

Abstract

Jones, Leslie Kay Stevenson. An exploration of the relationship between instructor learning styles, instructional models, roles, and strategies for the on-line environment. (Under the direction of Dr. Paula Berardinelli, Colleen Wiessner, and Diane Chapman)

There has been considerable research done concerning online learning for the student, but a look at how learning styles of instructors might help or hinder the student learning experience are less visible. What is the relationship between instructor learning style, instructional role, and strategy in an online course? What are the learning style strengths and areas for development of an online course instructor? What instructional roles and practices support instructor-learning styles in relation to online course? What strengths and areas of development can be identified from a literature review of Kolb's learning style theory that will assist online instructor development?

Universities, colleges, other educational, or training orientated interests, and the business community would benefit from a practical tool that merges instructional models, roles, and strategies with adult learning styles. This tool would also specify instructor strengths and areas to enhance instructor professional and personal development. For the

greatest number of students with a variety of learning styles to have their styles met by their instructors, the instructor should strive to enhance and develop expertise in all four of the learning style modes (Kolb, 1999).

An instructor should strive to develop practical application if not expertise in all the learning style arenas. Exploring each learning style and practicing each instructor role enhances personal and professional development for the instructor and the student. Whether an individual is new to instruction or not does not matter. To most, online instruction is new. To meet the needs of all the learners, no matter what the age level, an instructor must be flexible and strive to move effortlessly between the styles and roles. People grow and develop affectively, symbolically, behaviorally, and perceptually throughout their lives. If a beginning online instructor's learning style is in the acquisition stage and focuses on mainly one mode and the instructor/learner is aware of the need to develop the other modes, then over time the level of complexity and skill sophistication will increase to specialization and integration (Kolb, 2000).

The purpose of this research is to create a model linking learning styles, instructional models, roles, and strategies to assist in the educational development of instructors of online courses. Such a model provides a map for areas of needed development per learning style and a resource for practical application of strategies for the matching instructor role. Possible outcomes of this study include contribution to the literature and a tool for the instructor depicting models, roles, strategies, and instructor learning style.

A model was developed using Kolb's Learning Style Inventory as a base with the researcher adding instructional models, roles, strategies, and practices gathered from many resources. The researcher suggests that if an instructor takes Kolb's Learning Style Inventory and then compares their results with the model, a plan for their individual professional development that would meet their learning needs and that of their students would present itself. Expanding a personal view of one's learning style allows understanding and the ability to provide appropriate instruction for the learning needs of students.

**An exploration of the relationship between instructor learning
styles, instructional models, roles, and strategies for the
on-line environment.**

By

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fulfillment of the requirements for
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Biography

When the factory I was working in closed in 1984, I was offered an opportunity to return to school after dropping out in the 10th grade. I received a high school equivalency diploma after three months of study from the Hawkeye Success Center. I applied to the University of Northern Iowa and was accepted. After five years of many educational adventures I graduated with a BA in Earth Science Education in 1989.

My first full time teaching position was in Texas so my children and I moved from Iowa to Texas. After four amazing years teaching in a border city, I moved to North Carolina. I taught at a middle school and I was accepted to North Carolina State University in 1994. I completed a Master's in Education for Curriculum and Instruction & Instructional Technology in 1998. I applied and was accepted into the Educational Leadership Program at North Carolina State University. After a very short time, I transferred to Adult and Community College Department in Training and Development feeling a driving need to learn more about how adults learn. This paper is my final effort at a Master's of Science in Training and Development.

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Table of Contents

List of Tables	v
List of Figures	vi
Chapter I: Introduction	1
Chapter II: Literature Review	
Adult Learning Principles	4
Kolb's Experiential Learning Theory	6
Kolb's Learning Style Inventory	8
Instructor Styles and Online Instruction	11
Chapter III: Methodology	
Research Method	18
Selection of Participants	20
Collection of Data	21
Limitations of the Study	22
Chapter IV: Research Study Findings	
Introduction to Findings	23
Adult Learning Styles/Instructor Role: Mode 1 ..	23
Adult Learning Styles/Instructor Role: Mode 2 ..	26
Adult Learning Styles/Instructor Role: Mode 3 ..	29
Adult Learning Styles/Instructor Role: Mode 4 ..	32
Analysis of Data	35
Chapter V: Conclusions & Recommendations	
Conclusions	44
Recommendations	47
Bibliography	48
Appendix A: E-mail invitation: inventory & survey ..	52
Appendix B: Survey Questions & Responses	54
Appendix C: Follow-up questions to online survey ..	68
Appendix D: Transcription of interviews	71
Appendix E: Web Resources	82

List of Tables

Number	Page
1. Table 1 Learning From Experience.....	7
2. Table 2 Learning Styles & Myers-Briggs.....	11
3. Table 3 Using Learning Styles Online.....	13
4. Table 4 Participant Learning Styles.....	36
5. Table 5 Survey Scale.....	37
6. Table 6 Participant Online Survey Ratings....	39
7. Table 7 Survey Question 10 Responses.....	40
8. Table 8 Follow-up Question Responses.....	41

List of Figures

Number	Page
1. Figure 1: Kolb's Cycles & Styles Integrated..	10
2. Figure 2: Mode One.....	25
3. Figure 3: Mode Two.....	28
4. Figure 4: Mode Three.....	31
5. Figure 5: Mode Four.....	34

Chapter 1: Introduction

Online instruction is becoming the choice for instruction for many companies and educational institutions (Glanz, W., 2002). With new technology developments and product enhancements, online instruction has become a viable avenue for the presentation of content (Pantazis, 2002). There are many reasons why educational institutions and businesses are moving toward online training including: reduction of travel costs associated with instructor-led courses, instruction can happen anytime and anywhere, instruction can be individualized and flexible (Driscoll, M., 1999, p. 21).

There has been considerable research done concerning online learning for the student, but a look at how learning styles of instructors might help or hinder the student learning experience are less visible. What is the relationship between instructor learning style, instructional role, and strategy in an online course? What are the learning style strengths and areas for development of an online course instructor? What instructional roles and practices support instructor-learning styles in relation to online courses? What strengths and areas of development can be

identified from a literature review of Kolb's learning style theory that will assist online instructor development?

Universities, colleges, other educational, or training orientated interests, and the business community would benefit from a practical tool that merges instructional models, roles, and strategies with adult learning styles. This model also specifies instructor strengths and areas to enhance instructor professional and personal development. For the greatest number of students with a variety of learning styles to have their styles met by their instructors, the instructor should strive to enhance and develop expertise in all four of the learning style modes (Kolb, 1999).

On Dr Kolb's experiential learning website (<http://www.learningfromexperience.com/html/faq.html>), he describes learning styles not as fixed traits but as a current presence of mind. An instructor should strive to develop practical application, if not expertise, in all the learning style arenas. Exploring each learning style and practicing each instructor role enhances personal and professional development for the instructor and the student. Whether or not an individual is new to instruction or not does not matter. To most, online instruction is new. To meet the

needs of all the learners, no matter what the age level, an instructor must be flexible and strive to move effortlessly between the styles and roles. People grow and develop affectively, symbolically, behaviorally, and perceptually throughout their lives. If a beginning online instructor's learning style is in the acquisition stage and focuses on mainly one mode and the instructor/learner is aware of the need to develop the other modes, then over time the level of complexity and skill sophistication will increase to specialization and integration (Kolb, 2000).

The purpose of this research is to create a model linking learning styles, instructional models, roles, and strategies to assist in the educational development of instructors of online courses. Such a model provides a map for areas of needed development per learning style and a resource for practical application of strategies for the matching instructor role. Possible outcomes of this study include contribution to the literature and a model for instructor professional development.

Chapter II: Literature Review

Adult Learning Principles

In an effort to provide a frame of thought for this written endeavor, this study investigates adult instructional models, roles, and strategies treating the participants as co-researchers (Merriam and Brockett, 1997). During the creation this model the individuals completed Kolb's Learning Style Inventory and provided feedback about their online instructional practice, The participants evaluated their instructional role and practice, adding in the act of reflection, stimulating self-analysis and learning (Reiman, and Thies-Sprinthall, 1998). Self-direction is a key process for adults in continuing their education (Knowles, 1975).

Malcolm Knowles showed that adults have a need to know why they should learn something; that adults have a deep need to be self-directing, have a greater volume and different quality of experience; are ready to learn when life situations present the need for learning to occur; enter a learning situation with a task-centered, problem-centered, or life-centered orientation, and that adults are motivated to learn both extrinsically (paycheck, completion, promotion) and

intrinsically (self-esteem and achievement) (Craig, 1996). An additional need is to be shown respect (Lieb, 1991).

The Faculty Development Online Guide Book (<http://www.honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/adults-1.htm>) from the University of Hawaii in Honolulu suggests adults have established values, beliefs, and opinions; are people whose style and pace of learning has changed; prefer learning methods other than lecture; are people whose bodies are affected by gravity; tend to have a problem-centered orientation to learning. All people have pride, self-esteem, and ego, which can be very delicate and must be handled with care. Another area indicated is individual differences among people increase with age.

Knowles states "the trainer must know andragogy - the art and science of helping adults learn-and how it differs from pedagogy-the art and science of teaching youth.... This is the mark of a pro". Later in his career Dr. Knowles writes, "From pedagogy to andragogy and back again. My stance is now to use both-as appropriate to the situation. In other words, some times we train and sometimes we educate and sometimes we do both. Age does not seem to matter". Dr. Knowles opinions adjusted as his perceptions changed as others shared their

observations by using his observations and research in their classrooms (Craig, 1996).

Stephen Brookfield raises some questions in *International Encyclopedia of Education* about whether adult learning should be looked at as a separate issue from the rest of the learning of a life span. He suggests ethnicity, personality, culture, and political ethos might have more significance (A. Tuinjmans, ed. 1995).

Kolb's Experiential Learning Theory

First, a look at the connection between Kolb's experiential learning theory and learning style inventory developed to help predict personal learning style.

Experiential learning theory draws on the work of many 20th century scholars who gave experience a central role in developing theories of human learning and the development of a holistic model of the experiential learning process, such as John Dewey, Kurt Lewin, Jean Piaget, William James, Carl Jung, Paulo Freire, Carl Rogers, and others (Kolb, 1984). Mezirow's transformation theory uses an adult's experience and prior interpretation to revisit or to construct a new perspective in order to guide future action (Merriam, 1999).

Learning is a cycle that begins with experience, continues with reflection, and later leads to action that becomes a concrete experience for reflection (Kelly, 1997). Kolb used this as a starting point when he began to design the Experiential Learning Model (Kolb, 2000).

Several web sites have critiqued Experiential Learning and provided links to articles and other resources. There are over 1500 articles listed as resources for experiential learning on Kolb's Learning From Experience website. See the Table 1 for a selected listing of websites.

