Cognitive and Teaching Style Preferences of Officers Attending the Air Force Reserve Officer Training Instructor Course

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Abstract

The purpose of this study was to investigate the relationship between the cognitive style and teaching style preferences of instructors enrolled in the Reserve Officer Training Corps instructor course at the Academic Instructor School at Maxwell Air Force base. Sixty-five cases were examined for two research questions: (1) To what extent is there a relationship between cognitive style and teaching style preferences and (2) Is there a combination from the variables (a) gender, (b) age group, (c) ethnicity, (d) marital status, and (e) education level that will predict the KAI score for cognitive styles and the PALS score for teaching style preferences of the instructors in the Academic Instructor School? Correlation analysis indicated no significant relationship between cognitive style and teaching style preferences. Multiple regression analysis revealed no predictor variables for either cognitive style or teaching style. Multiple regression procedures indicated that both instruments performed according to the theory with Pearson r coefficients at the .05 and .01 levels of significance. Recommendations addressing sameness and lack of change in educational institutions include investigating additional variables, including other ranks and personnel from other Air University system schools, and examining cognitive style and teaching style preferences of non-military educational personnel.

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Faculty members generally espouse the common belief that students learn and develop through exposure to content. A typical, didactic approach to teaching is one in which the teacher presents content to the student. The traditional lecture system focuses on covering subject matter through teaching by telling. However, learning may not be effective when the learner does not fully understand the teacher and, as a result, associations between learned information and new information may not occur. "If we believe that what we are teaching has real value, then we can benefit from understanding the effect of how we are presenting it and to whom" (Schroeder, 1993). There is more information about learning available now than ever before, and the amount of research on learning is escalating at a substantial rate.

Birkey & Rodman (1995) suggest that culture plays an important part in determining how students learn. As the population becomes more diverse, it is important to develop and fine tune training and learning strategies that are sensitive to individual differences. Information related to learning styles is pertinent as advancing technology affects areas of instruction where the real life model of the magic wand, the microchip and associated software, challenge individual learning preferences in new and unique ways (Birkey & Rodman).

Perhaps disparity between students' cognitive styles and teaching style preferences could be minimized if these variables were better understood. Cognitive style refers to an individual's creativity and style of problem solving. Style, in this case, refers to whether a person attempts to solve problems within the existing context (adapter) or whether a person seeks to find new ways to approach problems (innovator) (Kirton, 1987). Teaching style preferences refers to the "congruency between adult education practitioners' actual observable classroom behavior and their expressed belief in the collaborative teaching-learning mode" (Conti, 1979). An analysis of teaching style preferences and cognitive style preferences could be useful in assessing inconsistencies that may occur in the classroom due to "style conflicts" or "style gaps." Decisions to use or not use structure becomes part of the decisions which teachers and instructional designers must make to design, develop, and implement

effective instruction (O'Boyle, 1986). Matching teaching styles to cognitive style might be one way that will enhance effective decision making about the teaching and learning process (Schmeck, 1988). "The teacher's role, stated simply, is to facilitate learning," (Miller, 1999, p.1). Comprehension of individual differences and cognitive styles can provide teachers with the theory and knowledge to improve the teaching and learning process.

Statement of the Problem

People perceive the world in different ways, and they learn about the world in different ways and under different conditions. Instructors' understanding of cognitive styles and teaching style preferences may assist them in student advisement and instructional design and delivery. The focus of this study was the absence of information related to cognitive styles and teaching style preferences of ROTC instructors.

Purpose of the Study

The purpose of this study was to investigate cognitive styles and teaching style preferences of future instructors for the Air Force who were enrolled in the Reserve Officer Training Corps (ROTC) instructor course at the Academic Instructor School at Maxwell Air Force Base in Alabama. The following research questions guided this study:

1. To what extent is there a relationship between cognitive style as measured by scores on the Kirton Adaption-Innovation Inventory (KAI) and teaching style preferences as measured by scores on the Principles of Adult Learning Scale (PALS) instrument for instructors enrolled in the Academic Instructor School Reserve Officer Training Corps?
2. Is there a combination from the variables (a) gender, (b) age group, (c) ethnicity, (d) marital status, and (e) education level that will predict the KAI score for cognitive styles and the PALS score for teaching style preferences of the instructors in the Academic Instructor School?

Significance of the Problem

The diversity of cognitive style is not usually considered in student recruitment, the delivery of instruction, or program assessment. Researchers suggest that the school culture is often alien and frequently in conflict with the home culture (Birkey & Rodman, 1995). Increased diversity of students may frustrate instructors. Unfamiliar with many of the new student characteristics, instructors see contemporary students as hopelessly under prepared or less bright or less motivated than previous generations (Schroeder, 1993).

