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Identifying Individual Differences: A Cognitive Styles Tool

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Abstract

Although One-Stop Career Centers are mandated to promote client-centered services, patrons are ordinarily funneled through a standard procedure. Adult education principles suggest that these centers should be learner-centered and address individual differences. Therefore, the purpose of the this study was to describe the interaction of the cognitive styles of decision-making styles, ways of knowing approaches, and learning strategy preferences of customers of Workforce Oklahoma, a One-Stop Career Center in Tulsa, Oklahoma. To do this, data were collected from 255 customers at the center using the General Decision-Making Survey (GDMS), the Attitude Toward Thinking and Learning Survey (ATTLS), and Assessing The Learning Strategies of AdultS (ATLAS). While no interaction was found among these three cognitive processes using discriminant analysis, three naturally-occurring groups were found with cluster analysis for each decision-making styles and ways of knowing. Collectively, these findings were used to created a practitioner tool called AID: Addressing Individual Differences.

Introduction

A major characteristic of the current times is the accelerated rate of change. One area that is greatly affected by constant change is the job market. As the nature of work changes and as the type of jobs change, many current or displaced workers are in need of training to acquire the skills needed for a new job. Through legislation over the years, the government has created and supported programs to provide training to combat unemployment and underemployment. The current federal program has created One-Stop Career Centers for this training.

Vocational training at these One-Stop Career Centers is a form of adult education. The mandate of the legislation for the One-Stop Career Centers to provide training that is tailored to the needs of the trainee is compatible with the learner-centered approach supported by the adult education literature. To implement this learner-centered approach, the individual differences of the customers at the One-Stop Career Centers need to be addressed. One way of doing this is by taking into consideration the learner's cognitive styles. Cognitive styles are "people's characteristic and typically preferred modes of processing information" (Sternberg & Grigorenko, 1997, p. 700).

Cognitive styles have a long history that can be traced to the work of Jung in the 1920s (Sternberg &

Grigorenko, 1997, p. 701), and there are a variety of cognitive style dimensions.

> People see and make sense of the world in different ways. They give their attention to different aspects of the environment; they approach problems with different methods for solution; they construct relationships in distinctive patterns; they process information in different but personally consistent ways. (Cross, 1976, p. 115)

The cognitive style of "the learned, habitual response pattern exhibited by an individual when confronted with a decision situation" (Scott & Bruce, 1995, p. 820) has been termed decision-making style. The framework that people adopt or construct for addressing the environment and relationships in it for "obtaining, reflecting on, evaluating, and communicating knowledge" (Galotti et al., 1999, p. 746) is referred to as ways of knowing. The personal "techniques or skills that an individual elects to use in order to accomplish a learning task" (Fellenz & Conti, 1989, p. 7) are called learning strategy preferences. These are three characteristic ways that people have of using their minds, and as cognitive styles they can be potent variables in students' academic choices and vocational preferences as well as in how they learn and how they interact in the classroom (Cross, 1976, p. 112) when pursuing an education program such as those at One-Stop Career Centers.

One-Stop Career Centers

The Workforce Development System was established through Public Law 105-220 on August 7, 1998, as 112 Statute 936 by the 105th Congress. This congressional act has been an attempt to create customer focused services on a local level through the One-Stop Career Centers. It is an effort to consolidate, coordinate, and improve employment, training, literacy, and rehabilitation programs in the United States. Local private and public entities provide comprehensive services which will result in a skilled and competitive workforce from which employers can draw. These centers gain guidance from Chief Local Elected Officials and a Workforce Development Board made up of 51% representatives from the business sector and other members of community organizations and institutions. These are structured to be oriented toward customer informed choice approaches with emphases being also focused on system performance, customer satisfaction, and continuous improvement. Services are categorized into three levels of services termed core, intensive, and training. Core Services refer to assessment activities and the provision of job information and placement assistance. Assessment Services Section are related to the development of an individual employment plan and case management to implement that plan. Training services can include occupational skills training and adult education and literacy activities to support this training.

The One-Stop Career Center concept, which is in Section 121 of Chapter 3 of the law, is an effort toward centralizing comprehensive social services in the community. Those who are searching for assistance but who are not aware of all available opportunities can go to one location to access help that would meet their needs. It allows them the convenience of being evaluated for a number of services at a single, One-Stop Career Center by partners in a consortium.

Circumstances and events occurring in the country in recent years necessitate assiduous decisions to augment customer-centered services by case managers for people affected by these situations. The United States has experienced in recent years economic deceleration, international aggression, and political action affecting a multitude of persons which spurred an effort to provide many in the public with services to meet their needs. This has reaffirmed the need for institutions to be capable of quickly altering their policy and procedures in order to administer to the needs of Americans affected by these factors. For example, the One-Stop Centers have been sensitive to needs of services for patrons from specific groups who meet eligibility criteria as outlined in the Work Force Investment Act. Such eligible groups include: (1) youth, (2) adults, (3) older individuals, (4) veterans, (5) Native

Americans, (6) individuals with disabilities, (7) dislocated workers, (8) displaced homemakers, (9) low-income individuals, and (10) criminal offenders.

Most of these groups benefit from general assistance through core or intensive services (Tucker, 2001). These operations are devoted to resource room services. In the resource room, students have at their disposal materials, equipment, and guidance to enter into self-directed exercises relevant to career exploration, job readiness, and job seeking procedures. Job readiness workshops provide instructional information helpful in resume writing, interviewing, and dressing for success in job search activities. Job seeking skills constitute those services rendered through formal instruction on how to pursue job opportunities. This knowledge is attained by career exploration activities pertaining to interest inventories and performance testing that give people insights into their individual abilities and preferred work orientation that can be matched with job descriptions. The users of the facility who need education or training to get back to work many times fall under the requirements of one of two workforce development categories; these are either the Adult Program or the Dislocated Workers Program. Those eligible under the Adult Program are below a certain income level for their family size and have not attained viable skills which make them marketable in the workforce. Those deemed *dislocated workers* have attained marketable skills at one time. However, they are laid off, and their skills now are obsolete; they can improve the prospect of becoming gainfully employed by receiving education or training assistance. Dislocated Workers receiving funds and services through the Trade Adjustment Act are eligible because their jobs were exported out of the country.

Decision Making

Thus, there are a plethora of reasons why various diverse groups are seeking employment services at a One-Stop Career Center. Due to role changes, some are motivated to upgrade educational or technical skills to establish a career which will provide sufficient income for a family. Others have lost their jobs and are looking to re-establish themselves through a new employment opportunity. Regardless of the reason for the inclination to access these services, they all go through a decision-making process.

Most people have a preferred decision-making style (Harren, 1979). Consequently, they will resort to that style unless situational factors interfere. According to Scott and Bruce (1995), people decide by selecting a style from one of five positions: (a) rational, (b) intuitive, (c) dependent, (d) avoidance, and (e) spontaneous. Rational decision makers use reasoning and logic to arrive at a chosen solution. Intuitive decision makers rely on emotion and feeling to guide their decision. Dependent decision makers rely upon people to lead them to a decision. Avoidance decision makers are reluctant to commit to a course of action and thus elect to avoid making a decision altogether, hoping perhaps it will work out satisfactorily without any action on their part. Spontaneous decision makers are spurred on by the immediate need and desire to get things started.

Ways of Knowing

Ways of knowing are the procedural modes of thinking that a person constructs or adopts for dealing with knowledge (Galotti et al., 1999, p. 746). According to the ways of knowing framework, "learning occurs in different ways for different people in different situations, and may be affected by the learning styles of others who are present" (Galotti, Drebus, & Reimer, 2001, pp. 419-420). The elements of this framework "represent different kinds of cognitive or learning styles" (p. 423) in which "people are presumed to have different sets of spontaneous orientations to learning and knowledge, and, as a consequence, employ different procedures as they test and refine their own ideas" (p. 421).

Within the ways of knowing framework, there are two distinct types of procedural knowledge; these are separate knowing and connected knowing (Galotti et al., 1999, p. 746). Separate knowing is similar to what

many call critical thinking (Galotti, 1998, p. 282). This view of critical thinking is:

> Thinking that examines assumptions behind conclusions. It is rational–it is reasoning that is uncontaminated by emotions or personal feeling. It is rigorous–it seeks and finds the "holes" in an argument, the alternative explanations of a phenomenon, the contradictions of mission statement, the implications of a policy change. (p. 281)

In the same way, separate knowing is objective, is detached, is adversarial in nature, takes nothing at face value or for granted, and involves the construction and evaluation of arguments (p. 282). Its focus is on looking for what is wrong with an argument, "person or anything at all" (p. 282). The heart of separate knowing is detachment in which the knower stays distant from the object that is being analyzed (Galotti, Drebus, & Reimer, 2001, p. 421). In this detached process, the "separate knowers attempt to 'rigorously exclude' their own beliefs when evaluating a proposal or idea" (p. 421).

