very little at the end of each class, became more comfortable with this method of communication as time went on.

Finding 2A: Through communication in dialogue journals, many students were able to explore their intelligences in greater depth.

Betty

One student who revealed a lot about herself in her dialogue journal right from the beginning was Betty. Below you will find her AMI Assessment Survey grid and excerpts from a running dialogue taken from her journal entries. This information was extremely helpful when we formulated a more comprehensive view of her strongest intelligences.

Name: Betty		Adult Multiple Intelligences Profile						
	Musical	Bodily/ Kinesthetic	Linguistic	Logical/ Mathematical	Visual/ Spatial	Interpersonal	Intrapersonal	Naturalist
Very Much	X					X		X
A Lot					X			
Somewhat			X				X	
Just a Little								
Hardly at All		X		X				

I want the reader to understand that the following actually only represents a very small portion of our correspondence with one another between September and December 1997. I have included these selected excerpts, nonetheless, to show the reader how valuable the dialogue journals were to my research and to emphasize their importance in establishing an atmosphere of trust and understanding between student and teacher. Betty's comments are in regular print; mine appear in italic.

9/15 The ... meeting with the group discussion was very good...Upon my first day of class [I was] quite nervous.

9/16 *You mentioned one thing...that I'd like to explore further. You said, 'The thought of failure scares me to death!' I wonder, with all the successes in your life, why you still have this fear. I also like to think of 'failure' as an opportunity to learn from your mistakes. Thomas Edison had many, many failed attempts when he was working to develop the electric light bulb...He saw that each failure was a chance to learn what wouldn't work.*

9/17 I appreciate your comments also on my first night of class. The math will be the hardest but I will conquer it.

9/18 *Let me know how your math is coming along. What do you find helpful? What would you like to see done differently?*

9/22 The tape on Multiple Intelligences Profile...was a good exercise to make you think then show your weaknesses and strengths.

9/23 *Now I'm interested in learning what you think are your strengths. Building on your intelligences will help you with subjects like math. Too often people try to learn new material by using the old ways which never seemed to work in the first place. I hope you'll be able to come up with the best ways for you to learn.*

Name: Betty		Adult Multiple Intelligences Profile						
	Musical	Bodily/ Kinesthetic	Linguistic	Logical/ Mathematical	Visual/ Spatial	Interpersonal	Intrapersonal	Naturalist
Very Much	X					X		X
A Lot					X			
Somewhat			X				X	
Just a Little								
Hardly at All		X		X				

I want the reader to understand that the following actually only represents a very small portion of our correspondence with one another between September and December 1997. I have included these selected excerpts, nonetheless, to show the reader how valuable the dialogue journals were to my research and to emphasize their importance in establishing an atmosphere of trust and understanding between student and teacher. Betty's comments are in regular print; mine appear in italic.

9/15 The ... meeting with the group discussion was very good...Upon my first day of class [I was] quite nervous.

9/16 *You mentioned one thing...that I'd like to explore further. You said, 'The thought of failure scares me to death!' I wonder, with all the successes in your life, why you still have this fear. I also like to think of 'failure' as an opportunity to learn from your mistakes. Thomas Edison had many, many failed attempts when he was working to develop the electric light bulb...He saw that each failure was a chance to learn what wouldn't work.*

9/17 I appreciate your comments also on my first night of class. The math will be the hardest but I will conquer it.

9/18 *Let me know how your math is coming along. What do you find helpful? What would you like to see done differently?*

9/22 The tape on Multiple Intelligences Profile...was a good exercise to make you think then show your weaknesses and strengths.

9/23 *Now I'm interested in learning what you think are your strengths. Building on your intelligences will help you with subjects like math. Too often people try to learn new material by using the old ways which never seemed to work in the first place. I hope you'll be able to come up with the best ways for you to learn.*

9/24 Class is going fine. I really appreciated the extra help in the math department. When being shown how to (rather than trying to grasp from a booklet the needed instruction) makes it much easier. I feel a lot more comfortable in class this week...I really look forward to coming to class but to also see new friends.

9/25 It was good to hear that you're feeling more comfortable in class...Being comfortable helps to bring down a lot of the defenses that made learning difficult in the past.

10/8 The math does seem easier now than in the beginning but it still is confusing at times. Yes, the addition and subtraction are easy but questions like: which is larger $1/8$ or $3/4$? I have to do the actual math. Maybe I am too hard on myself but that is only because I want to succeed.

10/10 I'd like you to try using your visual/spatial intelligence when comparing fractions like $1/8$ and $3/4$. We'll start with actual fractions pieces and then try forming a mental picture of them which you can draw upon in the future. Also try using your linguistic intelligence to describe a fraction. Example, " $1/8$ means break a whole into 8 equal parts and look at one of those eight pieces." Try actually visualizing yourself cutting a cake into eight pieces and eating one of the pieces. Have you eaten much of the cake? Now try visualizing cutting the cake into four pieces and eating three of the four ($3/4$) pieces. Have you eaten much of the cake?

10/13 Tonight's class went by quickly. I miss the other classmates but it is nice to be able to have individual help. Class is easier now than the start...I look forward to Monday and Wednesday class....I am determined to do this because graduating means everything to me. I want to fill a void that has been with me for many years plus it will give me one more accomplishment in my life.

10/14 Your enthusiasm is catching....What have you learned about yourself as a learner so far?

10/15 Thank you for 'your' comments about my positive comments....I have learned that I can do this program if I work [at] it. I have also realized (learned) that I am very fortunate in some ways such as: being in the work force with a good job, being successful in that job, having experienced many different life events that I feel [help] me to pursue my diploma.

10/16 You sound like a person who knows herself well. I think your intrapersonal skills are just as strong as your interpersonal skills. You are able to set goals for yourself, carry out the plans needed to achieve your goals, meet challenges and reflect on the positive and negative events in you life.

11/5 Compared to others in the class, I feel like the 'oldest beginner'. By that I mean, I'm the oldest member of [the] class and have only participated in a few of the activities. I have enjoyed the recruitment project the best because a lot of the material we used were very familiar to me and I could share my knowledge. The most helpful activity will be the autobiography unit. This project will enable me to find or to become more aware of weaknesses and will hopefully lead me to strengthen them....I like your way of remembering the math. The visual can help and make the learning of the fractions easier.

11/6 You have such a way with words! I love your expression 'oldest beginner.' The more I get to know you, the more I think that your linguistic intelligence is stronger than you may believe.

12/3 You are right in saying I have accomplished a lot in three months. The one thing I have learned about myself is that I can do it and not underestimate myself.

As my research came to an end, Betty wrote the following piece to describe her participation in the AMI Project.

While attending The Tutorial Center and completing my high school education through The Vermont Adult Diploma Program, I was able to acquire knowledge about myself that I never knew existed. Meg Costanzo, my instructor for the program, was very instrumental in teaching me about multiple intelligences... she gave me a little exercise to do to see what my interests were in several categories. This was actually a fun task to perform...It was amazing to learn about my intelligences and to identify with them.

B. How can teacher and student, working cooperatively, use the understanding of these intelligences to guide the learning process?

This next part of the “Findings” section shows how the students and I applied the information about their strongest intelligences during our classroom interactions. Working with the students to make them aware of their unique intelligences profiles led most of the students to become more willing to take risks and experiment while learning. I will begin my answer to Part B of my research question by referring back to Betty, whose profile the reader has just examined above. Betty’s experiences with self-reflection mirror those of many of the students with whom I worked during this project.

Finding 1B: Through the process of examining their strongest intelligences, the students gained self-knowledge that helped them increase their confidence as learners.

Betty told me during one of our first classes on September 17, 1997, that she would find it a challenge to write a poem about why people might admire her. In my anecdotal notes for that evening, I write that she mentioned that she would have trouble praising herself because she was so used to putting herself down instead. As the semester progressed, Betty became more willing to contemplate her strengths and view herself in a more positive light.

Throughout the period of time I worked with Betty, I saw more and more evidence of her growing self-confidence. This was reflected in her journal entries (see above), our interviews and her increased willingness to help other students in math. Perhaps the poem she wrote about herself best illustrates this change. During an autobiography unit the class completed at the end of November, Betty elected to write a diamante poem about herself. (A diamante is a structured poem that asks students to use adjectives, verbs, and nouns to describe a given topic.)

To me this represented a breakthrough for Betty and shows considerable growth on her part. I believe much of this positive change was due to Betty’s acceptance of what she had learned about herself as a result of our discussions regarding multiple intelligences.

B. Findings

- Through the process of examining their strongest intelligences, the students gained self-knowledge that helped them increase their confidence as learners.
- Generally, self-knowledge also led to an increase in the students’ willingness to experiment with new, nontraditional learning strategies.
- Students need to have MI-inspired learning strategies demonstrated to them frequently and repeatedly before they will feel comfortable utilizing them.
- Students prefer to have a choice in how they demonstrate what they have learned.
- When given open-ended challenges, that allow them to draw upon their strongest intelligences, students begin to approach problem solving in unique ways, looking at this process from “outside the box.”
- The application of MI theory in adult learning contexts can inform the instruction of reading and writing, as well as mathematics.
- Each student’s individual intelligence profile dictated the type of learning strategy that I would emphasize during our sessions together.
- Changes in students’ approaches to learning appeared to be accelerated by their knowledge of their unique multiple intelligences profiles and their work on activities and projects inspired by MI theory.
- Teachers should pay particular attention to the personal intelligences when designing a program for adult learners.
- Adult students are enthusiastic about real-life projects and are willing to take a role in how their learning programs are designed.
- Many adult students would prefer to work in groups and help each other learn.

Betty
 Dependable Diligent
 Giving Working Shopping
 Woman Jay Corrine Rae
 Betty Smith will be a graduate in June.
 Lynn Jimmy GrandAm Cats
 Golfing Selling Cleaning
 Generous Courteous
 Smith

Finding 2B: Generally self-knowledge also led to an increase in the students' willingness to experiment with new, nontraditional learning strategies.

Mike

Mike is another student whose awareness of his strengths helped him overcome some learning difficulties, especially in the area of mathematics.

Name: <u>Mike</u>		Adult Multiple Intelligences Profile						
	Musical	Bodily/ Kinesthetic	Linguistic	Logical/ Mathematical	Visual/ Spatial	Interpersonal	Intrapersonal	Naturalist
Very Much								
A Lot		X						X
Somewhat					X			
Just a Little	X			X		X	X	
Hardly at All			X					

My teacher journal entry from the evening of April 30, 1997, helps to create a picture of the “math paralysis” experienced by Mike prior to his acceptance of his strongest intelligences. My aim since January 1997 had been to encourage Mike to use his strongest intelligences when working in math, especially in relation to word problems. Mike seemed willing to accept that he had strengths and there were alternative ways of learning, but he was unable to put this awareness into practice.

I began the lesson by copying the glossary definitions of area and perimeter on the board. I then asked the student (Mike) if he could recall the formulae for calculating the same. After some initial difficulty, he was able to come up with the two formulae. We discussed the fact that, even though we had worked on this subject matter last Wednesday, the concepts were

already becoming fuzzy, especially area. We talked about how traditional lessons are typically presented in either linguistic or logical-mathematical formats, and how these two ways of learning something might not be the best ones for him.