Methodology

Research Design

This was a correlation study using scores from two research instruments, the KAI and the PALS and one group (Air Force officers). The design of the study also included multiple regression procedures to predict KAI and PALS scores based on a combination of demographic variables of participants.

Population and Sample

Participants for this study were Air Force officers with the rank of first lieutenant through colonel who were enrolled in the Reserve Officer Training Corps (ROTC) instructor course during May and June 2000 at the Academic Instructor School at Maxwell Air Force Base. These officers were assigned to teaching positions at Air Force ROTC detachments in universities within the continental United States and its territories.

Instrumentation

An eight-item researcher-developed demographic questionnaire collected the following data from each participant: (1) military rank, (2) sex, (3) age group (25–33; 34–44; 45–54), (4) ethnicity (Caucasian; African-American; Hispanic; Other) , (5) marital status (married; single; divorced), (6) previous job before this assignment,

(7) present job (current assignment), and (8) educational status (bachelor, masters, doctorate).

The Principles of Adult Learning Scale (PALS)

The Principles of Adult Learning Scale (PALS) developed by Conti (1983) is based on the theory that collaborative teaching and learning is appropriate when teaching adults. The PALS was used to measure teaching style preferences. This instrument includes a total of 44 items. One-half of the items are supportive of the collaborative teaching-learning mode, while the other one-half are statements of a non-collaborative nature. The items are randomly arranged within the instrument (Conti, 1983). The PALS uses a 6-point Likert type-scale to identify the perceived frequency with which instructors practice the collaborative teaching-learning mode (Conti, 1983). Items consistent with the collaborative mode of teaching are given the following values: 5 = Always, 4 = Almost Always, 3 = Often, 2 = Seldom, 1 = Almost Never, and 0 = Never. Reverse scoring is used for those items counter to the collaborative mode. Thus, responses to these items are scored as follows: 0 = Always, 1 = Almost Always, 2 = Often, 3 = Seldom, 4 = Almost Never, and 5 = Never. Overall scores may range from 0 to 220. The mean score for the instrument is 146 with a standard deviation of 20.

The overall PALS score is divided into seven factors that are basic elements that form an instructor's general teaching style. These factors are as follows: (1) Learner-Centered Activities; (2) Personalizing Instruction; (3) Relating to Experience; (4) Assessing Student Needs; (5) Climate Building; (6) Participation in the Learning Process; and (7) Flexibility for Personal Development. High scores in each area represent support for the concept reflected in the factor name. An analysis of these seven factors can provide an understanding of the instructor's classroom behavior (Conti, 1985). The overall score indicates the degree to which the respondent reports his/her collaborative teaching-learning mode. High scores on the PALS show a learner-centered preference for the teaching-learning process. Low scores indicate a teacher-centered style preference. Scores near the mean (mean = 146) indicate a combination of teaching behaviors which draws from both the

learner-centered approach and the teacher-centered approach (Conti, 1985).

Reliability was established by the test-retest method and yielded a Pearson correlation coefficient of 0.92. Validity of the PALS instrument was established by field tests with adult basic education practitioners in Illinois (Conti, 1979).

Kirton Adaption-Innovation Inventory (KAI)

The Kirton Adaption-Innovation Inventory (KAI) was used in this study to measure cognitive style preferences (Kirton,1987) . The KAI was designed for adults with work experience. The theory is based on the assumption that all people solve problems and are creative — both are outcomes of the same brain function (cognitive style). The key assumption relevant to this measure is that individuals have a cognitive style which develops early and becomes stable over time. Everyone's cognitive style can be located on a continuum representing a personality dimension, ranging from adaptor to innovator, depending on the characteristic mode in which they solve problems. The KAI is a measure designed to locate respondents on this adaptiveness-innovativeness continuum. These style differences, which lie on a normally distributed continuum, range from high adaptation to high innovation. The KAI yields a continuum of scores on which location is neither praiseworthy nor pejorative. Adaptors are on one end of the continuum and are comfortable with existing paradigms. Adaptors seek to solve problems within the context of existing patterns, and traditions. They tend to be methodical and conforming and seek solutions to problems in tried and true ways. Adaptors try to improve the current situation. The innovator is located on the other end of the continuum. The innovator's characteristic preference is to change the pattern or paradigm and to challenge the customs of the organization. The innovator is comfortable with risk and challenging the status quo. Innovators look for ways to do things differently and restructure the problem to arrive at solutions which create new paradigms.