Table 1. Learning From Experience
Experiential Learning articles and critiques of David Kolb's theory by Tim Pickles retrieved January, 26, 2004 from http://reviewing.co.uk/research/experiential.learning.htm#1
What is experiential learning? Retrieved January 12, 2004 from http://www.teamskillstraining.co.uk/tst_article1.html
David Kolb's own website. Retrieved December 22, 2003 from http://www.learningfromexperience.com
Learning Styles and Experiential Learning from the University of South Wales retrieved January 31, 2004 from http://reviewing.co.uk/research/experiential.learning.htm#1

Kolb's Learning Style Inventory

Kolb's Experiential Learning Model is based on two lines of axis. The horizontal axis or perception continuum

represents how we approach a task, would we rather watch or do. The vertical axis or processing continuum represents our emotional response: how do we think or how do we feel? For each task or emotional response learning preferences also represent four different learning methods and learning styles: doing (active experimentation), watching (reflective observation), feeling (concrete experience), and thinking (abstract conceptualization). Kolb actually refers to doing (active experimentation), watching (reflective observation), feeling (concrete experience), and thinking (abstract conceptualization) as learning cycles (Clark, 2001). Cycles represent a continuum of development, whereas styles represent a personal preference for learning (Kolb, 2000).

Kolb describes our learning preferences as a combination of two of the cycles: an **accommodating/activist** (doing and feeling preferences, or concrete-active), a **diverging/reflector** (watching and doing, or concrete-reflective), an **assimilator/theorist** (watching and thinking, or abstract-reflective), or a **converging/pragmatist** (thinking and doing, or abstract-active). We each have a strong area, but more than likely will work to some extent in all areas depending on the environment. To enhance our professional

development as instructors, online or not, each combination of learning styles should be viewed as an opportunity to tend to the needs of the students we are instructing. Since each style is not a fixed state but a current presence of mind, instructors should attempt to develop all four areas to use in their teaching (Smith, 2000; Kolb, 2000).

Figure 1 illustrates a flow of cycles and styles and the description of the horizontal and vertical axes if the model was divided into four quadrants. The direction of the flow could be in any direction, as well as encompassing more than one quadrant at a time depending on the type of assignment that was offered or the role the instructor was taking during a particular instruction time.

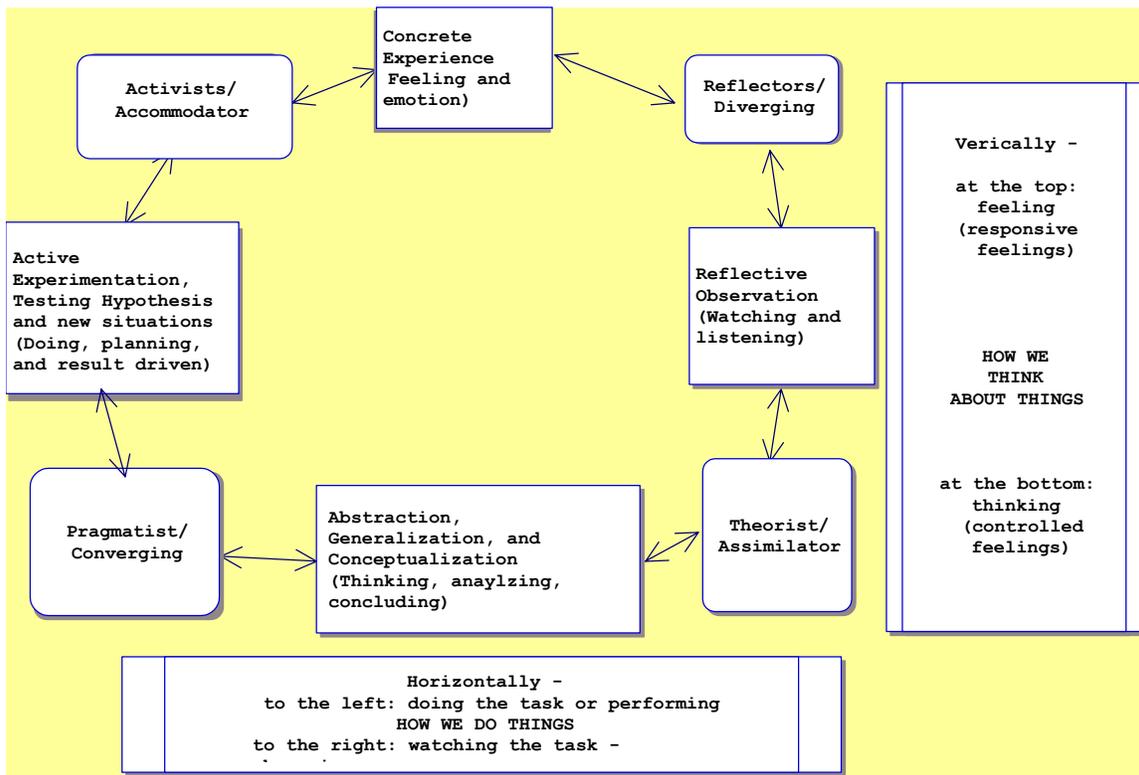


Figure 1: Kolb's Cycles and Styles Integrated.

Note: the author created the illustration after investigating several different learning style models based on Kolb's Learning Styles in an attempt for clarification.

To get a concrete understanding of Kolb's Learning Cycles and Styles, I decided I needed to take the Learning Inventory and examine my results. I discovered later that Kolb also recommends this in the Facilitator's Guide to Learning (Kolb, 2000).

In Kolb's, Facilitator's Guide to Learning, he presents LSI correlation with Myers-Briggs Type Indicator showing accommodating equal to sensing, assimilating equal to

intuitive, diverging equal to feeling, and converging equal to thinking. I located three articles that talked about learning styles and Myers-Briggs Type Indicator. See Table 2 for author, title, and URL. The articles each express that the learning Style Inventory and Myers-Briggs Type Indicator have matching points that would allow for coordination.

Table 2: Learning Styles and Myers-Briggs Type Indicator		
Brightman, Harvey (nd)	GSU Master Teacher Program: On Learning Styles	Retrieved on 12/10/2003 from http://www.gsu.edu/~dschjb/wwmmbti.html
Felder, Richard and Soloman, Barbara (nd)	Learning Styles and Strategies	Retrieved on 12/10/2003 from http://www.ncsu.edu/felder-public/ILSdir/styles.htm
Felder, Richard, (1993)	Reaching the Second Tier: Learning and Teaching Styles in College Science Education	Journal of College Science Teaching. Vol. 23(5), 286-290 (1993). Retrieved on 12/10/2003 from http://www.ncsu.edu/felder-public/Papers/Secondtier.html

Instructor Styles and Online Instruction

A critical literature review revealed limited articles on instructor learning styles, roles, and practices for teaching online.

How many of the articles and books actually deal with instructor and student learning styles and online learning? It was exciting to see the wide variety of different journals

that are presenting the papers. From the newest published articles and books to the oldest it seems the thoughts are similar: put the style of the student to the forefront, not the style of the instructor. If an instructor provides the course materials with options or choices on how they can be completed, the variety and creativity of the class increases and so does the learning. Different types of learners may not know how to accomplish a task outside of their particular style but once exposed to a new perspective, task completion becomes a possibility. Discussion and all other types of communication between online course members is a key avenue for enlightenment for instructors and learners (Collison, Elbaum, Haavind, and Tinker, 2000).

Keep in mind that even the instructor will be a learner in the classroom supporting why the term "life-long learner" may have been coined. When an instructor gives up being the monarch of the online environment or the face-to-face environment, students are allowed to occasionally enlighten the instructor and it is okay that this happens. All learners, provided with choices and options that meet their learning needs, will rise to the occasion, learn, and share their personal experiences.

Table 3. Using Learning Styles Online			
Author/Year	Title of Study	Relevance	Web or Journal Information
Abdelraheem , Ahmed Yousif (2003)	"Computer learning environment: problems, design challenges, and future promises"	Learners are kept at the center of the instruction and learning process	<u>Journal of Interactive Online Learning</u> , Vol. 2 Number 2, Fall 2003. Retrieved Mar. 15, 2004, from http://www.ncolr.org/jiol/archives/2003/fall/01/index.html
Armao, Agnes and Coulter, Denise-Marie (2001)	"A vice president learns an online lesson"	All about Phasing into Online Instruction.	<u>THE Journal</u> , Vol. 28, 2001
Bickle, Marianne C. and Carroll, Jan C. (2003)	"Checklist for quality online instruction: outcomes for learners, the professor, and the institution"	Does this help you decide for quality online instruction?	<u>College Student Journal</u> , Vol. 37, 2003

Table 3 (continued)			
Blackwell, Charles W., Gibson, Jane W., and Tesone, Dana V. (2001)	"The journey to cyberspace: reflections from three online business professors"	Shows the change in instructional online impressions over time.	<u>SAM Advanced Management Journal</u> , Vol. 66, 2001
Brandao, Colleen (2002)	"Teaching online: harnessing technology's power at Florida virtual school"	students coming to businesses, universities, and colleges, receiving online training at high and middle schools.	<u>THE Journal</u> , Vol. 29, 2002
Caris, M., Ferguson, D., and Smith, G.G. (2002)	"Teaching over the web versus in the classroom: differences in the instructor experience"	..online teaching has some definite advantages that may make the greater work worth the effort for many instructors (the last part of the last sentence)	<u>International Journal of Instructional Media</u> , Vol. 29, 2002
Cini, Marie A. (1998)	"Learning leadership online: a synergy of the medium and the message"	Though written just 6 years ago, reading the online part of this article shows how far forward we have progressed	<u>Journal of Leadership Studies</u> , Vol. 5, 1998

Table 3 (continued)			
Dewar, Tammy (1999)	"Adult learning online"	a little dated, the last link does not work	Retrieved March 14, 2004 from http://calliopelarning.com/adult.htm#Adult%20Learning%20Principles%20(A
Fritz, Margaret (2002)	"Using learning styles inventories to promote active learning"	Instructors need to make adjustments in their teaching styles to accommodate their students' learning styles	<u>Journal of College Reading and Learning</u> , Vol. 32, 2002
Fulton, Kathleen and Riel, Margaret (2001)	"The role of technology in supporting learning communities"	Building learning communities for teachers	<u>Phi Delta Kappan</u> , Vol. 82, 2001
Grasha, Anthony F. and Yangarber-Hicks, Natalia (2000)	"Integrating teaching styles and learning styles with instructional technology"	The article clearly delineates areas relating to teaching styles and learning styles.	<u>College Teaching</u> . Vol. 48. Issue: 1. 2000.
Holcomb, L. B., King, F. B., and Brown, S. W. (2004)	"Student traits and attributes contributing to success in online courses"	learner characteristics may have a major impact on the manner in which online courses are designed and on the pedagogy that is employed to deliver them	<u>Journal of Interactive Online Learning</u> , Vol. 2 Num. 3, 2004. Retrieved March 15, 2004, from http://www.ncolr.org/jiol/archives/2004/winter/04/index.html

Table 3 (continued)			
Ross, Jonathan I. and Schulz, Robert A. (1999)	"Using the world wide web to accommodate diverse learning styles"	...encourage professors to devise a development list detailing ways to use the Web in their classes	<u>College Teaching</u> , Vol. 47, 1999
Schwartzma, Roy and Tuttle Heath V. (2002)	"What can online course components teach about improving instruction and learning?"	The potential for pedagogical promise or peril lies not in the technological tools, but in the hands of those who wield them.	<u>Journal of Instructional Psychology</u> , Vol.29, 2002
Sims Robert R and Sims Serbrenia J. (1995)	"Chapter 1: Learning enhancement in higher education"	adult learning theory, principles of learning, how the brain and thinking fits in with learning, applications of learning and thinking styles to teaching, instructional design, and teaching modes linked to Kolb's learning styles with strategies.	<u>The Importance of Learning Styles: Understanding the Implications for Learning, Course Design, and Education.</u> Contributors: Serbrenia J. Sims - editor. Publisher: Greenwood Press. Place of Publication: Westport, CT. Publication Year: 1995.