I then asked Mike to try using a different intelligence to record the meaning of the two terms. He decided he wanted to use his spatial talents to graphically represent perimeter and area. His drawing for perimeter was clearer than his one for area. I then gave him this problem to solve:

Consider rectangle ABCD. If side AB = 12 inches and side BC = 9 inches, what is the area of triangle ABC?

Mike expressed confusion about how to proceed. I asked him what intelligences were evident in the problem. He noted linguistic and logical-mathematical. We discussed how he needed to approach the problem using his strongest intelligences – that he had to translate the information into a form that would be easier for him to process. Mike appeared physically relieved when I offered this suggestion. After a short time, he had the problem solved. I had him cut the rectangle into two parts to prove that his answer was correct. Then I asked him to come up with a notation for his resource book that would help him remember how to solve a similar problem in the future. Mike drew a rectangle, divided into two equal parts, and shaded the two parts in different colors.

My reflections on this part of the evening's lesson indicate my concern that Mike was still stymied by these types of math problems.

Despite the use of manipulative materials in previous lessons, Mike is reluctant to begin the problem solving process in a non-traditional way. He has not "bought into" the concept that he should draw upon his strongest intelligences when initially approaching a problem. Yet he is quite willing to use such materials when prompted to do so.

Despite this, I sensed that Mike's understanding of his strongest intelligences could provide a way to get beyond this difficulty.

I was surprised that Mike was so comfortable with MI theory. He seems to have a better understanding of the different intelligences than I expected. I had expected him to be thrown off by some of the terminology, but Mike uses the terms with surprising accuracy. Once again, I note that Mike is showing signs of having a stronger logical/mathematical leaning than I previously would have thought.

Finding 3B: Students need to have MI-inspired learning strategies demonstrated to them frequently and repeatedly before they will feel comfortable utilizing them.

At this point in the research project, I became aware that it would take a considerable amount of modeling and practice before I would begin to see any significant changes in how the students approach the learning process. I decided to include more open-ended math problems in my lessons and found that the students liked experimenting with challenging problems. On the evening of May 7th, I tried this approach:

I gave the students an area problem involving an L-shaped figure that was labeled in such a way that they had to figure out some of the unmarked sides before they could begin computing the area. Jennifer and Mike worked together. Jennifer came up with the missing dimensions and explained how she arrived at the answer. Then Mike determined that, by squaring off the figure, computing the entire area, and subtracting the squared off portion, the area of the L-shaped figure could be found. He explained the process to Jennifer, who caught on quickly.

I then asked the students if they could come up with another way to solve the problem. After a short period of time, Jennifer noticed that you could make two rectangles from the L-shaped figure by extending one of the lines. The students then found the area of the two smaller rectangles. We checked the answers against the first solution.

Next I gave them four toothpicks and asked them to think of each toothpick as one unit. The problem was to find a geometric figure with a perimeter of 4 units. Jennifer immediately made a one unit square. I asked if there were any other solutions. Jennifer made a parallelogram. I encouraged the students to find other solutions. Mike suggested breaking the toothpicks in half. The students made a hexagon and an octagon from combinations of pieces. I asked the students to prove that the perimeter of each figure was 4 units. Jennifer put 4 other toothpicks end to end and then compared the component pieces against this 4 unit line.

I then asked the students to make another rectangle with a perimeter of four units. Mike combined one and a half units to come up with a rectangle that was $1\frac{1}{2}$ by $\frac{1}{2}$.

After the lesson was over, I reflected on the success of this approach.

The students really enjoyed the challenge of solving problems with multiple solutions. At the end of the evening, Mike told me that he had really enjoyed class this evening. He described the session as 'intense.' I want to ask him why he felt that way. Perhaps it is because he is more engaged in the activities now that he has more of an opportunity to draw upon his strongest intelligences as he works through the problems.

I thought they might have been more intimidated by this type of problem. Instead they dove right into solving them.

The students are using manipulatives without prompting from me. They are more comfortable with ambiguity.

Finding 4B: Students prefer to have a choice in how they demonstrate what they have learned.

Both Betty and Mike confidently drew upon their strongest intelligences when they were doing a review lesson on measurement. The following is an entry from my teacher journal dated December 3, 1997. It describes how each student chose a different way to represent his/her understanding of the material we had been studying.

Description of Lesson *I had the class divide a large (12" x 18") piece of white paper into eight boxes. Then they numbered each box #1-#8 on the front and #9-#16 on the back. I told them that I was going to name various units of measure. They were to write or draw whatever comes to mind when they hear that term. The units I mentioned were the following:*

- | | |
|---------------|----------------|
| 1. Inch | 9. Meter |
| 2. Cup | 10. Yard |
| 3. Milliliter | 11. Millimeter |
| 4. Quart | 12. Gallon |
| 5. Kilometer | 13. Foot |
| 6. Gram | 14. Centimeter |
| 7. Liter | 15. Kilogram |
| 8. Pint | 16. Pound |

Observations *As soon as I gave the directions to the lesson, Betty said, 'This is a good idea.' The students completed the assignment quickly, with little hesitation. I noticed that those who were drawing needed greater time to complete each section. When we began a wrap-up of the activity, Betty said, 'The metric ones are the harder ones.' Mike mentioned that he used mostly drawings to represent the units. 'How would you make a cup? You'd draw it.' Carolyn frequently used equivalents written in equation form to show her understanding of the relationships between the various units. Betty was more likely to write out descriptions of what came to mind when she heard the term. For example, when I said the word 'pint,' Betty wrote 'heavy cream,' Carolyn noted that 2 cups = 1 pint and Mike drew a measuring cup showing two cups equaling one pint. The same was true for the term 'quart'; Betty wrote 'milk,' Carolyn noted that 4 quarts = 1 gallon and Mike drew a quart of milk.*

I thought they might have been more intimidated by this type of problem. Instead they dove right into solving them.

The students are using manipulatives without prompting from me. They are more comfortable with ambiguity.

Finding 4B: Students prefer to have a choice in how they demonstrate what they have learned.

Both Betty and Mike confidently drew upon their strongest intelligences when they were doing a review lesson on measurement. The following is an entry from my teacher journal dated December 3, 1997. It describes how each student chose a different way to represent his/her understanding of the material we had been studying.

Description of Lesson *I had the class divide a large (12" x 18") piece of white paper into eight boxes. Then they numbered each box #1-#8 on the front and #9-#16 on the back. I told them that I was going to name various units of measure. They were to write or draw whatever comes to mind when they hear that term. The units I mentioned were the following:*

- | | |
|---------------|----------------|
| 1. Inch | 9. Meter |
| 2. Cup | 10. Yard |
| 3. Milliliter | 11. Millimeter |
| 4. Quart | 12. Gallon |
| 5. Kilometer | 13. Foot |
| 6. Gram | 14. Centimeter |
| 7. Liter | 15. Kilogram |
| 8. Pint | 16. Pound |

Observations *As soon as I gave the directions to the lesson, Betty said, 'This is a good idea.' The students completed the assignment quickly, with little hesitation. I noticed that those who were drawing needed greater time to complete each section. When we began a wrap-up of the activity, Betty said, 'The metric ones are the harder ones.' Mike mentioned that he used mostly drawings to represent the units. 'How would you make a cup? You'd draw it.' Carolyn frequently used equivalents written in equation form to show her understanding of the relationships between the various units. Betty was more likely to write out descriptions of what came to mind when she heard the term. For example, when I said the word 'pint,' Betty wrote 'heavy cream,' Carolyn noted that 2 cups = 1 pint and Mike drew a measuring cup showing two cups equaling one pint. The same was true for the term 'quart'; Betty wrote 'milk,' Carolyn noted that 4 quarts = 1 gallon and Mike drew a quart of milk.*

***Implications** I was very encouraged by the diverse approaches that the three students took in completing this assignment. I sensed that the students were comfortable in selecting their own methods to record their responses. No one stated that his/her answers were 'wrong' or 'should have been' like someone else's. I was pleased that the students had the confidence to tackle the assignment on their own terms. Old habits are dying!*

In addition to having choices when doing individual lessons, the students also responded very positively to having choice in what they learn and how they present evidence of their understanding during project work. A quote from my December 1997 interview with Mike sums up the typical student's attitude about the projects we completed as part of this study.

I like the class projects. Everyone gets to participate. You have choices. You feel more comfortable when you have choice. Then you're willing to do more and you do better.

Other students frequently voiced this same attitude during our interviews. (See page 25.)

Finding 5B: When given open-ended challenges that allow them to draw upon their strongest intelligences, students begin to approach problem solving in unique ways, looking at this process from "outside the box."

Mike's math skills continued to improve as he progressed in our program. I was struck by how comfortable he had become working on word problems when I reviewed a video taken on March 30, 1998, the evening of our last class together. I had given the students the following challenge: *Making only three cuts, slice a donut so that you end up with at least 10 pieces.*

My notes written after viewing the video indicate how Mike approached the problem.

Mike notices that the challenge doesn't call for making equal pieces and states, 'So they don't have to be equal pieces.' He starts drawing a donut on a piece of paper.

Mike says, 'You could do it on paper. If you do it on paper, you don't have to stop.' I ask him to demonstrate what he means. He asks me to draw the donut on the board, so I do as he approaches the front of the room. Mike begins by drawing the lines of the cut in the air above the board. He says he will be able to get about 12 pieces out of one cut and proceeds to draw a serpentine line that weaves through the donut with one continuous motion.

In our wrap-up discussion, I ask the class if there is anything they learned from this exercise that could be applied to real life problems or challenges. Mike tells the class to look beyond the obvious.

Mike replies, 'Things aren't always so cut and dry...Everything's not norm, as norm would be.'

I note in my journal entry for the night that I am pleased to see the level of confidence Mike and the

other students displayed as they went about this task. Before our work on this project, the students probably would have been more reluctant to take the risks involved in meeting this type of challenge. Their understanding and appreciation of their intelligences gave them permission to try new approaches to learning, to experiment, to take risks.

Finding 6B: The application of MI theory in adult learning contexts can inform the instruction of reading and writing, as well as mathematics.

Jennifer

When I began participating in this project, I could see more clearly how the application of MI theory could inform the instruction of math, but I was less sure how I could apply the theory to the teaching of reading and writing. My work with Jennifer helped me broaden my understanding of MI’s implications.

One of Jennifer’s self-stated goals in our program was to improve her reading comprehension. She felt she was too easily distracted when reading and, therefore, her retention of information was poor.

Name: <u>Jennifer</u>		Adult Multiple Intelligences Profile						
	Musical	Bodily/ Kinesthetic	Linguistic	Logical/ Mathematical	Visual/ Spatial	Interpersonal	Intrapersonal	Naturalist
Very Much		X			X	X		
A Lot	X							
Somewhat			X					
Just a Little				X				X
Hardly at All							X	

As I began my work with Jennifer, she was quick to pick up on her learning strengths. In her dialogue journal dated March 21, 1997, Jennifer writes,

I realized that I learn faster by visual. I like working by myself. I am very easily distracted. It's not really that I learned more about myself it's just that I never really thought about that kind of stuff!