In contrast, connected knowing is a type of appreciative thinking "that honors the contribution that a particular writer [person], however controversial, has made" (Galotti, 1998, p. 281). Connected knowers are passionate participants who "deliberately bias themselves in favor of the thing they are examining. They try to get right inside it, to form an intimate attachment to it" (Galotti, Drebus, & Reimer, 2001, p. 421). Connected knowers relate to the other person's position and seek to understand why it makes sense and how it might be correct (Galotti et al., 1999, p. 747). Connected knowing is uncritical by refraining from judgement, but it is not unthinking; instead, "it is a personal way of thinking, and it involves feeling" (Galotti, Drebus, & Reimer, 2001, p. 422). Connected knowing is personal, collaborative, draws on personal experiences, and empathic; it seeks understanding and meaning with a focus on the experiences that others have that have led them to their position (Galotti, 1998, p. 282). While the voice of separate knowing is argument, the voice of connected knowing is a narrative one (p. 282), and its heart is imaginative attachment (Galotti, Drebus, & Reimer, 2001, p. 421).

While the two ways of knowing differ, they are not opposites of each other (Galotti, 1998, p. 282). Numerous studies have shown the separate knowing and connected knowing are not opposites of each other. Instead, they are styles of thinking that are independent of each other (p. 282). That is, elements of both ways of knowing can coexist within an individual (p. 282). Thus, "connected and separated knowing appear to represent different kinds of cognitive or learning styles, not intellectual abilities or capacities" (Galotti et al., 1999, p. 762).

Adult Education

Eventually, after the customer goes through the decision making process and it is concluded, they will with the help of a case manager develop an individualized employment plan. While creating the plan, it is essential to remember that it is a customer-centered approach. Other adult education concepts are key to keep in mind when working with adults. Most adults wish to have a degree of autonomy, independence, and personal input into their plan and training activities. Desires such as these are firmly rooted in the two pillars of adult learning theory: andragogy and self-directed learning (Merriam, 2001, p. 3).

Andragogy

The modern concept of andragogy was developed by Malcolm Knowles (1980) and is the art of helping adults learn, as contrasted with pedagogy, which is the art and science of helping children learn (Knowles, 1980, p. 43). According to Knowles' five andragogical assumptions, adults are those who (1) have an independent self-concept and who can direct their own learning, (2) have accumulated a reservoir of life experiences that is a rich resource for learning, (3) have learning needs closely related to changing social roles, (4) are problem centered and interested in immediate

application of knowledge, and (5) are motivated to learn by internal rather than external factors. Finally, adults have a need to know why they need to learn something before undertaking the learning task. From these assumptions, Knowles proposed a learner-centered program planning model for designing, implementing, and evaluating educational activities.

Self-Directed Learning

Knowles (1975) also contributed to the development of the concept of self-directed learning. "In its broadest meaning, 'self-directed learning' describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (p. 18). Other theorists such as Tough (1971) expanded and developed the concept. Self-directed learning not only takes learners into account but also considers the context of the learning and the nature of the learning. In another model, "for example, learning strategies, phases of the learning process, the content, the learner, and the environmental factors in the context must all be taken into account in mapping the process of self-directed learning" (Merriam, 2001, p. 9).

Learning Strategies

The twin pillars of andragogy and self-directed learning support a learner-centered approach to education in which "the distinguishing characteristic of adult education is its focus on the individual learner" (McClellan & Conti, 2008, p. 13). "Learning strategies are the techniques or skills that an individual elects to use in order to accomplish a specific learning task" (Conti & Fellenz, 1991, p. 1). Individuals have varying learning strategies (Fellenz & Conti, 1989, p. 8). However, research has shown that adult learners fall into three broad learning strategy preference groups, and these groups have been named Navigators, Problem Solvers, and Engagers (Conti, 2009, p. 891). Navigators are "focused learners who chart a course for learning and follow it" (p. 893). Problem Solvers rely on critical thinking skills to generate alternatives to create additional learning options (p. 894). "Engagers are passionate learners who love to learn, learn with feeling, and learn best when they are actively engaged in a meaningful manner with the learning task" (p, 894).

Problem Statement

The problem addressed by this study was that clients who come to the One-Stop Career Centers are adults facing real-life problems related to making decisions about how to learn new employment skills. Although One-Stop Career Centers are in theory supposed to have a client-centered design, individual differences are not being addressed in designing the individual learning plans for clients who come to the centers. Decision-making styles, ways of knowing, and learning strategy preferences are cognitive processes that can be identified and used to guide the design and implementation of a learning plan. Without a knowledge of how a client goes about making decisions, about how they approach knowledge, and about how that person approaches a learning task, staff at the One-Stop Career Centers are not able to customize training for each individual. If these characteristics could be included in learning plans, it could result in a more efficient and fulfilling services and greater customer satisfaction. Identifying these and using them in the customer's plan would allow the One-Stop Career Centers to fulfill their mandate of addressing individual differences.

Adult learners are a heterogeneous group with a compilation of various experiences and interests. They are unique in their reasoning for what, when, and how they want to learn. They enter a learning situation with their own set of strengths and weaknesses. They tend to be self-directed and want to function with a degree of autonomy. These learners are influenced by expectations based on previous learning events. Therefore, instructors should consider the learner-centered approach when working with adults.

Cyril Houle (1996) noted that andragogy has alerted educators to the fact that learners should be involved in their educational process as much as possible. He noted that learners were goal-oriented, learning-oriented, or activity-oriented (Darkenwald & Merriam, 1982, p. 133). Each adult learner must see value in what they are learning. It needs to be practical and problem solving since most adult learners have a rich resource of life experiences to draw from. In other words, they must see a need to know the material; that is, it must have relevance to them. Adult learners also function under different levels of autonomy with which they feel comfortable. This comfortable level varies from activity to activity. Therefore, at times they prefer to be self-directed in their inquiry while at other times they would rather be given more specific direction. However, ordinarily they wish to be included in the planning and evaluation process of instruction.

Moreover, real-life learning is different than learning in an academic setting (Sternberg, 1990). These differences influence how a person goes about addressing problems. For example, in the world of academia, collaboration is frowned on. It is often seen as a negative or weakness. Functioning in the real world, people rarely solve problems in isolation. People usually collaborate with others or get views and solutions approved or cleared by other people. Thus, it is a challenge for adult educators to work with adults to learn how to solve real-life problems rather than manufactured academic problems where they are not posed in real-life situations.

Therefore, the purpose of this study was to describe the decision-making styles, ways of knowing, and the learning strategy preferences of the customers of the One-Stop Career Center in Tulsa, Oklahoma. The concept of the decision-making style was measured with the General Decision-Making Style (GDMS) instrument. The concept of ways of knowing was measured with the Attitudes Toward Thinking and Learning (ATTLS) survey. The concept of learning strategy preference was identified with Assessing The Learning Strategies of AdultS (ATLAS).

Methodology

This descriptive study used survey-like learning instruments to examine the three different cognitive processes of decision-making styles, ways of knowing, and learning strategy preferences for One-Stop Center users in Tulsa, Oklahoma. Merriam (2001) has pointed out that the foundational theories of adult learning are andragogy and self-directed learning (p. 3). Both of these theories are rooted in a firm belief in a learner-centered approach to education. The key to implementing a learner-centered approach is to address individual differences, and the One-Stop Career Centers are designed to tailor their services to the needs of the individual client.

Decision-making styles, ways of knowing, and learning strategy preferences are cognitive processes. Cognition is "the study of how people receive, store, retrieve, transform, and transmit information" (Merriam & Caffarella, 1991, p. 159). Decision-making style involves mentally processing "the amount of information gathered and the number of alternatives considered when making a decision" (Scott & Bruce, 1995, p. 819) and involves "differences in the way individuals make sense of the data they gather" (p. 819). Ways of knowing are the "different sets of spontaneous orientation to learning and knowledge" (Galotti, Drebus, & Reimer, 2001, p. 421) that people have, and "connected and separate knowing represent different kinds of cognitive or learning styles" (p. 423). Learning strategies are based on how adults perceive factors in their learning environment and on the metacognitive process "that advance the understanding of the individuality of learning experiences and that promote learner self-knowledge and control of personal perceptions and judgments...for potential empowerment of the individual" (Fellenz & Conti, 1989, p. 23).