Table 3 (continued)			
Paulson, Karen (2002)	"Reconfiguring faculty roles for virtual settings"	Different in the aspect for a trainer but in relationship for the roles a trainer or an instructor.	<u>Journal of Higher Education</u> , Vol. 73, 2002.
Woods Jr., Robert H. (2002)	"How much communication is enough in online courses?"	... both quality and frequency of interpersonal and group communication are critical factors in the relative success of online distance courses and programs...	<u>International Journal of Instructional Media</u> , Vol. 29, 2002

In the literature review more articles were found that included something on instructor learning style. So, instructor-learning styles seems to require some more investigation and thought. Research and study in this area can provide needed connections for student-teacher learning style comparisons. In the next chapter the methodology that was chosen to further explore instructor-learning style is explained.

Chapter III: Methodology

Research Method

The purpose of this study was to develop a model that would show how an instructor might grow in instructional style by portraying a cycle for professional growth and development and an indication of instruction models, roles, practices, and strategies. The model suggests areas of strength as well as areas that might be weak and could be improved upon.

The model comes from comparing Kolb's Learning Style Inventory and knowledge gleaned from research articles, books, and web sites that provide instructional insight for all kinds of instructors. All the references have been placed in the bibliography at the end of the paper.

The development of the model started with research into the learning styles that Kolb's inventory displays. Each style represented instructional presentation models such as direct, cooperative, informational, and others. From here, each instructional model presents instructor roles, practices, and strategies that are used in the classroom or online. Some of the instructional models, roles, strategies, and practices cross over the learning style areas, appearing in more than one style. When an instructor takes the learning style

inventory, the instructor may be in more than one quadrant of the grid. The model addresses areas that the instructor was strong in and other areas that needed to be developed for the cycle presented in Kolb's Learning Style Inventory for professional development. Once the model was completed conceptually it was applied to several individuals who were in various instructor roles.

By means of qualitative methodology and using the grounded theory strategy, I looked for a general, abstract theory of a process, action, or interaction grounded on the views of participants responding to survey questions (Creswell, 2003) in relation to online instructional role, strategies, and the individual learning styles that the participants reflect.

The use of grounded theory strategy involves the refinement of information by using multiple collections of data. In this instance the collection of data is in four forms: research-based model, Kolb's Learning Style Inventory, a researcher developed survey, and follow-up questions. The Learning style inventory provided the data about the participants learning cycles and styles. The survey attempted to relate instructor method, role, practices, and strategies to the learning style inventory. The sampling of participants

helped to clarify the information provided in the model presented in Figures 2, 3, 4, and 5.

Four participants completed Kolb's Learning Style Inventory and a researcher developed survey online through e-mail invitation with site URLs and instructions. Once the inventory and survey were completed, I analyzed the information comparing the responses of the four participants and analysis of the individual responses in relationship to the models of characteristics corresponding linked to learning styles, instructional methods, roles, practices, and strategies. After analysis of the survey information, the participants were asked to respond to five follow-up questions that became apparent after viewing their survey responses and their completed Learning Style Inventories was needed for clarification proposes.

Selection of Participants

Participants were selected by the knowledge that they were instructing online and their willingness to participate. It was a selection of convenience; personal contacts were used to find individuals willing to participate. Three university professors participated (P_1, P_3, P_4). The fourth participant is a trainer for a national company (P_2). P_2 has

a high school education and has trained herself to train individuals online and in the classroom. All four are actively instructing online courses now.

Five identifiable factors that shape an individual's learning styles are described in Kolb's Learning Style Inventory. Current job role, current task/problem, professional career choice, educational specialization, and personality type also played a part in the selection of participants by chance (Kolb, D. 2000). Current job role, career choice, and task include online instruction. Educational specialization seems to be a factor as well. Though all participants do not have the same educational backgrounds they have more or less taught themselves how to teach online.

Collection of Data

The online environment was chosen for ease of access for all participants and because the instruction that is under observation is online.

For data collection, an email was sent to four experienced, online instructors asking for feedback by the completion of the Kolb's online Learning Style Inventory and an online survey developed by the researcher. The Learning

Style Inventory is an established inventory used by the educational and business worlds. The online survey was developed by the researcher to show that instructional style and cycle can be combined successfully with instructional methods, roles, and strategies. As a follow-up for questions that may arise after the participants have completed the online survey, follow-up questions that were generated after an initial review of the results of the inventory and the online survey were presented by telephone or in person.

Limitations of the Study

The data collection form was not without issues. There was some confusion with the implementation of the instructions. The researcher, before the development and activation of the survey, had not used this particular site. The survey questions had not been tested on any others previously for readability or validity.

When the participants responded to the follow-up questions, there was still some confusion on the part of some of the participants about the instructional terminology. Which leads to a discussion of the findings.

Chapter IV: Research Study Findings

Introduction to Findings:

After extensive research I developed the following model. Since it is so large I divided into four smaller segments. Each model is based on one of Kolb's Learning Styles. I included in the model the additional areas of instructor strengths, developmental needs, instructional models, roles, practices, and strategies.

Adult Learning Styles/Instructor Models/Instructor Roles:

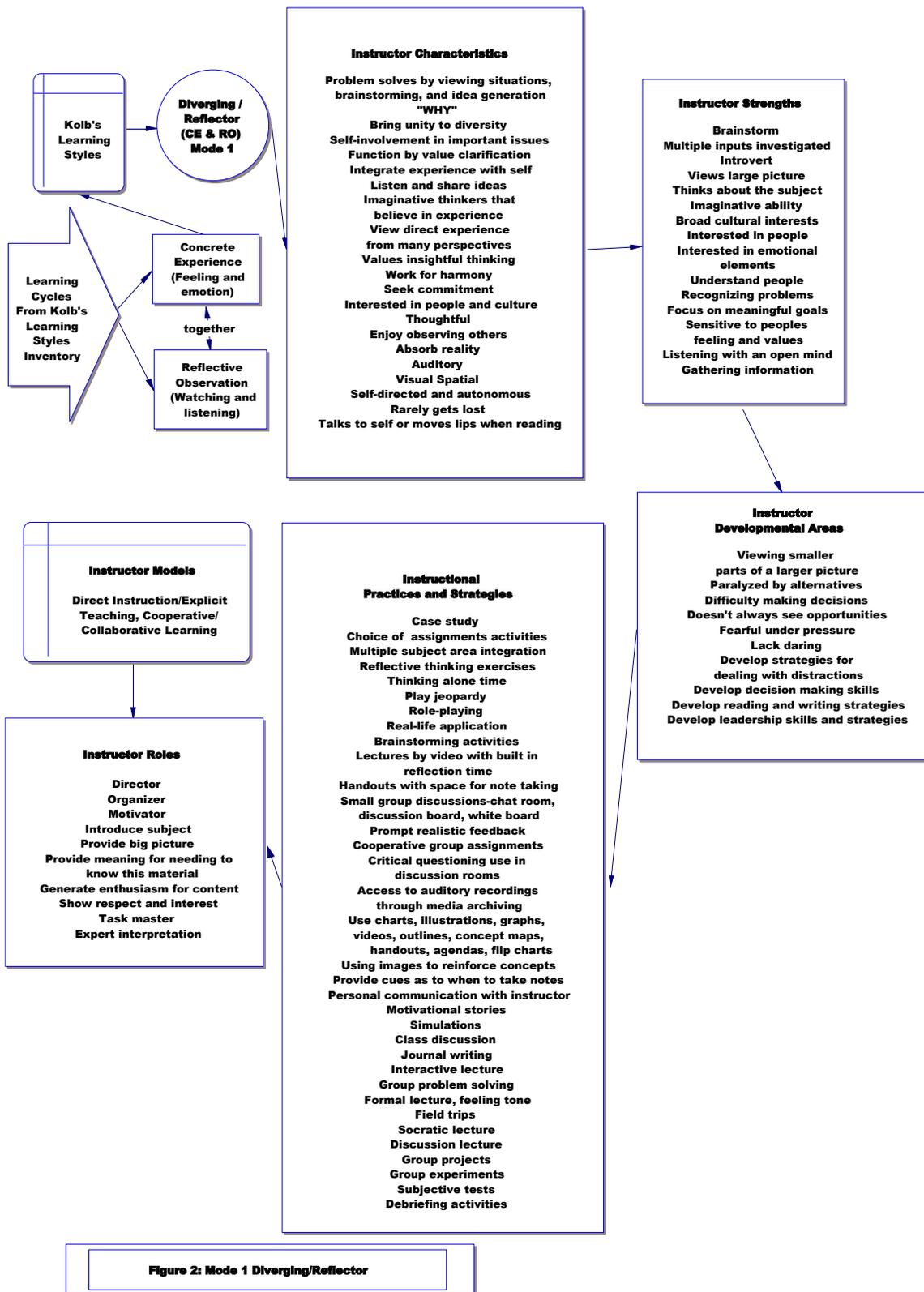
Mode 1 Diverging/Reflector

When an individual with a diverging style is presented with a situation, the individual will find alternative possibilities by viewing the situation from differing perspectives. These individuals emphasize feelings rather than thinking (Kolb, 1999).

This type of a instructor enjoys looking at situations from many different views and perspectives. One of the methods that this instructor might use is collaborative learning. In collaborative learning the grouping and pairing of students occurs for the purpose of developing and enhancing critical thinking skills and placing an emphasis on working as a member

of a team to think creatively, make decisions, and solve problems (Gokhale, 1995). Cooperative learning requires students to work in groups on problems or projects that provide for individual accountability and positive interdependence (Felder, 2004) Always being the expert or formal authority can lead to a rigid, intimidating, and inflexible way of managing students and their needs (ISU, 2004).

Instructors that are diverging/reflectors prefer concrete experiences, reflective observation, and become very enthusiastic about the generation of multiple solutions as long as they do not have to implement any of the solutions that they have generated (Buch & Sena, 2001).