After drawing attention to her strongest intelligences, I suggested that Jennifer use a combination of these strengths to help her improve her reading comprehension. I pointed out to her that good readers are always questioning themselves as they read in order to self-monitor their comprehension; I had Jennifer practice a similar technique whereby she came up with questions for each paragraph

she read. She wrote the questions down on one side of a paper that was folded in half from the right hand edge to the margin. After composing the questions, Jennifer then wrote the answers on the other side of the fold. In effect, Jennifer was having a “conversation” with herself as she read. Writing the information down helped to reinforce comprehension. When Jennifer wanted to review the matter, she could fold over the part with the answers, reread the questions and then determine for herself her level of understanding. In her dialogue journal for the evening after this lesson, Jennifer expresses her opinion about this technique.

Thanks for explaining that there are different ways to take notes. I think these will help me a lot!

Jennifer’s response to this method of improving comprehension was positive. In my anecdotal notes, I write,

Introduced to “learning to learn” method for improving comprehension. Quickly understood how to format Q and A. Was able to locate information easily.

I also encouraged Jennifer to focus on any pictures that accompanied the material she was reading. While we were working on a biography of Harriet Tubman, she told me that she found the illustrations helpful in comprehending the story. Jennifer also seemed to enjoy discussing “what if” questions such as, “If you had been a slave in the South, would you have attempted an escape using the Underground Railroad? Why or why not?” My anecdotal notes from the evening of 10/20/97 indicate how Jennifer is responding to reading activities designed to encourage the students to draw upon their strongest intelligences as they read.

Read chapter in bio of H.T. – good comprehension – has thoughtful look on face during discussions. Noted that she learns best visually.

I then suggested to Jennifer that she form her own illustrations in her mind as she reads. We practiced reading a few paragraphs at a time, and I asked her to tell me what images she had formed as we went along.

Finding 7B: Each student’s individual intelligence profile dictated the type of learning strategy that I would emphasize during our sessions together.

A dialogue journal response that I wrote to Roland on May 15, 1997 exemplifies this personalized approach.

I have been giving a lot of thought to what you said about taking the GED Writing Test. I can understand your concerns about the time limits. Unfortunately, they are a reality that you have to deal with. The challenge that faces you is to see how you can take advantage of your strengths to overcome some of the obstacles that you feel are in your path.

I would like you to think about how you would go about putting together a home

entertainment center. Break the process down step-by-step. What do you need to finish the job? What do you do if you make a mistake? What do you do when you become frustrated by the job? I'd like you to share your thoughts with me. You could do this by writing an essay about the subject, or you could simply tell me what you do. You could also write up a step-by-step list of how you would handle the task, or you could make a video showing me what you would do. I don't care how you present this information - I'll leave that decision up to you. I am interested in knowing how you go about a job like this. Perhaps we can take some of the things you have learned doing this type of work and apply it to 'constructing' an essay. What do you think?

As one takes note of the different lessons and projects that I used in my class, the reader may come to the realization that many of the teaching techniques I have presented are not necessarily new or revolutionary. The difference was in my students' willingness to accept that there are different learning approaches and to understand which approaches work best for them individually. This was not a change that took place overnight; the awareness and acceptance had to be nurtured and encouraged over time.

Finding 8B: Changes in students' approaches to learning appeared to be accelerated by their knowledge of their unique multiple intelligences profiles and their work on activities and projects inspired by MI theory.

Before I go on, I would like to bring you up to date on the four students whose case studies I have highlighted on the previous pages. Roland did take the writing portion of the GED exam and passed with a respectable score. He was so pleased with the essay he had written that he wanted the testing center to give him a copy of his paper. Jennifer passed the reading and written math portions of her diagnostics tests for the Vermont Adult Diploma Program. Although work commitments have kept Roland and Jennifer from progressing any further toward meeting their educational goals for the time being, I hope that both will pick up their studies again in the fall. Betty and Mike completed all their testing and requirements for the adult diploma program and graduated in June 1998. Of course, I cannot state unequivocally that these results were directly the result of my use of MI-inspired activities and projects in our class. However, I have to believe that, based on the overwhelming positive response by the students to this new approach to learning, the application of MI theory in an adult learning context did play a major role in the successes achieved by the four students studied above, as well as the successes of a number of other students with whom I worked over the period of this research project.

Finding 9B: Teachers should pay particular attention to the personal intelligences when designing a program for adult learners.

I would have to say that my most surprising finding is how the personal intelligences emerged as such an important element in my research. Eventually, some of the methods I developed as a means to help me gather data for the project – dialogue journals, self-assessments and interviews – became, in themselves, an end; they served as a model for good classroom practice and a method for nurturing and developing the personal intelligences. My students responded positively to those types

of activities that emphasized the interpersonal and intrapersonal intelligences. They showed a preference for group activities and social interaction. They demonstrated a growing acceptance of constructive feedback, especially when it came from their peers. Additionally, they were receptive to those activities that helped them to recognize their strengths, accept limits, take risks and expand their horizons. Through our work on MI-inspired lessons and projects, the students learned to tackle problems in an original way, persevere and overcome frustration. Most students seemed thirsty for the opportunity to develop their personal intelligences.

With this in mind, I would recommend that teachers consciously incorporate those types of activities that promote growth in the personal intelligences into their academic program:

<u>Interpersonal</u>	<u>Intrapersonal</u>
Activities involving strategizing	Autobiographies
Oral presentations	Interest inventories
Panel discussions	Predictions
Debates	Personal narratives
Team building	Goal setting
Community service	Reactions to open-ended situations
Reciprocal teaching	Personal time lines
Group design	Stories involving life experiences

Finding 10B: Adult students are enthusiastic about real-life projects and are willing to take a role in how their learning programs are designed.

The students reported enjoying both the MI-inspired lessons and projects we did in class. While contextual constraints prevented the students from working on projects of a more long-term nature, they told me that they liked our shorter term learning projects. I think that was because these projects could be completed in a relatively short period of time. The students appreciated having a choice in what they could do for these assignments. For example, the class worked on the following challenge in the fall of 1997: *How can we, as a group, encourage other adults to attend classes at The Tutorial Center?*

When we began our planning, one student asked me if we were really going to carry out the ideas that we came up with or if this were "...just an exercise." When I told the group that we were actually going to try to attract new students into our program, they tackled the challenge with added enthusiasm. The students designed a new flyer for our center, interviewed former graduates to obtain their feedback, wrote a public service announcement, brainstormed ways to improve the sign in front of our building, and conducted a survey to determine which type of sign would be the best advertisement for the center. Throughout the project the students were able to display their intelligences by selecting activities that allowed them to showcase their strengths.

While I was sifting through my data and sketching out the themes that I saw emerging in relation to my research question, I began to realize more and more how my students had become "co-researchers" with me on this project. For my December 1997 interview, I decided to ask them what they thought I should tell other teachers about our classes and what advice they would want to give teachers to help them plan effective lessons for adult learners. Their responses support

the significance of emphasizing all the intelligences and, in particular, the personal intelligences when planning an ABE program. I have categorized their comments into four main categories:

1. Spend time getting to know the students' strengths.

Mike: Know the person you are teaching.

Betty: Listen to the student's needs.

2. Encourage students to draw upon their intrapersonal intelligence.

Mike: Students have to know their goals.

Betty: Some students are doomed before they begin if they don't have the right attitude. The students have to bring something to this, the desire to do their best. Otherwise it won't work.

3. Plan varied lessons that can reach the students through their strengths.

Mike: [The MI] profile will help you know which way to teach. Look for similarities in profiles and use that approach.

Betty: Try to figure out why we don't understand something and then use a different approach, not just the same thing over and over again.

Carolyn: You benefit from problem solving activities.

Jennifer: The math activity [review game] was very effective. Use more "hands-on" activities.

Mike: Use different learning tools.

Betty: Use creative ways to get the students involved, like the cubes [Autobiography Unit] and the measurement activity. They make learning fun and interesting. MI theory can help because it leads to creativity in lesson planning.

Carolyn: Make the lessons understandable, give clear instructions, talk about it, give an example.

Jennifer: I liked [the units or projects] personally, like the cube and the time line [Autobiography Unit]. They helped me think more about myself this time. I'm usually thinking about others. This gave me time to think about me.

4. Plan activities that encourage students to draw upon their interpersonal intelligences.

Carolyn: Sometimes we work together in a group. If one person doesn't understand, we work together.

Jennifer: Learning is easy because it's mostly done as group activity.

Mike: Get everyone to participate.

Betty: Group activities are important. Through interaction with others you learn more.

This last section of student comments surprised me the most and led to my final finding regarding how an understanding of MI theory can guide the learning process:

Finding 11B: Many adult students would prefer to work in groups and help each other learn.

ADDITIONAL FINDINGS

Offering an MI-inspired program to adult learners can lead to increased enrollment and improved attendance.

My research resulted in a few unexpected outcomes. The first involved enrollment and attendance. As I just detailed in the previous section of this paper, one of the team building activities we worked on during this project called for the students to meet the challenge of recruiting more students into our program. During the wrap-up to this project, the students calculated the change in our class enrollment from December 1996 to December 1997, a full year since we had begun working on the AMI Project. They were excited when they realized that our figures were up 80% during that time. I later went back and looked at actual student hours of attendance compared to total classroom hours scheduled during the same period. Surprisingly, this figure grew by almost 220%. After reviewing the data provided in our dialogue journals, my teacher journal, interviews and observation reports, I am confident in proposing that this increase in class participation is due, largely, to the MI-inspired changes I have made in our program, particularly the heightened emphasis on developing the personal intelligences. Our increased attention to the personal intelligences transformed our group from simply an adult basic education class into a community of learners, or, as Betty termed it, our “class family.”

Both low scores and unrealistically high scores on the Personal Intelligences Cluster may be “red flags” to alert the teacher that these students need special attention in order to encourage them to remain in an ABE program.

When I examined the results of the AMI Assessment Survey that the students completed as part of this research project, I found some interesting patterns and new questions began to emerge for me.

A total of fifteen students listened to the AMI Assessment Survey and developed their profiles. I took their responses, assigned them a point value and posted the scores on a class profile chart. (I did not include the naturalist intelligence on this chart because not all of the surveyed students had the opportunity to respond to this scenario.) In order to illustrate how I did this, I have shown Betty’s profile and scores below.

Additional Findings

- Offering an MI-inspired program to adult learners can lead to increased enrollment and improved attendance.
- Both low scores and unrealistically high scores on the Personal Intelligences Cluster may be “red flags” to alert the teacher that these students need special attention in order to encourage them to remain in an ABE program.
- The incorporation of MI-inspired lessons and projects into the curriculum can have a positive influence on teacher/student relationships.
- Awareness and understanding of MI theory will influence a teacher’s understanding of his/her own personal and professional strengths.