The KAI is a 33-item instrument with a five-point scale ranging from Very Hard to Very Easy. Subjects are asked to rate the difficulty (or ease) of presenting a certain image of themselves

consistently for a long time. Each of the 33 items addresses a different image. The theoretical range of scores is 32–160 (the first item, a person who is patient, is not scored). The scale is hand-scored by a certified individual. The instrument is designed to reflect the fact that innovators score higher than the theoretical mean score of 96, and adaptors score lower than the mean. The total KAI score is the sum of the total of the following three trait scores: (1) Sufficiency–Proliferation of Originality, (2) Efficiency, and (3) Rule Conformity. These trait factors yield subscores labeled as SO, E, and R for Sufficiency, Efficiency, and Rule Conformity, respectively.

The Kuder Richardson Formula 20 coefficient for test reliability was .88, (Kirton 1987). The observed mean score of the general population was 94.23; the observed range extends from 45–145 (Kirton & Carne, 1982). Women had a lower adaptive score (mean = 90.8) than men (mean = 96.8); and those individuals over 45 years of age had a lower adaptive score (male mean = 94.20, female mean = 85.94) than did those individuals under 30 (male mean = 101.39, female mean = 93.83) and individuals between 30–44 (male mean = 96.76, female mean = 92.67) (Kirton & Carne).

Data Collection Procedures

Arrangements were made with the Academic Instructor School (AIS) so that on the first day of the ROTC instructor course, the researcher was given time to meet with all the participants in a large group. Instructors volunteered for the study. Instructors who chose not to participate were allowed to leave the auditorium. The instructors that chose to participate were given a (1) letter of information and consent to participate, (2) demographic questionnaire, (3) KAI instrument, and (4) PALS instrument with scoring sheet. The researcher explained each instrument. Instructors completed the instruments anonymously and returned them in sealed manila envelopes to the researcher.

Data Analysis Procedures

The researcher scored each instrument manually and entered the scores into the SPSS spreadsheet for analysis. The Pearson Product Moment (Pearson *r*) correlation analysis was used to ascertain the

relationship between cognitive style and teaching style preference. Stepwise regression procedures were used to examine the relationship among the demographic variables.

Descriptive data for all predictor variables and the dependent variables were calculated using the SPSS 14.0 program. The number and percent of participants in each category were reported by group. The mean and standard deviation scores were reported for the PALS and the KAI for the norm group as established by Conti (1985) and for the participants in this study, along with the factor scores for both instruments for the norm group and this study group. Regression models were analyzed to estimate parameters of the model and find a "best fitting" equation (Norusis, 1998). The class of models used in MRA such that all of the predictors are not selected simultaneously is known as variable selection procedures (Lomax, 1992). There are several types of variable selection procedures that can be used in performing multiple regression analysis. "The most commonly used method for model building is stepwise variable selection" (Norusis, 1998, p. 471). The residuals of the estimated values of the regression provided the basis for assessing the adequacy of the model. Various diagnostic procedures were performed on the model to ensure that there were no violations of multiple regression assumptions and to insure that the models were adequate.

Results

Demographic data for the sample are presented in Table 1. The mean age for the 65 participants in this study was 36.5 with a range of 29 (25–54). The majority of the participants were male (78.5%) and the largest percent of the participants was Caucasian (89.2%). Of those participating in the study, 80% had a Master's degree, 19% had a bachelor's degree and 1% had an earned doctorate. In this study 83% of the respondents were married, 12% single and 5% divorced. Table 1 shows the demographic information for the respondents.

Table 1.
Demographic Data for the Participants

Category	N	%
Age		
25 – 34	31	41.7
35 – 44	20	30.8
45 – 54	14	21.5
Gender		
Male	51	78.5
Female	14	21.5
Ethnicity		
Caucasian	58	89.2
African America	4	6.2
Hispanic	1	1.5
Other	2	3.1
Marital Status		
Married	54	83.1
Single	8	12.3
Divorced	3	4.6
Education Status		
Bachelor degree	12	18.5
Master's degree	2	80.0
Doctorate degree	1	1.5