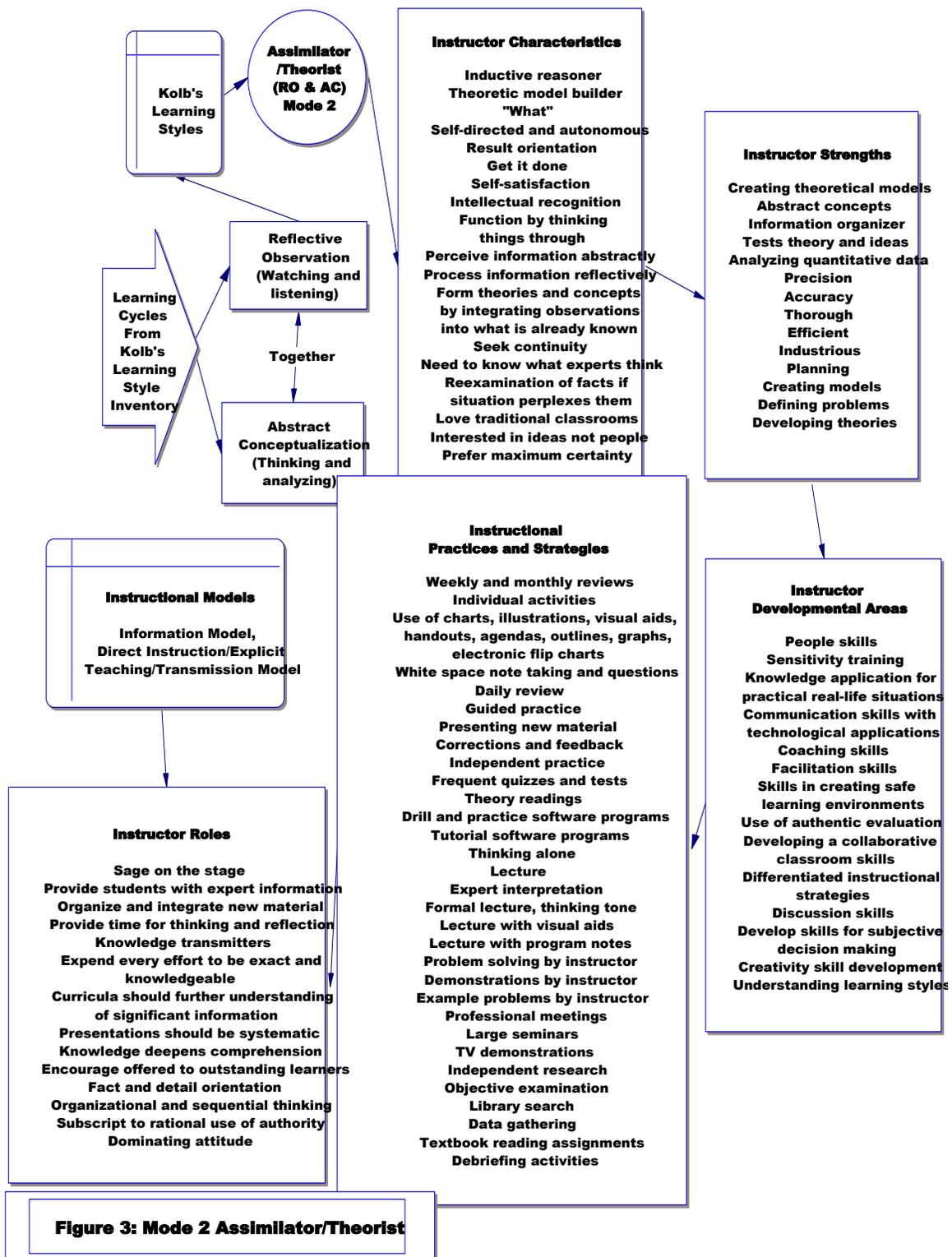
Adult Learning Styles/Instructor Methods/Instructor Roles:

Mode 2 Assimilator/Theorist

The instructor who favors the assimilator style prefers a well-known fixed body of knowledge that each and every student needs to know and be able to repeat back exactly as learned. This instructor feels if they are a transmitter of knowledge or "sage on the stage". An instructor who is the "sage on the stage" likes to know all and be all to his or her students. This individual is the focus of the class, not the students. The students are expected to listen and to absorb the huge amounts of information that are presented (Kolb, 1999).

The instructor is the director of all that happens online or in the classroom. Each step is spelled out in the syllabus and the expectation of the student is to follow the directions and learn the content. Students must know certain information before they can proceed in their educational attainment of a certain subject. Such an instructor prefers abstract conceptualization and reflective observation. The instructor reveals in grasping a wide array of information and then placing it logically and concisely in order (Buch & Sena, 2001).

When relating this particular teaching style to learning styles it is said to accommodate multiple learning styles by employing varying types of examples and types of student practice (Reiman and Thies-Sprinthall, 1998). But, disagreement with this statement can be found in the research. For example, direct teaching is probably best for teaching skills, not understanding, (retrieved March 6, 2004 from <http://www.adprima.com/direct.htm>). Experiential learning methods seem to encompass more learning styles than direct teaching methods. But, the key point here is that the variety of methods used brings the instructor closer to the needs of the students (Kolb, 1999).



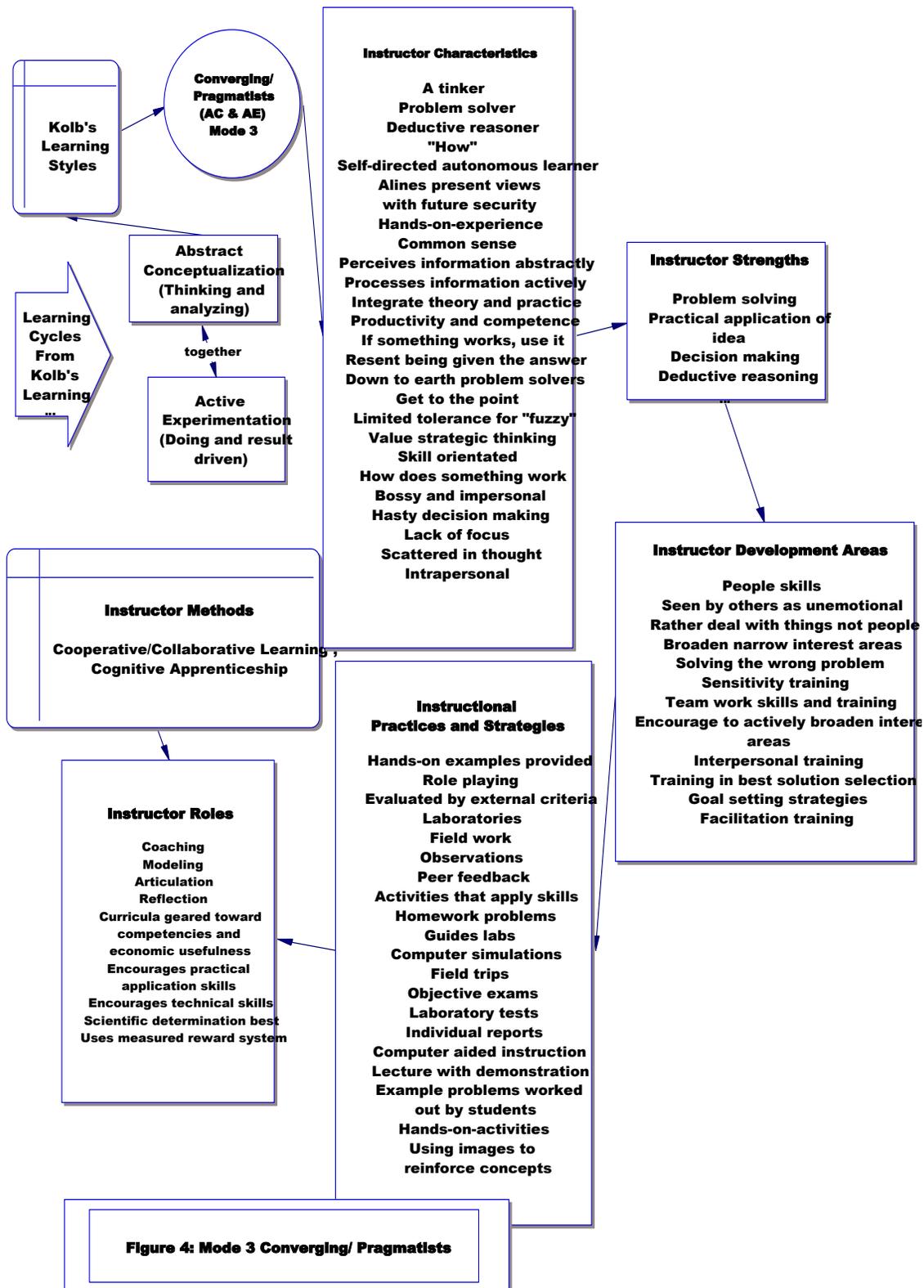
Adult Learning Styles/Instructor Methods/Instructor Roles:

Mode 3 Converging/Pragmatists

Converging style characterizes finding practical uses for theories and ideas. This instructor solves problems, finds solutions, and makes decisions. Pragmatists really like to work with technical tasks and issues. A pragmatist makes an effort to avoid social and interpersonal entanglements (Kolb, 1999).

Instructor methods include using cooperative, collaborative, and cognitive apprenticeships. Cooperative and collaborative learning are sometimes used interchangeably and involves students working and making decisions together in heterogeneous groups. Usually in collaborative groupings the grading systems are more group orientated. In a cooperative group the grading reflects the individual or a combination of group and individual. Cognitive Apprenticeship is learning-through-guided-experience and is focused on teaching processes used to handle complex tasks (Conway, 1997). Converging instructors prefer abstract conceptualization and active experimentation. This instructor finds pleasure in assisting students in singular uses for ideas and then implementing the ideas the students have generated (Buch & Sena, 2001).

An instructor that is a coach and a helper would rather not spend huge amounts of time with people. Instructor method is the practical application of an idea (Clark, 2001).



Adult Learning Styles/Instructor Models/Instructor Roles:

