LEARNING STYLES OF MYERS-BRIGGS TYPE INDICATORS

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CERTIFICATE OF APPROVAL

MASTER'S THESIS

This is to certify that the Master's Thesis of

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ABSTRACT

This research study illustrated that personality type influences learning style. The study compared the personalities expressed in Myers-Briggs Type Indicator (MBTI) to Felder and Silverman's (1988) Index of Learning Styles (ILS). Phase one was a combined MBTI and ILS assessment that was administered to 105 participants. To further define learning style, phase two was a follow-up questionnaire administered to 37 participants and was based on Goley's (1982) Learning Pattern (LP) assessment. The research did indicate a correlation between specific dichotomies of MBTI, ILS, and LP.

The Extravert and Introvert dichotomy in MBTI appeared to correlate with the Active and Reflective dichotomy in ILS. Furthermore, a relationship emerged for MBTI Sensing and the ILS Sensory dichotomy, although no connection appeared in MBTI and the ILS Intuitive dichotomies. Moreover, participants who preferred MBTI Sensing dichotomy generally preferred Sequential learning. Participants with Intuitive personality in MBTI appeared to be either Sequential or Global learners. Finally, it was interesting to note that 68% of the participants scored as Visual as opposed to Verbal learners.

The findings indicated personality does affect learning style. Curriculum designers and corporate trainers should consider personality in their training. Although the number of participants was small, the findings were significant enough to indicate that further research could improve training effectiveness and should be conducted.

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Chapter 1

INTRODUCTION

The purpose of this research project was to determine if individuals with different Myers-Briggs Type Indicators (MBTI) have distinct learning styles, and if so, to provide insights to curriculum designers and corporate trainers for training employees. Chapter 1 consisted of a brief literature review, describing the history and theory of MBTI, the theory of learning styles and the Index of Learning (ILS) assessment, and curriculum design in corporate training. Also included in Chapter 1 was the statement of the problem, the purpose of the research, questions that the researcher would answer, and the need for the research. Chapter 1 also provided the assumptions and limitations of this research project and reviewed the research methods used in the study along with a list of steps taken. Lastly, Chapter 1 defined the terminology used in this project.

Literature Review

Myers-Briggs Type Indicators

According to the Center for Application of Psychological Type, MBTI was a validated assessment tool used by over two million individuals a year to determine personality preference (2005). Using Jung's (1990) personality type theory as a basis for their work, Briggs and Myers developed the MBTI assessment for the workplace (Myers

& Myers, 1995, p. xii). MBTI theory had four dichotomies that indicated an individual's personality preferences. These four dichotomies demonstrated how individuals acquired energy, gathered information, made decisions, and timed their decisions. Each area had two opposing poles, and each individual had a personality preference towards one of these extremes (Myers, McCaulley, Quenk, & Hammer, 1998, pp. 23-27).

The MBTI assessment identified an individual's preference for each of the four areas to determine the individual's MBTI type. Therefore, because each person had four personality preferences, sixteen unique personality type combinations emerged. Each personality type made each specific personality preference a little different when it was part of a specific combination. Myers compiled a systematic type table to simplify the process of categorizing the individual personality type codes (Myers & Myers, 1995, pp. 27-29).

Learning Theories and Index of Learning Style

Education theories have continued to evolve. Kolb (1984) expanded the experiential learning theory by incorporating aspects of personality type theory (p. 15). Felder and Silverman (1988) developed the Index of Learning Styles (ILS) as a comprehensive learning style indicator, which used both Kolb's (1984) expanded theory on experiential learning (p. 15) and Jung's (1990) personality type theories (p. 484). ILS also included modality theory. This considered visual, auditory, and kinesthetic learning. Modality learning theory originated with the cognitive theory of information processing (Felder & Spurlin, 2005, p. 103).

Like MBTI, ILS was an assessment-based tool to determine learning type preferences through dichotomies. ILS' four dimensions had polar opposites and a

student's preference towards one extremity or the other could be strong, moderate, or mild (Felder & Spurlin, 2005, p. 103). Individuals gained knowledge through all of the learning styles but had preferences for perception, input, processing, and understanding. Just as the MBTI looked at an individual's whole personality, Felder and Silverman's (1988) ILS attempted to encompass the various dimensions of an individual's learning style (p. 675). The original development of the ILS was for engineering students, but others used ILS to assess business students (Van Zwanenberg, Wilkinson, & Anderson, 2000, p. 366).

Curriculum Design and Corporate Training

According to the *ASTD Reference Guide to Workplace Learning and Performance*, "Training is a short-term learning intervention. It is intended to build on individual knowledge, skills, and attitudes to meet present or future work requirements" (Dubois & Rothwell, 2004, p. 48). Many organizations followed the instructional systems design (ISD) model when developing formal training programs to address employee's knowledge, skills, and attitudes (Dubois & Rothwell, 2004, pp. 49 -50). The problem with the ISD model was that it placed the responsibility for effective outcomes on the curriculum designer or corporate trainer instead of the employees. If the delivery method used in training failed to reach the employees being trained, then the training would be ineffective.