Results for Teaching Style Preference

Teaching style preference was assessed using the Principles of Adult Learning Scale (PALS). The mean score for the norm group was 146 with a standard deviation of 20 (Conti, 1985). The mean score for the 65 participants in this study was 123.29 with a standard deviation of 11.20. The range of scores was from 102 to 167. The scores were distributed as follows: 2 scores between 98–104, 8 scores between 105–111, 10 scores between 112–118, 21 scores between 119–125, 11 scores between 126–132, 8 scores between 133–139, 3 scores between 140–146, 0 scores between 147–153, 0 scores between 154–160, and 1 score between 161–167. The mean

for the participants in this study was 1.14 standard deviations below the standardized mean. A score of 123 has percentile rank of 57. Thus this group of educators tended to strongly favor a teacher-centered orientation in instruction. Table 2 presents the mean and standard deviation scores for the norm group and this study group. Mean scores and standard deviations are displayed in Table 3 for the norm group and study group for each of the seven factors which comprise the total PALS score.

Table 2.
Total PALS Score Values for the Norm Group and Study Group

Group	Mean	Standard Deviation
Norm	146.00	20.00
Study Group	123.29	11.19

Table 3.
PALS Factor Score Values for the Norm Group and Study Group

	Norm		Study	
Factor	Mean	S.D.	Mean	S.D.
1. Learner-Centered Activities	38	8.3	29.5	5.8
2. Personalizing Instruction	31	6.8	21.2	4.1
3. Relating to Experience	21	4.9	20.1	3.4
4. Assessing Student Needs	14	3.6	14.5	2.4
5. Climate Building	16	3.0	14.2	2.4
6. Participation in Learning Process	13	3.5	11.9	2.5
7. Flexibility for Personal Development	13	3.9	12.0	2.7

Following is a discussion of each of the factors that comprise the total PALS instrument.

Factor 1: Learner Centered Activities

This factor relates to the degree to which the instructor controls the classroom. The norm mean for this factor is 38 with a standard

deviation of 8.3 (Conti, 1985). The mean score for the student instructors participating in this study was 29.52 with a standard deviation of 5.80. Based on norm scores published by Conti, participants in this study scored 1.09 standard deviations below the mean of the norm group.

Factor 2: Personalizing Instruction

The items in this factor address meeting the individual needs of the student by using a variety of methods and materials. The norm mean for this factor is 31 with a standard deviation of 6.8. The student instructors in this study averaged 21.22 with a standard deviation of 4.06. This was 1.44 standard deviations below the expected mean (Conti, 1985).

Factor 3: Relating to Experience

This factor focuses on the instructor recognizing the student's prior experiences and relating these experiences to new learning. The normed mean for this factor is 21 with a standard deviation of 4.9. This group of student instructors averaged 20.08 with a standard deviation of 3.36. Participants in this group scored .19 of a standard deviation below the mean of the norm group (Conti, 1985).

Factor 4: Assessing Student Needs

This factor is concerned with assisting and involving students in the diagnosis of their learning needs. The normed mean is 14 and the standard deviation is 3.6. The average score for the instructors participating in this study was 14.46 with a standard deviation of 2.35. Participants in this study scored .13 of a standard deviation above the mean of the norm group published by Conti (1985).

Factor 5: Climate Building

This factor focuses on the degree to which the instructor is able to create the most favorable atmosphere for the teaching-learning process. The norm mean for this factor is 16 with a standard deviation of 3.0 (Conti, 1985). The student instructors in this study scored an average of 14.15 with a standard deviation of 2.35. This

was .62 of a standard deviation below the mean based on Conti norm scores.

Factor 6: Participation in the Learning Process

This factor relates to the amount of student involvement in planning and evaluation of course content and classroom performance. The norm mean for this factor is 13 with a standard deviation o 3.5. Respondents in this study had a mean score of 11.89 and a standard deviation of 2.46. This was .32 of a standard deviation below the expected mean (Conti, 1985).

Factor 7: Flexibility for Personal Development

This factor addresses the degree to which classroom environment and course content are adjusted to meet student needs. It addresses the learning environment and flexibility of the instructor. The norm mean for this factor is 13 with a standard deviation of 3.9. The mean score for the respondents in this study was 11.97 with a standard deviation of 2.67. Respondents in this study scored .26 of a standard deviation below the expected mean (Conti, 1985).

Results for Cognitive Style

The cognitive style preference for each of the respondents was assessed using the Kirton Adaptation-Innovation inventory (KAI). The total KAI score is composed of three factors, which indicate a respondent's cognitive style preference. The degree to which an individual requires structure is mirrored in the various factor scores. High scores signify support for an innovator approach to cognitive style while low scores indicate endorsement for an adaptor orientation. Scores that are near the mean reflect a blending of behaviors (Kirton, 1987). Table 4 presents the factor scores for the norm group established by Kirton and factor scores for the participants in this study.