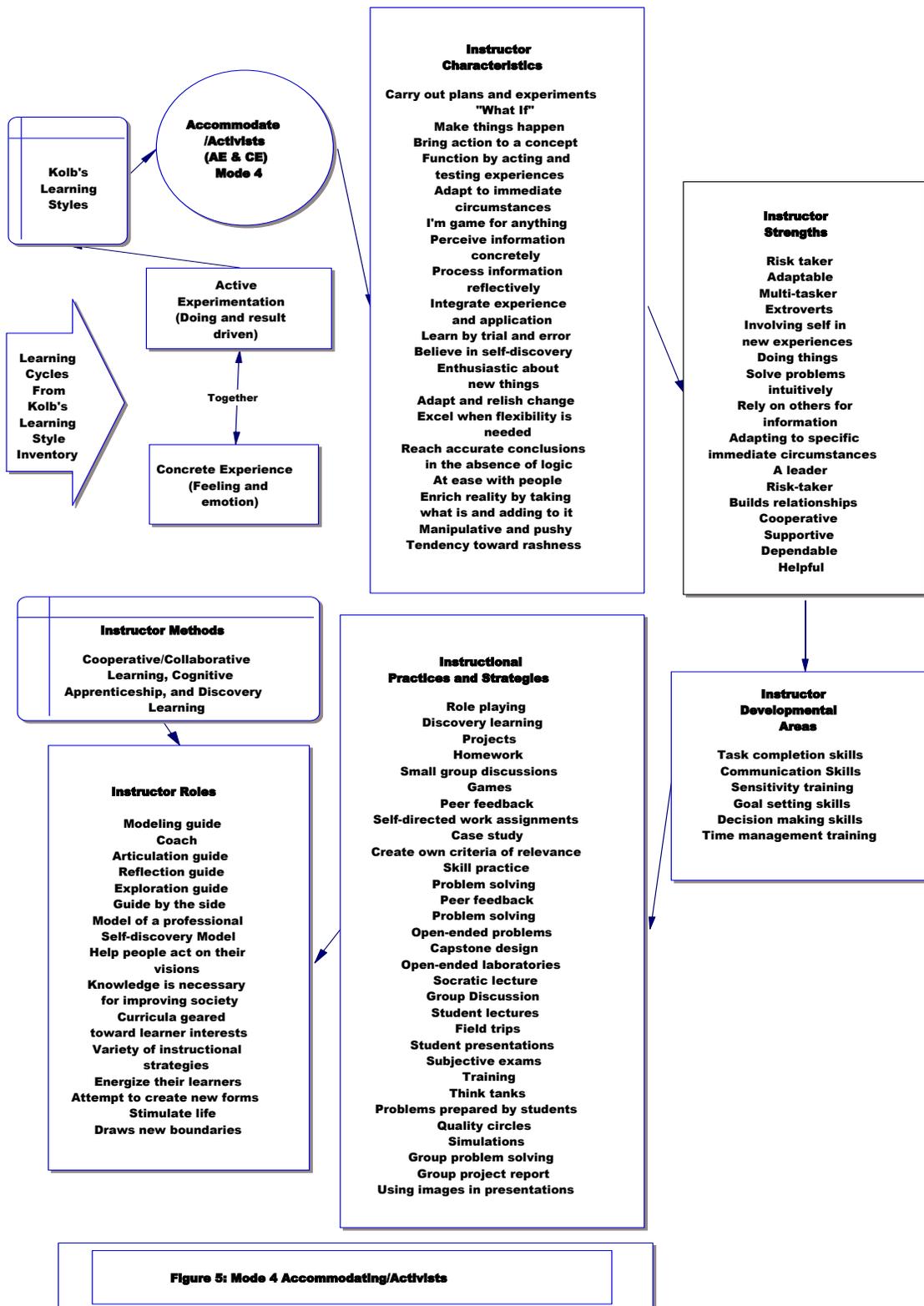
Mode 4 Accommodator/Activist

Practice makes perfect is the accommodator motto. The application of ideas in many different situations provides this instructor happiness. The more uses for an idea that can be found, the more useful the information that was learned. The activist has a tendency to adapt and to accommodate to situations and changing events, circumstances, and information (Kolb, 1999).

Cooperative, collaborative learning, cognitive apprenticeship, and discovery learning are models of learning that you will use when instructing your courses. Cooperative, collaborative, and cognitive apprenticeship were discussed in the previous modes. Discovery learning, the only model that is being introduced in this mode, takes place when students explore, manipulate, perform, and question controversies in their environments (Conway, 1997). An inquiry-based learning model, discovery learning in problem solving situations provides the learner with an opportunity to draw on previous experience and knowledge (Clark, 1999).

The main instructor role would be the "guide on the side" or the "role model." The instructor provides opportunities

for the learner to see and touch all, with students developing their own criteria or assist with the development of a rubric (Kolb, 1999).



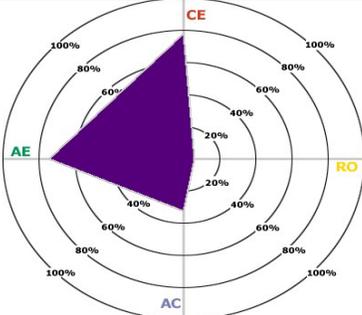
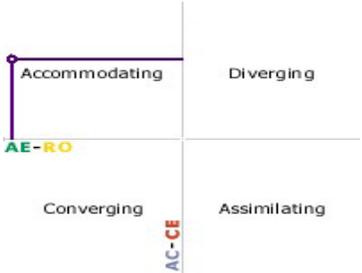
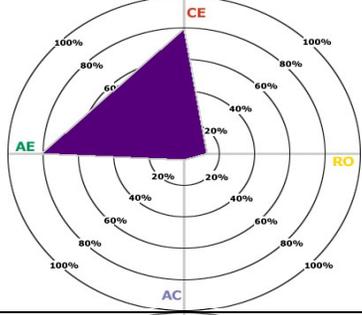
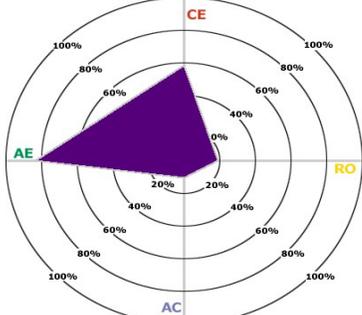
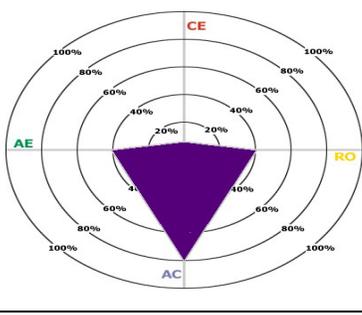
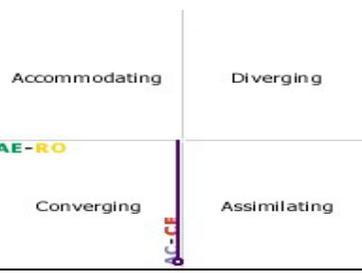
Analysis of Data

The data from Kolb's Learning Style Inventory showed preferred learning styles for three of the participants (P_2, P_3, and P_1) to be strong accommodators. The fourth (P_4) was converging and assimilating equally. See Figure 6.

P_4 has a learning style that clearly shows converging and assimilating as her preferred learning style, but her LSI analysis said she is only converging. P_4 uses more than one style to in her learning. This may indicate that she is very comfortable learning using both styles in her personal educational activities. Her grid showed that she perceives new information abstractly and she favors active experimentation and reflective observation to process that information.

P_1, P_3, and P_2 clearly showed a preferred learning style of accommodating. Their grids showed differences in their reliance on the style. The furthest a point is from the intersection, the more reliance on a style (Kolb, D. 2000). P_3 and P_1 are close to the same intersection point, about half way, showing a more balanced learning approach than P_2, who shows total reliance on the accommodating style. All three participants show that they perceive new information

using concrete experience and favor active experimentation to process the new information.

Table 4: Kolb's Learning Style Inventory: Participant preferred learning Style and Grid		
Name	Preferred Learning Style	Preferred Learning Style Grid
P_1		
P_2		
P_3		
P_4		

In order to answer the research question, "Does the learning style of the instructor reflect instructional model, role, and strategy used in online learning?" I designed a survey. This survey captured unique characteristics from the model in Figures 2 through 5, to allow for an exploration between the Learning Style Inventory results and the instructional models, roles, and strategies. There are ten questions on the survey, nine of the questions asked the participant to choose the ones they were most likely to use as a four. Each participant was to rank each of the choices from 4 (most likely), three (likely), two (less likely), or one (least likely) based on a Likert scale.

Table 5: Survey Scale			
4-most likely	3-likely	2-less likely	1-least likely

Question 10 was an opened-ended question.

As the researcher looked at the responses from the participants, it was apparent that some misconceptions were present in terminology depicted by the Learning Style Inventory. To clarify this two follow-up questions were created. The definitions for some of the terms used were included so that there would be no guesswork from the participants and all participants would be working with the

same definitions. In another of the survey questions, the question asked about the value for a type of thinking skill, each of the participants valued a thinking skill that was opposite of their learning style.

The third question was created when none of the participants used games in their instruction. The researcher was curious about this lack of use of an instructional strategy.

The researcher noted a lack of survey questions on what the participant thought were their strengths and areas to be developed, so two questions were created to examine this a little closer and then compare to the model's suggestions.

Table 6 below shows a summary of the participants' self-assessment in relation to the online survey.

Table 7 shows the opened question and participant responses.

Table 6: On-line Survey Results	P_1	P_2	P_3	P_4
1. When I am instructing on-line, I provide:				
___ expert interpretation for the student (diverging)	3	4	2	4
___ time for thinking and reflection (assimilating)	4	4	4	4
___ people with life skills (converging)	3	3	3	2
___ situations for self discovery (accommodating)	2	4	4	4
2. When I use discussion in on-line learning, the discussion format is:				
___ learner to teacher (interact and receive feedback directly from you) (assimilating/diverging)	2	2	2	2
___ learner to learner (participate in activities with other learners) (accommodating/converging)	4	3	4	4
___ learner to environment (work with resources and simulations) (accommodating/converging)	2	3	3	3
___ learner to content (information on the web, books, and databases) (diverging/assimilating)	1	2	2	1
3. I use the following instructional strategies in on-line instruction:				
___ case studies (accommodating/diverging)	4	4	4	4
___ lecture (converging/assimilating)	3	3	1	2
___ formal lecture (converging/assimilating)	2	4	2	3
___ games (accommodating/diverging)	1	1	2	2
4. As an instructor, I see myself asking:				
___ "What if?" (accommodating/diverging)	4	4	4	4
___ "How?" (converging/assimilating)	3	4	4	4
___ "What?" (converging/assimilating)	4	3	4	2
___ "Why?" (accommodating/diverging)	4	4	4	4
5. When I am instructing on-line, I encourage:				
___ practical application skills (converging)	4	4	3	4
___ creation of new forms of information (accommodating)	4	4	4	4
___ outstanding learners (assimilating)	4	2	3	2
___ cooperative effort (diverging)	4	3	4	4
6. When I am instructing on-line, I use the following instructor models:				
___ discovery learning (accommodating)	4	4	4	4
___ cooperative learning (converging/accommodating)	3	2	3	4
___ direct instruction (diverging/assimilating)	3	3	2	2
___ information model (assimilating/diverging)	2	3	1	3
7. When I am instructing on-line I see myself as:				
___ a guide (accommodating/converging)	3	4	4	4
___ a coach (accommodating/converging)	1	4	4	4
___ a expert (assimilating/diverging)	3	3	2	2
___ a motivator (assimilating/diverging)	2	2	3	3
8. As an instructor, I am very good at:				
___ planning (assimilating)	3	4	4	4
___ brainstorming (diverging)	4	3	4	3
___ adapting (accommodating)	4	4	4	4
___ problem solving (converging)	4	3	3	3
9. As a learner and an instructor, I value:				
___ strategic thinking (converging)	2	3	3	4
___ insightful thinking (diverging)	4	4	4	4
___ thoughtful thinking (assimilating)	3	4	4	3
___ group thinking (accommodating)	2	3	3	2

Table 7: Survey Question 10: Open-ended Response	P_1
If an instructor provides a variety of strategies to the student, how does this help the student in the educational process?	It helps the student both learn in the manner best for them and perhaps identifies learning strategies that work for them.
All of the participant responses were similar.	P_2
	The student can select the strategy or strategies that work best for him/her. Also the student has an opportunity to try new strategies with less negative consequences.
	P_3
	Student can process the information in a variety of ways
	P_4
	Students have preferred ways of learning. Providing different strategies helps to make more students comfortable with online learning.

Follow-up Question Results

The responses to the follow-up questions are presented in Table 8. Since this is such a small group of participants the data will not be as supportive of the model as it could be.