Dubois and Rothwell (2004) wrote that modifying ISD to a more comprehensive design called strategic systems model (SSM) would improve training delivery (p. 52). SSM used personality as part of its curriculum delivery, thus creating a personalized training approach to reach employees participating in corporate training. Furthermore,

Dubois and Rothwell (2004) wrote that training required "changing individual motivation levels and cultivating the development of personality traits. Those will, of course, call for actions different from traditional training methods" (p. 52).

Statement of the Problem

The problem of this study was to determine the types of learning styles associated with MBTI. Research questions answered during this study included:

1. How would the ILS correlate to each of the sixteen MBTI personality preferences?
2. How would each of the four MBTI dichotomies measure against the ILS?
3. How would the proposed findings translate into suggested applications for curriculum designers and corporate trainers?
4. What would the trainers or curriculum designers need to know about the personality make up of the training participants to be able to use the proposed suggested applications?
5. What would the trainers or curriculum designers need to know about the learning style of training participants to be able to use the proposed suggested applications?

Statement of the Purpose

The purpose of this study was to determine if different MBTI had distinct learning styles associated with them and to provide suggestions to curriculum designers and corporate trainers.

Statement of the Need

In the review of the literature, the researcher found evidence that individuals with different MBTI results had different learning styles (Myers et al., 1998, p. 262). However, most of the research "has solely reported patterns of correlations between a

single dichotomy and other variables" (Myers et al., 1998, p. 254). In addition, Goley (1982) established learning preferences, which separated individuals into four personality groups (p. 27). Those four groups originated from Keirsey's four temperaments (Keirsey & Bates, 1984, p. 5). That meant research had not focused on the sixteen personality types in relation to various learning styles. Therefore, reporting a learning style for a single dichotomy might not address the individual's learning style (Myers et al., 1998, p. 254).

Felder and Silverman's (1988) ILS appeared to be a comprehensive and easy assessment that curriculum designers and corporate trainers could use to evaluate student's learning style. Although originally developed only for engineering students, ILS was used for both engineering students (Felder & Spurlin, 2005, p. 103) and business students (Van Zwanenberg et al., 2000, p. 366). Felder and Spurlin (2005) noted that ILS was a comprehensive overview of individual learning styles because it took into account research from experiential learning theories, personality type theories, behaviorist theories, and cognitive learning studies (p. 103). Research had been conducted on MBTI and the Grasha-Reichmann Student Learning Styles Questionnaire and the Kirton Adaptation and Innovation Inventory (Myers et al., 1998, p. 255), but no studies appeared on MBTI that specifically used Felder and Silverman's (1988) ILS.

According to the American Society for Training and Development (2006) *State of the Industry Report*: "leaders who understand how to drive business results in an increasingly competitive, global environment recognize that a better-trained workforce improves performance, and investing in employee learning and development is critical to achieving success" (p. 4). As the need to become competitive increased, so would the

need to have training, which would create an effective workforce to improve business performance.

Kolb (1984) wrote, "To learn is not the special province of a single specialized realm of human functioning such as cognition or perception. It involves the integrated functioning of the total organism – thinking, feeling, perceiving, and behaving" (p. 31). Although the link between personality and learning was clear, corporate trainers had not recognized it as a critical factor in corporate training programs. Dubois and Rothwell (2004) in reviewing corporate training models indicated the importance of using personality in developing corporate training and that traditional training methods would need to change (p. 52). They advised that corporate trainers focus their attention on individual needs by allowing learners to structure their own learning activities in order to process information in an effective manner. Through the SSM, there was an increased focus on learning objectives and performance outcomes (Dubois & Rothwell, 2004, p. 53).

There was a need to continue to understand how personality affects learning, particularly in the corporate training arena. Incorporating practical solutions for designing curricula and training methods that addressed individual personality indicators could improve training effectiveness. Dubois and Rothwell (2004) indicated that curriculum designers and corporate trainers needed to address differences in employee personalities and learning styles in order to conduct training that had effective outcomes (p. 52). The need for greater corporate training effectiveness increased as technology evolved and jobs continued to increase in complexity.

Statement of the Hypothesis

The hypothesis of this study was that individuals with different MBTI had distinctive learning styles.

Statement of Assumptions

The following assumptions were relevant to this study:

1. Individuals had different MBTI preferences.
2. Individuals had different learning styles.
3. MBTI was a validated assessment of personality preferences.
4. ILS was a validated assessment of learning style preferences.
5. LP was a validated assessment of learning style preferences.
6. Participants had adequate knowledge and desire to complete the surveys correctly.
7. Participants assessed were competent in literacy to at least a high school level.
8. Participants assessed were adults with a minimum age of eighteen.
9. Corporate training had specific learning goals to achieve and therefore must have effective training methods.
10. Corporate training was limited in time, equipment, and with facility constraints.
11. Current corporate training did take into account the effect of personality in curriculum design and training methods.
12. Current corporate trainers wanted practical solutions to design curriculum and training methods.

