



Dissertations: Professional Development

Author: Caldwell, Dorothy Ann
Title: Staff Development Process that Results in Change: A Training of Trainers Cadre
School/Degree: The University of Oklahoma/Ph.D.
Date: 1997
Abstract: The literature is inundated with information regarding school improvement and staff development, and yet, few schools are implementing changes as a result of these processes. This qualitative study examined a training of trainers Cadre during and after training in the schools and classrooms of seven participants.

Each Cadre included three phases. Phase I focused on adult learning, research-based staff development, learning styles, group processing, and effective presentation skills. For the learning styles component, Bernice McCarthy's (1987) was selected because McCarthy's 4MAT System connects the knowledge of differences in the way people learn to lesson plans for teaching. Phase II dealt with assessment as a content area, and Phase III integrated Phase I and Phase II and provided follow-up strategies for implementation.

Two research questions guided this study. The first one was concerned with the nature of implementation of the assessment concepts. The second question focused on the factors that facilitate, impede, and modify the implementation process. Changes that occurred as a result of the Cadre were the physical environments of the classroom, expansion of instructional strategies, student evaluation, and the teachers' confidence. Overwhelmingly, teachers felt they were better teachers. They understood the differences in learners, how to plan for interaction more clearly, and the need to provide a variety of choices and assessments to meet all students' needs.

Findings that facilitate the implementation process were: (1) provide time for professional development; (2) ensure district and principal support; (3) establish follow up and maintenance procedures; (4) designate someone to be held accountable at all levels; (5) establish an environment conducive to change; (6) connect new information to present teaching; (7) create a core of teacher leaders; (8) share ideas through dialogue and reflection; and, (9) have a belief in what you are doing.

The factors that impede the implementation process are: (1) failing to provide time for professional development; (2) omitting follow-up and maintenance and, (3) change itself.

The one factor that modified implementation was being able to modify the concepts from the Cadre training to personal and site needs.

The implications and recommendations integrate previous learning with new findings. A new model is provided for a structure to ensure implementation of staff development. This model provides the image of how to impact change.

The training of trainers program provides an answer to staff development that is a continuous job-embedded process. It provides the flexibility and adaptability for our rapidly changing society to meet the demands on public education.

Research in Post-Secondary Settings

Author: Craig, Allan J.

Title: Principals as Intrapreneurs: An Examination of the Management of Instructional/Curriculum Implementation in Secondary Schools

School/Degree University of Toronto/Ed.D.

Date: 1991

Abstract: This study examined the role of the secondary school in managing the implementation of the 4MAT System, an instructional / curriculum innovation designed to improve teaching methodology in the classroom. The study was based upon the assumption that knowledge of the way principals and teachers think about the role of the principal in managing change could increase our understanding of this role and make a contribution to theory and practice.

The study was conducted in three secondary schools of a large urban school board. Data were collected to determine: What influenced the principal's decision to initiate the implementation of the innovation. What knowledge and skills do principals perceive as being most critical to manage the implementation of the innovation. What factors affected implementation, and which factors did the principals try to address. What strategies did the principals use in managing the implementation of the innovation. And, what was the effect of the principals' effort on teachers.

It was clear from the results of this study that principals can influence teacher implementation by addressing factors that affect implementation. Equally important in this view of the intrapreneurial (internal entrepreneur) principal was the identification of a core set of strategies / activities that were reported by teachers to be very helpful to their implementation of the 4MAT System.

In summary, this study provides evidence that capable principals can initiate and manage meaningful curriculum/instructional change.

Research in Post-Secondary Settings

Author: Griffin, Maureen L.
Title: A Case Study of Transfer of Learning Activities in a Trainer of Trainers Program
School/Degree: University of Wisconsin- Madison/Ph.D.
Date: 1997

Abstract: One form of staff development used in the field of education is called trainer of trainers and has infrequently been the focus of research efforts. The trainer of trainers model (ToT) is a two (or more) tiered design for disseminating information and skills. The design of a ToT assumes that selected individuals from a school district will receive training from experts for the purpose of training large numbers of others in their school district who cannot be trained by the experts.

The purpose of this study was to describe and analyze how one trainer of trainers' program attempted to achieve its goals. The following objectives were established: (a) to describe and analyze one trainer of trainers program's activities carried out before, during, and after training by both the ToT program and participating school districts; (b) to identify activities that support and impede the ToT program's goals; and (c) to describe the experiences of ToT participants.

A specific ToT program, the 4MAT System from About Learning, Inc., was studied. Activities were identified across phases of the program (before, during and after) and across stakeholders (ToT participants, ToT program, and school districts). Participant observation and interviews were the methods used to collect data. This study revealed that shared responsibility for transfer of learning activities by school districts, the ToT program, and the ToT participants is essential. In addition, four factors were uncovered which appear to be critical levers for the success of a ToT program: (a) the selection process (of suitable participants, of a relevant and quality ToT program, of a receptive and primed setting); (b) the preparation of ToT trainees for their new roles (trainer, coach, change agent); (c) formation of learning teams (during the ToT program and back in the team's school); and (d) the inclusion of evaluation in planning for implementation of a ToT program. If educational agencies continue to use this staff development model, the above factors must seriously be considered in the design and selection of ToT programs and continued research on the model is recommended.

Research in Post-Secondary Settings

Author: Klenetsky, Phyllis Schiffer
Title: The Impact of 4MAT Training on Teachers' Attitudes Towards Student Behaviors Associated with Creativity

School/Degree: Florida Atlantic University/Doctor of Education

Date: 1997

Abstract: The purpose of this study was to determine if 4MAT training had an impact on teachers' attitudes towards students' behaviors associated with creativity. Specifically, this study analyzed the relationship between the dependent variable of attitude toward creativity, and the independent variables of levels of training, grade level, years of teaching experience, and subject area.

A sample of 459 subjects consisted of an experimental (n=310) and control group (n=149). The experimental group received either Fundamental 4MAT training or both Fundamental and Intermediate training, while the control group received no intervention. The Ideal Child Checklist (ICC), developed by Torrance, 1975), was used as a pre- and posttest measure to determine change in attitude following treatment.