Table 8. Follow-up Questions Responses

Follow-up Questions	P 1	P 2	P 3	P-4
1. Can you briefly describe how you have used each of the instructional models online?				
Discovery Learning	Case studies; Students define an instruction problem and develop their own case based on their teaching and practice, resulting in a solution.	I don't consciously use this but try to get AHA's from students.	Students do an assigned reading; they have an online prompt where they relate the readings to their own practice	Case studies, reflecting at how the information can use in your everyday work or how you have used these same skills and techniques, the students don't really know what they are called.
Direct Instruction	I have at least one PowerPoint presentation and I utilize this with a multimedia presentation and a discussion about the presentation presenting information in more of a lecture format.	I use this mostly when I am training for software.	I don't think I have an example of direct instruction for online.	I provide web pages with static information, it is there all the time, and it is scripted, thought out, and chunked.
Informational Learning	I have discussion space for technical and for content questions.	Students can't see us online - we need to utilize all of these.	Assigned readings or video clips that they see, Prompting questions	Online forums for help and the student lounge, both areas are where a lot of interaction goes on between students.
Cooperative Learning	When the students are writing their case there is peer review and group work process, reviewing each others work and providing feedback.	I have not tried this but would like to in the future.	Small groups meet outside of class time.	Four to six people usually, have them come up with a consensus response for the group that they have interacted together to produce.

Table 8: (continued)				
Follow-up Questions	P 1	P 2	P 3	P-4
2. When I asked you "As a learner and an instructor, I value: insightful thinking, thoughtful thinking, group thinking, and strategic thinking", your responses were the opposite of your style in Kolb's Learning Style Inventory. Can you share your thoughts about why this might have happened?	I can't separate them, thoughtful and insightful. I was interested in their reflection and what process they do while they process.	I had not really thought about the thinking aspect except that everyone needs to be involved and we need a group focus.	Don't know I, I am not sure.	This participant matched the responses to the learning style inventory report.
3. When selecting instructional strategies, you did not select the use of games as one of your common choices; explain why you would not use games in your instruction?	Time, resources, and students.	Not sure games are a good use of our time. I usually do a review of the materials.	Not aware of games that would be appropriate for the content I am teaching.	To use games well, they have to be really designed well, which costs time and money.
4. When instructing online, what do you think you are the most skilled in and why?	Designing interactive environments	I am really good at making people feel at ease and to get the talking.	Develop prompting questions. Questions that make the student reflect individually and to each other.	I am most skilled in my ability to be responsive to students.
5. When instructing online, what do you think you could improve upon and why?	Planning: get things planned so it is not so helter skelter.	Doing new things: Breakout sessions or more hands-on activities.	Finding or developing games or simulations that goes with my content. Adding digital video.	I think creativity, is one area I really would like to improve on.

Table 8 shows the paraphrased responses of the four participants to the follow up questions. All the participants, no matter what their learning styles, see time, resources, and relevance to their courses as a reason for not using games in their instruction. Participants evaluated what they felt they were most skilled at and what they could improve upon differently. Each presented a individual view of their online experiences in their answers.

Chapter V: Conclusions and Recommendations

Conclusions

I have created a model with four modes that I believe provides a professional development course of action in instructor training. I have researched and read articles and books that have continued to allow me both professional and educational growth. I believe that online learning has a major potential for the development of instructors as time progresses and the needs of businesses and education adapt and change to fill the needs of the learners.

In online learning environments the learner is not only the student in the course but the instructor as well. I have always felt that way even in a face-to-face class. Students bring their experiences with them and I have not always had the same experiences that they have had. Each of us has different perspectives and when sharing thoughts and opinions or trying to establish views through dialogue and human communication learning occurs in a give-and-take method. Many important educators have expressed such views in their writing such as John Dewey, Paulo Freire, Kurt Lewin, and Jean Piaget, (Kolb, 1984).

For many years adult learners were expected to adjust to the instructor style. An instructor might still want to be the sage on the stage and the student might want the instructor to continue that role as well because that is the dependant position the student finds in most traditional college classrooms. Someone lectures, the student might get to play a game or two or maybe make a presentation, take notes, or depending on the instructor's learning style, the student might participate in a class discussion, student to teacher or student to student to teacher (Buch, K., & Sena, S., 2001).

How does all this fit into adult online teaching and learning? Online learning lends itself to provide an avenue for the instructor to critically challenge learners and foster deeper levels of learning using critical questioning techniques (Collison, G., Elbaum, B., Havvind, S., and Tinder, R., 2000).

Learning from experience by providing challenging task-centered, problem-centered, or life-centered problems and issues to be creatively resolved revolving around team work and building in communication levels provides self directed learners with pathways for success.

The learning environment or climate is very important online since communication is likely text-based with little visual reinforcement through body posture and or facial expressions (Collison, Elbaum, Havvind, and Tinder, 2000).

Recommendations

Facilitating Online Learning: Effective Strategies for Moderators, (Collison, Elbaum, Havvind, and Tinder, 2000), is a book I would recommend to help counter the lack of visual expression. The use of "voices" to help set the different tones of dialogue depending on the learning needs of the students. The authors describe the use of six voices, eight tones, and six critical thinking strategies allowing for the building of community and open sharing of ideas.

I recommend that instructors take at least one of the Learning Style Inventories that are available to expand their self-awareness, personal growth, and professional development.

Over the years I have taken several inventories to help myself and have students in my classes that the same inventories to assist the students in their developmental awareness of their learning styles. I consider myself a life-long learner, it would be interesting to have an adult who has not started on their educational adventures yet start taking

some of these inventories and keep track of their results over the years. Gathering such evidence could document the growth and development of a maturing adult, not physically but emotionally, socially, ethically, and educationally.

When working with Kolb's Learning Style inventory it would be interesting to investigate how many instructors overlap in their styles and if there is a way that the Learning Style Inventory could show and discuss that when the results are sent to the participants and the researchers.

Online survey tools that are used for research must be thoroughly investigated before using them in a study. Limitations in the survey tool can damage the productivity of the research and cause frustration on the part of the participants and the researcher.

In conclusion, though there were many areas of concern during the time participant information was being gathered, the end result was the development of four modes in chart form that show the necessary steps for instructor professional development. The search and active research for supporting documentation to provide the Instructor Developmental Model the necessary rigor will be implemented.

Bibliography

- Buch, K., & Sena, S. (2001). "Accommodating Diverse Learning Styles in Design and Delivery of Online Learning Experiences." International Journal of Engineering Education. Vol.17, No. 1, pp. 93-98, 2001.
- Clark, D. (1999, December). "Discovery Learning". Retrieved March 26, 2004, from www.nwlink.com/~donclark/hrd/history/discovery.html
- Collison, George, Elbaum, Bonnie, Havvind, Sarah, and Tinder, Robert (2000). Facilitating Online Learning: Effective Strategies for Moderators. Atwood Publishing. WI.
- Conway, J. (1997). "Educational Technology's Effect on Models of Instruction." Retrieved March 26, 2004, from <http://copland.udel.edu/~jconway/EDST666.htm#cogappr>
- Conway, Judith (1997). "Educational Technology's Effect on Models of Instruction". Retrieved January 20, 2004 from <http://udel.edu/~jconway/EDST666.htm>.
- Craig, R. L. (1996). "The ASTD Training & Development Handbook" (4th ed.). Adult Learning, M. S. Knowles. pp. 253. New York: McGraw-Hill.
- Creswell, J. (2002). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 2nd. Ed. Sage

Publications. Thousand Oaks, CA.

Driscoll, M. (1999). "Web-Based Training in the WORKPLACE".

Adult Learning, 10(4), 21. Retrieved April 25, 2004, from
Questia database, <http://www.questia.com>.

Felder, R. M., & Brent, R. (2001). "Effective Strategies for

Cooperative Learning." J. Cooperation & Collaboration in
College Teaching, 10(2), 69-75 (2001). Retrieved March

16, 2004, from [http://www.ncsu.edu/felder-
public/Papers/CLStrategies\(JCCCT\).pdf](http://www.ncsu.edu/felder-public/Papers/CLStrategies(JCCCT).pdf)

Gokhale, A. A. (1995). "Collaborative Learning Enhances

Critical Thinking". The Journal Of Technology Education.

Vol.7. No. 1, 1995. Retrieved March 16, 2004 from

[http://scholar.lib.vt.edu/ejournals/JTE/jte-
v7n1/gokhale.jte-v7n1.html](http://scholar.lib.vt.edu/ejournals/JTE/jte-v7n1/gokhale.jte-v7n1.html)

Grasha A. 2004."Teaching Styles and the WWW". Retrieved March

2, 2004, from

<http://web.indstate.edu/ctl/styles/5styles.html>

Kelly, C. (1997). "David Kolb, The Theory of Experiential

Learning and ESL". The Internet TESL Journal, 3(9),

Retrieved January 10, 2004 from

<http://iteslj.org/Articles/Kelly-Experiential/>.

- Knowles, M. S. (1975). Self-Directed Learning: A Guide for Learners and Teachers. New York: Cambridge Book Co.
- Kolb, D.A. (1984). Experiential learning: Experience as the source of learning and development. New Jersey: Prentice-Hall.
- Kolb, D.A. (1999). The Kolb Learning Style Inventory. Boston: Hay Resources Direct.
- Kolb, D.A. (2000). Facilitator's Guide to Learning. Boston: Hay/McBer Training Resources Group.
- Merriam, S. B. and Brockett, Ralph G. (1997). The Profession and Practice of Adult Education: An Introduction. San Francisco: Jossey-Bass.
- Merriam, S. B. and Caffarella, R. S. (1999). Learning in Adulthood: A Comprehensive Guide 2nd Edition. San Francisco: Jossey-Bass.
- Pantazis, C. (2002). "Maximizing E-Learning to Train the 21st Century Workforce". Public Personnel Management, 31(1), 21. Retrieved March 15, 2004, from Questia database, <http://www.questia.com>.
- Reiman, P_1 J. and Thies-Sprinthall, Lois (1998). Mentoring and Supervision for Teacher Development. pp. 262, 184-151. New York: Longman.

Glanz W. (2002). "Schooling for the future: Learning online a growth industry." (2002, February 18). *The Washington Times*, p. D08.

Smith, M.K. (2001). David A. Kolb on experiential learning, the encyclopedia of informal education, Retrieved January 20, 2004 from <http://www.infed.org/b-explrn.htm>.

Tuinjman, A. (1995). *International Encyclopedia of Education*. Retrieved May 4, 2003, from <http://www.nl.edu/ace/Resources?Documents?AdultLearning.html>

Appendix A: E-mail concerning inventory and survey.

Original Email Invitation from Leslie Jones

On Jun 3, 2004, at 4:23 PM, LESLIE JONES wrote:

> TO MY PARTICIPANTS: P-1, P_4, P_2, and P_3

> The following information will allow you to take the Learning Style Inventory and view your results. It will also send your information to me.

> Thank you for participating!!!

> Please email if you have any problems.

> LSI Access Information goes to

> [HTTP://www.hayresourcesdirect.haygroup.com/lsi/default-new.asp?oz=377](http://www.hayresourcesdirect.haygroup.com/lsi/default-new.asp?oz=377)

> This will bring you to the survey login page.