Statement of Limitations

The following limitations were inherent in this study:

1. The assessment results of the MBTI were dependent on the validity of the assessment.

2. The assessment results of the ILS were dependent on the validity of the assessment.
3. The assessment results of the LP were dependent on the validity of the assessment.
4. The participants taking the MBTI, ILS, and LP assessments were limited to the researcher's network and therefore might not be representative of the general population.
5. The participants taking the MBTI, ILS, and LP assessments might not have included enough representation from all sixteen-personality indicators.
6. The follow-up LP assessment was limited to three individuals from each of the MBTI categories assessed through the MBTI and ILS parts of this study.
7. This research would only indicate if there were correlations between the MBTI and ILS assessments. It provided suggestions to curriculum designers and corporate trainers, but it did not determine if curriculum designers or corporate trainers concurred with those suggestions.
8. This research would only indicate if there were correlations between the MBTI and ILS assessments and would not attempt to determine if using learning styles based on MBTI would increase corporate training outcome effectiveness.

Statement of Methodology

The study had two sequential phases and utilized quantitative research methodologies. Phase one research included assessments of MBTI and ILS to determine if the results from the assessment provided the researcher with an indication of a correlation between the MBTI and ILS instruments. Phase two research included an additional LP assessment of three participants for each of the MBTI personality types

who had participated in phase one. This assessment assisted the researcher in further defining learning styles.

Phase One – MBTI and ILS Assessment

For the first phase of the study, the researcher distributed the MBTI and ILS assessments to participants through an electronic format. Recruitment of participants occurred through the researcher's work organization and a network of colleagues at other organizations. The participants received the results of their assessments as a benefit of participating in the study and they were notified of the possibility of participating in an additional questionnaire. The researcher needed enough assessments to have at least three individuals from each of the 16 MBTI personality types. To ensure that the participation remained anonymous, the researcher used a third party assistant to replace the participant's name and email address with a number for the combined MBTI and ILS assessment. The third party acted as the correspondent between the researcher and participants. In addition, the researcher asked three participants in each MBTI personality type, who had scored strongly, to participate in a follow-up questionnaire.

The researcher compiled each participant's validated combined assessment score from the MBTI and ILS into in a computerized tabulation. The researcher analyzed the information generated by comparing the 16 MBTI personality types with their learning styles, comparing the four Keirsey temperaments with their learning styles, and through computer tabulation, using scatter diagrams to illustrate different coefficient correlations of the sixteen personality types and their ILS scores.

Phase Two – Learning Pattern Questionnaire

For the second phase of the study, the researcher adapted Goley's (1982) LP assessment into a self-assessment instrument (pp. 100-102). The researcher found two professional trainers certified in MBTI to review and validate the adjusted self-assessment questions so that they did not deviate significantly from the original LP assessment. Once completed, the researcher gave the LP self-assessment to three participants of each of the MBTI personality types who had participated and scored strongly in phase one. The format of the assessment was a Likert-type questionnaire.

The researcher added the LP assessment results to the computerized tabulation from the first phase. The researcher analyzed the information from phases one and two through a table comparing their Keirsey temperament with the LP score. The intent of the additional assessment was to validate the findings of phase one and to further define the learning styles used for each of the sixteen personality types. The questionnaire also assisted in the development of suggestions for corporate trainers and curriculum designers.

Statement of the Terminology

Active learner (A): An individual who is more comfortable learning through interactive experimentation instead of reflective observation (Felder & Silverman, 1988, p. 678).

Attitude: Extraversion and Introversion in Jung's theory and the term attitude also refers to the Judging-Perceiving dichotomy in MBTI (Myers et al., 1998, p. 389).

Auditory learner: An individual who does well at learning through hearing, discussing, or through the spoken word (Felder & Spurlin, 2005, p. 103).

Auxiliary function: "The function or process that is second in importance and that provides balance (a) between perception and judgment and (b) between extraversion and introversion" (Myers et al., 1998, p. 389).

Behaviorism theories: The premise that behavior can be measured and changed through the application of behavioral ideology (Kolb, 1984, p. 26).

Cognitive theory: Learning theory that focuses on the nature of intelligence and how it develops through interaction with the environment (Kolb, 1984, p. 12).

Competencies: An individual's knowledge, skills, and attitudes. The term is often used in a workplace to describe the needed qualities to perform a job effectively (Dubois & Rothwell, 2004, p. 49).

Concrete content: A teaching method for giving information that consists of facts, figures, and data (Felder & Silverman, 1988, p. 676).

Corporate trainer: Practitioners in the training field, who plan, implement, and evaluate training programs for corporations (Kirkpatrick, 1998).