Responses on the ICC were tallied to create a single score on the instrument. Statistical methods used to analyze the data consisted of (a) a t-test to compare 4MAT with controls by calculating the difference between pre- and posttest scores, (b) a one-way analysis of covariance to compare level of training, and (c) a two-way analysis of covariance to compare levels of training with independent demographic variables.

Five hypotheses were developed to determine if 4MAT training had an impact on attitudes and the aforementioned variables. All hypotheses were tested at the .05 level of significance.

Based on the findings of this study, none of the demographic variables had a significant relationship to change in attitude towards creativity, beyond what could normally be expected by chance. However, the 4MAT group had a statistically significant higher attitude score than the control group, $t(147)=6.29$, $p<.001$, and there was a statistically significant difference between groups for control and levels of training, $F(2, 307)=35.46$, $p<.001$.

Research in Post-Secondary Settings

Author: Medford, Lienne Federico
Title: A Curriculum Development Response to the North Carolina Professional Practices Commission's Call for Cultural Diversity
School/Degree: East Carolina University/Ed.D.
Year: 1996

Abstract: The purpose of this dissertation is to provide a curriculum development response to the North Carolina Professional Practices Commission's report "A Time for Understanding and Action: Preparing Teachers for Cultural Diversity." The two middle school multicultural enrichment units provided by the dissertation seek to fulfill the Commission's two criteria: adding multicultural material to the standard curriculum and presenting the material in ways responsive to a variety of learning styles. The topics of the units are African-American folktales and African-American holidays.

A pilot test of the African-American folktale unit was conducted at Myrtle Grove Middle School in Wilmington, North Carolina, in the spring of 1995. The unit was also reviewed by a panel of North Carolina teachers and administrators who were participants in the 1995 East Carolina University Institute of Multicultural Education and Change. The data from these two studies supplied additional information for the designing of the African-American holidays unit. Both units were designed to follow Bernice McCarthy's 4MAT method.

The dissertation examines the pertinent literature in the areas of multicultural education's trends and critics, multicultural curriculum development models, and primary and secondary sources in the areas of African-American folktales and holidays.

The design and methodology section of the dissertation traces the set up and implementation of the pilot study, and it examines the qualitative data generated by student essays and instructor opinions of the study. The results and discussion portion of the dissertation examines the quantitative data generated by the East Carolina Institute of Multicultural Education and Change panel.

The final section of the dissertation discusses the changes that the study suggests and implications for further research. The study's conclusions express a desire for a change in university pre-service preparation of teachers. This change should incorporate a stronger emphasis on familiarity with diverse learning styles and an ability to present material in a way that will appeal to a wide variety of students. In addition, undergraduates should be familiarized with a wider spectrum of multicultural ideas and sources, because in-service teachers have little time to spend searching for new instructional materials.

Research in Post-Secondary Settings

Author: Miller, Jane

Title: Transferring Teaching Skills and Strategies from the Inservice Workshop into Practice in the Classroom: An Evaluation of One District's Experience

School/Degree: State University of New York at Buffalo/Ed.D.

Date: 1989

Abstract: The purpose of the study was to explore the degree to which teachers learned and transferred teaching skills and strategies from the workshop into practice in their classroom. The intervention studied was the 4MAT teaching model. The research investigated this question by collecting and analyzing data on: (1) attitude toward The 4MAT System, as measured by a self-report questionnaire; (2) knowledge about the system, as measured by an objective test; and (3) use of the system in the classroom, as measured by the number and quality of 4MAT lesson plans teachers developed.

The population consisted of 353 K–12 teachers. The four treatment groups included: Untrained Group—teachers receiving no training in The 4MAT System; Awareness Group—teachers receiving only initial training; Lesson Planning Group—teachers attending follow-up training emphasizing 4MAT lesson design; and Support Group—teachers attending support group meetings following training.

The hypotheses tested were the following: the greater the degree of exposure to the system, the more likely the teachers would be (1) to express positive attitudes toward 4MAT, (2) to know the facts and operating principles of 4MAT, and (3) to use 4MAT in planning actual lessons.

The results of the Questionnaire, Knowledge Survey, and lesson plan analysis supported all three hypotheses. On the Questionnaire, a Friedman Two-Way Analysis of Variance by Ranks yielded a .001 level of significance, indicating that the increasingly positive attitude that occurred is likely a result of continued exposure to The 4MAT System rather than a result of selection. The twenty-five item objective test revealed a definite progression of knowledge with means of 3.4, 8.6, 16.2, and 22.5 for the Untrained, Awareness, Lesson Planning, and Support Groups, respectively. A One-Way ANOVA on these results yielded a .001 level of significance. Lesson plans critiqued by two independent raters using the Lesson Plan Criterion Scale ranged (after scores were averaged) between 1 and 2.2 (1—Well Done, 2—Sufficiently Done, 3—Partially Accomplished, 4—Not Accomplished) indicating that these teachers had transferred the skills from the workshop into their actual lesson plans. Implications including providing follow-up training and support groups as opposed to “one-shot” workshops are discussed.

Research in Post-Secondary Settings

Author: Montgomery, Paula Monette Singleton
Title: The Effectiveness of the 4MAT Multi-Level Staff Development and Teaching Model in a Selected School District
School/Degree: University of Southern Mississippi
Date: 1997

Abstract: The primary purpose of this study was to explore the relationship between teachers' attitudes toward a multi-level staff development, their knowledge of program components, and their level of use of the program. Additionally, the subjects' teaching experience and grade levels taught were also important to this study. In particular, the study investigated the 4MAT teaching model as introduced during staff development training in a southwestern rural school district. The research addressed this question by collecting and analyzing data about: (1) teachers' attitudes toward the 4MAT teaching model, as measured by a questionnaire; (2) knowledge about the system, as measured by a survey and (3) use of the 4MAT teaching model in the classroom, as measured by prescribed criteria to evaluate lesson plans. The ultimate goal of this study is to provide data concerning the feasibility and effectiveness of the 4MAT multi-level staff development to the 4MAT Corporation and the administration of the selected school district.