Table 4.
KAI Factor Score Values: Normed Group and Study Group

	Norm		Study	
Factor	Mean	S.D.	Mean	S.D.
1. Sufficiency of Originality (SO)	40.78	8.89	43.95	8.25
2. Efficiency (E)	18.82	5.59	19.02	5.26
3. Rule/Group Conformity (R)	35.39	8.56	34.31	7.57

Norm n = 562; Study n = 65

Following is a discussion of each of the factors that comprise the total PALS instrument.

Factor 1: Sufficiency of Originality (SO)

This factor helps to identify more clearly perceived differences between people in their preferred handling of original notions or ideas. Adaptors tend to operate within the prevailing paradigm, improving it as a product of problem solving. Innovators prefer to break out of the paradigm and often generate a proliferation of ideas. The norm mean for this factor is 40.78 with a standard deviation of 8.89 (Kirton, 1999). The mean score for the respondents in this study was 43.95 with a standard deviation of 8.25. Participants in this study scored .38 of a standard deviation above the mean of the norm group established by Kirton (1999).

Factor 2: Efficiency (E)

The items in this factor address meeting an individual's preference for adaptive efficiency. Adaptors prefer to have change that keeps the general structure stable. They search methodically for information and arrange it in more orderly ways. Innovators prefer to take themselves "out of the system." Innovators are the individuals who often find a way to break the paradigm. The normed mean for this factor is 18.82 with a standard deviation of 5.59 (Kirton, 1999). The student instructors in this study averaged 19.02 with a standard deviation of 5.26. This was .04 of a standard deviation above the expected mean (Kirton).

Factor 3: Rule/Group Conformity (R)

This factor focuses on the preference for operating within rules, policies, mores and consensus. The normed mean for this factor is 35.39 with a standard deviation of 8.56 (Kirton, 1999). This group of student instructors averaged 34.31 with a standard deviation of 7.57. This was .13 of a standard deviation below the mean of the norm group (Kirton).

Results for Relationship of Cognitive Style and Teaching Style Preferences

The first research question was "To what extent is there a relationship between cognitive style as measured by scores on the Kirton Adaption-Innovation Inventory (KAI) and teaching style preferences as measured by scores on the Principles of Adult Learning Scale (PALS) instrument for instructors enrolled in the Academic Instructor School Reserve Officer Training Corps?" Correlation analysis was performed to answer this research question. The Pearson Product Moment correlation coefficient *r* for the PALS and KAI scores was .170 with an $\alpha = .05$, which indicated a very slight correlation between scores on the two instruments. The correlation was not significant at the .05 level. Therefore, the null hypothesis of no correlation was retained.

Predicting Cognitive Style and Teaching Style Preferences

The second research question was "Is there a combination from the variables (a) gender, (b) age group, (c) ethnicity, (d) marital status, and (e) education level that will predict the KAI score for cognitive styles and the PALS score for teaching style preferences of the instructors in the Academic Instructor School"? Multiple regression analysis (MRA) using step-wise procedures was used to perform the analysis. Six outliers were identified in the model in which ethnicity was retained as a predictor variable. The outliers were removed leaving a sample of 59 cases, and a new MRA was performed. With the outliers removed, no variables were retained in the model. This indicated that the variables of (a) gender, (b) age group, (c) ethnicity, (d) marital status and (e) education level of participants had no statistically significant predictive impact on

either cognitive style or teaching style. The null hypothesis was retained.

Summary of Findings

Sixty-five cases were analyzed to respond to the research questions. Results for this study indicated that no statistically significant relationship existed between cognitive style as measured by the KAI and teaching style as measured by the PALS. Multiple regression analysis of the data revealed no statistically significant predictor variables for either cognitive style or teaching style when participants were grouped by (a) gender, (b) age group, (c) ethnicity, (d) marital status and (e) education level. The multiple regression analysis indicated strong support for both the KAI Instrument and PALS instruments as performing according to the theories proposed by Kirton (1999) and Conti (1985). Each instrument retained all factors associated with it as predictor variables.

Discussion

Teaching style has been described as "a pervasive quality of an individual that persists though the content may change" (Fischer & Fischer, 1979, p. 245). Teachers enter the teaching-learning environment with a defined set of values and beliefs which are linked to their educational philosophy. These values and beliefs may influence teachers' interpretation of their behaviors in the classroom. As Air Force officers, the respondents may have been influenced by the Air Force culture or by their perceptions of the expectations of this culture, which is often focused on a training perspective rather than an educational perspective. Respondents in this study scored predominantly in the teacher-centered ranges of the continuum.