Corporate training: "[Corporate] training is a short-term learning intervention. It is intended to build on individual knowledge, skills, and attitudes to meet present or future work requirements" (Dubois & Rothwell, 2004, p. 48).

Curriculum: The "syllabi, curriculum guides, course outlines, standards and lists of objectives" for a program of study or training course (Posner, 2004, p.12).

Curriculum designers: A practitioner in education, who analyzes curricula for a program of study or training course (Posner, 2004, p. 23).

Deductive learner: An individual who learns well through a reasoning progression that begins with generalities and then proceeds into specific details (Felder & Silverman, 1988, p. 677).

Dichotomy: "A division into two distinct parts. In type theory, the two parts are assumed to identify opposite domains of mental functioning or attitudes. . . the four dichotomies of the MBTI are Extraverted-Introverted, Sensing-Intuition, Thinking-Feeling, and Judging-Perceiving" (Myers et al., 1998, p. 390).

Dimensions of learning: Used in ILS to describe the different areas of learning, which include perception, input, processing, and understanding (Felder & Silverman, 1988, p. 675).

Dominant function: "The function or process that is assumed to be the first developed, most conscious, and most differentiated, and which become the governing force dominating and unifying one's life" (Myers et al., 1998, p. 390).

Experiential learning theories: Based on the theory that individuals learn based on experience (Kolb, 1984, p. 15).

Extraverted (E): "The attitude (orientation) that identifies the direction and flow of energy to the outer world" (Myers et al., 1998, p. 390).

Feeling (F): "Of the two opposite judging functions, the one by which decisions are made through ordering choices in terms of personal values" (Myers et al., 1998, p. 390).

Four Temperaments: Keirsey's (1984) theory that different personalities could be categorized into four distinct temperaments (Goley, 1982, p. 11).

Global learner (G): An individual who prefers to learn through connections of detailed information to the big picture (Felder & Silverman, 1988, p. 679).

Index of Learning Styles (ILS): A comprehensive learning style indicator developed by Felder and Silverman (1988, p. 675).

Inductive learner: An individual who tends to use a reasoning progression for learning that begins with specific details and then goes to generalities (Felder & Silverman, 1988, p. 677).

Input: In ILS, the manner in which a learner prefers to have information presented through either a verbal or visual means (Felder & Silverman, 1988, p. 676).

Instructional systems design (ISD): Formal training method that incorporates knowledge, skills, and attitudes (KSA) to develop better work performance outcomes (Dubois & Rothwell, 2004, pp. 49-50).

Introverted (I): "The attitude (orientation) that identifies the direction and flow of attention and energy to the inner world" (Myers et al., 1998, p. 390).

Intuitive (N): "Of the two opposite perceiving functions, the one that is concerned with meanings, relationships, pattern, and possibilities" (Myers et al., 1998, p. 391).

Intuitive learner (N): An individual who prefers to learn through theory and principals. They like to solve problems through innovative solutions (Felder & Silverman, 1988, p. 676).

Judging (J): "Preferring the decisiveness and closure that results from dealing with the outer world using one of the judging processes [Thinking or Feeling]" (Quenk, 2000, p. 10).

Kinesthetic learner: An individual who has an ability to learn through taste, touch, and smell (Felder & Silverman, 1988, p. 676).

Knowledge, skills, and attitudes (KSA): Often measured competencies in the workplace to determine skills for employee recruitment, performance, development, and promotion (Dubois & Rothwell, 2004, p. 48).

Learning Patterns (LP): An assessment developed by Goley for teachers to use to determine student personality temperament (Goley, 1982, p. 6).

Modality theory: A learning theory that considers visual, auditory, and kinesthetic means (Felder & Spurlin, 2005, p. 103).

Myers-Briggs Type Indicators (MBTI): An assessment to determine an individual's personality temperament (Myers & Myers, 1995, p. xiii).

Passive participation: From ILS, the teaching style that does not require active participation from students (Felder & Silverman, 1988, p. 678).

Perceiving (P): "Preferring the flexibility and spontaneity that result from dealing with the outer world using one of the perceiving processes [Sensing or Intuitive]" (Quenk, 2000, p. 10).

Perception: From ILS, a learner's view on how to receive information through either intuitive or sensory methods (Felder & Silverman, 1988, p. 676).

Perspective: From ILS, the teaching style that uses sequential or global viewpoints to develop a learner's understanding of the information (Felder & Silverman, 1988, p. 679).

Polar opposites: "Dynamic elements that are opposite to each other in both function and attitude" (Myers et al., 1998, p. 392).

Preference: An individual's favored inclination towards one dichotomy over another dichotomy (Myers et al., 1998, p. 392).

Prescribed work outcomes: Calculated expected results from employees after a corporate training has been conducted (Dubois & Rothwell, 2004, p. 48).

Presentation: From ILS, the teaching style that imparts information through visual or verbal means (Felder & Silverman, 1988, pp. 676-677).