The study provided a review of the literature related to attitudes toward staff development and the process of the transfer of skills from staff development training to classroom use

The subjects of this study were 1997 educators in a selected southwestern Louisiana school district. Nine-hundred and fifty-four Questionnaire and Knowledge Surveys were provided to be administered to the teachers of the entire district. Administration of the instrument was conducted by the building administrator on the target date. A total of 569 were returned. In addition to responding to the 4MAT Questionnaire and Knowledge Survey, teachers were also asked to provide educational demographic information pertaining to sex, level of 4MAT training, grade level taught and years of teaching experience. Teachers were also asked to volunteer a 4MAT lesson plan for evaluation by an independent rated. The lesson plans were assessed using a prescribed criteria that is based on the teaching strategies presented during the 4MAT staff development.

The analysis of data pertaining to the testing of the hypotheses is presented. There was a significant relationship between teachers' attitudes toward a multi-level staff development program, their knowledge of program components, their level of use, their grade level taught and their teaching experience. No significant relationships were found when interactions were addressed.

This dissertation presents a discussion related to the results of the study. In consideration of the study's findings, recommendations for future research are included.

Research in Post-Secondary Settings

- Author: Morley, Jamie Ann
- Title: The Effect of the 4MAT System of Instruction on Achievement in Students Completing Computer Certification Courses through Distance Education
- School/Degree: Capella University, Ph.D.
- Date: 2000
- Abstract: The primary purpose of this study was to determine whether students enrolled in the computer Repair Technician course at Trinity Learning Solutions and taught through distance education using the 4MAT system of Instruction would have higher test scores than students taught using Trinity's original distance learning curriculum. The dependent variable in this study was the student test scores. The independent variables were learning style and curriculum design version. Other topics investigated in this study were which learning type, if any, performed higher in Trinity's mentored distance learning methodology and whether or not being taught by an instructor with a matching learning type had an effect on the students' mean test scores. The instruments used in this study were McCarthy's (1987) Learning Type Measure and Trinity's assessment exams, which were written by Course Technology, Inc. Test scores obtained from students taught using the original curriculum were compared with test scores from students taught using the 4MAT instructional design method. Descriptive and inferential statistics including ANOVA, chi-square, and the student t-test were used to analyze the data. Study findings indicate that the first null hypothesis was not rejected at the $p > .05$ significance level but that it was rejected at a $p > .09$ level. These findings suggest that there were mean test score increases among some of the learning types but not enough to reject at the $p > .05$ level. The second and third hypotheses were both rejected at the $p > .05$ level. Analysis of the findings revealed that Type 3 learners performed significantly better than learners from the other three quadrants. The findings also suggested that students taught by an instructor with a matching learning profile perform significantly better than students taught by an instructor with a mismatching profile. These findings support other similar research.

Research in Post-Secondary Settings

Author: Murray, Anna M.

Title: Training Teachers to Foster Creativity Using The 4MAT Model

School/Degree: University of Massachusetts/Ed.D.

Date: 1992

Abstract: This study was undertaken to assess outcomes of a teacher training program whose goal was application of the 4MAT Learning Style Model (McCarthy, 1981) to the design of lessons which foster student creativity. Results derived from the analysis of data in this study indicate that the training program met its objectives of content mastery, attitudinal change, and application of theory, within the context of a case study involving 27 subjects undergoing 36 hours of training.

Goals of the training program included: (1) developing understanding of basic learning style and creativity concepts; (2) increasing positive attitudes regarding the significance of diversity and creativity; and (3) applying concepts taught through construction of 4MAT lesson plans.

Results indicate that (1) during the course of the training there was a significant increase in positive attitude regarding the importance of accommodating diversity and creativity in educational settings; (2) that the training program prepared the majority of participants to develop lessons which integrated creativity and learning style theory, while satisfying 4MAT criteria; (3) that performance on lesson plan design correlated more closely to attitude than to content; and (4) that gender and learning style of participants appeared to significantly affect assessment scores.

Some Conclusions: (1) The 4MAT Model is philosophically, theoretically, and structurally suited to the development of creativity. (2) Creativity can be defined and incorporated into classroom instruction. (3) A 36 hour training program can sufficiently prepare teachers to apply learning style and creativity research to the design of a 4MAT lesson. (4) Patterns of participant performance in training situations may be influenced by gender, learning style, and grade level taught. (5) Personal involvement of the learner is a key element of understanding diversity and creativity. (6) A Retrospective Attitude Survey provides useful information regarding attitudinal change during the course of a training program. (7) Content mastery, application, and attitudinal change are key components of training which should be planned for, implemented and assessed.

Research in Post-Secondary Settings

Author: Ojure, Lenna
Title: An Investigation of the Relationship Between Teachers' Participation in 4MAT Fundamental Training and Teachers' Perception of Teacher Efficacy
School/Degree: Virginia Tech University/Ph.D.

Abstract: The relationship between teachers' participation in learning style training and their perception of teacher efficacy was investigated three ways. Teachers who participated in 4MAT training were surveyed, observed and interviewed. The Gusky and Passaro (1994) teacher efficacy scale was given to 120 K-12 teachers at 4MAT training sites. The survey was administered three times: before the workshop, immediately after the workshop, and one month after the teachers had returned to their classrooms. The scale measured two teacher efficacy factors: (a) internal teacher efficacy- perceptions of personal influence and impact on teaching and learning situations; (b) external teacher efficacy- perception of the influence and impact of elements that lie outside the classroom on teaching and learning situations. In addition, teachers at one learning style training site were observed to determine how readily they adapted learning style technology. Finally, six teachers were interviewed three times each to determine if factors found by Ashton (1984) to be associated with high level of teacher efficacy were present.