Intelligence	Response	Point Value
Musical	Very Much	5
Bodily/Kinesthetic	Hardly at All	1
Linguistic	Somewhat	3
Logical/Mathematical	Hardly at All	1
Spatial	A lot	4
Interpersonal	Very Much	5
Intrapersonal	Somewhat	3
	TOTAL	22

I then grouped the scores of certain intelligences into clusters.

Linguistic & Logical Mathematical	4
Interpersonal & Intrapersonal	8
Bodily Kinesthetic & Spatial	5

Upon examining the class profile chart when it was completed, I noticed an interesting correlation between how the students responded on the survey and the likelihood that they would remain in class long enough to meet their educational goals. Of the five who left the program after only attending a few classes, two had very low total scores when compared with the class average (total scores of 14 and 16, compared with a class average of 20.6), two had scores in the average range, while the fifth student had a total score of 31, fully ten points higher than the average and six points higher than any other students who completed the survey.

When you examine their scores in the Personal Intelligence Cluster, another pattern emerges. While the class average is 5.9 in this cluster, three of the five students being discussed had scores of 3, 4, and 5, respectively, while the fourth student had a score of 7 and the fifth was the only student in the entire group who scored a high total of 9 in this cluster. Although this is a very unscientific study, it made me think about how this type of information could be helpful to a teacher.

The incorporation of MI-inspired lessons and projects into the curriculum can have a positive influence on teacher/student relationships.

I developed a very different relationship with my students as time evolved during this project. I remember reading somewhere when I first started working with adults that in order to have an effective adult basic education program it is important for the teachers to be peers of the students. I was rather taken aback by this statement, for although I did not consider myself better than my students, I certainly felt my level of education, economic position and background made it difficult

for me to consider myself their peer. Our involvement in the AMI Project has given all of us a chance to get to know each other on a different level. Even though I had always had a good rapport with my students, I have learned things about them while doing this research that I possibly never would have known otherwise. Silja noted a “palpable sense of camaraderie” upon visiting our classroom. One student described this as our “class family.” I have a much deeper understanding and appreciation of my students’ strengths as a result of my work on the project, and I certainly have come to recognize how the students are indeed my peers. I am humbled by this experience and much the wiser as a consequence.

Awareness and understanding of MI theory will influence a teacher’s understanding of his/her own personal and professional strengths.

Finally, my involvement in the AMI Project was a tremendously rewarding experience. I not only grew professionally, but also personally, as a result of my work. My knowledge of MI theory caused me to look at myself differently, recognize my own strengths and have the courage to take risks developing some of my weaker domains. Diane Paxton, one of the researchers with whom I have worked on this project, said something when we first started working on our research that has stuck with me for the past year and a half. She remarked that we would not be the same people who we were at the beginning of the project when we reached its conclusion. That is certainly the case for me.

DISCUSSION

Probably the most important [educational] implication [of MI theory]... is to take differences among individuals very seriously, to know as much as you can about each of the individuals, and try as much as possible to gear and to fit your approach to what you know about that individual.

Howard Gardner

Address to the New England
Conference on Multiple
Intelligences in ABE/ESOL

Implications

My work involving the application of MI theory at the adult learner level has given me a new lens with which to view adult students. This experience has also given the adult learners with whom I worked the opportunity to contemplate on how they learn best and a vocabulary to express their reflections. I had the chance to develop or modify teaching strategies that work best with adult learners, allowing them to demonstrate a variety of strengths and talents. Because the students accepted and acknowledged their intelligences, they were more willing to respond to these non-traditional teaching strategies and take on the responsibility of discovering for themselves how they learn best. I expanded my methods of assessment to allow students to demonstrate their knowledge of the subject matter in alternative ways.

Because of my involvement in the AMI Project, I have come to recognize a new dynamic that emerged in my class. I come away from my research with a revised model for an effective ABE classroom, one that is less teacher-centered and which gives the students a greater voice in what they study. It is a classroom that emphasizes personal growth as well as academic development. It is a model that encourages students to solve real life problems and develop a variety of skills they will find useful in the future.

ADVICE TO OTHER PRACTITIONERS

Don't drop what Success for All has established, or Reading Recovery, in order to buy an 'MI Kit' and have people dance around and read; that would be a poor strategy.

Howard Gardner

Address to the New England
Conference on Multiple
Intelligences in ABE/ESOL

When I heard this statement during Gardner's address to the conference, I was particularly impressed by these words. In my thirty years as a teacher, I have seen fads come and go in education. I was weary of new programs that were touted to be "the" only way to teach and tired of implementing program after program as they phased in and out of favor. Gardner's message to educators was refreshing. Instead of abandoning those aspects of our programs that we have found successful, he urged us to keep doing what we recognize as sound educational practice. He also encouraged us to experiment with his theory as we saw appropriate. "Try it out; see what works." In other words, celebrate our successes, but investigate what we can do better in light of what the theory has to offer to us as thoughtful practitioners.

With this in mind, I would urge teachers to read about MI theory and spend some time reflecting on their own strongest intelligences. I suggest that they encourage their students to think about their strengths too. Again I have to state how powerful a tool the use of dialogue journals was in this respect. I would also suggest that teachers read through some MI-inspired lesson plans, with an open mind as to how they might be adapted to their particular adult learning contexts. I would challenge them to see how similar ideas could work and warn them not to dismiss new ideas too quickly before giving them a chance to succeed. I would recommend that teachers clearly articulate to their students the advantages of an MI-inspired ABE program. I would caution teachers to have patience implementing new teaching techniques. I would encourage them to model new learning strategies frequently and repeatedly. Finally, I would strongly urge adult educators to find the time in their busy lessons to nurture and promote the personal intelligences. It is my finding that time spent doing this reaps rewards for the learner far greater than time spent purely on academic tasks.

NEW QUESTIONS

Adult learners already have a sense of who they are; what they can do; what they can't do. That's a good starting point, but some of those conceptions many not be well motivated. They may think there are certain things they can't do and that may be wrong. And part of your challenge is to help them see that there are ways in which they can do those kinds of things. So intrapersonal intelligence in a learning society is tremendously important.

Howard Gardner
Address to the New England
Conference on Multiple
Intelligences in ABE/ESOL

I think it would be interesting to pursue an investigation of the relationship between the student's understanding of his/her personal intelligences profile and the likelihood that the student will make a commitment to continued participation in an ABE program. Our Center is presently considering ways that we can better meet the educational needs of our younger adult population. It is my belief that many of the students who are in their teens and early twenties when they enroll in our program have not developed their personal intelligences and, therefore, may not possess the necessary skills to succeed in meeting their educational goals. This is particularly true of the young men who enroll in our program. In the group of five students who left my program without making any progress toward meeting their educational goals, the three students with the lowest score in the Personal Intelligences Cluster were males 16, 18, and 23 years old, respectively. I believe that a program that is especially designed to help students explore their personal intelligences might help with student retention. In particular, I feel that involving the students in the design of this program would be beneficial. Many adult students, especially those who have recently left school, expect education not to be interesting or worthwhile. Getting them to explore these feelings and to become involved in designing their courses of study could prove to be the key to their success.

I would be very interested in working with our staff at The Tutorial Center in an effort to adapt MI-inspired strategies to this particular population. My "burning question" would be "How can MI theory inform the development of curriculum materials designed to encourage young adult students to succeed in ABE programs?"

I would like to end this paper with two quotes from the dialogue journal of Donna, one of students who first worked with me on this research project. I have used this selection in my writings a number of times because, to me, it sums up the promise that MI theory holds for adult learners.

On February 5, 1997, after our class discussion about Multiple Intelligences, Donna wrote the following entry in her dialogue journal.

I haven't really had time to think about where my strengths are. I just know my weaknesses and that sometimes worries me. I always knew everyone had strengths and weaknesses but I always worried about the things I couldn't do and not the things I could.

A month after she wrote the journal entry above, I asked Donna to reflect on the completion of our first team building project. Again in her journal she wrote,

First of all I really believe that our project was a success for two reasons. 1) We all worked together and worked for something that we thought was important. 2) That you have inspired us to open our minds and have [the] belief that we are capable of almost anything if we really want to do it...I need a new focus and this is very interesting to me. I really want to thank you for being a good friend, teacher and listener. You have inspired me in more ways than one and I never thought I could feel this good about my education and my self-esteem.

APPENDIX 9

<http://www.nwlink.com/~donclark/hrd/learning/styles.html#together>

LEARNING STYLES

APPENDIX 9

<http://www.nwlink.com/~donclark/hrd/learning/styles.html#together>

LEARNING STYLES

OR, HOW WE GO FROM THE UNKNOWN TO THE KNOWN

A learning style is a student's consistent way of responding to and using stimuli in the context of learning. There are various instruments used to determine a student's learning style. The first style to be discussed is VAK (Visual, Auditory, Kinesthetic), which is derived from the accelerated learning world, and seems to be about the most popular model nowadays. Its main strength is that it is quite simple, which appeals to a lot of people. Its main weakness, is that the research does not really support it. Kolb's learning inventory describes a learning process and a style, which makes it quite interesting. It can be thought of as a simpler version of the MBTI which is based upon determining the personality type. Kolb's version uses two dimensions, while the MBTI uses two similar dimensions, plus two additional ones. Howard Gardner's Multiple Intelligences seems to provide the most promising outlook for diversifying learning. **WARNING:** These various learning styles or intelligences are points along a scale that help us to discover the different forms of mental representation; they are not good characterizations of what people are (or are not) like. We should not divide the population into a set category (e.g. visual person, extrovert). What these various instruments are doing is allocating the person along some point on a continuum (similar to measuring height or weight). In other words, do not pigeon-hole people as we are all capable of learning under any style or intelligence no matter what our preference is.

VAK LEARNING STYLES

The VAK learning Style uses the three main sensory receivers - Vision, Auditory, and Kinesthetic (movement) to determine the dominate learning style. Learners use all three to receive information. However, one or more of these receiving styles is normally dominant. This dominant style defines the best way for a person to learn new information by filtering what is to be learned. This style may not always to be the same for some tasks. The learner may prefer one style of learning for one task, and a combination of others for another task. Classically, our learning style is forced upon us through life like this: In grades kindergarten to third, new information is presented to us kinesthetically; grades 4 to 8 are visually presented; while grades 9 to college and on into the business learning environment, information is presented to us auditory by lectures. As trainers, we need to present information using all three styles. This allows all learners, no matter what their preferred style is, the opportunity to become involved. It also allows a learner to be presented with the other two methods of reinforcement. Just because we prefer one style, does not mean that the other two do us no good. On the contrary, they help us to learn even faster by reinforcing the material. Some hints for recognizing and implementing the three styles are:

Auditory learners often talk to themselves. They also may move their lips and read out loud. They may have difficulty with reading and writing tasks. They often do better talking to a colleague or a tape recorder and hearing what was said. To integrate this style into the learning environment:

- 1. Begin new material with a brief explanation of what is coming. Conclude with a summary of what has been covered. This is the old adage of "tell them what they are going to learn, teach them, and tell them what they have learned."
- 2. Use the Socratic method of lecturing by questioning learners to draw as much information from them as possible and then fill in the gaps with your own expertise.
- 3. Include auditory activities, such as brainstorming, buzz groups, or Jeopardy.
- 4. Leave plenty of time to debrief activities. This allows them to make connections of what they learned and how it applies to their situation.
- 5. Have the learners verbalize the questions.
- 6. Develop an internal dialogue between yourself and the learners.