Processing: According to ILS, the way a learner prefers to process information through either an active or reflective manner (Felder & Silverman, 1988, p. 678).

Reflective learner (R): An individual who preferred to learn through examination and manipulation of the information introspectively (Felder & Silverman, 1988, p. 678).

Sensing (S): "The perceiving function that is concerned with experiences available to the senses" (Myers et al., 1998, p. 392).

Sensory perception: A learning dimension in Felder and Silverman's ILS, which considers whether students are sensing learners (Felder & Silverman, 1988, p. 676).

Sensing learner (S): An individual who prefers to learn through concrete facts, figures, data, and experimentation. They like to solve problems through standard methods (Felder & Silverman, 1988, p. 676).

Sequential learner (Q): An individual who prefers to learn in a logical and ordered progression (Felder & Silverman, 1988, p. 679).

Student participation: From ILS, the teaching style that uses either active or passive involvement in the processing of information (Felder & Silverman, 1988, p. 678).

Strategic Systems Model (SSM): Formal training method that incorporates knowledge, skills, and attitudes (KSA) and identifies "how workers must think (including

knowledge and skills acquisition), feel, and act to perform their work successfully" to develop better work performance outcomes (Dubois & Rothwell, 2004, p. 51).

Temperament: An individual's preferred personality, considered "one of four categories hypothesized to be base ways of identifying individual differences in personality" (Myers et al., 1998, p. 393).

Thinking (T): An individual who bases "conclusions on logical analysis with a focus on objectivity and detachment" (Quenk, 2000, p. 10).

Traditional education: A teaching and learning method that relies on lecturing, reading, memorization, and recitation (Posner, 2004, pp.45-46).

Training: A method of teaching that can predict the specific situations that individuals will use what they learn (Posner, 2004, p. 70).

Type: "The four letters used to denote a type [of personality], for example ESTJ or INFJ" (Myers et al., 1998, p. 394).

Type table: "A display of the 16 types in the format developed by Isabel Myers. The type table. . .may be supplemented by a column at the side showing the type groupings" (Myers et al., 1998, p. 394).

Understanding: From ILS, the way a learner understands information through either a sequential thought process or a global view (Felder & Silverman, 1988, p. 679).

Verbal learner (B): In ILS, an individual who learns easily through discussions, lectures, and other spoken methods of teaching (Felder & Silverman, 1988, p. 676).

Visual learner (V): An individual who has an ability to learn through mediums such as: pictures, movies, flowcharts, or other images (Felder & Spurlin, 2005, p. 103).

Chapter 2

REVIEW OF RELATED LITERATURE

The review of literature included three sections. The first section described the history of MBTI, defined the MBTI preferences, and diagramed them in a type table. The second section introduced the history of learning theories, reviewed current learning theories, and defined the learning dimensions in the Index of Learning Styles (ILS). The third section provided an overview of current curriculum design and corporate training methods.

Myers-Briggs Type Indicators

In the early twentieth century, Jung (1990) wrote a book called *Psychological Types*. The text described consistent differences between psychological functions and the affect of an Introverted or Extraverted attitude on these functions (p. 484). Jung (1990) explained individual personality differences based on opposing dichotomies in function and attitude. Function included a person's preferred manner to gather information and the manner in which they made decisions (p. 6). Jung (1990) believed attitude included how an individual gathered energy and played a role in how individuals would use their functions (p. 518).

Myers and Briggs adapted Jung's (1990) theory for the workplace. They developed the MBTI assessment to place individuals in the best jobs for their personality temperament (Myers & Myers, 1995, p. xiii). The established academic community strongly opposed Myers and Briggs, as they were not formally trained psychologists or psychometricians. Undeterred, they continued to collect data and refine the MBTI assessment questions, creating a more accurate testing vehicle (Myers & Myers, 1995, p. xiii).

MBTI theory was composed of four personality dichotomies that indicated the "preferences related to the basic functions our personalities perform throughout life" (Kroeger & Thuesen, 1988, p. 8). Each of the personality types had two opposing poles, and each individual had a preference towards one of these extremes. One function focused on how an individual perceived the world and how they gathered information. An individual with a Sensing (S) personality preferred to have information presented in a literal and chronological manner. As such, they used their five senses to gather information (Kroeger & Thuesen, 1988, pp. 24-25) and to them there was trust in what they knew and what could be verified (Quenk, 2000, p. 6). Meanwhile, a person with an Intuitive (N) personality preferred to translate literal information into possibilities, implications, and associations. Individuals with Intuitive personalities looked at the big picture and often ignored specific details (Kroeger & Thuesen, 1988, pp. 24-25). They could easily progress to what was implied, and to that which may have had potential implications (Quenk, 2000, p. 6).