Perceptions of internal teacher efficacy increased significantly from pre to post workshop administrations. After the teachers had been in the classroom for one month, internal teacher efficacy scores were lower than immediately after the workshop but still significantly higher than before the workshop. The training had no significant impact on external teacher efficacy scores. An interaction was found between teachers' level of previous knowledge and the reported gain in internal teacher efficacy. Those teachers with little previous knowledge of learning style theory and methodology showed higher levels of gain in internal teacher efficacy immediately after the workshop and on the one-month follow up survey.

The teacher' discourse during interviews and behavior during the workshops reflected all the elements Ashton outlined as associated with teacher efficacy: a belief in students' potential to learn and develop, awareness of the classroom as a social setting, and use of reflective behavior. These data also suggested that the maintenance of a high level of efficacy was influenced by the support of colleagues, modeling of instructional techniques, and validation of teachers' ideas concerning practice. It was also noted that teachers adapted 4MAT methodology idiosyncratically.

These findings suggest that knowledge of learning style theory and practice can be valuable to teachers. It appears that examining the impact of learning style training on teachers' attitudes and behaviors may provide meaningful insights into why learning style concepts continue despite an inconclusive research base.

Research in Post-Secondary Settings

Author: Spatz, Thea Siria
Title: A Comparison of Two Programs for Teaching Breast Self-Examination to Women
School/Degree: University of Arkansas/Ed.D.
Date: 1987

Abstract: Middle-aged and elderly female members of Home Demonstration clubs participated in a study that compared two methods of teaching breast self-examination (BSE) to a control group. The 4MAT presentation (N = 63) addressed four learning styles and brain dominance functions. The American Cancer Society (ACS) presentation (N = 53) used a traditional lecture/discussion format. The Control group (N = 63) attended a club presentation unrelated to cancer or BSE. The materials and information used in the two BSE presentations were the same; the method of presentation differed.

Five dependent variables were measured: knowledge of breast cancer and BSE, regularity of practice of BSE, confidence in performing BSE, belief in the importance of BSE, and intent to practice BSE. These variables were measured before training (pretest), after training (posttest), and three months later (follow-up). The data was analyzed so learning (posttest minus pretest) and retention (follow-up minus pretest) were assessed.

The method of presentation made a difference. For nine of the ten comparisons of the three groups (four to assess the effects on learning and five to assess the effects on retention), the means improvement scores were ordered as 4MAT, ACS, and Control. A tenth comparison of the three groups was not expected to show any ordering.

ANOVA's and Scheffe tests showed that the 4MAT group was significantly better than the ACS group in knowledge, both in learning and in retention. The 4MAT group was significantly better than the Control group in knowledge (learning and retention), practice (retention), confidence (learning and retention), belief (learning), and intent (learning). The ACS group was significantly better than the Control group in knowledge (learning and retention), confidence (learning and retention) and intent (learning).

The method of presentation had a sizable effect on what was learned and retained. For older learners in settings other than traditional academic ones, a presentation that addresses different learning styles and left and right brain functions is recommended.

Dissertations: Adult Education

Author: Buchanan, Linda Kay
Title: A Comparative Study of Learning Styles and Math Attitudes of Remedial and College-Level Math Students.
School/Degree: Texas Tech University/Ed.D.
Date: 1992
Order Number: ADG92-26325. 9210.

Abstract: At this time, there are seven states that are practicing mandatory testing and placement in mathematics.

However, the literature reveals that no “cure-all” has been found. In spite of the variety of modes and methods being used, no one has produced results so remarkable for a consensus to develop. The purpose of this study was to explore differences between remedial and college-level math students in an effort to discover characteristics of the remedial population that might lead to more effective educational practices.

The remedial students were significantly more concrete in their learning style while the college-level students were more abstract. A significant relationship was found between learning styles and math attitudes for both groups, but was more pronounced in the remedial group. The diverger learning style was related to lack of success in the combined groups of students. A significant relationship appeared between math attitudes at the end of the semester and final course grades for both groups of students. Further studies are suggested to explore the significance of responding to these affective and scholastic characteristics in the remedial classroom. [127 pages]

Research in Post-Secondary Settings

Author: Cordell, Barbara Jean

Title: The Effects of Different Learning Styles Outcomes of Education
Using Two Computer-Assisted Instructional Designs

School/Degree: The University of Utah/Ph.D.

Date: 1989

Abstract: The use of Computer-Assisted Instruction (CAI) in the health field is rapidly increasing. Several strategies, or instructional designs, are available in CAI and little information exists to assist in deciding which strategy to use. One dimension in education that would help educators decide which strategy to use is learning style. This study's aim was to determine whether or not learning styles as assessed by the "4MAT" Learning Styles Inventory affect the outcome of learning with two CAI design strategies: linear and branching.

A multiple classification experimental design was used. Two variables, one independent (instructional design) and one moderator (learning styles), were considered. The dependent variable was learning outcome as measured by the scores on a posttest.

All tested subjects (200) completed the learning styles inventory. The inventory was scored and learning style determined. The subject was then randomly assigned to either the linear or branching health tutorial. The number of correct and incorrect responses on the posttest was kept by the computer. A Likert-type opinionnaire was then administered to see if subjects enjoyed the CAI design and developed positive attitudes toward CAI.

A two-way analysis of variance was performed on the data. The results showed significant main effects for instructional design, no main effects for learning style and no effects for interaction of instructional design and learning style. Even though there was no statistically significant interaction effect, there was an educationally significant curvilinear interaction. This interaction was further supported by the opinionnaire data.

Research in Post-Secondary Settings

Author: Crawford, Cynthia E
Title: The Internet Master Program: Internet Education for Adults and Facilitating Volunteer Community Education
School/Degree: University of Missouri-Columbia/Ph.D.
Date: 1997

Abstract: The primary purpose of this study was to examine characteristics of those participating in the pilot classes of Internet Masters, the training approach of the Internet master program, and the impact of volunteer community education on participants.