This study described each of these cognitive processes with established instruments and explored the interactions among them. Instrumented learning is a process in which learners use instruments to learn things about themselves (Blake & Mouton, 1972, p. 113). These self-report exercises allow the learner to become

aware of how they go about learning; such thinking about the process of thinking is referred to as metacognition (Fellenz & Conti, 1989, p. 9). Although the participants in this study did not receive direct feedback on their responses, this study gathered and analyzed data that can be used as a baseline for future instrumented learning at the One-Stop Career Center.

Sample

This study used voluntary participants and asked them to complete the survey information while they are waiting to receive services. In order to ensure that the data that were collected were representative of the population using Workforce Oklahoma, data were collected throughout the entire day for four consecutive weeks at the center. As a result of this process, data were collected from 255 clients at Workforce Oklahoma.

Information was collected on the personal characteristics of gender, age, race, educational level, marital status, and income level. A typical Workforce Oklahoma customer was a single, 38 year-old minority. Slightly over half (53.8%) of the participants were females; this is very similar to the female composition of 51.1% for Tulsa County according to the 2006 U.S. Census. Thus, there were slightly more females than males, but this was much like the general population.

The age of the Workforce Oklahoma sample was similar to the general Oklahoma population. According to the 2006 U.S. Census data, the median age of citizens of Oklahoma is 35.5 years. The median age for the Workforce Oklahoma sample was 38; it had a mean of 38.3 with a standard deviation of 11.4. The sample had a wide age ranged from 18 to 73.

The racial profile of the Workforce Oklahoma sample differed from the general population for Tulsa County. Although Whites make up over three-fourths (77.8%) of the population of the county and African Americans make up 11.5% (U.S. Census Bureau, 2006), the Workforce Oklahoma sample was almost evenly divided between Blacks (43.3%) and Whites (41.3%) with a few more Blacks than Whites. Approximately one-tenth (9.96%) of those using the Workforce Oklahoma facility were Native Americans; this is slightly more than their 5.2% representation in the Tulsa County population (U.S. Census Bureau, 2006). The other racial groups made up only 5.6% of the sample. Thus, while it is evident that minority groups do utilize the Workforce Oklahoma facility, they are particularly the African American and Native American groups, and they have a greater representation at the Workforce Oklahoma facility than in the general population of the area.

Instruments

Instruments with established validity and reliability were used to collect data on the three cognitive process of decision making, way of knowing, and learning strategy preference. The General Decision-Making Styles (GDMS) was used to measure decision-making style (Scott & Bruce, 1995). The GDMS is a 25-item, summated rating survey that uses a 5-point Likert-type scale. The GDMS identifies five different decision-making styles. These five separate scales are Rational, Intuitive, Dependent, Avoidant, and Spontaneous. Each scale consists of five items that are representative of the five independent dimensions of decision-making style. The scores on each scale may range from 5 to 25. The scale with the highest score represents the respondent's primary decision-making style. The second highest score represents the respondent's backup decision-making style, and the lowest score represent the decision-making style least associated with the respondent.

The Attitudes Toward Thinking and Learning Survey (ATTLS) is a 20-item instrument that measures one's ways of knowing (Galotti et al., 1999). The survey has two scales of 10 items each. The items in the Separate Knowing scale involve "objective, analytical, detached evaluation of an argument or piece of work" (p. 746) and measure a critical and detached way of knowing (p. 745). The items in the Connected Knowing scale involve a person trying to understand another person's point of view and placing oneself in alliance

with another person's position (p. 747); consequently, it measures an empathic way of knowing (p. 745). The ATTLS is a summated rating scale that uses a 7-point Likert-type scale ranging from 1 to 7. The scores on each of the 10-item scales of Separate Knowing and Connected Knowing can range from 7 to 70 "with high scores indicating strong agreement with that style of knowing" (p. 750).

The learning strategy preferences of the patrons at Workforce Oklahoma were identified with Assessing The Learning Strategies of AdultS (ATLAS)). ATLAS consists of five items. In the original and most widely used form of ATLAS, they are organized in a flow-chart design (Conti, 2009). In this format,

> ATLAS is a 8.5' x 5.5' bound booklet with each item on a separate page and with each option for an item having a box which directs the respondent to the next appropriate action...Each page of this self-contained booklet is printed on a different colored card stock, and after selecting an option for an item, the participant is instructed to go to the appropriately colored page" (p. 889).

Based on their responses to these items, participants are grouped as either a Navigator, Problem Solver, or Engager. Since participants did not receive feedback on their learning strategy preferences when they completed the survey at Workforce Oklahoma, the questions were arranged in a standard-text format (p. 889) and only the appropriate responses were used for placing each individual in the correct learning strategy preference group.

Interaction of Cognitive Processes

Discriminant analysis was used to explore the interaction of decision-making styles, ways of knowing, and learning strategy preferences. Discriminant analysis is a statistical procedure "for examining the difference between two or more groups of objects with respect to several variables simultaneously" (Klecka, 1980, p. 5). This multivariate procedure serves to recognize parameters between groups of objects. The discriminant analysis "investigates the differences between these groups and a set of discriminating variables" (Conti, 1993, p. 91). It is a procedure for identifying "relationships between qualitative criterion variables and quantitative predictor variables" (Kachigan, 1991, p. 216). In the social sciences, this procedure consists of placing people into groups that make sense in terms of the real-life research question and then "analyzing the interrelationship of multiple variables to determine if they can explain a person's placement in a specific group" (Conti, 1993, p. 91).

The variables involved in the discriminant analysis are the grouping variable, which is the qualitative criterion variable, and the discriminating variables, which must be capable of being measured at the interval or ratio level (Conti, 1993, p. 91). A benefit of this process is it is possible to identify which variables are associated with the criterion variable, and then it is possible to predict values to the criterion variable (Kachigan, 1991, p. 216). When a object or person is placed into a group, it is a exclusively a member to that group. It does not share membership with any other group. Each member of each group is measured by the same predictor variables, and there may be different number of members in each group. Regardless of whether the criterion variable is dichotomous fitting into one group or another or is a multi-valued variable, "the task of discriminant analysis is to classify the given objects into groups--or, equivalently, to assign them a qualitative label–based on information on various predictor or classification variables" (p. 218).

The discriminant analysis produces a discriminant function. "This is a formula which contains the variables and their coefficients and which can be used to place people in the groups" (Conti, 1993, p. 91). "The discriminate function uses a weighted combination of those predictor variable values to *classify* an object into one of the criterion variable *groups*--or, alternatively, to assign it a value on the qualitative criterion variable" (Kachigan, 1991, p. 219). The discriminate function identifies the weights associated with each predictor variable and provides the critical cutoff score for assigning objects into the alternative criterion groups (p. 221).

Key elements of the analysis output are related to the discriminant function. The strength of the discriminant function is reported in terms of its eigenvalue and its canonical correlation. The eigenvalue summarizes the variance associated with the function, and "large eigenvalues are associated with useful functions" (Conti, 1993, p. 93). The canonical correlation "tells how useful the discriminant function produced by the analysis is in explaining the group differences; squaring the canonical correlation provides the proportion of variation in the discriminant function explained by the groups" (p. 93).

The discriminant function is used to place individual cases into the groups in the criterion variable. These placements are displayed in a "classification table which indicates the accuracy of the discriminant function in correctly placing people in the correct group" (Conti, 1993, p. 91). "Perhaps the most meaningful evaluation of the discriminant function will be in terms of the *actual errors of classification*, both in *number* and in *type*" (Kachigan, 1991, p. 230). The "accuracy of the classification results must be interpreted in relationship to that which could be expected from random assignment" (Conti, 1993, p. 94) to the groups.

As a multivariate procedure, discriminant analysis is interested in the interaction of the variables in the analysis (Conti, 1993, pp. 90-91). While this interaction is stated in the discriminant function, the discriminant function does not reveal the nature of this interaction. The structure matrix is used to clarify this relationship. The structure matrix is a display of the "correlation coefficients that indicate how closely a variable and the discriminant function are related" (pp. 93-94). The structure matrix "is used to name the discriminant function so that qualitative terms exist to explain the interaction that exists among the variable in distinguishing among the groups" (p. 91).

Once a discriminant analysis is calculated, "the criteria for accepting the outcome of the analysis should be stated. Two criteria are appropriate for judging the acceptance of the discriminant analysis as useful" (Conti, 1993, p. 93). These are (a) that the discriminant function should be describable using the structure matrix and (b) that a predetermined number of cases are classified correctly in the classification table.

Thus, the discriminate function analysis is valuable in deciding which variables discriminate between two or more groups. Explained in another way, discriminate analysis is used to delineate if groups differ in terms of a mean on a variable and then with the help of that variable to predict group membership. These mean variables are used to determine if there is a significant difference between each of two or more groups. In this analysis, "continuous predictor variables are used to predict a categorical variable....Thus, the predictions made are about categorical group membership. For example, based on the predictor variables, discriminant function analysis allows us to classify whether an individual manifests the characteristics" (Gay & Airasian, 2000, p. 335) of membership in one of categories of the grouping variable.