Another function explained how individuals came to decisions and made judgments. An individual who preferred Thinking (T) judgment tended to use analytical

logic to come to a decision (Kroeger & Thuesen, 1988, p. 28). They liked to keep emotions from clouding their judgment until after making a decision (Quenk, 2000, p. 7). Someone who favored Feeling (F) judgment made subjective decisions based on personally held values (Quenk, 2000, p. 7). They were concerned about the "personal impact of the decision on the people around [them]" (Keirsey & Bates, 1984, p. 22), versus the logic of the decision. These two personality dichotomies were based on functions of gathering information and making decisions and were core to the MBTI theory. Each played a role in an individual's preferred teaching or learning style.

MBTI theory also looked at the two personality dichotomies that indicated the preferred attitude that an individual showed towards these functions. One attitude considered how an individual obtained energy. Individuals with an Extraverted (E) personality preference would receive energy through the outside world of people, things, and action. Individuals with an Introverted (I) personality preference would receive energy through reflection, introspection, and solitude (Quenk, 2000, p. 2). Furthermore, long periods of solitude would drain someone with an Extraverted personality, while constant social interaction could exhaust an individual with an Introverted personality (Kroeger & Thuesen, 1988, p. 32).

The second attitude dichotomy developed by Myers determined whether an individual's dominant function was Perceiving (P) through gathering information or Judging (J) by making decisions (Kroeger & Thuesen, 1988, p. 40). Specifically, this dichotomy showed an individual's attitude towards deadlines, organization, and decisions. A person with a Judging preference preferred their decision-making function to be dominant. They liked to "plan their work and work their plan" (Kroeger &

Thuesen, 1988, p. 37). Organization, meeting deadlines, and coming to quick decisions was their preferred lifestyle. Meanwhile, an individual with a Perceiving personality preferred to continue to collect information, rather than to come to a decision. They enjoyed spontaneity and flexibility in their lives (Kroeger & Thuesen, 1988, p. 38).

Since each person had four personality preferences, sixteen unique personality type codes emerged. Each combination made each specific preference a little different from when it was part of a different combination. To simplify the process of categorizing the individual personality type codes, Myers and Myers (1995) compiled a systematic type table (pp. 27-29) as illustrated in Table 1.

Table 1

Myers-Briggs Type Indicator Systematic Type Table

			Sensing Types		Intuitive Types	
			Thinking	Feeling	Feeling	Thinking
			- ST -	- SF -	- NF -	- NT -
Introvert	Judging	I – J	ISTJ	ISFJ	INFJ	INTJ
Introvert	Perceiving	I – P	ISTP	ISFP	INFP	INTP
Extravert	Perceiving	E – P	ESTP	ESFP	ENFP	ENTP
Extravert	Judging	E – J	ESTJ	ESFJ	ENFJ	ENTJ

The type table listed the sixteen personality types that represented the consistent differences between individual personalities. These combinations showed a distinct personality variation that was unlike any other combination. These personality variations, as described by Rutledge and Kroeger (2005), were:

- ISTJ were considered natural organizers and saw the world in terms of tangible facts (Sensing), which they handled objectively (Thinking) through structure (Judging). Others often considered them aloof and cool (Introverted) (p. 14).
- ISFJ were committed to getting the job done. They were comfortable working quietly (Introverted) in a structured environment (Judging). They had a realistic view of the world (Sensing) and made decisions based on interpersonal factors (Feeling) (p. 15).
- INFJ were considered inspired leaders and followers. They were reflective (Introverted) and saw life as full of possibilities (iNtuitive). They made subjective decisions regarding these possibilities (Feeling), which they implemented in an orderly, scheduled manner (Judging).
- INTJ were independent thinkers, who reflected on ideas (Introverted) and saw the world in endless possibilities (iNtuitive). They translated these ideas and possibilities into objective decisions (Thinking), which they implemented through a structured order (Judging) (p. 17).
- ISTP were known for their ability to get things done. They were often difficult to read (Introverted), lived in the present, and perceived the world in tangible terms (Sensing). They made objective decisions (Thinking) on the spur of the moment (Perceiving) (p. 18)

- ISFP thought that an individual's actions spoke louder than their words, and believed that plans and actions should be thought out in an orderly manner (Introverted). They saw the world as tactile (Sensing) but made subjective decisions (Feeling). They liked to keep their options open (Perceiving) (p. 19), rather than coming to a decision.
- INFP had a gentle personality that enjoyed contemplation (Introverted) integrated with imagination (iNtuitive). They used personal values to make decisions (Feeling), and they enjoyed keeping things flexible (Perceiving) (p. 20).
- INTP liked to resolve problems by reflecting (Introverted) on the possibilities (iNtuitive), which was a basis to make objective decisions (Thinking). At the same time, they were easygoing and adaptable (Perceiving) (p. 21).
- ESTP made the most of the moment by scanning the external environment (Extraverted) and looking at it in a factual and grounded fashion (Sensing). They used this information to make objective decisions (Thinking) for whatever was happening in the immediate moment (Perceiving) (p. 22).
- ESFP enjoyed fun through an outgoing nature (Extraverted) and had a realistic outlook (Sensing). They made subjective decisions (Feeling) in a spontaneous manner (Perceiving), and were very flexible (p. 23).
- ENFP were people oriented who enjoyed social interactions (Extraverted) and were searched for endless possibilities (iNtuitive). They made decisions based on their interpersonal interactions (Feeling), while keeping their options open (Perceiving) (p. 24).