A repeated measures design was utilized for the study. The repeated measures instruments were administered at the beginning of class one, at the conclusion of class 10, and when the Internet master concluded volunteer community education. An additional measure was the Learning Type Measure administered during the ninth lesson of each series. Descriptive statistics were first established. A general linear model repeated measure analysis of variance (ANOVA) design was utilized for hypotheses testing.

The Internet Master programming attracted adults of all ages with a wide variety of educational backgrounds that were highly motivated to learn about the Internet. Internet masters median use of the Internet quadrupled from a median of 2 hours per week prior to classes to 10 hours per week during classes. Internet Masters projected they would remain at a median of 10 hours per week after classes concluded.

Eighty-five percent of those enrolled in the Internet master program completed the instructional curriculum. Of the two classes that had completion deadlines prior to the on conclusion of the data collection process for this study, there was a less than 50% successful volunteer community education completion rate. The curriculum was successful in precipitating statistically significant increases in knowledge and use of the Internet and confidence to facilitate community education from the beginning of class 1 to the conclusion of class 10.

There was not a statistically significant difference between the variables Learning Type Measure, watching/doing scores, gender, age, education, and year home computer was first purchased and repeated measures of knowledge and use of the Internet or facilitating community education from the beginning of class 1 to the conclusion of class 10 or repeated measures from the conclusion of class 10 to the conclusion of volunteer community education.

Research in Post-Secondary Settings

Author: Handley, Cynthia
Title: Clinical Laboratory Science University Faculty Learning Types and the Use of Information Technology in the Classroom
School/Degree: Louisiana State University/Ph.D.
Date: 1998

Abstract This study was designed to explore the status of learning types of clinical laboratory science university faculty and their use of information technology in the classroom. Traditionally laboratory science education has been lecture and lab sessions. However, with the advent of the information age, professors are moving from the role of lecturer to facilitator. Some professors are in tune with the new information tools, while others are not interested at all.

This research had a two-fold purpose: 1) to explore who was using technology in the classroom and identify what they were using, and 2) to search for a possible relationship between a professor's learning type and the use of information technology in the classroom. To meet these ends, the researcher chose to conduct a national survey of university-based clinical laboratory science professors. A national list of faculty was compiled and a random sample was chosen. This study employed a commercial learning type tool (McCarthy's Learning Type Measure) and a self-designed information technology use instrument.

Data received from the survey were analyzed using the statistical package SPSS. Descriptive statistics were performed using the demographic variables, learning types, and information technology use scores. Two one-way analyses of variance were performed, one with technology scores and the highest preferred learning type quadrant and one with the technology scores and the lowest preferred learning type quadrant. A significant difference was found between the technology scores and the highest preferred learning type quadrant. A Tukey's analysis indicated a significant difference between the use of information technology for quadrant three learners and quadrant two learners. A multiple linear regression was run with the technology score as the dependent variable and the learning type quadrant and demographics as the independent variables. Seventeen percent of variance in the technology scores was explained by the independent variables which were loaded into the regression equation.

This research indicated that there was a relationship between the respondent professors' learning type and their use of information technology in the classroom. Although this cannot be generalized to the population, the researcher would recommend this topic for further study.

Research in Post-Secondary Settings

Author: Hearron, Mary Carol

Title: The Predictive Effect of Logical Thinking, Prior Knowledge, and Learning Style Characteristics on Academic Achievement in an Anatomy and Physiology Course.

School/Degree: East Texas State University/Ed.D.

Date: 1991

Order Number: DA9214344

Abstract: *Purpose of the study.* The major purpose of this study was to identify the combined predictive effect of logical thinking, prior knowledge, learning style characteristics, and various demographic variables on academic achievement in an anatomy and physiology course in which selected community college students were enrolled.

Findings. The major findings of this investigation included the following: (1) The variables of logical thinking, age, prior knowledge, prior college-level general biology course, and the learning style of abstract conceptualization produced a statistically significant predictive model, $F(5,287) = 30.50$, $p < .00005$, for academic achievement in an anatomy and physiology course. (2) The best predictive models were produced for three specific sub-groups within the population including (a) those subjects who enrolled in an anatomy and physiology course following a prior college-level course in general biology, (b) those subjects who were LVN's and (c) those subjects who were G.E.D. graduates. (3) A statistically significant difference ($p < .00005$) in academic achievement was found between those subjects who had completed a prior college-level general biology course and those who had not, as well as between those subjects who were classified as concrete operational and those who were classified as transitional or formal operational.

Conclusions. This study provided evidence for a statistically significant relationship between logical thinking ($r = .4653$, $p < .001$), prior knowledge ($r = .2966$, $p < .001$), and abstract conceptualization ($r = .1824$, $p < .01$) and academic achievement in an anatomy and physiology course. Additionally, all three variables combined to produce a statistically significant predictive model for academic achievement. [144 pages]

Research in Post-Secondary Settings

Author: Wedeking, Lorene A.

Title: The Learning Styles of Public Health Nurses

School/Degree: Capella University, Ph.D.

Date: 2000

Abstract: The purpose of this study was to identify the learning styles of practicing public health nurses. An answer to this question has taken on greater importance as more and more of the continuing education and training for the public health workforce, including that of nurses, is done through distance education. The Learning Type Measure was used to assess the learning styles and Watching/Doing preferences of 106 public health nurses practicing in the upper Midwest states of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin. This group was slightly younger than the average age for public health nurses in the United States and was slightly more female than the national average for registered nurses. The racial and ethnic background of the research participants mirrored that of registered nurses in the North central states. About 72% of the group held baccalaureate degrees in nursing. Type 1 Learning Style was selected by 44%, Type 2 Learning Style by 17%, Type 3 learning Style by 19%, and type 4 Learning Style by 12% of the group. A small part of the group, 7.4%, did not make a single type selection; they opted for tie scores for two or more learning style types. The group was about evenly divided between Watching and Doing as an information-processing strategy, with 53% of the group selecting Doing. Age, educational attainment, and experiences as a public health nurse were not statistically significant factors in nurses' selection of learning style. Experience as a registered nurse, however, was statistically significant. Recommendations are given for suggested actions in the design of continuing education for public health nurses and for health education for clients. Recommendations are also given for additional research studies.