> You will then need to do the following:

> Enter a username - we recommend first name underscore last name e.g. Joe_Sample

> Enter a password - this is a personal password of your choice but it must be 6 characters only (no more, no less!)

> Enter the organizational password: nc0604.

> You can then access the test and print/view your results and the interpretative information.

> You can re-access your results at any time for up to one year by going to www.hayresourcesdirect.haygroup.com/lsi and entering your username and personal password.

> If you have any questions please call the Hay Group at 1 800
729 8074 or email Leslie.

> THE SECOND PART:

> Please follow the following URL and participate in the final
survey.

> <http://www.zoomerang.com/survey.zgi?p=WEB2HFH4AHJW>

> Thanks again. Loads of writing and analyzing left to do.

> Thanks again to all of you for helping out with this.

Appendix B: Survey Questions

Please rate each of the following statements 4, 3, 2, or 1.
"4" is most like you and "1" is least like you

1. When I am instructing online, I provide:

___ expert interpretation for the student (diverging)

___ time for thinking and reflection (assimilating)

___ people with life skills (converging)

___ situations for self discovery (accommodating)

2. When I use discussion in online learning, the discussion format is:

___ learner to teacher (interact directly with you and receive feedback from you) (assimilating/diverging)

___ learner to learner (participate in activities with other learners) (accommodating/converging)

___ learner to environment (work with resources and simulations) (accommodating/converging)

___ learner to content (work with information on the web, in books, and in databases)
(diverging/assimilating)

3. I use the following instructional strategies in online instruction:

___ case studies (accommodating/diverging)

___ lecture (converging/assimilating)

___ formal lecture (converging/assimilating)

___ games (accommodating/diverging)

4. As an instructor, I see myself asking:

___ "What if?" (accommodating/diverging)

- "How?" (converging/assimilating)
 - "What?" (converging/assimilating)
 - "Why?" (accommodating/diverging)
5. When I am instructing online, I encourage:
- practical application skills (converging)
 - creation of new forms of information (accommodating)
 - outstanding learners (assimilating)
 - cooperative effort (diverging)
6. When I am instructing online, I use the following instructor models:
- discovery learning (accommodating)
 - cooperative learning (converging/accommodating)
 - direct instruction (diverging/assimilating)
 - information model (assimilating/diverging)
7. When I am instructing online I see myself as:
- a guide (accommodating/converging)
 - a coach (accommodating/converging)
 - a sage (assimilating/diverging)
 - a motivator (assimilating/diverging)
8. As an instructor, I am very good at:
- planning (assimilating)
 - brainstorming (diverging)
 - adapting (accommodating)

- ___ problem solving (converging)
9. As a learner and an instructor, I value:
- ___ strategic thinking (converging)
- ___ insightful thinking (diverging)
- ___ thoughtful thinking (assimilating)
- ___ group thinking (accommodating)
10. If an instructor provides a variety of strategies to the student, how does this help the student in the educational process?

Survey Responses from Participants

P_1's ratings:

1. When I am instructing online, I provide:
4. time for thinking and reflection (assimilating)
3. expert interpretation for the student (diverging)
3. situations for self discovery (accommodating)
2. people with life skills (converging)
2. When I use discussion in online learning, the discussion format is:
- 4 learner to learner (participate in activities with other learners) (accommodating/converging)
- 2 learner to teacher (interact directly with you and receive feedback from you) (assimilating/diverging)
- 2 learner to environment (work with resources and

simulations) (accommodating/converging)

1 learner to content (work with information on the web,
in books, and in databases) (diverging/assimilating)

3. I use the following instructional strategies in online
instruction:

4 case studies (accommodating/diverging)

3 lecture (converging/assimilating)

2 formal lecture (converging/assimilating)

1 games (accommodating/diverging)

4. As an instructor, I see myself asking:

4. "What if?" (accommodating/diverging)

4_ "What?" (converging/assimilating)

4 "Why?" (accommodating/diverging)

3 "How?" (converging/assimilating)

5. When I am instructing online, I encourage:

4 practical application skills (converging)

4_ creation of new forms of information (accommodating)

4 outstanding learners (assimilating)

4_ cooperative effort (diverging)

6. When I am instructing online, I use the following
instructor models:

4 discovery learning (accommodating)

- 3 cooperative learning (converging/accommodating)
 - 3 direct instruction (diverging/assimilating)
 - 2 information model (assimilating/diverging)
7. When I am instructing online I see myself as:
- 3. a guide (accommodating/converging)
 - 3 an expert (assimilating/diverging)
 - 2 a motivator (assimilating/diverging)
 - 1 a coach (accommodating/converging)
8. As an instructor, I am very good at:
- 4 brainstorming (diverging)
 - 4 adapting (accommodating)
 - 4 problem solving (converging)
 - 3 planning (assimilating)
9. As a learner and an instructor, I value:
- 4. insightful thinking (diverging)
 - 3 thoughtful thinking (assimilating)
 - 2 strategic thinking (converging)
 - 2 group thinking (accommodating)
10. As an instructor provides a variety of strategies to the student, how does this help the student in the educational process?

It helps the student both learn in the manner best for them and perhaps identifies learning strategies that work for them.

P_2's ratings:

1. When I am instructing online, I provide:

4 expert interpretations for the student (diverging)

4 time for thinking and reflection (assimilating)

4 situations for self-discovery (accommodating)

3 people with life skills (converging)

2. When I use discussion in online learning, the discussion format is:

3 learner to learner (participate in activities with other learners) (accommodating/converging)

3 learner to environment (work with resources and simulations) (accommodating/converging)

2 learner to content (work with information on the web, in books, and in databases) (diverging/assimilating)

2 learner to teacher (interact directly with you and receive feedback from you) (assimilating/diverging)

3. I use the following instructional strategies in online instruction:

4 case studies (accommodating/diverging)

- 4 formal lecture (converging/assimilating)
 - 3 lecture (converging/assimilating)
 - 1 games (accommodating/diverging)
4. As an instructor, I see myself asking:
- 4 "What if?" (accommodating/diverging)
 - 4 "How?" (converging/assimilating)
 - 4 "Why?" (accommodating/diverging)
 - 3 "What?" (converging/assimilating)
5. When I am instructing online, I encourage:
- 4 practical application skills (converging)
 - 4 creation of new forms of information (accommodating)
 - 3 cooperative effort (diverging)
 - 2 outstanding learners (assimilating)
6. When I am instructing online, I use the following instructor models:
- 4 discovery learning (accommodating)
 - 3 direct instruction (diverging/assimilating)
 - 3 information model (assimilating/diverging)
 - 2 cooperative learning (converging/accommodating)
7. When I am instructing online I see myself as:
- 4 a guide (accommodating/converging)
 - 4 a coach (accommodating/converging)

- 3 a motivator (assimilating/diverging)
 - 2 a sage (assimilating/diverging)
8. As an instructor, I am very good at:
- 4 planning (assimilating)
 - 4 adapting (accommodating)
 - 3 problem solving (converging)
 - 3 brainstorming (diverging)
9. As a learner and an instructor, I value:
- 4 insightful thinking (diverging)
 - 4 thoughtful thinking (assimilating)
 - 3 group thinking (accommodating)
 - 3 strategic thinking (converging)
10. If an instructor provides a variety of strategies to the student, how does this help the student in the educational process?

The student can select the strategy or strategies that work best for him/her. Also the student has an opportunity to try new strategies with less negative consequences.

P_3's ratings:

1. When I am instructing online, I provide:
- 4 situations for self discovery (accommodating)
 - 4 time for thinking and reflection (assimilating)

- 3 people with life skills (converging)
 - 2 expert interpretation for the student (diverging)
2. When I use discussion in online learning, the discussion format is:
- 4 learner to learner (participate in activities with other learners) (accommodating/converging)
 - 3 learner to environment (work with resources and simulations) (accommodating/converging)
 - 2 learner to content (work with information on the web, in books, and in databases) (diverging/assimilating)
 - 2 learner to teacher (interact directly with you and receive feedback from you) (assimilating/diverging)
3. I use the following instructional strategies in online instruction:
- 4 case studies (accommodating/diverging)
 - 2 formal lecture (converging/assimilating)
 - 2 games (accommodating/diverging)
 - 1 lecture (converging/assimilating)
4. As an instructor, I see myself asking:
- 4 "What if?" (accommodating/diverging)
 - 4 "How?" (converging/assimilating)
 - 4 "What?" (converging/assimilating)

- 4 "Why?" (accommodating/diverging)
- 5. When I am instructing online, I encourage:
 - 4 cooperative effort (diverging)
 - 4 creation of new forms of information (accommodating)
 - 3 outstanding learners (assimilating)
 - 3 practical application skills (converging)
- 6. When I am instructing online, I use the following instructor models:
 - 4 discovery learning (accommodating)
 - 3 cooperative learning (converging/accommodating)
 - 2 information model (assimilating/diverging)
 - 1 direct instruction (diverging/assimilating)
- 7. When I am instructing online I see myself as:
 - 4 a guide (accommodating/converging)
 - 4 a coach (accommodating/converging)
 - 3 a motivator (assimilating/diverging)
 - 2 a sage (assimilating/diverging)
- 8. As an instructor, I am very good at:
 - 4 planning (assimilating)
 - 4 brainstorming (diverging)
 - 4 adapting (accommodating)
 - 3 problem solving (converging)

9. As a learner and an instructor, I value:

4 insightful thinking (diverging)

4 thoughtful thinking (assimilating)

3 group thinking (accommodating)

3 strategic thinking (converging)

10. If an instructor provides a variety of strategies to the student, how does this help the student in the educational process?

Student can process the information in a variety of ways

P_4's rating:

1. When I am instructing online, I provide:

4 expert interpretation for the student (diverging)

4 time for thinking and reflection (assimilating)

4 situations for self discovery (accommodating)

2 people with life skills (converging)

2. When I use discussion in online learning, the discussion format is:

4 learner to learner (participate in activities with other learners) (accommodating/converging)

3 learner to environment (work with resources and simulations) (accommodating/converging)

2 learner to content (work with information on the web,
in books, and in databases)

(diverging/assimilating)

2 learner to teacher (interact directly with you and
receive feedback from you) (assimilating/diverging)

3. I use the following instructional strategies in online
instruction:

4 case studies (accommodating/diverging)

3 simulations (converging/assimilating)

2 games (accommodating/diverging)

2 lecture (converging/assimilating)

4. As an instructor, I see myself asking:

4 "What if?" (accommodating/diverging)

4 "How?" (converging/assimilating)

4 "Why?" (accommodating/diverging)

2 "What?" (converging/assimilating)

5. When I am instructing online, I encourage:

4 practical application skills (converging)

4 creation of new forms of information (accommodating)

4 cooperative effort (diverging)

2 outstanding learners (assimilating)

6. When I am instructing online, I use the following instructor models:

- 4 discovery learning (accommodating)
- 4 cooperative learning (converging/accommodating)
- 3 information model (assimilating/diverging)
- 2 direct instruction (diverging/assimilating)

7. When I am instructing online I see myself as:

- 4 a guide (accommodating/converging)
- 4 a coach (accommodating/converging)
- 3 a motivator (assimilating/diverging)
- 2 an expert (assimilating/diverging)

8. As an instructor, I am very good at:

- 4 planning (assimilating)
- 4 adapting (accommodating)
- 3 problem solving (converging)
- 3 brainstorming (diverging)

9. As a learner and an instructor, I value:

- 4 strategic thinking (converging)
- 4 insightful thinking (diverging)
- 3 thoughtful thinking (assimilating)
- 2 group thinking (accommodating)

10. If an instructor provides a variety of strategies to the student, how does this help the student in the educational process?