In this discriminant analysis, the Workforce Oklahoma customers were grouped according to the learning strategy preference and the discriminating variables were the items from the decision-making styles instrument and the ways of knowing scale. Complete data were available on 245 of the participants, and their groupings on the criterion variable were as follows: Problem Solvers–102, Navigators–84, and Engagers–59. There were 45 discriminating variables; these were the 25 items on the GDMS and the 20 items on the ATTLS. The analysis was run using the Wilks' stepwise method for selecting the variables for inclusion in the analysis.

Two criteria were used for judging the usefulness of the discriminant function produced by the analysis. First, the function had to be at least 75% accurate in correctly classifying the participants. If it met this criterion, then the structure matrix also needed to clearly describe the process that separated the groups. Although 75% is more than double the chance placement rate of 33.3%, the judgement criterion was set at this level because any formula that cannot correctly place at least three-fourths of the participants does not have any practical use in the Workforce Oklahoma environment.

The analysis produced two discriminant functions

because discriminant analysis always "produces one less function than total number of groups" (Conti, 1993, p. 94). The first function discriminated the members of one group from the two other groups, and the second function then discriminated between the two remaining groups (Kachigan, 1991, p. 226). Although 45 discriminating variables were used in the analysis, both discriminant functions were very short:

D_1 = .43(ATTLS_16) - .45(ATTLS_9) + 1.01.

D_2 = .43(ATTLS_16) - .47(ATTLS_9) - 3.62.

Both items in the function were from the ATTLS. Item 9 was from the Connected Knowing scale and dealt with learning to understand people who are different from me. Item 16 was from the Separate Knowing scale and dealt with arguing with the authors of books to try to logically figure out why they are wrong.

These two discriminant functions were extremely weak in discriminating among the groups. The discriminant analysis correctly classified only 40% of the participants into their actual group (see Table 1). The accuracy was below 50% or half for all three groups. This low accuracy was reflected in eigenvalues of .044 for the first function and .027 for the second function. Since large eigenvalues are associated with "good" functions (Norusis, 1988, p. B-14) and any eigenvalue below one is considered small, these extremely low values indicate that the functions lack power in discriminating between the groups. This weakness is also reflected in the low canonical correlations of .21 for the first function and .16 for the second function. When the canonical correlations are squared, they indicate that the first function only accounted for 4.2% of the variance in the groups, and the second function only explained a mere 2.7% of the variance in its groups. Because the discriminant functions explained so little of the variance in the groups, the structure matrix was not examined. Based on the criteria for evaluating the analysis, the discriminant functions were judged as not being useful for discriminating among the groups. Consequently, this lack of usefulness indicates that there is no meaningful interaction among decision-making styles, ways of knowing, and learning strategy preference.

Table 1: Classification Results for ATLAS Groups from Discriminant Analysis

Actual Groups	Predicted Groups			Total
	Navigator	Pro. Sol.	Engager	
Frequency				
Navigator	38	22	24	84
Problem Solver	40	31	31	102
Engager	16	14	29	59
Percentage				
Navigator	45.2	26.2	28.6	100
Problem Solver	39.2	30.4	30.4	100
Engager	27.1	23.7	49.2	100

Naturally-Occurring Groups

Cluster analysis was used to explore for naturally-occurring groups in the Workforce Oklahoma dataset. Cluster analysis is a multivariate procedure used to recognize and place persons into relatively homogeneous subsets based on similarities among the people (Aldenderfer & Blashfield, 1984, Chapter 1; Kachigan, 1991). "In cluster analysis, we ask whether a given group can be partitioned *into subgroups* which differ" (Kachigan, 1991, p. 262). Cluster analysis is a tremendous tool for researchers providing a means of analyzing and reasoning through data from the specific to the general. It involves placing items exclusively into

groups from the data which have inherently similar existence. This technique provides the researcher the advantage of seeing the person as a whole as opposed to a set of random variables. In other words,

> Cluster analysis is a powerful multivariate tool for inductively making sense of quantitative data. Its power lies in its ability to examine the person in a holistic manner rather than as a set of unrelated variables. Cluster analysis can be used to identify groups which inherently exist in the data. (Conti, 1996, p. 71)

Cluster analysis works by proceeding through a number of steps. At each step, two cases or groups of cases are combined. This process starts with as many clusters as there are cases in the data set and proceeds until there is only one cluster that consists of the total group. "Once a cluster is formed, it cannot be split; it can only be combined with other clusters" (Norusis, 1988, p. B-73). This process is referred to as hierarchical cluster analysis (p. B-73).

The outcome of the cluster analysis is influenced by how distance is measured between the cases at each step and by the criteria used for combining the cases into clusters (Norusis, 1988, p. B-71). "There are several methods of determining how distances between cases will be measured. These methods take into consideration the concepts of distance and similarity" (Conti, 1996, p. 69). A commonly used measure for measuring the similarity between two cases is the Euclidean distance (Kachigan, 1991, p. 265).

Several methods exist for determining how the cases will be combined into the clusters; these differ in how they calculate the distances between the clusters (Conti, 1996, p. 69). A commonly used method in the social sciences is the Ward's method because it tends to find relatively equal sized groups (Aldenderfer & Blashfield, 1984, p. 43).

In order to run cluster analysis,

> The choice of variables to be used with cluster analysis is one of the most critical steps in the research process....The basic problem is to find the set of variables that best represents the concept of similarity under which the study operates. Ideally, variables should be chosen within the context of an explicitly stated theory that is used to support the classification. The theory is the basis for the rational choice of the variables to be used in the study. (Aldenderfer & Blashfield, 1984, pp. 19-20)

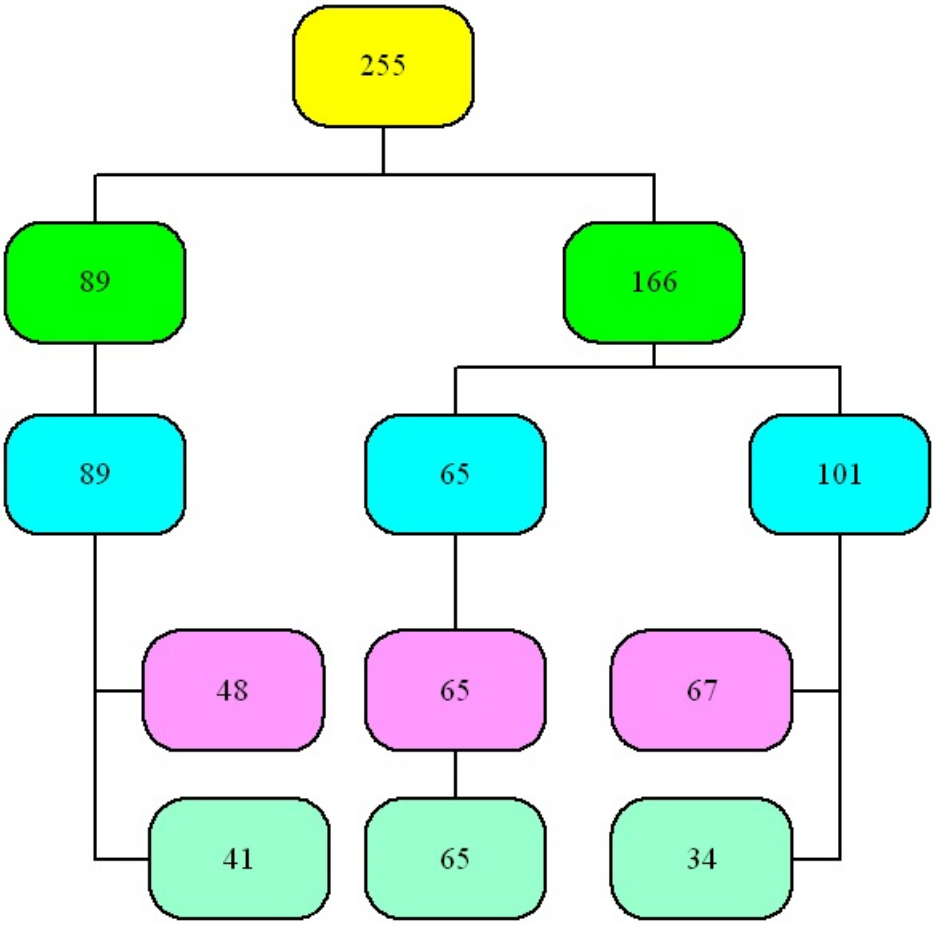
Since the variables included in the cluster analysis must be related conceptually, two separate cluster analyses were run. One cluster analysis explored for naturally-occurring groups among the Workforce Oklahoma clients based on decision-making styles, and the other one sought to uncover naturally-occurring groups based on ways of knowing.