Another aspect of the findings of this study concerns an instructor's teaching style. Although a learner-centered approach is strongly supported in the literature, a teacher-centered approach is widely practiced in community college and university settings. The strong preference for a teacher-centered approach to instruction in higher education is supported in related literature (Brooks, 1988;

McCann, 1988; Moulton, 1992; Scotney, 1984; Waters, 1992; Wilson, 1994). The findings of this study are in keeping with the general trend of teacher-centered practices in higher education.

Cognitive style in this study was defined as the cognitive means by which an individual processes information for problem solving and decision-making as measured by the Kirton Adaption-Innovation Inventory (KAI). Cognitive style is a bipolar construct with two basic typologies, adaptor and innovator, which are located on a continuum (Kirton, 1987). Research conducted by Hayward and Everett (1983) and Holland (1987) indicated that the mean KAI score of members of an organization reflect the organizational climate. Such consensus or aggregate preference may make it more likely that individuals who do not fit in because their style is not consistent with the aggregate style may feel compelled to leave the situation or may be pressured to leave by the group (Kirton & De Ciantis, 1986). There is a tendency for groups to recruit those who are similar to the group or to put pressure to conform on those who are different. Thus, the group may become more homogeneous over time. It may be important to organizations, whether it be the U.S. military or a school in the public or private system, to be aware of these tendencies and guard against them by supporting individuals in the group who are different. This is one way to insure diversity in its broadest sense.

Purposely adding individuals to a group who differ in their cognitive style from the majority may help to increase the likelihood of new ideas and diverse opinions. Studies conducted by Nemeth (1985) and Nemeth and Kwan (1985) indicated that minority opinion may influence innovation by providing alternative ideas and viewpoints.

The adaption-innovation theory maintains that there is no particular value applied to either style, adaption or innovation, in and of itself. Certain situations or needs in an organization may emphasize the desirability of one style over another. True innovative change often requires individuals to face risk and uncertainty. Individuals who have a preference for an innovative cognitive style will be comfortable with change, and they are often able to generate ideas needed to facilitate necessary transformations. Individuals who

have an adaptive cognitive style will be more likely to cling to tradition and seek to find ways to maintain the status quo with minor revisions rather than total restructuring.

Individuals who are concerned with adaptation or innovation in educational and training environments may benefit by being aware of the implications of cognitive style of individuals. For example, a learning climate that is conducive to innovation requires individuals in teaching and other educational leadership roles who prefer an innovative cognitive style.

Important aspects of groups and group processes have been identified which facilitate or inhibit productive problem solving. Diversity within a group (Kirton, 2003; Nemeth & Kawn, 1985) adds to the potential for innovations.

Recommendations for Further Study

This study focused on the relationship between cognitive style and teaching style preferences. Future research could be expanded to include those within the enlisted ranks of the Air Force to increase the generalizability of results. In addition, expanding the study to include individuals who are preparing to be classroom teachers in non-military settings may be helpful for professional educational personnel in the public schools.

Statistical analyses other than correlation and multiple regression analysis may be useful in studying different aspects of cognitive style and teaching style preferences. For example, statistical procedures such as multivariate analysis of variance (MANOVA) may be appropriately applied.

In order to address the concern about sameness and lack of change it might be helpful to examine public education institutions. It would appear to be helpful to examine schools that are truly different from a military school such as the Academic Instructor School (AIS). It may be beneficial for future educational planning to study the cognitive style of school administrators, counselors, and teachers using a random sample to gain a better understanding of cognitive style and teaching style preferences of these individuals. Research on the combination of cognitive styles of individuals and

group composition in schools may reveal information helpful to plan innovation in teaching methods, curriculum, and assessment in schools. In addition, a study of cognitive style of students and their respective teachers may be helpful to curriculum specialists and teachers in planning effective instruction. Teachers may become more aware of student needs driven by cognitive style and teachers' impact on the teaching-learning environment. Methodology designed to address these diverse needs may lead to a productive, effective and efficient learning transaction.

Educators and trainers cannot expect to meet the needs of youth in the future if only minor changes are made. Professional education personnel should be able to consider different curricula, methods, and ways of assessment to bring about effective changes. Educational change requires individuals who have innovative cognitive styles in teaching and other leadership positions; consequently, it will also be important to recruit and hire teachers who are able to take risks and consider solutions outside current paradigms.

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