Additional Studies: Professional Development

- Author: Cox, Charlotte; And Others
- Title: Balancing Innovation and Tradition to Create Learning Opportunities for All Learners.
- Publication: In Walking the Tightrope: the Balance between Innovation and Leadership. Proceedings of the Annual International Conference of the Chair Academy (6th, Reno, NV, February 12-15, 1997). ED407005
- Description: In an effort to improve instruction and give greater attention to teaching techniques that accommodate different learning styles, Nevada's Truckee Meadows Community College (TMCC) implemented the 4MAT System Fundamental Training for faculty. The 4MAT System identifies four major learning styles (i. e., learners who are primarily interested in personal meaning, those interested in facts, those interested in how things work, and those interested in self-discovery) and recommends that learners be taught in all four styles. As a result of the 4MAT training, the college has witnessed increased networking among faculty, while faculty report a newfound enthusiasm for teaching and successes with students. There are also certified 4MAT system trainers on campus, allowing the college to offer the techniques to staff and community members indefinitely.

Research in Post-Secondary Settings

Author: Irish, Barbara Moffett

Title: Meaning in Music: Cognitive and Affective Response in Adults (Cognition)

School/Degree: Cornell University/Ph.D.

Date: 1993

Order Number: ADG93-25293. 9310.

Abstract: Important epistemological questions concerning the meaning of music are relevant to the place of music in a society and the educational life of its people.

Correlation of preferred learning styles and listening to music response was high, and the relationship of adults' vocational or avocational interest in music and cognitive/affective response was confirmed. [270 pages]

Research in Post-Secondary Settings

- Author: Lieberman, Marcus
- Title: Report on the Fairfax County Area III 4MAT Project
- School: Fairfax County Public Schools, Fairfax, VA
- Date: 1986–87
- Abstract: This report is a summary of data analyses performed on measures administered to 91 4MAT participant teachers early and late in the 1986–87 school year. The measures included awareness of the four learning styles and the left/right hemispheric modalities included in The 4MAT Model. Attitudes consistent with the 4MAT philosophy were assessed with a questionnaire. Knowledge of the eight steps of the lesson plan was measured with an eight question matching exercise. The final measure was a pair of actual lesson plans, one constructed early in the 4MAT training sequence and one constructed late in the year. Teachers who had an opportunity to test out a lesson plan responded to a reaction sheet and the responses are summarized along with their general perceptions of the strengths and weaknesses of 4MAT. This information provides a complete picture of the teacher-focused phase of this project. Available from About Learning, Inc. at our Wauconda office.

Research in Post-Secondary Settings

Author: Reed, Philip Anthony

Title: The Relationship Between Learning Style and Conventional or Modular Laboratory Preference Among Technology Education Teachers in Virginia

School/Degree: Virginia Polytechnic Institute and State University/Ph.D.

Date: 2000

Abstract: This study investigated the relationship between the laboratory environments and the learning styles of middle school technology education teachers in the Commonwealth of Virginia. Based on the assumption that a strong relationship between teaching and learning styles exists, it was hypothesized that teacher preference for one type of laboratory over another (conventional or modular) may be an issue of learning style.

A random sample (n=195) was drawn from the entire population (as identified by the Virginia Department of Education in 1998) of public middle school technology education teachers (N=392). Randomly selected teachers were mailed a cover letter, demographic questionnaire, postage-paid envelope, the Learning Type Measure (LTM) instrument, and one dollar for taking the time to complete and return the instrument. The LTM instrument, demographic questionnaire and Bernice McCarthy's research on the 4MAT System of Leadership and Instruction were used to describe the laboratory environments and the teaching and learning styles of the respondents. Data collected were compared using contingency tables and Pearson's Chi-square analysis.

Eighty-three (42.5%) of the middle school teachers responded and sixty-five of the instruments (78%) were usable. The findings indicate that respondents were overwhelmingly male (94%) and had considerable teaching experience ($x = 17.4$). Sixty-six percent of respondents taught in a modular laboratory and forty-percent taught in a conventional laboratory. Of the four learning styles identified by the LTM (Imaginative, Analytic, Common Sense, and Dynamic), respondents overwhelmingly (69.2%) rated themselves as Common Sense learners. Common Sense learners as teachers encouraged practical applications, are interested in productivity and competence, like technical things, use hands-on activities, and try to give students the skills they will need to be economically independent in life. These findings are consistent with previous research involving the personalities and learning styles of industrial arts/technology educators.

The self-perceived learning styles of respondents were significantly different when compared to McCarthy's findings for secondary teachers and administrators in general. However, the learning styles of respondents in conventional laboratories were not significantly different than the learning styles of respondents in modular laboratories. Though it seems logical that learning style might explain laboratory preference, this notion was not supported by this study.

Research in Post-Secondary Settings

Author: Scott, Harry V.

Title: A Serious Look at the 4MAT Model

School/Degree Literature Review/ED383654

Date: 1994

Abstract: 4MAT, an eight step model developed by Bernice McCarthy, is derived by interacting each of Kolb's four quadrants with both left and right brain teaching strategies. McCarthy concluded that the full cycle of a lesson would include eight activities, accommodating each of Kolb's four types of learners using both right and left techniques in each quadrant. Such lessons highlight the style of each learner for some fraction of the whole and rotation between left and right gives prime time to the basically different orientation and should lead to whole-brain performance. This paper is a review of professional literature on research with 4MAT as a tool for instructional design and staff development as well as a theory, its use and implication validity and legitimization. There is no direct criticism of the 4MAT model in the literature, though some educators have questioned the relevance of the concept of learning styles to instructional design. Legitimization of the model has come through academic discussion and widespread use of 4MAT concepts. Review of the literature on 4MAT has revealed little research of student achievement. The professional literature indicates that the 4MAT model is capable of comprehensive use, for developing instructional units for discursive as well as non-discursive disciplines, for secondary as well as elementary education, and for urban as well as suburban schools.