Decision-Making Style Clusters

Cluster analysis was used to explore for naturally-occurring groups based on decision-making styles. The 25 items of the General Decision-Making Styles instrument were used as the variables for this analysis. The clusters were formed using hierarchical cluster analysis; in agglomerative hierarchical clustering, "clusters are formed by grouping cases into bigger and bigger clusters until all cases are members of a single cluster" (Norusis, 1988, p. B-73). The squared Euclidean distance was used to measure the distance between the cases. This method is the sum of the squared differences over all the variables and has widespread use in the social sciences (p. B-72). The Ward's method was used for determining how cases would be combined into clusters. This method, which is also widely used in the social sciences, tends to find equally-sized groups (Aldenderfer & Blashfield, 1984, p. 43). Using this procedure, a 3-cluster solution was judged the best explanation of the data (see Figure 1). At the 3-cluster level, the size of the groups are distributed more equitably than at the other levels: 101 (39.6%), 89 (34.9%), and 65 (25.5%). At the 4-cluster level, the group of 101 splits into groups of 67 and 34. At this level, the largest group of 89 is over two-and-a-half times larger than the smallest group of 34. Likewise, at the 5-cluster level, the largest group of 67 is approximately twice as large as the smallest group of

34. At the 2-cluster level, the larger group of 166 is almost twice as large as the smaller group of 89. Thus, the 3-cluster level has the most relatively equal-sized groups of all the levels of the cluster analysis.

Figure 1: Cluster Formation for Decision-Making Styles



Once the clusters have been found with a cluster analysis, "additional information is needed to better gain insight into the true meaning of the clusters and to name and describe them" (Conti, 1996, p. 70). One way to do this is to use discriminant analysis with the same variables used in the cluster analysis to identify the process that separates clusters (p. 71). Therefore, discriminant analysis was used with the clusters from the cluster analysis as the groups and with the 25 items of the General Decision-Making Style, which were the same variables used in the cluster analysis, as the discriminating variables.

While any number of groups can be used in a discriminant analysis, the easiest discriminant analysis to analyze is one with only two groups. Therefore, two separate discriminant analyses were conducted to gather information to describe the process that separates or discriminates among the three decision-making styles clusters. The first discriminant analysis used the clusters of 166 and 89 at the 2-cluster level for the groups and the 25 items from the General Decision-Making Styles instrument as the discriminating variables. The discriminant function produced by this analysis was 93.3% accurate in placing the participants in their

correct group. The structure matrix contained 10 variables with a correlation with the discriminant function of .3 or above. Five of these items were in the Spontaneous style, and the other five items were in the Avoidant style. This combination of Spontaneous and Avoidant decision-making behavior was named Non-Reflective. The Avoidant items support procrastination and delaying the decision-making process, and the Spontaneous items support impulsive decision making. Reflective suggests an orderly and analytical turning over in the mind of information with the purpose of reaching a definitive understanding of an issue (Webster's New World Dictionary, 1996, p. 544); since the concepts of Avoidant and Spontaneous together imply the opposite of this, this function was named Non-Reflective. The average of the means of the scores for these 10 variables for the group of 89 (M=1.4) was lower than the average scores for the group of 166 (M=2.9). Based on the response scale for the GDMS, the group of 89 tended to disagree with Non-Reflective behavior while the group of 166 was neutral about Non-Reflective behavior.

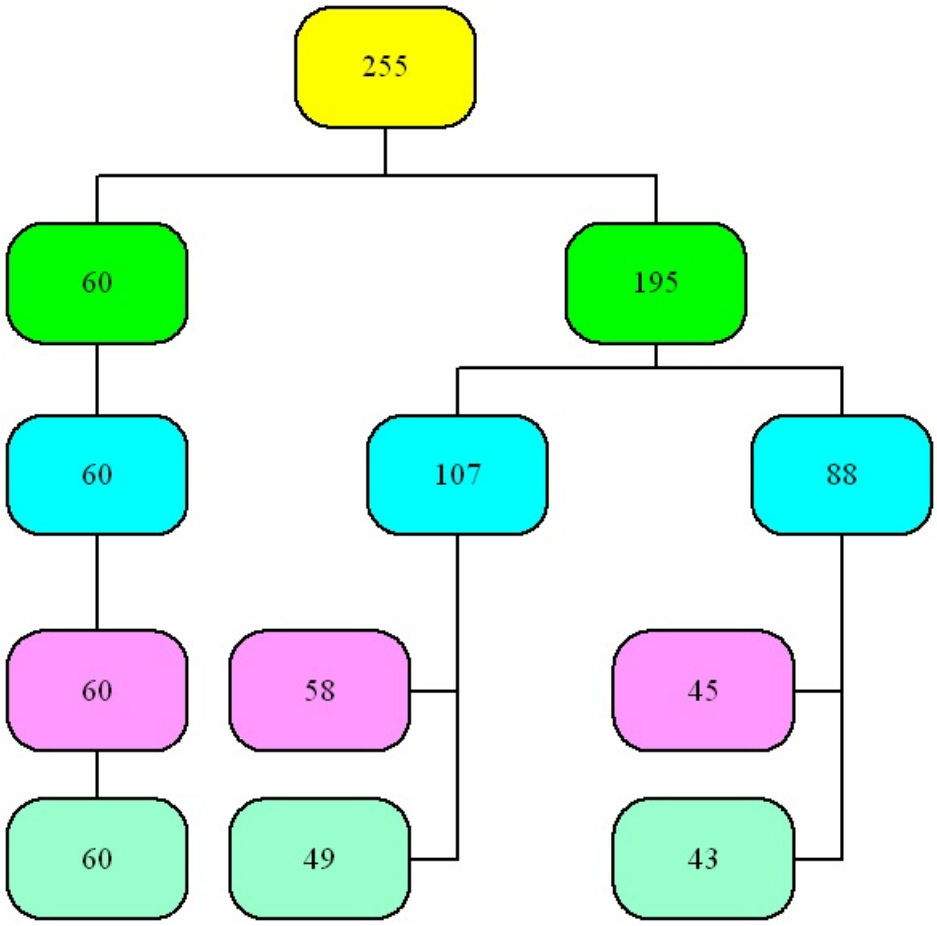
The second discriminant analysis used the groups of 101 and 65 that made up the larger group of 166. The discriminating variables were the 25 items from the General Decision-Making Styles instrument. The discriminant function produced by this analysis was 95.2% accurate in placing the participants in their correct group. The structure matrix contained 6 variables with a correlation with the discriminant function of .3 or above. Three of these items were in the Dependent style, and the other three items were in the Avoidant style. This combination of Dependent and Avoidant decision-making behavior was named Enabling. The Dependent variables dealt with seeking assistance from other for decision making. The Avoidant variables dealt with postponing or delaying the decision-making process. Enabling is the process of providing the means, opportunity, power, or authority to do something (Webster's New World Dictionary, 1996, p. 252); thus, enabling combines both concepts of Dependent and Avoidant. The average of the means of the scores for these 6 variables for the group of 65 (M=2.1) was lower than the average scores for the group of 101 (M=3.4). Based on the response scale for the GDMS, the group of 65 tended to somewhat disagree with Enabling behavior while the group of 101 slightly agreed with Enabling behavior.

Thus, three distinct groups related to decision-making styles were found among the Workforce Oklahoma clients. The group of 89 are Reflective Decision-Makers who disagree with having a Non-Reflective approach to decision making. The group of 65 felt that Non-Reflective decision making may sometimes be necessary but disagreed with Enabling behavior in decision making. The group of 101 felt that Non-Reflective decision making and Enabling behavior may sometimes be necessary.

Ways of Knowing Clusters

Cluster analysis was also used to explore for naturally-occurring groups based on ways of knowing. The 20 items of the Attitudes Toward Thinking and Learning Survey were used as the variables for this analysis. The clusters analysis used hierarchical clustering distances measured by the squared Euclidean method and with cases combined with the Ward's method. Using this procedure, a 3-cluster solution was judged the best explanation of the data (see Figure 2). At the 3-cluster level, the size of the groups were as follows: 107 (42.0%), 88 (34.5%), and 60 (23.5%).