Visual learners have two subchannels - linguistic and spatial. Learners who are visual-linguistic like to learn through written language, such as reading and writing tasks. They remember what has been written down, even if they do not read it more than once. They like to write down directions and pay better attention to lectures if they watch them. Learners who are visual-spatial usually have difficulty with written language and do better with charts, demonstrations, videos, and other visual materials. They easily visualize faces and places by using their

imagination and seldom get lost in new surroundings. To integrate this style into the learning environment:

- Use graphs, charts, illustrations, or other visual aids.
- Include outlines, agendas, handouts, etc. for reading and taking notes.
- Include plenty of content in handouts to reread after the learning session.
- Leave white space in handouts for note taking.
- Invite questions to help them stay alert in auditory environments.
- Post flip charts to show what will come and what has been presented.
- Emphasize key points to cue when to take notes.
- Eliminate potential distractions.
- Supplement textual information with illustrations whenever possible.
- Have them draw pictures in the margins.
- Show diagrams and then explain them.
- Have the learners envision the topic or have them act out the subject matter.

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

- Use activities that get the learners up and moving.
- Play music, when appropriate, during activities.
- Use colored markers to emphasize key points on flipcharts or white boards.
- Give frequent stretch breaks (brain breaks).
- Provide toys such as Koosh balls and Play-Dough to give them something to do with their hands.
- To highlight a point, provide gum, candy, scents, etc. which provides a cross link of scent (aroma) to the topic at hand (scent can be a powerful cue).
- Provide highlighters, colored pens and/or pencils.
- Guide learners through a visualization of complex tasks.
- Have them transfer information from the text to another medium such as a keyboard or a tablet.

CARL JUNG AND MYERS BRIGGS TYPE INDICATOR (M)

During the early 1900s, Carl Jung established a field identifying distinct personality patterns. Many theorists have since broken these patterns into categories attempting to make them easier to understand. Carl Jung was a contemporary of Sigmund Freud and a leading exponent of Gestalt personality theory. Jung developed a ground-breaking personality theory that introduced two attitudes - extraversion and introversion (1933a). Later he described human behavior as a combination of four psychic functions - thinking/feeling and intuition/sensation (1933b). Thinking and feeling are said to be rational functions because they both require acts of judgments. Sensation and intuition involve immediate experiences.

The MBTI, Kolb's Learning Style Inventory, [Managerial Grid](#), and a number of other instruments all use a form of extraversion/introversion. His four other functions are also closely tied with these instruments. The most widely used personality survey instrument is the Myers Briggs Type Indicator (MBTI), followed closely by the DiSC assessment (Carlson Learning). The MBTI can be an aid in understanding the individual differences. This is why it is more complicated than the other models discussed here, since they are strictly learning models why the MBTI is a personality model. However, our personality does play an important part in determining our learning style. And it does tie in within the other models so we will discuss its part in the the learning process.

Scores obtained from the MBTI indicate a person's preference on each of four dichotomous dimensions:

- Extroversion (E) versus Introversion (I) [similar to [two dimensional behavioral models](#) and [Kolb's Learning Style Inventory](#)]
- Sensing (S) versus iNtuition (N)
- Thinking (T) versus Feeling (F) [similar to [two dimensional behavioral models](#) and [Kolb's Learning Style Inventory](#)]
- Judging (J) versus Perceptive (P)

1. Extroversion (E) versus Introversion (I)

This indicates whether a learner prefers to direct attention towards the external world of people and things or toward the internal world of concepts and ideas. This preference tells us from where people get their energy. Introverts find energy in the inner world of ideas, concepts, and abstractions. They can be sociable but need tranquility to regain their energy. They want to understand the world; they concentrate and tend to be reflective thinkers. They think more than talk. Introverted learners want to develop frameworks that integrate or connect the information that they learn, this becomes knowledge is the interconnection of the material and to see a global view. Extroverts find energy in things and people. They prefer interaction with others, and tend to be action-oriented. They also tend to think on their feet. They talk more than listen. Extroverted learners learn by teaching others. They do not normally understand the subject until they try to explain it to themselves or others (working in groups). Problem Based Learning and Collaborative Learning are good teaching techniques for this group.

2. Sensing (S) versus iNtuition (N)

This indicates whether a learner prefers to perceive the world by directly observing the surrounding reality or through impressions and imagining possibilities. Sensing people choose to rely on their five senses. They are detail-oriented, they want facts, and they trust them. Sensing learners prefer organized, linear, and structured lectures (systematic instruction or step-by-step learning). Intuitive people seek out patterns and relationships among the facts they have gathered. They trust hunches ("sixth" sense) and their intuition and look for the "big picture." They also value imagination and innovation. Intuitive learners prefer various forms of discovery learning and must have the big picture (metaphors and analogies), or an integrating framework in order to understand a subject. They like concept maps or and often compare and contrast tables.

3. Thinking (T) versus Feeling (F)

This indicates how the learner makes decisions, either through logic or by using fairness and human values. Thinkers decide things impersonally based on analysis, logic, and principle. They value fairness - focusing on the situation's logic, and placing great weight on objective criteria in making a decision. They naturally see flaws and tend to be critical. Thinking learners prefer clear goal and objectives. They want to see precise, action-oriented cognitive, affective and psychomotor objective. They also want to know what they have to do to learn the material. Feelers value harmony by focusing on human values. They focus on human values and needs as they make decisions or arrive at judgments. They tend to be good at persuasion and facilitating differences among group members. They value empathy and harmony. Feeling learners enjoy the small group exercises, especially harmonious groups.

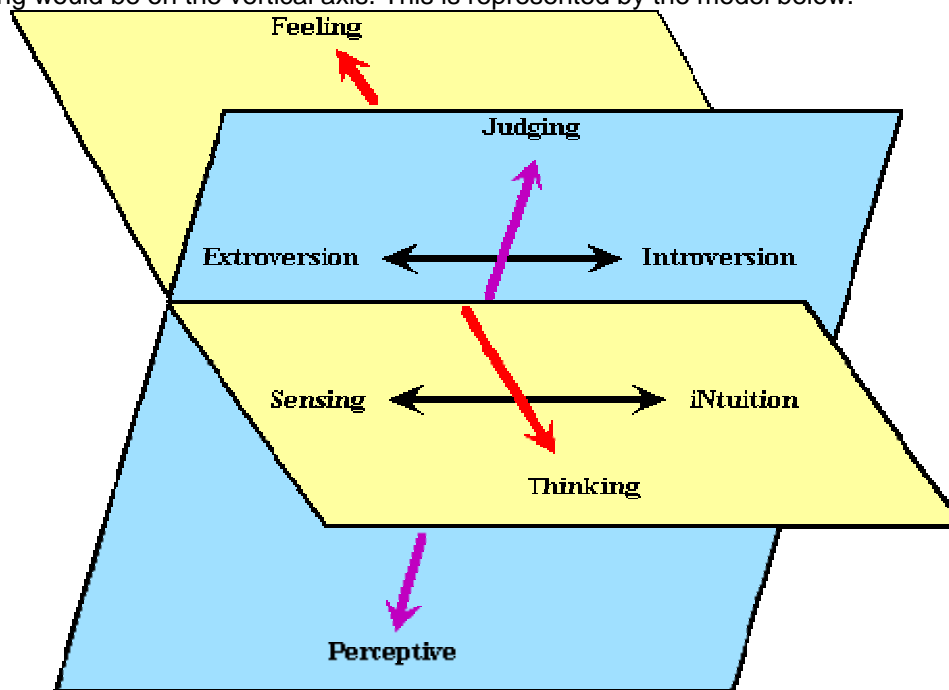
4. Judging (J) versus Perceptive (P)

This indicates how the learner views the world, either as a structured and planned environment or as a spontaneous environment. Judging people are decisive, self-starters and self-regimented. They also focus on completing the task, knowing the essentials, and they take action quickly. They plan their work and work their plan. Deadlines are sacred as they see time as a finite resource. Judging learners need tools that help them to plan their work and work their plan. They want guides that give quick tips. They can be encouraged by offering self-improvement. Perceptive learners are curious, adaptable, and spontaneous. They start many tasks, want to know everything about each task, and often find it difficult to complete a task. Deadlines are meant to be stretched while more information is gathered as they see time as a renewable resource. They like to leave their options open. Perceptive learners often postpone doing an assignment until the last minute. They are not lazy, they are merely seeking information up to the very last minute. Breaking down a complex project into a series of sub-assignments and providing deadlines will keep perceptive learners on target. Also they are often process oriented (emphasis is on how the task is completed) and will easily adapt as long as they know the how.

MBTI Model

The MBTI model would have two dimensions - height and width, similar to [Kolb's](#) and [other models](#), but it would also a third dimension - depth. Extroversion/Introversion would be on the horizontal axis, while

Feeling/Thinking would be on the vertical axis. This is represented by the model below.



The depth (third dimension) of Extroversion/Introversion (EI) would be Judging/Perceptive (JP). This might be thought of as how much time (JP) we are willing to stick to a task (EI) rather it be actively engaging in it or reflecting on it. The depth (third dimension) of Feeling/Thinking (FT) would be Sensing/iNtuition (SN). This might be thought of as using our various senses, to include our "sixth sense" (SN) when thinking or feeling (FT) about a subject.

MULTIPLE INTELLIGENCES

"although they are not necessarily dependent on each other, these intelligences seldom operate in isolation. Every normal individual possesses varying degrees of each of these intelligences, but the ways in which intelligences combine and blend are as varied as the faces and the personalities of individuals."

- Howard Gardner

Howard Gardner theorized that there are multiple intelligences, and that we all use one or two for the most effective learning. Our culture teach, test, reinforce and reward primarily two kinds of intelligence: verbal/linguistic and logical/mathematical. His theory proposes that there are at least eight other kinds of intelligence that are equally important. They are "languages" that most people speak, and that cut through cultural, educational, and ability differences. The mind is not comprised of a single representation or a single language of representations. Rather, we harbor numerous internal representations in our minds. Some scholars speak of "modules of mind," some of a "society of mind," in this case it is "multiple intelligences." They include

- Verbal Linguistic intelligence (sensitive to the meaning and order of words as in a poet). Use activities that involve hearing, listening, impromptu or formal speaking, tongue twisters, humor, oral or silent reading, documentation, creative writing, spelling, journal, poetry.
- Logical-mathematical intelligence (able to handle chains of reasoning and recognize patterns and orders as in a scientist). Use activities that involve abstract symbols/formulas, outlining, graphic organizers, numeric sequences, calculation, deciphering codes, problem solving.
- Musical intelligence (sensitive to pitch, melody, rhythm, and tone as in a composer). Use activities that involve audio tape, music recitals, singing on key, whistling, humming, environmental sounds, percussion vibrations, rhythmic patterns, music composition, tonal patterns.
- Spatial intelligence (perceive the world accurately and try to re-create or transform aspects of that world as in a sculptor or airplane pilot). Use activities that involve art, pictures, sculpture, drawings, doodling, mind mapping, patterns/designs, color schemes, active imagination, imagery, block building.
- Bodily Kinesthetic intelligence (able to use the body skillfully and handle objects adroitly, as in an athlete or dancer). Use activities that involve role playing, physical gestures, drama, inventing, ball

passing, sports games, physical exercise, body language, dancing.