- ENTP enjoyed the external world of people (Extraverted) and the endless possibilities of theoretical connections (iNtuitive). These theoretical connections were objectively filtered (Thinking) but not binding, as they continued to consider new options (Perceiving) (p. 25).
- ESTJ were natural administrators because of their outgoing and direct manner (Extraverted), but they saw the world in a practical and realistic way (Sensing). They used this information to make impersonal, analytical decisions (Thinking) and implemented them in a structured manner (Judging) (p. 26).
- ESFJ were considered trusted friends who interacted with others easily (Extraverted). They paid close attention to personal details (Sensing), and used this information in an interpersonal way (Feeling) through a scheduled order (Judging) (p. 27).
- ENFJ were natural persuaders who were socially oriented (Extraverted), considered the possibilities (iNtuitive), and made subjective decisions (Feeling). They used these attributes in a structured manner (Judging) that made them excellent at networking (p. 28).
- ENTJ were considered natural leaders with people oriented skills (Extraverted). In seeing connections and possibilities (iNtuitive), they were able to analyze them objectively (Thinking) and implemented them in an organized fashion (Judging) (p. 29).

In addition to the sixteen personality types, there was a formula in determining the dominance of functions. The most dominant function was the one an individual had the most confidence in using (Myers et al., 1998, p.253) and was followed in descending

order by the auxiliary, tertiary, and the inferior function. Table 2 illustrates two examples of the formula used to determine whether a function was dominant, auxiliary, tertiary, and inferior functions as well as extraverted or introverted.

Table 2

Two Examples of the Dominant, Auxiliary, Tertiary, and Inferior Functions

Formula	Dominant to Inferior	Extraverted or Introverted
	Dominant – iNtuitive	Introverted
	Auxiliary – Thinking	Extraverted
	Tertiary – Feeling	Extraverted
	Inferior – Sensing	Extraverted
	Dominant – Sensing	Extraverted
	Auxiliary – Feeling	Introverted
	Tertiary – Thinking	Introverted
	Inferior – iNtuitive	Introverted

The first step in determining the dominance of functions was to look at the Judging-Perceiving dichotomy (Myers et al., 1998, p.30). If an individual had a Judging indicator, then their Thinking-Feeling dichotomy would have been extraverted and the Intuitive-Sensing indicator would have been introverted. Likewise, if an individual had a Perceiving indicator, then the process reversed and their Intuitive-Sensing indicator

would have been extraverted and their Thinking-Feeling dichotomy would have been introverted (Quenk, 2000, pp. 14-15).

The second step showed that if the individual had an Extraverted attitude, whichever function was extraverted was dominant. Likewise, if the individual had an Introverted attitude, whichever function was introverted was dominant. The individual's other function was their auxiliary function and the opposite attitude was conversely either extraverted or introverted. The tertiary was the opposite function of the auxiliary and the inferior function was the opposite function of the dominate function. Both the tertiary and inferior had the same attitude as the auxiliary, either extraverted or introverted. This dominance of functions created the significant differences in the sixteen personality indicators (Myers et al., 1998, pp. 30-31

Myers conducted research on type indicator preferences and education. Myers "saw in type theory not only a means for human understanding but also a catalyst for the realization of human potential" (Myers et al., 1998, p.253). Keirsey integrated different personality indicators into what he described as four different temperament styles (Goley, 1982, p.11). Goley (1982) developed the LP assessment using the four temperament styles to help a teacher determine student-learning preferences. The LP assessment would enable teachers to adjust their teaching method to increase student learning (p. 6). Therefore, just as personality may affect how someone learns, it would also affect how someone teaches. Goley (1982) wrote that: "When the teacher begins to view each student as having a certain type of personality and a particular learning pattern he will no longer expect all students to be responsive to the same educational program" (p. 8).

Table 3 illustrates the connections between the MBTI personality types, Keirsey Temperaments, and Goley's LP styles.