Figure 2: Cluster Formation for Ways of Knowing



In selecting the cluster solution to explain the data, the goal is to choose a level with a manageable number of clusters with adequate size that differ from each other. This guideline directed the analysis of the group sizes for the ways of knowing data. At the 6-cluster level, one groups is extremely small and represents only 2.7% of the total group. Therefore, the search for the solution was initiated at the 5-cluster level. The clusters at the 5-cluster level were relatively equal in their distribution, but 5 clusters constitute a large number of groups for the 2-dimension concept of ways of knowing. At the 4-cluster level, the groups of 60 and of 58 are near the random probability of 25% for 4 groups while the group of 88 is 38% above this probability level and the group of 49 is 23% below this probability level. At the 3-cluster level, the group of 88 is near the random probability of 33.3% for 3 groups while the group of 107 is 26% above this probability level and the group of 60 is 29% below this probability level. At the 2-cluster level, both of the groups are 53% either larger or smaller than the random probability of 50% for 2 groups. Thus, the cluster sizes varied at each level and differed from the random probably level for that number of groups. Therefore, the 3-cluster level and the 4-cluster level were analyzed to determine the most parsimonious solution.

Discriminant analysis can be used to compare the clusters (Kachigan, 1991, p. 269) as well as to describe

the process that separates the groups (Conti, 1996, p. 71). The discriminant processes that were used to describe the process that separates the groups confirmed that the 3-cluster solution was the most parsimonious because the addition of the fourth cluster did not provide a great deal of understanding to the process that separated the groups. This type of content analysis is an appropriate way to "arrive at an intuitive or expert judgmental description of the clusters" (Kachigan, 1991, p. 269).

Two separate discriminant analyses were conducted to gather information to describe the process that separates or discriminates among the three ways of knowing clusters. The first discriminant analysis used the clusters of 195 and 60 at the 2-cluster level for the groups and the 20 items from the Attitudes Toward Thinking and Learning Survey as the discriminating variables. The discriminant function produced by this analysis was 92.5% accurate in placing the participants in their correct group. The structure matrix contained 5 variables with a correlation with the discriminant function of .3 or above. Collectively, these items suggest a process of Intellectual Debate. The average of the means of the scores for these 5 variables for the group of 195 (M=3.1) was lower than the average scores for the group of 60 (M=5.1). Based on the response scale for the ATTLS, the group of 195 tended to Slightly Disagree with Intellectual Debate while the group of 60 Slightly Agrees with Intellectual Debate.

The second discriminant analysis used the groups of 107 and 88 that made up the larger group of 195. The discriminating variables were the 20 items from the Attitudes Toward Thinking and Learning Survey. The discriminant function produced by this analysis was 93.3% accurate in placing the participants in their correct group. The structure matrix contained 5 variables with a correlation with the discriminant function of .4 or above. Collectively, these items suggest a process of Interacting with Others. The average of the means of the scores for these 5 variables for the group of 107 (M=4.4) was lower than the average scores for the group of 88 (M=6.0). Based on the response scale for the ATTLS, the group of 107 tended to neutral with Interacting with Others while the group of 88 Somewhat Agreed with Interacting with Others.

Thus, three distinct groups related to ways of knowing were found among the Workforce Oklahoma clients. The group of 60 slightly agree with Intellectual Debate and can be labeled Let's Debate. The group of 88 slightly disagree with Intellectual Debate but somewhat agrees with Interacting with Others and can be labeled Let's Talk. The group of 107 slightly disagrees with Intellectual Debate and are neutral on Interacting with Others; this group can be labeled as Let's Be Open.

Discussion

Decision-Making Groups

Workforce Oklahoma clients have three distinct approaches to decision making: Reflective Decision Makers, Non-Reflective Decision Makers, and Enabled Decision Makers. Although addition research will be necessary in order to follow-up on these groups and to describe them, the behaviors associated with these groups can be observed in current Workforce Oklahoma customers. For example, many of the adults using the Workforce Oklahoma facilities prefer reflection and feel that reflection is a necessary practice in most situations. They prefer to take the time to review choices and consequences of their actions in an analytical manner before committing to a decision. They have a lot of hesitation and reluctance when they perceive they are being pushed into a quick decision. They prefer to be certain of their position and guard against making a mistake before they proceed. When they have control, they feel they can call upon their experiences, evaluate their feelings, and recall theories in their knowledge. Then they can act or proceed in an effort to improve or enhance their performance. This continuation to build a better understanding might take them a period stretching over a matter of minutes, hours, or weeks. When time or circumstances are not placing them or others in danger of risking injury or harm, they want to evaluate their alternatives through reflection. It is a critical activity

that in most cases they would prefer not to circumvent.

However, some other Workforce Oklahoma demonstrate actions that indicate that they feel a non-reflecting environment might be best for them and other people. Although the staff tries to get customers to think in broad terms about work and career decisions, some customers do not desire to do such thinking. This might be particularly appropriate when the customer is seeking a short-term fix and not seeking any long-term options. This may occur when customers are trying to finish out their working career to reach retirement age.

A third group is both non-reflective and seeking enabling behavior in their decision making. They feel that the institution knows what is best for them and that it must do something to help them. They indicate that it would be faster and more efficacious if Workforce Oklahoma staff make the decisions for them. Besides, the staff member or enabler has the key to unlock the answers for them if they will only listen and follow their prompting. They feel that the energy and effort applied by the concerned person will pay off in helping them to get through their dilemma since it is a tremendous program and opportunity for them to succeed. Customers such as this feel that they must follow schedules and procedures in addition to agreeing to any request by staff. In addition, they do not want to question practices and policies in fear of being rejected by the program.

Moreover, some of the staff support this when they feel urgency and when they feel the program can save time for customers if they structure activities where no consideration or choices have to be made by the customers. Assistance can be manipulated to save the customers the question-and-answer sessions or to make allowances in the process of trial-and-error where staff are already aware of and made efforts to help customers avoid pitfalls by building in rigid procedures. This they feel can also help to alleviate customer consternation and anxiety and perhaps conflicts between them and other customers. Staff behaviors such as this enable customers.

Thus, the behaviors of the three groups that were uncovered by the cluster analysis can be seen in the actions of individuals at Workforce Oklahoma. Future qualitative research should be done with these groups to better describe them and their various characteristics in greater detail and to discover from them ways to make their experiences at Workforce Oklahoma as successful as possible and ways of best address their needs.

Ways of Knowing Groups

Workforce Oklahoma clients have three distinct approaches to ways of knowing. They formed three groups: Let's Debate (60), Let's Talk (88), and Let's Be Open (107). As with the decision-making groups, these approaches to relating to knowledge can be seen in the Workforce Oklahoma customers. Some Workforce Oklahoma customers generally exercise their option to debate their views and opportunities. When these customers have a number of options, they prefer to view each point with a critical eye. Critically analyzing and discussing elements of the option with other customers or a counselor can help them clarify to other and themselves the advantages of each. Some customers feel they must give the impression that they have given extensive thought and are strong on their decision to proceed toward a certain plan. It might be perceived as weak or not committed if they are indecisive. Indeed, some counselors have been known to question the plan of action of some customers to see if they waver from their position or if they are firmly committed toward their goals. Therefore, it is the practice of many customers to debate elements of their options in order to be sure of and firm toward their goals before interacting and discussing plans with their counselor.

A certain amount of dialog must go on between a customer and counselor to accomplish mutual goals. It is imperative for prospective customers to explain their present position and question enough to discover what services would be of interest to them. Some explain their view and position by being storytellers. Others seek out just the necessary facts, and they determine the appropriateness of services to their circumstances. Talking with others, which includes both staff and other customers as well as self-talk, helps them formulate their own feelings and position.

All customer of the Workforce Oklahoma facility have their own degree of comfort concerning their willingness to open up to a fellow customer or counselor. It takes different degrees of familiarity with others before a person will have the trust and confidence to talk freely. There might be a feeling of insecurity among some customers, and they may guard against being made fun of or being put into a position where they have someone who questions their abilities. Others may feel comfortable expressing their feelings and seeking to establish a personal relationship before continuing on with program procedures. They may feel free to explain their feelings and ask the staff member or other customers for their opinions. It can be a positive openness between the customers and staff. However, if the customers feel that their expectations have not been met or that the program has not fulfilled their commitment, the customers may freely express their negative view of their disappointment.

Thus, all three groups of ways of knowing can be observed at Workforce Oklahoma. Further qualitative research is needed to better describe these groups and to determine what policies and procedures can be established to help each one interact most efficiently with the other groups, with the counselors, and with the program goals.