- Interpersonal intelligence (understand people and relationship as in a salesman or teacher). learners think by bouncing ideas off of each other (socializers who are people smart). Use activities that involve group projects, division of labor, sensing others' motives, receiving/giving feedback, collaboration skills.
- Intrapersonal intelligence (possess access to one's emotional life as a means to understand oneself and others exhibited by individuals with accurate views of themselves). Use activities that involve emotional processing, silent reflection methods, thinking strategies, concentration skills, higher order reasoning, "centering" practices, meta-cognitive techniques.
- Naturalist (connected to the intricacies and subtleties in nature such as Charles Darwin and Meriwether Lewis of Lewis and Clark fame). Use activities that involve bringing the outdoors into the class, relating to the natural world, charting, mapping changes, observing wildlife, keeping journals or logs.

According to multiple intelligences theory, not only do all individuals possess numerous mental representations and intellectual languages, but individuals also differ from one another in the forms of these representations, their relative strengths, and the ways in which (and ease with which) these representations can be changed.

PUTTING THE STYLES TOGETHER

First, it should be noted that no single measurement of style ensures that a learner's needs will be met. It is perhaps more important to build an adaptable learning environment that presents the material in a variety of methods than try to determine each learner's personal style. Likewise, recognizing your own style will help to ensure you do not unintentionally force one learning style upon the learners. The more styles you address, the easier the instruction will be received by the learners. This is because you will be striving to reach their needs, not yours. Also, material presented in a variety of methods keeps the learners interested and reinforces itself. Learning styles come from three schools of thought: Perceptual Modality, Information Processing, and Personality Patterns (Conner & Hodgins, 2000).

Perceptual Modality are biologically-based reactions to the physical environment. It refers to the primary way our bodies take in information, such as auditory, visual, smell, kinesthetic, and tactile. Learning style:

- VAK - Notice that this style does not really worry about the why of learning styles.

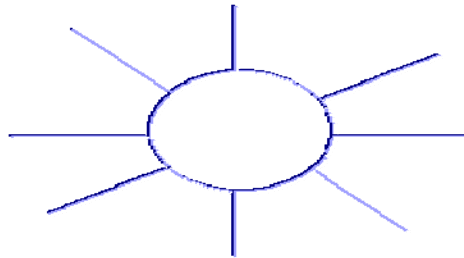
Information Processing distinguishes between the way we think, solve problems, and remember information. This may be thought of as the way our brain processes information. Learning style:

- The first part of Kolb's Learning Style Inventory in which he describes the process of learning. Personality Models are the way we interact with our surroundings. Each of us has a preferred, consistent, distinct way of perceiving, organizing, and retaining information. This is due to the way we were brought up (environment or nurture) and the genes (DNA or nature) within us. This may be thought of as the ego within us, or what makes us what we are. Learning styles:
 - The second part of Kolb's Learning Style Inventory in which he describes individual learning styles.
 - MBTI.
 - Howard Gardner's multiple intelligences.

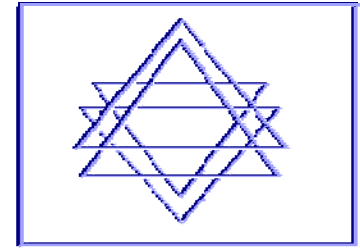
All of these models can be thought of as a Mandala - a Sanskrit word for "magical circle." It is one of the oldest religious symbols and is found throughout the world. Although it is normally circular in appearance, it can take on a variety of forms.



Yin and Yang



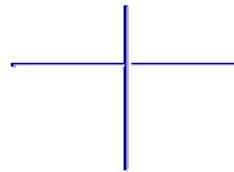
Sun Wheel



Sri Yantra of Tibet



Cross



Jung found the mandala symbol occurring spontaneously in the dreams and images of his patients. He thought of it as a symbol of wholeness that can aid us in integrating our personality. While several of the styles presented here are represented by various forms of crosses and circles, all the styles and models have one thing in common, they are an attempt to minimize the complexity of an extremely multifaceted subject. It is only by slicing through behaviors one step at a time, such as how we learn through these simple models, will we ever have a chance of understanding our whole learning styles. This is why these models do not fully explain how we learn and at the same time are both right and wrong. Learning is an extremely complex process. These models tend to simplify the process (which is a starting point in understanding a complex process). Also, each one tends to tackle something different in the learning environment by taking a small slice out of it. It is only by looking at these various slices and others will we ever begin to understand the whole learning process.

References

- Conner, Marcia & Hodgins, Wayne (September 14, 2000). Learning Styles
<http://www.learnativity.com/learningstyles.html>
- Gardner, Howard (1993). Frames of Mind: The Theory of Multiple Intelligences (10th Anniversary Edition). NY: Basic Books.
- Jung, C. G. (1933). Psychological Types. New York: Harcourt, Brace.
- Jung, C. G. (1933). Modern Man In Search of A Soul. New York: Harcourt, Brace.
- Rose, Colin (1985). Accelerated Learning. New York: Dell.
- Schroeder, Charles, C. (1997). New Students - New Learning Styles. On-line:
<http://www.virtualschool.edu/mon/Academia/KierseyLearningStyles.html>
or <http://www.virtualschool.edu/mon>.

Created May 29, 2000. Updated October 20, 2000

[ISD - Development](#)

donclark@nwlinc.com

<http://www.nwlinc.com/~donclark/hrd/learning/styles.html>

APPENDIX 10

GSU Master Teacher Program: On Learning Styles

This material can be copied and used for educational, non-profit purposes only. Copyright: Harvey J. Brightman, Georgia State University

<http://www2.gsu.edu/~dschjb/wwwmbti.html>)

APPENDIX 10

GSU Master Teacher Program: On Learning Styles

This material can be copied and used for educational, non-profit purposes only. Copyright: Harvey J. Brightman, Georgia State University
<http://www2.gsu.edu/~dschjb/wwwmbti.html>)

This file discusses briefly (1) the four dimensions underlying the Myers-Briggs Type Indicator (MBTI), and (2) several teaching approaches that will appeal to different MBTI profiles. The 126 item Myers-Briggs Type Indicator (MBTI), Form G, is the most reliable method for assessing student learning style. The MBTI provides data on four sets of preferences. These preferences result in 16 learning styles, or types. A type is the combination of the four preferences. The most common MBTI type for business undergraduates is the ESTJ, the Extraverted-Sensing-Thinking-Judger. The MBTI instrument should be administered in the first or second class period by the counseling center at your school. It takes about 45 minutes to complete the instrument. The counseling center can score the MBTI and share the data with the students. Students enjoy learning about themselves and find the MBTI data informative.

Extraversion (E) versus Introversion (I)

This preference tells us how people "charge their batteries." *Introverts* find energy in the inner world of ideas, concepts, and abstractions. They can be sociable but need quiet to recharge their batteries. Introverts want to understand the world. Introverts are *concentrators* and reflective thinkers. Their motto is: Ready, Aim, Aim, For the introvert, there is no impression without reflection. *Extraverts* find energy in things and people. They prefer interaction with others, and are action oriented. Extraverts are *interactors* and "on-the-fly" thinkers. Their motto is: Ready, Fire, Aim. For the extravert, there is no impression without expression. The majority of undergraduate students are extraverts. Based on data from the Center for Applied Psychological Type (CAPT) between 56% and 58% of over 16,000 freshman students at three state universities were extraverts. Interestingly, over 83% of college student leaders were extraverts, while over 65% of Phi Beta Kappas were introverts. Our own data base indicates that over 65% of *business* students are extraverts. It is not surprising that almost two-thirds of undergraduate business students are extraverts. Students may major in business administration because the business world appreciates and rewards action which coincides with the extraverts' strength. The majority of university faculty are introverts. CAPT reported that almost 55% of 2,282 faculty are introverts. Our own data base for business faculty indicates that over 60% are introverts.

Teaching Extraverted Students

Extraverted students learn by explaining to others. They do not know if they understand the subject until they try to explain it to themselves or others. Extraverted students have told us that they thought they knew the material until they tried to explain it to a fellow student. Only then did they realize they did not understand the subject.

Extraverted students enjoy working in groups. Consider in-class or outside-of-class group exercises and projects. We recommend the

Thinking Aloud Paired Problem Solving (TAPPS) method and
Nominal Group Method.

Both support learning through explaining, but provide quiet time for introverted students.

TAPPS

Teacher poses question and provides quiet time for students.

Teacher designates the explainer and listener within each dyad.

Explainers explains ideas to listeners. Listeners can (1) ask questions of clarification, (2) disagree, or (3) provide hints when explainers becomes lost

Teacher critiques some explainers' answers and provides closure

Nominal Group Method

Teachers pose question and provide quiet time for students.

Each team member shares ideas with others in a round-robin fashion.

Teams discusses ideas and reaches closure.

Teacher critiques some team's answers and provide closure.

Teaching Introverted Students

In a seminal study, George Miller noted that people can hold 7 ± 2 *chunks* of knowledge in their minds at any given time. If each knowledge chunk contains a specific fact, then the amount of knowledge possessed is limited. But if each chunk contains many interconnected facts, a network or framework of facts, then the amount of knowledge is almost unlimited. Introverted students want to develop frameworks that integrate or connect the subject matter. To an introvert, disconnected chunks are not knowledge, merely information. Knowledge means interconnecting material and seeing the "big picture." Faculty should teach their students how to *chunk*, or group and interconnect, knowledge. Introverted students will appreciate it, extraverted students may not. Nevertheless, cognitive psychologists tell us that through chunking, students master the material. We recommend that faculty teach students how to build a compare/ contrast table, flowchart, or concept map.

Sensing (S) versus Intuition (N)

Some of us choose to rely on our five senses. Some prefer taking in information through our "sixth" sense. Sensing people are detail oriented, want facts, and trust them. Joe Friday from the TV show *Dragnet* epitomizes the extreme sensing detective. All he ever wanted was "just the facts". Intuitive people seek out patterns and relationships among the facts they have gathered. They trust hunches and their intuition and look for the "big picture." The quintessential intuitive was Albert Einstein whose fanciful thought experiments revolutionized the 20th century. He could see patterns where others saw randomness or chaos. The majority of undergraduates are sensing students. Based on data from the Center for Applied Psychological Type (CAPT) between 56% and 72% of over 16,000 freshmen at three state universities were sensing students. Interestingly, almost 83% of national merit scholarship finalists and 92% of Rhodes Scholars were intuitive students. Our own data base indicates that over 65% of *business* majors are sensing students. The majority of university faculty are intuitive. CAPT reported that almost 64% of 2,282 faculty are intuitive. We obtained the same percentage from our business faculty data base.