Students have preferred ways of learning. Providing different strategies helps to make more students comfortable with online learning.

Appendix C: Follow-up Questions

1. These four models: discovery learning, direct instruction, information model, and cooperative learning and their use in instruction can tell a lot about an instructor's learning style. You rated these for your use of in online instruction. Can you briefly describe how you have used each of the instructional models online?

Discovery Learning: is an inquiry-based learning method. Discovery learning is based on this "Aha!" method. Discovery learning takes place most notably in problem solving situations where the learner draws on his own experience and prior knowledge to discover the truths that are to be learned. It is a personal, internal, constructivist-learning environment. From:

<http://www.nwlink.com/~donclark/hrd/history/discovery.html>

Direct Instruction: A rigorously developed, highly scripted method for teaching that is fast-paced and provides constant interaction between students and lead by the teacher. Rapid pacing and choral group response punctuated by individual turns. From:

<http://www.jefflindsay.com/EducData.shtml>

Informational Learning: The blend of information and instruction, integrated learning solutions, a listing of the most frequently asked questions reflecting genuine problems faced on a continuous basis. Learners will exchange their experiences, ideas, troubles, and solutions with one another in an online conversational space. Articles written by in-house/external experts, and describe new trends/techniques/tactics on using a particular function/process. From:

<http://www.elearningpost.com/features/archives/002088.asp>

Cooperative Learning: small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement. From:

<http://www.ed.gov/pubs/OR/ConsumerGuides/cooplear.html>

2. When I asked you "As a learner and an instructor, I value: insightful thinking, thoughtful thinking, group thinking, and strategic thinking", your responses were the opposite of your style in Kolb's Learning Style Inventory. Can you share your thoughts about why this might have happened?

Insightful thinking: sees possibilities, looks beyond the facts to imagine what could be, what might have been.

Thoughtful thinking: Contemplative and engrossed on a subject or concept

Group thinking: Critical thinking in a structured group activity

Strategic thinking: Important or essential in relation to a plan of action

3. When selecting instructional strategies, you did not select the use of games as one of your common choices; explain why you would not use games in your instruction?

4. When teaching online, what do you think you are the most skilled in and why?

5. When teaching online, what do you think you could improve upon and why?

Appendix D: Transcribed Responses from Follow-up questions

P_1 Responses

Researcher: May I record this conversation?

P_1: You do.

1. These four models: discovery learning, direct instruction, information model, and cooperative learning and their use in instruction can tell a lot about an instructor's learning style. You rated these for your use of in online instruction. Can you briefly describe how you have used each of the instructional models online?

Discovery Learning: Case studies; Students define an instruction problem and develop their own case based on their teaching and practice, resulting in a solution.

Direct Instruction: I do not do this as much, for each course I have developed at least one PowerPoint presentation, and I utilize this with a multimedia presentation and a discussion about the presentation presenting information in more of a lecture format.

Informational Learning: Basing on the case format, I do a lot of that. I have a discussion space for each case. Two forums for the online course: one for technical and the other content related, provides a standard place for articles that

all read for a common background. I do not have the time to develop the learning objects that I would like to have.

Cooperative Learning: When the students are writing their case there is peer review and group work process, reviewing each others work and providing feedback. Expert views are added either online for through an interview and these are shared with the groups. Group discussion fosters collaboration. I get bored if I do the same thing, kind of narcissistic.

2. When I asked you "As a learner and an instructor, I value: insightful thinking, thoughtful thinking, group thinking, and strategic thinking", your responses were the opposite of your style in Kolb's Learning Style Inventory. Can you share your thoughts about why this might have happened?

Thoughtful thinking ties into "What if questions" Thoughtful reflective, strategic, being aware what is going on. May have read more into the categories than you wanted. What is the other end of the continuum? Thoughtful and insightful are kind of a process for the group; I want my students to really have thought deeply about the issues. I cannot separate them, thoughtful and insightful. I was

interested in their reflection and what process they do while they process. I really look at how people have changed from where they began.

3. When selecting instructional strategies, you did not select the use of games as one of your common choices; explain why you would not use games in your instruction?

Time, resources, and students, I have found that the time investment does not meet our needs. Some bias might be in here as well. I know some people who are investigating games and the uses and it seems to me they might be making excuses to play video games. I do not have the time and resources to develop games. I do think there is some value as an instructional resource? Yes. But, if something is going to take me ten hours to develop and I can get the same effect from another strategy and only use 2 hours. It makes more sense to do it the other way. Does that mean it is right or the correct approach, No, but it is reality.

4. When teaching online, what do you think you are the most skilled in and why?

Probably designing interactive environments, Mayer's ideas about how learning occurs in interactive environments with a fair degree of depth.

5. When teaching online, what do you think you could improve upon and why?

Planning: get things planned so it is not so helter skelter.

P_2 Responses (Tape record malfunctioned, used written notes)

Researcher: May I record this conversation?

P_2: Sure.

1. These four models: discovery learning, direct instruction, information model, and cooperative learning and their use in instruction can tell a lot about an instructor's learning style. You rated these for your use of in online instruction. Can you briefly describe how you have used each of the instructional models online?

Discovery Learning: I do not consciously use this but try to get AHA's from students.

Direct Instruction: I use this mostly when I am training for software.

Informational Learning: Students cannot see us online - we need to utilize all of these.

Cooperative Learning: I have not tried this but would like to in the future.

2. When I asked you "As a learner and an instructor, I value: insightful thinking, thoughtful thinking, group

thinking, and strategic thinking”, your responses were the opposite of your style in Kolb’s Learning Style Inventory. Can you share your thoughts about why this might have happened?

I had not really thought about the thinking aspect except that everyone needs to be involved and we need a group focus.

3. When selecting instructional strategies, you did not select the use of games as one of your common choices; explain why you would not use games in your instruction?

Not sure games are a good use of our time. I usually do a review of the materials.

4. When teaching online, what do you think you are the most skilled in and why?

I am good at making people feel at ease and to get the talking. Some are shy in a Face-To-Face class and here they learn to express themselves.

5. When teaching online, what do you think you could improve upon and why?

Doing new things: Breakout sessions or more hands-on activities.

P_3 Responses

Researcher: May I record this conversation?

P_3: Yes, that is just fine.

1. These four models: discovery learning, direct instruction, information model, and cooperative learning and their use in instruction can tell a lot about an instructor's learning style. You rated these for your use of in online instruction. Can you briefly describe how you have used each of the instructional models online?

Discovery Learning: Students do an assigned reading; they have an online prompt where they relate the readings to their own practice. Post it online and then read and responds to each other's postings.

Direct Instruction: I do not think I have an example of direct instruction for online.

Informational Learning: We have assigned readings or they might have video clips that they might watch. Prompting questions that they answer and then respond as a group.

Cooperative Learning: Discussions are mostly broken into small groups, small groups meet outside of class time. I divide a large reading by using jigsaw and then each group presents online the results of meeting and discussions.

2. When I asked you "As a learner and an instructor, I value: insightful thinking, thoughtful thinking, group

thinking, and strategic thinking”, your responses were the opposite of your style in Kolb’s Learning Style Inventory. Can you share your thoughts about why this might have happened?

Do not know I, I am not sure.

3. When selecting instructional strategies, you did not select the use of games as one of your common choices; explain why you would not use games in your instruction?

Not aware of games that would appropriate for the content I am teaching. Not that I am against using games. No time to develop any games that would go with the content either.

4. When teaching online, what do you think you are the most skilled in and why?

Developing prompting questions. Questions that make the student reflect individually and to each other.

5. When teaching online, what do you think you could improve upon and why?

Maybe finding or developing games or simulations that goes with my content. So doing more with digital video, students creating a video, taking it to the next level.

P_4 Responses

Researcher: May I record this conversation?

P_4: Yes, you may.

1. These four models: discovery learning, direct instruction, information model, and cooperative learning and their use in instruction can tell a lot about an instructor's learning style. You rated these for your use of in online instruction. Can you briefly describe how you have used each of the instructional models online?

Discovery Learning: Most usually in case studies, reflecting at how the information can use in your everyday work or how you have used these same skills and techniques, the students don't really know what they are called. Making connections that normally are not made from text to real life.

Direct Instruction: Online learning not sure how I would define that. When I look at direct instruction, I think I do because I provide web pages with static information, it is there all the time, and it is scripted, thought out, and chunked. That is what I think of. Do I use that, yes, would I continue to use it? Yes. One-way-communication. So, I use that. I think it is a good thing, but not the only thing I use.

Informational Learning: Definitely use it. In online learning I provide forums for help and what I call the student

lounge, both areas is where a lot of interaction goes on between students. Help can go to the instructor or other students can answer if they can. Time wasted if not. The student lounge I don't interfere at all, anything off topic, post pictures of their pets if they want to. Articles used a lot, to broaden the learning experience beyond NCSU.

Cooperative Learning: Teams used on line, makes it more manageable for the instructor. Conversations with 30 people in a class make it hard to keep up with, or to have the student feel like they are being heard. Four to six people usually, have them come up with a consensus response for the group that they have interacted together to come up with. Then I only have to read and respond to 4 or 5 responses rather than 30. Allows for brainstorming in an area that has no criticism.

2. When I asked you "As a learner and an instructor, I value: insightful thinking, thoughtful thinking, group thinking, and strategic thinking", your responses were the opposite of your style in Kolb's Learning Style Inventory. Can you share your thoughts about why this might have happened?

In this instance this participant matched the responses to the learning style inventory report.

3. When selecting instructional strategies, you did not select the use of games as one of your common choices; explain why you would not use games in your instruction?

To use games well, they have to be really designed well, which costs time and money. A game solves nothing for me, if it does not have some effectiveness with the learning outcome at the end of it. My fear is to games out there for the sake of games. I did the needs assessment recently and the participants clearly said no games.

4. When teaching online, what do you think you are the most skilled in and why?

A broad question, I am most skilled in my ability to be responsive to students. That is where I feel I am most skilled as an instructor.

5. When teaching online, what do you think you could improve upon and why? There are several areas, I think creativity, is one area I really would like to improve on. Part of it is the lack of time, but I would like to be more creative with the way that way that I conduct my online courses but with the strategies and the technologies that I

use. I teach instructional design so would like to model more creative ways. Time is always an issue.

Appendix E: Web Resources

http://www.learningfromexperience.com/Research_Library.htm

<http://www.learningfromexperience.com/html/faq.html>

<http://www.businessballs.com/kolblearningstyles.htm>

<http://www.honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/adults-1.htm>