Learning Strategy Preferences

Workforce Oklahoma's image of offering alternative paths for addressing job training is congruent with the Problem Solver learning strategy preference. Workforce Oklahoma customers are likely to have many of the characteristics possessed by the Problem Solver strategies identified by the ATLAS. The disproportionally large number of Problem Solvers found at Workforce Oklahoma may be drawn to the facility by an array of resources made available to users of the facility. It is natural for them to evaluate the variety of options to access the information. This requires that they use their critical thinking skills and reflection concerning their approach toward the learning tasks in order to get the benefit of the services. They are faced with and attracted to enormous categories and bits of information related to self-evaluation, employment, and training for which they can generate alternatives. These customers are allowed to work at their own pace permitting time to evaluate each option and generate new possibilities. These customers at the career center have the opportunity to interact with others to ask questions with staff and share information with fellow participants

These descriptions of some of the customers at Workforce Oklahoma describe the Problem Solvers illustrated by the ATLAS. According to the ATLAS, Problem Solvers use critical thinking skills with reflection (Conti, 2009, p. 894). They seek out alternative resources and look for opportunities to generate other alternatives. Problem Solvers view the process as an adventure where they can use their curious, inventive, and intuitive nature. They also are abstract thinkers with descriptive examples and often illustrate ideas through story telling.

Cognitive Processes

Decision-making styles, ways of knowing, and learning strategy preferences are separate, unrelated cognitive processes. Before the results of the discriminate analysis were known, it could be hypothesized that some interaction existed between the cognitive processes being identified by the GDMS, ATTLS, and ATLAS. These instruments share several similar constructs. For example, the concept of intuition is found in the decision-making styles of the GDMS, is implied in the connective knowing in the ATTLS, and is implied in the importance of feeling with the Engagers in the learning strategy preferences on the ATLAS. Likewise, the logical approach is the core of the rational decision-making style on the GDMS, of separate knowing on the ATTLS, and of the Navigator learning strategy preference on the ATLAS. In a similar fashion, relationships are a factor in the dependent decision-making style on the GDMS, for the differences between the ways of knowing on the ATTLS, and for Engagers on the ATLAS. Despite the existence of several concepts such as these that overlap cognitive

processes, there was no interaction for the Workforce Oklahoma customers among the cognitive processes of decision-making styles, ways of knowing, and learning strategy preferences as measured by the GDMS, ATTLS, and ATLAS. Thus, while cognitive processing is a broad theme that unites these three, the findings from this study indicate that each of these instruments is measuring different elements of the overall concept of cognitive processing.

AID: A Tool for Addressing Individual Differences

The findings from this study suggest that a tool is available to educators for quickly addressing individual differences among learners. This tool has been named "AID: Addressing Individual Differences" (see copy at end of article) because it can serve as an "aid" to educators in their informal assessment of individual learners. While this tool may not be generalized to all adult learners because it is based on the findings of a study in a specific setting, Lincoln and Guba (1985) have suggested that practitioners need to consider the concept of "applicability" in interpreting research. This concept challenges the user of the research to analyze the research and then ask how similar is the research study situation to the real-life situation of the user of the research. If these situations are very similar, then the research findings can be applied in the local setting. Thus, before using AID, the users should reflect upon how similar their situation and their learners are to those at Workforce Oklahoma.

AID is a 3-by-3 screener based on the findings of this study in the three areas of cognitive processing of decision-making styles, way of knowing approaches, and learning strategy preferences. Although these are three ways of cognitive processing, the findings from the study suggest that they do not interact and are thus independent of each other. Therefore, they each can provide a different perspective on the individual differences of the learner.

AID consists of three separate cognitive processes with three groups in each of the processes. The decision-making styles process involves the three groups of Reflective Decision Makers, Non-Reflective Decision Makers, and Enabled Decision Makers. The way of knowing approach involves the three groups of Let's Debate, Let's Talk, and Let's Be Open. Learning strategy preferences involves the three groups of Navigators, Problem Solvers, and Engagers. For each of these three dimensions of cognitive processing, the educator can be looking for learner behavior that fits into one of the three groups. The learners who are Reflective Decision Makers may need to take some extra time to assimilate all the information before confirming their decision. While their decisions will be based on their abilities, values, interest, and experiences, it might be of help to the learner if the educator would help distill the information so the learner gets an accurate overview of the information and does not fail to consider some aspects of the decision because of their schemas or blind spots. The educators can assist the Rational Decision Makers by helping them focus on relevant areas that they might otherwise neglect to evaluation process.

Conversely, the Non-Reflective Decision Makers might require more time with the educator. It could be of help to the learner if the educator helps them reflect on some of the details involved with the information to be considered before confirming their decision. Perhaps the educator can cultivate the learner's sense of adventure and excitement regarding progressing through the stages of the program and guiding them through the cognitive process.

The Enabled Decision Makers may also require additional time for the educator to determine how to work with them so that the learner gets the most benefit from the educational process. Perhaps the educator can utilize the confidence and trust that the learner often places in them to help the learner benefit from the decision-making process. It might require that the educator place certain responsibilities with the learners and that the educator gradually increase these responsibilities as the learner progresses through the stages of the program. Since the Enabled Decision Makers style of making decisions is counter to the adult learning

principle of the learners taking ownership of their learning program, the educator will need to work with these learners on decision-making skills as well as issues related to learning so that the learners learn to take ownership of their decisions and plan for learning.

The Let's Debate way of communication describes learners for whom debate is a natural approach to gathering information. They feel comfortable viewing information with a critical eye and remaining objective when considering other people's view. When they are going through the cognitive process of considering and planning services, they feel comfortable debating and can formulate their ideas better from this type of interaction. Therefore, the educators can engage in an active exchange with them. After these learners present their views, they often gain satisfaction from being engaged in the conversation where they have an educator who challenges their ideas and views which requires the learners to explain them and which helps the learners better formulate their own thoughts. Their thoughts are further conceptualized from this ways of knowing process of reflection which is ferreted out by the debating process through gaining insight from the point of view of others and thus which solidifies their own views.

The Let's Talk group describes those learners who feel comfortable establishing a dialog with the educator to gather and understand information. Although this new information may in some cases be cathartic and insightful, they enjoy the interaction and at the same time gain useful information. While talking, they can better formulate their ideas and solidify their thoughts. This rapport can serve to establish a respect between the learner and educator and thereby create a good environment for learners making important decisions.

The Let's Be Open approach describes those learners who are essentially not interested in creating a dialog. They would rather have the information presented to them so that they can absorb it without feeling compelled to establish any interaction. Since this group prefers to avoid debate and would rather receive information somewhat passively, they may have to take some time to absorb the information and formulate their ideas before making known their desires regarding their educational plan. Therefore, educators might want to work with them to help them jot down ideas and develop a written interest that they can present to the educator after they have had time to contemplate all aspects of the information. Working this way with these learners may require time and a degree of understanding by the educator to make the educator-learner relationship a positive experience with a successful result.

Learning strategy preferences deal with how the learners perceive information related to their training plans. An educator can help the learner who is a Navigator get a positive feel from the interaction in the process. Educators need to understand that Navigators are seeking information which will help them get through the educational process in the most logical and efficient way. These learners will be involved in the process of reviewing all aspects of the program in a critical and objective manner. It could be beneficial for the educator to help the learners who are Navigators line out and understand the stages in the educational program and the expectations that they must meet. Then they should set up a schedule with them to accomplish the program with periodic checks to be certain they are on the right course.

Problem Solvers desire to search out options and evaluate alternatives. It would be helpful for the educator to remember that Problem Solvers like to explain their views with stories and feel comfortable talking to others regarding possibilities. It might be time saving and efficacious if the educator help these learners narrow down some of their alternatives and to set deadlines with them for various states of the program.

At the heart of the recruitment and of working with Engagers once they are in the program is building relationships. While educators are aware of milestones that must be accomplished in the program, it is important for them to realize that Engagers will not enthusiastically become involved in the program until they are comfortable with the relationships that they have with the educators and with others at the learning center. Therefore, the educator's initial activities with Engagers should focus on building a relationship with

the learner that creates a nonthreatening atmosphere of trust and understanding. This is not only congruent with the adult learning principles prescribed by Knowles (1970), but it is also a necessity for Engagers.

Educators should remember that learning strategy preferences relate to the learner's initial approach to a learning situation. This learning strategy preference may not be congruent with the needs of the workplace interests of the learner (McNeil, 2012). Since new learning strategies can be learned (p. 226), once learners are made aware of their personal learning strategy preferences and strengths,

> They can then enhance their "learning toolkits" by learning to master additional learning strategies with an increased ability to best discern and apply a larger spectrum of appropriate strategies to accomplish specific learning tasks. (p. 232)

Thus, AID is a tool that contains information about three independent cognitive processes. As educators initiate their interactions with learners they need some filters to begin to narrow down the tremendous differences among individuals and to focus on important factors related to learning. AID can be such a tool by using the characteristics from three cognitive processes to help identify the individual differences of each learner. The power of AID is that each of the elements in this 3-by-3 screener is grounded in a theoretical base. This clarifies individual practices by relating them to broader concepts. Importantly, this allows the client's individual differences to be discussed in nonjudgmental language (Cole Associates, n.d.). By depersonalizing the individual differences in this way, these differences can be used to highlight growth opportunities. In this way, the learning-centered approach to educating adults can be realized.