Teaching Sensing Students

Sensing students prefer organized, linear, and structured lectures. We recommend three methods for organizing a lecture: (1) the what must be known organizing strategy, (2) the application-theory-application organizing strategy and (3) the advance organizer. In the **what must be known (WMBK)** method, we first ask: What is (are) the topic's most essential general principle(s) or goals? Place the answer in a goal box. We then ask: What topic(s) must be known such that students could achieve the goal? Place these subgoal boxes below the goal box and show an arrow leading from each subgoal box to the goal box. Continue to ask WMBK questions until you interface with material previously covered. You would then present the lecture by starting at the bottom of the diagram and work up towards the goal box. The A-T-A method begins with a faculty member presenting an (A)pplication (problem or mini-case) to the class. The students attempt to analyze and solve the case or problem **without** the benefit of the upcoming chapter's theory or ideas. Applications *motivate* sensing students to learn the material. Applications answer the question that sensing students often ask, "why am I learning this material?" After the class has struggled with the problem (and sometimes emerged victoriously), the teacher presents the chapter's (T)heory or ideas, and then applies it to the original application. Afterwards the teacher presents additional (A)pplications and has the students apply the theory. An opening application problem or mini-case should (1) be familiar to students, (2) engage their curiosity, (3) be **almost** solvable from previous text material or student experiences, and (4) be baffling, or counter-intuitive, if possible. A familiar problem assures sensing students that their experiences have prepared them to address the problem. The third attribute minimizes students' frustrations. The application should be "just beyond a student's reach". However, previously learned material or experiences should help students make a reasonable solution attempt. An application that is too significant a leap will cause frustration, and the feeling that the teacher is playing games with the students. David Ausubel's advance organizer is a brief lecture or demonstration during the introduction of the lecture that provides a **mental scaffolding to anchor** the new material. The advance organizer provides a set of highly general concepts that subsume the material about to be learned. An advance organizer taps into students' existing knowledge structures. It helps **cross-list** new information with already existing information and thus aids learning and knowledge retrieval. It makes the unfamiliar more familiar; it makes the abstract more concrete. Note how the following advance organizer taps into existing knowledge that the students should have already acquired.

Subject:----- Gandhi's march to the sea

Organizer:---- King's march on Washington mini-lecture

Audience:---- African-American high-school students

Goal:-----Connects Indian history to an existing civil rights knowledge base.

The advance organizer is not an *overview*. An overview would have introduced the students to the lecture's key ideas: Gandhi, salt monopoly, British policy, boiling sea water, etc..

The advance organizer provides a familiar setting to anchor new, and potentially strange, material. The organizer works because at a very general level, the marches of King and Gandhi dealt with charismatic leaders in a struggle against oppressive forces. For an African-American audience, the MLK organizer transformed an abstract lecture into a familiar and more concrete setting.

Faculty can develop advance organizers by answering the following questions:

1. What do students know that at a very general level is similar to the subject matter about to be taught?
2. How can I demonstrate the connections between what is known and what is to be learned?

Teaching Intuitive Students

Intuitive students prefer either the traditional **Theory-Application-Theory** approach or the A-T-A approach using **discovery learning**. We illustrate the A-T-A approach using discovery learning in teaching the central limit theorem in a basic statistics course. The teacher selects 50 numbers from a random numbers table, and develops a frequency histogram. The data are not bell-shaped. The teacher then selects 30 samples of size eight numbers (replacing each number after it is drawn) from the 50 numbers, computes the 30 means, and develops a frequency histogram for the means. The histogram is now roughly bell-shaped. The teacher concludes the demonstration by asking **why** is the histogram of means nearly bell-shaped. Using the discovery method, students hopefully will discover the reasons underlying the central limit theorem. The discovery method, or the **why method**, will appeal to intuitive students and will teach sensing students how to uncover general principles. In using this method, sensing and intuitive students should be combined in learning groups. The intuitive student can help the sensing student to discover the theory; the sensing student can help identify and marshal the facts of the exercise. Intuitive students must have the big picture, or an integrating framework, to understand a subject. The big picture shows how the subject matter is interrelated. Intuitive students can develop reasonably correct concept maps or compare and contrast tables. Fortunately, sensing students can be taught to do the same.

Thinking (T) versus Feeling (F)

Some of us choose to decide things impersonally on analysis, logic, and principle. Some of us make decisions by focusing on human values. Thinking students value fairness. What could be fairer than focusing on the situation's logic, and placing great weight on objective criteria in making a decision. Mr. Spock, science officer of the starship Enterprise, had an extreme preference for thinking. Feeling students value harmony. They focus on human values and needs as they make decisions or arrive at judgments. They tend to be good at persuasion and facilitating differences among group members. Dr. McCoy, Spock's colleague aboard the Enterprise, demonstrated a preference for feeling. Unlike the two previous sets of preferences, CAPT reports that on this dimension, the proportion of males and females differ. About 64% of all males have a preference for thinking, while only about 34% of all females have a preference for thinking. Our own data base indicates that over 70% of male and female under-graduate *business* students are thinking students. It is not surprising that the majority of business majors are thinking students. Business is, after all, the domain of logic and analysis. The majority of university faculty have a preference for thinking. CAPT reported that almost 54% of 2,282 faculty are thinking. Seventy percent of business faculty have a preference for thinking. Thus, on the thinking versus feeling preference, business faculty and students are similar.

Teaching Thinking Students

Thinking students like clear course and topic objectives. Clear course or topic objectives avoid vague words or expressions such as "students will appreciate or be exposed to." Rather, objectives are precise and action-oriented. By precise we mean that teachers can write objectives at three meta-levels of learning: rote, meaningful and integrated, and critical thinking. By action oriented we mean that the verbs describe what students must do, not what faculty will do. The Bloom et al. taxonomy provides guidelines for writing clear and meaningful objectives.

Teaching Feeling Students

Feeling students like working in groups, especially harmonious groups. They enjoy the small group exercises such as TAPPS and the Nominal Group Method. To promote harmonious groups, we sometimes provide students with the following guidelines on how to facilitate small group meetings inside or outside of class

1. Make process suggestions to regain session focus.
2. Keep individuals from **personally** attacking one another.
3. Monitor time remaining within a session and gently remind members.
4. Encourage equal participation among members in discussion phase.
5. Demonstrate collaborative-seeking (WIN-WIN) behaviors.
6. Assure that recorder writes legibly.
7. Respond to group member's questions to you by restating the question and asking other group members to respond (the boomerang method).
8. Recognize that all the objectives and goals within a session may not be completed. Get group to do the possible given the time constraints.
9. Use light-hearted (or self-deprecating) humor to break tension.
10. Keep group enthusiasm high and sell ideas to members.

Judging (J) versus Perceptive (P)

Some of us like to postpone action and seek more data. Others like to make quick decisions. *Judging* people are decisive, planful and self-regimented. They focus on completing the task, only want to know the essentials, and take action quickly (perhaps too quickly). They plan their work and work their plan. Deadlines are sacred. Their motto is: just do it! Perceptive people are curious, adaptable, and spontaneous. They start many tasks, want to know everything about each task, and often find it difficult to complete a task. Deadlines are meant to be stretched. Their motto is: on the other hand. The majority of undergraduate students are judging students. Based on data from the Center for Applied Psychological Type (CAPT) between 46% and 60% of over 16,000 freshmen at three state universities were judging students. Interestingly, almost 64% of Rhodes Scholars were perceptive students. Our own data base indicates that over 70% of undergraduate business students are judging students. The majority of university faculty also have a preference for judging. CAPT reported that almost 65% of 2,282 faculty prefer judging. We obtained the same percentage from our business faculty data base.

Teaching Judging Students

We have found that the following hints on note taking and test taking help judging students learn more effectively.

Speedwriting

Most students can learn speedwriting in several minutes. Just omit all (or most) vowels. Or develop your own shorthand method. For example, mst stdnts cn lrn spdwrting in svrl mnths. Jst omt ll or mst vwls.

Split Page

Draw a line down center of a notebook page. On the left-hand side, record the lecture (use speedwriting or your own shorthand notation). After class, write a **commentary** on the right-hand side. Include restating ideas in your own words, finding sources of confusion, identifying key points, looking for links to earlier learned material, and asking what does this mean to me (the student).

Color Coding

Use different colors to record ideas presented in class and found in the text or readings. For example, use blue to code major ideas and green to code links to previously learned material.

AOR Model

In answering an essay question, first **Analyze** the question and jot down key ideas, **Organize** the ideas into a logical sequence, and only then write the essay (**Respond**).

Reverse Question

To review an essay question, first read your answer. Then construct an essay question based on your answer. Now compare your question to the teacher's question. If different, revise your answer. This strategy ensures that students answer the teacher's question.

Treating Objective Questions as Essay Question

Read the question's stem (the portion that contains the question) and write a brief answer. Then compare your answer to the four or five choices, and select the answer most similar to your mini-essay. Your universities' learning resource center is an especially good source for additional hints on note and test taking. Include

several hints in each course syllabus. Spend a few minutes explaining these hints in the first class period. Occasionally remind the students of the hints (especially before the first exam). Judging students often reach too-quick closure when analyzing cases. Thus we recommend a **second-look** meeting. After completing the case, the group reviews their analysis. A student plays a "gentle" Devil's Advocate (DA) and challenges the group's conclusions. The DA should be prepared to recommend an alternative solution. This will force the group to consider the pros and cons of both approaches. The DA can also ask team members to state assumptions about stakeholders (those who are affected by or will affect the case solution) which must be true for the group's solution to be effective. The DA can then challenge the group to provide evidence that the assumptions are true. Guidelines for a second-look meeting should be included in the case preparation hints provided to students.

Teaching Perceptive Students

Perceptive students often postpone doing an assignment until the very last minute. They are not lazy. Quite to the contrary, they seek information to the very last minute (and sometimes beyond). We recommend decomposing a complex project or paper into a series of sub-assignments and providing deadlines for each sub-assignment. The deadlines may keep the perceptive students on target. Decomposing a major project into sub-assignments provides the opportunity for continuous feedback to the student. Have students hand-in an audio tape with their sub-assignments. The teacher can then provide detailed audio (we speak faster than we can write) comments on content and grammar. When we have used the audio feedback approach, final papers are clear and readable, and thus less aggravation to read. Moreover, without the teacher's interim feedback, students lose an opportunity to improve their writing skills during the semester.

Additional Readings

The MBTI instrument is available from Consulting Psychological Press in Palo Alto, California.

Percentage data taken from Isabel Briggs Myers and Mary McCaulley, **Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator**, Consulting Psychologist Press, 1985.

George Miller, "The Magical Number Seven, Plus or Minus Two," **Psychological Review**, April 1956, pp.81-97.

David Ausubel, **Educational Psychology: A Cognitive View**. Holt, Rinehart, and Winston, 1968.

Benjamin Bloom, M. Englehart, E. Furst, W. Hill and D. Krathwohl, **Taxonomy of Educational Objectives, Handbook I: The Cognitive Domain**, Longmans Green, New York, 1956.