Additional Studies: Adult Education

- Author: Lust, Carol and Ann White
- Title: The Influence of Preferred Learning Style on Academic Performance By Occupational Therapy Students Using a Self-Study Format.
- School/Degree: North Carolina State University/Ed.D.
- Date: 1993
- Order Number: ADG93-17119. 9308.
- Abstract: This study was designed to investigate whether differences in preferred learning style might form the basis for differences in academic performance or personal satisfaction in occupational therapy students using a self-study instructional module. Increased competition for enrollment has shifted the demographics of the typical entering class towards a student population that is somewhat older, with higher grade point averages, and often with prior post-secondary degree training. Because of the change in demographics and the potential incompatibility with self-directed instruction, this study was undertaken to determine whether any of these parameters ultimately could be related to academic outcome. These results confirmed that the shift in demographic profile towards older students with higher grade point averages was accompanied by a fundamental difference in preferred learning style, but that neither academic performance nor personal satisfaction associated with the use of self-study course material were adversely affected by the shift in learning style. [134 pages]

Research in Post-Secondary Settings

- Author: Muscia, Anthony J., Jr.
- Title: An Analysis of the Learning Styles of Entrepreneurs And Small Business Development Center Clients (Phoenix, Arizona).
- School/Degree: Nova University/D.B.A.
- Date: 1993
- Order Number: ADG93-23811. 9310.
- Abstract: This study was intended to determine if certain learning styles are predominant among individuals who seek counseling at Small Business Development Centers and among entrepreneurs who own and operate business ventures.
- The research findings indicated that none of the four learning styles are dominant among entrepreneurs.
- However, the data did indicate that entrepreneurs tend to score higher along the active experimentation dimension of the LSI than along the reflective observation dimension. In addition, they are also more likely to favor abstract conceptualization to concrete experience as their preferred mode of gathering and processing data. [102 pages]

Research in Post-Secondary Settings

Author: Palmer, Jaellayna

Title: New Model, New Media: Applying 4MAT to Web-Based Training

Date: 1999

Available From: Unpublished Master's Thesis, University of Surrey

Abstract: This thesis suggests a practical model for fulfilling all learning style preferences identified in the 4MAT system through a Web-based course. The project includes a review of literature about adult education, learning styles, distance learning, and the impact technological change is having on course delivery. In an attempt to learn more about using technology to deliver courses that appeal to a variety of learning styles, practical research based on the literature and an investigation of current on-line courses were conducted. As the literature reveals, the 4MAT model has been linked with quality educational outcomes for face-to-face courses. Considering 4MAT's success in the classroom, the question explored is whether 4MAT, as a learning style model, can be applied successfully to a course delivered through technology.

Specifically, a course for the Ontario Agricultural Training Institute (OATI) was designed according to the constraints of the learning styles model 4MAT and delivered through the World Wide Web. This included simulating face-to-face processes through a computer interface.

The data submitted are both qualitative and quantitative. The key quantitative data are the results of a survey administered to 4MAT practitioners including a key question: In your opinion, has this course been 4MATed?, with all answering in the affirmative. Extending theory into practice, course-planning templates were developed; and, along with sample screen shots from the actual course, are included.

This work demonstrates that a learner-centric model, such as 4MAT can be applied to a Web-based course.

Research in Post-Secondary Settings

Author: Pirkle, Barry A.

Title: A Relationship Between Leadership Styles and Learning Styles

School/Degree: Spalding University

Date: 1997

Abstract: The purpose of this paper was to research and to examine a rationale for developing a more effective and efficient means of providing leadership instruction. Learning styles and leadership styles were investigated and their relationships studied. The study included 41 subjects, doctoral students in education at Spalding University, Louisville, Kentucky. The instruments used were the Learning Type Measure, developed by Dr. Bernice McCarthy, author of the 4MAT Learning System. The Learning Type Measure was administered to the research subjects to determine preferred learning styles. The Leadership Style Behavioral Matrix, authored by Susan Sayer, was also given to all subjects to ascertain preferred leadership styles. Sections of the literature review included leadership training, leadership style theory, adult learning theory, learning style theory, and the 4MAT learning system. Results of the study indicated a relationship existed; however, most outcomes were not at a statistically significant level. In some specific instances, the results did indicate statistically significant results.

Research in Post-Secondary Settings

Author: Ricci, Debra Mae
Title: A Phenomenological Study of the Experience of Learning in Adult Higher Education
School/Degree: University of Wisconsin, Madison / Ph.D.
Date: 1999

Abstract: The purpose of this study was to return directly to the experience of adult learners in order to portray and better understand the essential nature of adult learning and to explore the different ways adults experience learning. Adult educators have understood adult learning according to several perspectives, but none of these have been derived from phenomenological examinations. Learning differences have been depicted in an array of cognitive and learning style models, particularly that of David Kolb and Bernice McCarthy. These have been criticized as simplistic and static ways of understanding learning.

The questions that guided this investigations were 1) What is the experience of learning for adults? What does it mean to learn? What is it like to learn for an adult? What happens when one learns as an adult? and 2) What are the different ways adults experience learning?

A phenomenological approach was used to gather and work with the data from twelve participants (ages 20 -50) in an undergraduate college course on negotiation. Adult learners were asked to reflect on their experiences as they learned to negotiate by writing weekly journals and then a final integration paper. Using phenomenological procedures to disclose meanings via the phenomenological reduction, the researcher prepared individual learning portraits for each participant. From these a composite textural description revealed 16 essential themes from which a general structural description was derived in answer to question 1. Finally, the variations within several themes were elaborated to explicate learner differences in answer to question 2.