References

Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster analysis.* Beverly Hills, CA: Sage.

Blake, R. R., & Mouton, J. S. (1972). What is instrumented learning? Part I-Learning instruments. *Industrial Training International, 7*(4), 113-116.

Cole Associates. (n.d.). *Why use instrumented learning*. Retrieved August 5, 2002, from http://www.ednamariecole.com/page2.htm

Conti, G. J. (1993). *Using discriminant analysis in adult education*. Paper presented at the 34th annual Adult Education Research Conference (AERC). University Park, Pennsylvania.

Conti, G. J. (1996). *Using cluster analysis in adult education*. Paper presented at the 37th annual Adult Education Research Conference (AERC). Tampa, FL.

Conti, G. J. (2009). Development of a user-friendly instrument for identifying the learning strategy preferences of adults. *Teaching and Teacher Education*, *25*, 887-896.

Conti, G. J., & Fellenz, R. A. (1991). *Assessing adult learning strategies*. (ERIC Document Reproduction Service No. ED339847)

Cross, K. P. (1976). *Accent on learning*. San Francisco: Jossey-Bass.

Darkenwald, G. G., & Merriam, S. B. (1982). *Adult education: Foundation of practice*. New York, NY: Harper & Row.

Fellenz, R. A., & Conti, G. J. (1989). *Learning and reality: Reflections on trends in adult learning*. (ERIC Document Reproduction Service No. ED315663)

Galotti, K. M. (1998). Valuing connected knowing in the classroom. *The Clearing House, 71*(5), 281-283.

Galotti, K., Clinchy, B., Ainsworth, K., Lavin, B., & Mansfield, A. (1999). A new way of assessing ways of knowing: The Attitudes Toward Thinking and Learning Survey (ATTLS). *Sex Roles, 40*(9/10), 745-766.

Galotti, K., Drebus, D., & Reimer, R. (2001). Ways of knowing as learning styles: Learning MAGIC with a partner. *Sex Roles, 44*(7/9), 419-436.

Gay, L. R., & Airasian, P. (2000). *Educational research: Competencies for analysis and application* (6th ed.). Columbus, OH: Merrill.

Harren, V. A. (1979). A model of career decision making for college students. *Journal of Vocational*

Behavior, 14, 119-133.
Houle, C. O. (1996). *The design of education* (2nd Ed.). San Francisco: Jossey-Bass.
Kachigan, S. K. (1991). *Multivariate statistical analysis: A conceptual introduction* (2nd ed.). New York: Radius Press.
Klecka, W. R. (1980). *Discriminant analysis*. Beverly Hills, CA: Sage Publications.
Knowles, M. S. (1970). *The modern practice of adult education: Andragogy versus pedagogy*. New York: Association Press.
Knowles, M. S. (1975). *Self-directed learners: A guide for learners and teachers*. Chicago: Follett.
Knowles, M. S. (1980). *The modern practice of adult education: From pedagogy to andragogy*. Chicago: Follet.
Lincoln Y. S., & Guba E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.
McClellan, J. A., & Conti, G. J. (2008). Identifying the multiple intelligences of your students. *Journal of Adult Education, 37*(1), pp. 13-32, Insert.
McNeil, R. (2012). Diversity in workplace learning strategies. In C. L. Scott & M. Y. Byrd (Eds.), *Handbook of research on workforce diversity in a global society: Technologies and concepts* (pp. 225-244). Hershey, PA: IGI Global.
Merriam, S. B. (2001). Andragogy and self-directed learning: Pillars of adult learning theory. In S. B. Merriam (Ed.), *The new update on adult learning theory*. New Directions for Adult and Continuing Education, No. 89. San Francisco: Jossey-Bass.
Merriam, S. B., & Caffarella, R. S. (1999). *Learning in adulthood: A comprehensive guide* (2nd ed.). San Francisco: Jossey-Bass.
Norusis, M. J. (1988). *SPSS/PC+ advanced statistics V2.0*. Chicago: SPSS Inc.
Scott, S. G., & Bruce, R.A. (1995). Decision-making style: The development and assessment of a new measure. *Educational and Psychological Measurement, 55*(5), 818-831.
Sternberg, R. J. (1990). Real life vs. academic problem solving. In R. A. Fellenz & G. J. Conti (Eds.), *Intelligence and adult learning*. Bozeman, MT: Center for Adult Learning Research, Montana State University.
Sternberg, R. J., & Grigorenko, E. L. (1997). Are cognitive styles still in style? *American Psychologist, 52*(7), 700-712.
Tough, A. (1971). The adult's learning projects: A fresh approach to theory and practice in adult learning. Toronto: Ontario Institute of Studies in Education.
Tucker R. B. (2001). Innovation: The new core competency. *Strategy and Leadership, 29*(1), 11-14.
Turner, M. D. (2001). *Learning for leadership in Oklahoma higher education: A study of selected university presidents*. Unpublished doctoral dissertation, Oklahoma State University, Stillwater.
U.S. Bureau of the Census. (2006). *Statistical abstract* (123rd ed.). Washington, DC: U.S. Department of Commerce.
Webster's New World Dictionary (1996). New York: World Publishing Company.

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AID: Addressing Individual Differences

Learning Strategy Preferences

Navigators

- Focused learners who chart a course for learning and follow it
- Start learning activity by identifying and narrowing resources
- “Plan the work; work the plan”
- Focus on achieving efficiency and effectiveness in a learning task
- Like order and structure
- Want schedules and deadlines, desire clear learning objectives
- Use many organizational tools such as colored markers, staples, notebooks, and binders.
- Expect and appreciate prompt feedback
- Tend not to like learning in groups unless the group is led by an expert

Problem Solvers

- Love generating alternatives
- Tell stories
- Constantly looking for new, different, and better ways of doing things
- Often you end up learning about things that were not originally part of the original learning
- Appear to procrastinate but really generating more alternatives
- Once interrupted have difficulty in starting it again
- View trial-and-error as a great way to learn new things.
- Prefer to do in own way without rigid directions and supervision of others
- Comfortable dealing with abstract ideas and often use symbols.
- Very descriptive and detailed in answers and likes to use examples to explain ideas

Engagers

- Must feel learning activity is worth doing
- Learning should be FUN!!
- Building relationships with other learners and teachers is important
- Feelings are important in learning
- Joy and delight in new learning accomplishments.
- Get bored quickly if not actively engaged
- Enjoy teachers who are excited about learning and show their human side
- Teachers can get Engager excited about the learning task.
- Working with others is as important as the content learned
- Enjoy working in teams and networking with others
- Other people are a great resource

Ways of Knowing

Let’s Debate

- Debate is a natural approach to gathering information
- Comfortable viewing information with a critical eye and remaining objective when considering other people's view
- Comfortable debating and can formulate their ideas better from this type of interaction
- Can engage in an active exchange with them
- Challenges their ideas and views in order to require them to explain them and help them better formulate their own thoughts
- Provide alternative viewpoints

Let’s Talk

- Comfortable establishing a dialog with instructor to gather and understand information
- They enjoy the interaction and at the same time gain useful information
- Talking helps them better formulate their ideas and solidify their thoughts
- Helps build supportive climate

Let’s Be Open

- Essentially not interested in creating a dialog
- Prefer to have the information presented to them so that they can absorb it without feeling compelled to establish any interaction
- Would rather receive information somewhat passively
- May need some time to absorb the information and formulate their ideas before making known their needs
- Instructor may want to with them to help them develop a written list that they can contemplate before action
- May require time to develop positive relationship

Decision-Making Styles

Reflective Decision Makers

- May need to take some extra time to assimilate all the information before confirming decision
- Will base decision on own abilities, values, interest, and experiences
- Might need help to distill the information so the learner gets an accurate overview of the information and does not fail to consider some aspects of the decision because of their schemas or blind spots.
- Help focus on relevant areas that might otherwise be neglected in evaluation process.

Non-Reflective Decision Makers

- Might require more time with the counselor
- Help learner reflect on some of the details involved with the information to be considered before confirming decision
- Might need help cultivating a sense of adventure and excitement regarding the program
- Assist in guiding them through the cognitive process

Enabled Decision Makers

- May require additional time for the instructor to determine how to work with learner so that learner gets the most out of the program
- Seek to use confidence and trust that the learners often place in instructor to help the learners benefit from the decision-making process
- Might require placing certain responsibilities with the learners and gradually increasing these responsibilities as the learner progresses through the program
- Will need to work with learner on decision-making skills as well as training issues so that they learn to take ownership of their decisions and education