APPENDIX 11

MBTI® Basics

(Excerpted from the MBTI® Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator®)

APPENDIX 11

MBTI® Basics

(Excerpted from the MBTI® Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator®)

Preferences

Your results from the MBTI® instrument help you become aware of your personality preferences. A preference is what you like. You may like, or prefer, peppermint candy over butterscotch. You may prefer reading over watching movies. This doesn't mean you won't sometimes choose, or be pressured to choose, butterscotch candy or movies. But in general, you will prefer to choose peppermint or reading. There are no right or wrong preferences. Reading is not better than watching movies; each has its strengths and its problems. Most people have the ability to do both, even if they don't like one or the other. Personality preferences, sometimes called psychological preferences, are like any other preferences. Personality type is what you prefer when you are using your mind or focusing your attention. Studies and experience have shown that there are consistent patterns for each person. For example, one pair of preferences is about whether you choose to spend more time in the outside world or more time in your inner world. We call this a preference for Extraversion or Introversion. Neither is wrong. You can do both. You just prefer one. There are many benefits to understanding your own preferences, including how they affect you, how they affect your style of communication, and how they are different from what other people prefer. Preferences allow us to have different interests, different ways of behaving, and different ways of seeing the world. While all the preferences are equal, each has different strengths and different challenges. Knowing these personality strengths and challenges for yourself and others can help you understand and appreciate how everyone contributes to a situation, a task, or the solution to a problem.

Extraversion or Introversion

The first pair of psychological preferences is Extraversion and Introversion. Where do you put your attention and get your energy? Do you like to spend time in the outer world of people and things (Extraversion), or in your inner world of ideas and images (Introversion)? Extraversion and Introversion as terms used by C. G. Jung explain different attitudes people use to direct their energy. These words have a meaning in psychology that is different from the way they are used in everyday language. Everyone spends some time extraverting and some time introverting. Don't confuse Introversion with shyness or reclusiveness. They are not related. Take a minute to ask yourself which of the following descriptions seems more natural, effortless, and comfortable for you?

Extraversion (E)

I like getting my energy from active involvement in events and having a lot of different activities. I'm excited when I'm around people and I like to energize other people. I like moving into action and making things happen. I generally feel at home in the world. I often understand a problem better when I can talk out loud about it and hear what others have to say.

The following statements generally apply to me:

- I am seen as "outgoing" or as a "people person."
- I feel comfortable in groups and like working in them.
- I have a wide range of friends and know lots of people.
- I sometimes jump too quickly into an activity and don't allow enough time to think it over.
- Before I start a project, I sometimes forget to stop and get clear on what I want to do and why.

Introversion (I)

I like getting my energy from dealing with the ideas, pictures, memories, and reactions that are inside my head, in my inner world. I often prefer doing things alone or with one or two people I feel comfortable with. I take time to reflect so that I have a clear idea of what I'll be doing when I decide to act. Ideas are almost solid things for me. Sometimes I like the idea of something better than the real thing.

The following statements generally apply to me:

- I am seen as "reflective" or "reserved."
- I feel comfortable being alone and like things I can do on my own.
- I prefer to know just a few people well.
- I sometimes spend too much time reflecting and don't move into action quickly enough.
- I sometimes forget to check with the outside world to see if my ideas really fit the experience.

Sensing or Intuition

The second pair of psychological preferences is Sensing and Intuition. Do you pay more attention to information that comes in through your five senses (Sensing), or do you pay more attention to the patterns and possibilities that you see in the information you receive (Intuition)?

Everyone spends some time Sensing and some time using Intuition. Don't confuse Sensing with sensual. They aren't related.

Take a minute to ask yourself which of the following descriptions seems more natural, effortless, and comfortable for you?

Sensing (S)

Paying attention to physical reality, what I see, hear, touch, taste, and smell. I'm concerned with what is actual, present, current, and real. I notice facts and I remember details that are important to me. I like to see the practical use of things and learn best when I see how to use what I'm learning.

Experience speaks to me louder than words. The following statements generally apply to me:

- I remember events as snapshots of what actually happened.
- I solve problems by working through facts until I understand the problem.
- I am pragmatic and look to the "bottom line."
- I start with facts and then form a big picture.
- I trust experience first and trust words and symbols less.
- Sometimes I pay so much attention to facts, either present or past, that I miss new possibilities.

Intuition (N)

Paying the most attention to impressions or the meaning and patterns of the information I get. I would rather learn by thinking a problem through than by hands-on experience. I'm interested in new things and what might be possible, so that I think more about the future than the past. I like to work with symbols or abstract theories, even if I don't know how I will use them. I remember events more as an impression of what it was like than as actual facts or details of what happened. The following statements generally apply to me:

- I remember events by what I read "between the lines" about their meaning.
- I solve problems by leaping between different ideas and possibilities.
- I am interested in doing things that are new and different.
- I like to see the big picture, then to find out the facts.
- I trust impressions, symbols, and metaphors more than what I actually experienced
- Sometimes I think so much about new possibilities that I never look at how to make them a reality.

Thinking or Feeling

This third preference pair describes how you like to make decisions. Do you like to put more weight on objective principles and impersonal facts (Thinking) or do you put more weight on personal concerns and the people involved (Feeling)? Don't confuse Feeling with emotion. Everyone has emotions about the decisions they make. Also do not confuse Thinking with intelligence. Everyone uses Thinking for some decisions and Feeling for others. In fact, a person can make a decision using his or her preference, then test the decision by using the other preference to see what might not have been taken into account. Take a minute to ask yourself which of the following descriptions seems more natural, effortless, and comfortable for you?

Thinking (T)

When I make a decision, I like to find the basic truth or principle to be applied, regardless of the specific situation involved. I like to analyze pros and cons, and then be consistent and logical in deciding. I try to be impersonal, so I won't let my personal wishes--or other people's wishes--influence me. The following statements generally apply to me:

- I enjoy technical and scientific fields where logic is important.
- I notice inconsistencies.
- I look for logical explanations or solutions to most everything.
- I make decisions with my head and want to be fair.
- I believe telling the truth is more important than being tactful.
- Sometimes I miss or don't value the "people" part of a situation.
- I can be seen as too task-oriented, uncaring, or indifferent.

Feeling (F)

I believe I can make the best decisions by weighing what people care about and the points-of-view of persons involved in a situation. I am concerned with values and what is the best for the people involved. I like to do whatever will establish or maintain harmony. In my relationships, I appear caring, warm, and tactful. The following statements generally apply to me:

- I have a people or communications orientation.
- I am concerned with harmony and nervous when it is missing.
- I look for what is important to others and express concern for others.
- I make decisions with my heart and want to be compassionate.
- I believe being tactful is more important than telling the "cold" truth.
- Sometimes I miss seeing or communicating the "hard truth" of situations.
- I am sometimes experienced by others as too idealistic, mushy, or indirect.

Judging or Perceiving

This fourth preference pair describes how you like to live your outer life--what are the behaviors others tend to see? Do you prefer a more structured and decided lifestyle (Judging) or a more flexible and adaptable lifestyle (Perceiving)? This preference may also be thought of as your orientation to the outer world. Everyone extraverts some of the time. This pair describes whether you extravert (act in the outer world) when you are making decisions or when you are taking in information. Some people interact with the outside world when they are taking in information. Whether they use the Sensing preference or the Intuitive preference, they are still interacting in the outside world. Other people do their interacting when they are making decisions. It doesn't matter whether they are using a Thinking preference or a Feeling preference; they are still interacting in the outside world. Everyone takes in information some of the time. Everyone makes decisions some of the time. However, when it comes to dealing with the outer world, people who tend to

focus on making decisions have a preference for Judging because they tend to like things decided. People who tend to focus on taking in information prefer Perceiving because they stay open to a final decision in order to get more information. Sometimes people feel they have both. That is true. The J or P preference only tells which preference the person extraverts. One person may feel very orderly/structured (J) on the inside, yet their outer life looks spontaneous and adaptable (P). Another person may feel very curious and open-ended (P) in their inner world, yet their outer life looks more structured or decided (J). Don't confuse Judging and Perceiving with a person's level of organization. Either preference can be organized. Take a minute to ask yourself which of the following descriptions seems more natural, effortless, and comfortable for you?

Judging (J)

I use my decision-making (Judging) preference (whether it is Thinking or Feeling) in my outer life. To others, I seem to prefer a planned or orderly way of life, like to have things settled and organized, feel more comfortable when decisions are made, and like to bring life under control as much as possible. Since this pair only describes what I prefer in the outer world, I may, inside, feel flexible and open to new information (which I am).

Do not confuse Judging with judgmental, in its negative sense about people and events. They are not related.

The following statements generally apply to me:

- I like to have things decided.
- I appear to be task oriented.
- I like to make lists of things to do.
- I like to get my work done before playing.
- I plan work to avoid rushing just before a deadline.
- Sometimes I focus so much on the goal that I miss new information.

Perceiving (P)

I use my perceiving function (whether it is Sensing or Intuition) in my outer life. To others, I seem to prefer a flexible and spontaneous way of life, and I like to understand and adapt to the world rather than organize it. Others see me staying open to new experiences and information. Since this pair only describes what I prefer in the outer world, inside I may feel very planful or decisive (which I am). Remember, in type language perceiving means "preferring to take in information." It does not mean being "perceptive" in the sense of having quick and accurate perceptions about people and events.

The following statements generally apply to me:

- I like to stay open to respond to whatever happens.
- I appear to be loose and casual. I like to keep plans to a minimum.
- I like to approach work as play or mix work and play.
- I work in bursts of energy.
- I am stimulated by an approaching deadline.
- Sometimes I stay open to new information so long I miss making decisions when they are needed.

Your Personality Type

Four of these eight preferences (E or I, S or N, T or F, J or P) make up a person's MBTI[®] type, also called psychological or personality type. As you act on your type preferences, you create a unique approach to the world, to information, to decisions, and to other people. The theory of psychological type says that people with different preferences naturally have different interests and views, behave differently, and are motivated by different things. Awareness of differences between types can help people understand and value other people who think and act quite differently.

APPENDIX 12

Assignment/Project Cover Page



COMPUTER TRAINING DELIVERY

COURSE ASSESSMENT COVER SHEET

In cooperation with
FACULTY OF TECHNOLOGY AND INFORMATION SCIENCE
CENTRE FOR GENERAL STUDIES
FACULTY OF EDUCATION

Name:
MUHAMMAD FAISAL KAMARUL ZAMAN

Student/Staff ID:
K009909

Assignment #:
TWO

Assignment Title:
Theory, Method & Strategy:
Problem Oriented Project Pedagogy to Enhance Constructivism and Student Centered Learning

Course Coordinator/Facilitator:
ROSSENI DIN

Dateline:

MARKS	
/100	/10
Marker's Signature: Date:	Student's Signature: Date:

APPENDIX 13

Jonassen, D. H. Meaningful Learning Attributes. 1999.
In Jonassen, D. H., Peck, K.L. & Wilson, B. G. Eds. *Learning With Technology: A Constructivist Perspective*.
ppNew Jersey: Prentice-Hall.