The study revealed the essential nature of adult learning complex interaction of several components (themes) while also highlighting the unique expression of this essential structure by each individual. Findings also reveal more interactions between the learner's self-motivation, the learning situation, and several layers of the contextual environment than are depicted or implied in the Kolb and McCarthy instruments. Some support can be seen for the perceiving (grasping) and processing (transforming) dimensions of experiential learning theory underlying the Kolb and McCarthy models. To make appropriate use of learning styles instruments educators are advised to take careful account of motivational and contextual interactions that significantly influence expression of supposed learning style preferences in adult learners. Future research should attend to the uniqueness of individual learning experiences and focus on the role of motivational and contextual interactions.

Research in Post-Secondary Settings

Author: St. Germain, Clif Ph.D, Marcus Leiberman, Ph.D and Moseta Cohen, Ph.D

Title: Reliability and Validity Study of the Learning Type Measure (LTM).

School/Degree: Action Research, About Learning, Inc.

Abstract: The purpose of the study was to determine a reliability coefficient for the Learning Type Measure (LTM). The LTM is a self-report instrument designed to help people understand and identify the differences in the ways people learn. Developed for use with the 4MAT System for teaching and leadership, the LTM is intended to provide guidance in all situations where learner differences play a role in communications and human interaction.

The subjects were 106 Community College Students enrolled in a Introduction to Education course in Florida. Each student was administered the Learning Type Measure at the beginning of the semester. After a period of 6 weeks the measure was re-administered. A Kappa Test was performed to determine if there was significant agreement between the first and second administration of the measure. Results indicate that the Learning Type Measure is a reliable as a measure of personal preference in learning.

Research in Post-Secondary Settings

Author: St. Germain, Clif Ph.D, Marcus Leiberman, Ph.D. and Brian Mathiesen

Title: Replicated Validity Study of the Learning Type Measure (LTM)

School/Degree Action Research, About Learning, Inc.

Abstract The purpose of the study was to further examine the validity of the LTM as a measure of individual differences in learning. This study involved 217 Australian engineering students. All subjects were given the Learning Type Measure (LTM), the Learning Style Indicator (LSI) and the Myers-Briggs Type Indicator (MBTI). LTM scores were then compared to Kolb's constructs of Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization(AC), Active Experimentation(AE), and Myers-Briggs Type Indicator (MBTI) constructs of Introversion (I), Extroversion (E), Sensing (S), Intuition (N), Thinking (T), Feeling (F).

Also examined in this study were descriptive aspects of the population as well as Grade Point Average (GPA) comparisons of the population by LTM most preferred and least preferred quadrant. Analysis of these data revealed the following:

- Quadrants 1 and 4 are significantly related to CE and are significantly different from Quadrants 2 and 3
- Quadrants 2 and 3 have the highest means on AC but the means were not statistically different from each other
- There is a statistically significant difference between LTM quadrant scores on RO comparisons, with quadrant 2 having the highest RO mean score
- There is a statistically significant difference between LTM quadrant scores on AE comparisons, with quadrant 4 having the highest AE mean score
- There is a statistically significant relationship between quadrant 1 scores and Feeling (F) and Sensing (S), and quadrant 4 scores and Intuition (N)
- There is a statistically significant relationship between quadrant 2 scores and Thinking (T)
- There is a statistically significant relationship between Introversion (I) and Watching (W), and Extroversion and Doing (D)
- With regard to Watching (W): 2 is most watching, 1 is watching, 3 is doing and 4 is most doing
- LTM distribution for this sample was as follows:Quadrant 1 = 12.9%, Quadrant 2 = 15.2%, Quadrant 3 = 49.8% , Quadrant 4 = 22.1%

• GPA comparisons for this sample were as follows:

<i>Quadrant</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
Most Preferred Quadrant	4.29	4.45	4.24	3.74
Least Preferred Quadrant	4.31	3.73	4.04	4.43

- For Least Preferred, Quadrant 1 was least preferred for 2's, 3's, and 4's (note: in this sample of engineering students quadrant 3 made up 49.8% of the sample)

The data presented in this study clearly establish high levels of correlation between the LTM and individual constructs on the LSI and MBTI. Other descriptive comparisons reported in this study will constitute the basis of future investigations.

Research in Post-Secondary Settings

- Author: Vare, Jonatha; Dewalt, Mark W.; Dockery, E. Ray
- Title: Predicting Student Retention in Teacher Education Programs
- Publication: Paper presented at the annual meeting of the American Association of Colleges for Teacher Education, Chicago, Illinois, February 28, 2000
- Available from: Center for Pedagogy, College of Education, Winthrop University, Rock Hill, SC 29733.
- Description: Researchers describe preliminary results from a longitudinal study of attrition and retention. The sample consisted of 316 students in an initial course in teacher education. Data collection included the following: high school GPR; SAT scores; other demographic information such as education of the father and mother; and scores on the Learning Type Measure (LTM) which reports four learning styles or types (quadrants 1-4). Multiple regression analysis revealed four significant variables that predicted spring GPR in descending order: (1) SAT-V score; (2) high school GPR; (3) level of father's education; and (4) thinking/reflection (quadrant 2) score on the LTM. Researchers discuss implications for college retention based on these data. Programs should be more closely tailored to the needs of particular subgroups. Students with lower SAT-V scores may need assistance in study skills and areas of academic instruction. First-generation college students require a different form of assistance such as special advising sessions to discuss unfamiliar processes. Students with varied learning types may perform better when instruction matches their preferred learning styles.

Research in Post-Secondary Settings

Author: Zack, Carol Wolfe

Title: The Relationship Between Self-Knowledge of Personal Learning Style And Academic Choices Made by Freshmen College Students.

School/Degree: The Pennsylvania State University/D.Ed.

Date: 1991

Order Number: DA9214302

Abstract: This study was designed to explore the relationship between self-knowledge of personal learning style and the academic choices, including study habits, course election, choice of major, and career choices made by freshmen college students.

The data revealed a relationship between freshman major selection and individual learning style. This relationship occasionally followed the patterns found by Kolb in his studies of learning styles, college major, and career choice. No relationship was found between self-knowledge of personal learning styles and the effect of that knowledge on study habits, college major selection, or lifelong career goals. [99 pages]