Table 3

Connections Between MBTI, Keirsey Temperaments, and LP Styles

MBTI Types	Keisey Temperaments	Goley's LP Styles
ISTJ, ISFJ, ESTJ, ESFJ	SJ	Actual-Routine Learners (ARL)
ISTP, ISFP, ESTP, ESFP	SP	Actual-Spontaneous Learner (ASL)
INTJ, INTP, ENTJ, ENTP	NT	Conceptual-Specific Learner (CSL)
INFJ, INFP, ENFJ, ENFP	NF	Conceptual-Global Learner (CGL)

Learning Theories and Index of Learning Style

During the last century, traditional education evolved tremendously (Kolb, 1984, p. 26), through the experiential learning theories of Dewey (1957, p. 60) and Piaget (1950, p. 6), Tyler's curriculum and instruction principals (Tyler, 1969, p. 1), and the behaviorism theories of Skinner (1974, p. 184). Kolb (1984) enhanced the experiential learning theory by incorporating personality theory (p. 15) developed by Jung (1990). Experiential learning was based on the concept that individuals have lifetime learning through experience because, as Kolb (1984) stated: "Human beings are unique among all living organisms in that their primary adaptive specialization lies. . .in identification with the process of adaptation itself—in the process of learning" (p. 1). Experiential learning

and behavioral theories influenced a change in traditional education by advocating educational objectives using behavioral based learning through experience and not only through memorization and theory (Kliebard, 2004, p. 184).

Changing learning theories have evolved through a desire for educators to improve student learning. These changes encouraged the theory that individuals must have different learning styles. The trend in learning theories continued to be towards student behaviors and personality. As Bacon (2004) wrote, "when course delivery is tailored to the different learning styles of students, student learning is enhanced" (p. 206). Learning style assessment indicators arose to try to identify individual learning style, and therefore enhance a student's learning ability. By focusing on personality and behavior, learning style theory confirmed educators' awareness of the relationship between personality and learning style.

Yet, learning style assessments were difficult to validate. Bacon (2004) compared student achievement to two learning style assessments and found student achievement could not validate either assessment (p. 207). He also noted that student grades and achievement were often affected by other factors. Therefore, achievement was difficult to correlate with learning style. Additional research focused on determining if certain MBTI personalities were more intelligent than other MBTI personalities. Furnham, Moutafi, and Paltiel (2005) investigated the MBTI relationship to mental ability, and their results showed certain correlations (p. 2). Another study analyzed MBTI personality types in college scholars and determined only one unrepresented dichotomy in gifted students (Folger, Kanitz, Knudsen, & McHenry, 2003, p. 602). Sak (2004) did a similar study that found a different representation among gifted adolescents (p. 70). These

research studies resulted in inconsistent findings and demonstrated the difficulty in correlating intelligence with MBTI.

The unique aspect of each personality type allowed researchers to define explicit ways to work with each type. Consequently, there was extensive research on how MBTI personalized learning styles could help educators with student success. Hall and Moseley (2005) conducted a study on the key areas of 13 fixed learning models (p. 249). Using well-known learning model styles based on explicit learning theories, Hall and Moseley categorized and analyzed the styles for specific teaching methodologies (p. 245). Among the learning styles chosen, Hall and Moseley included many assessments that incorporated personality into learning, such as, MBTI, KAI, LSQ, and Kolb's (1984) learning theories. Their research used many learning model styles based primarily on personality differences to help educators understand specific student learning styles and apply teaching techniques to enhance teaching effectiveness.

One popular web-based learning style assessment was Felder and Silverman's (1988) ILS, which has been translated into six different languages, and the ILS website received approximately 100,000 users annually (Genovese, 2004, p.169). Felder and Silverman (1988) utilized experiential learning and personality type theory by developing ILS for engineering students (p. 675). ILS was a learning style assessment that correlated closely with MBTI. In addition, ILS included modality theory, which considered visual, auditory, and kinesthetic learning, as well as the visual and verbal distinctions based on the cognitive theory (Felder & Spurlin, 2005, p. 103). Like MBTI, the 2002 version of ILS had four dimensions of learning with polar opposites, and a student's preference towards one extremity or the other could be strong, moderate or mild (Felder & Spurlin,

2005, p. 103). Table 4 illustrates a breakdown of ILS learning and teaching styles (Felder & Silverman, 1988, p. 675), but excluded the dimension that was later dropped and adjusted the auditory to verbal (Felder, 2002).

Table 4

Felder and Silverman's ILS Dimensions of Learning and Teaching Styles

	Preferred Learning Style		Corresponding Teaching Style	
1.	Sensory (S) Intuitive (N)	} Perception	Concrete Abstract	} Content
2.	Visual (V) Verbal (B)	} Input	Visual Verbal	} Presentation
3.	Active (A) Reflective (R)	} Processing	Active Passive	} Student participation
4.	Sequential (Q) Global (G)	} Understanding	Sequential Global	} Perspective

Although ILS was originally developed for engineering students, it has been used to assess business students (Van Zwanenberg et al., 2000, p. 366), which suggests a

broader application. That said, others believed ILS was not a valid learning style assessment (Genovese, 2004, p. 169) and needed further research to prove its reliability.

Originally, ILS had five different dimensions of learning. However, Felder (2002) dropped the inductive and deductive dimensions and modified auditory preference to verbal preference (preface). The remaining four dimensions have polar opposites, and a student's preference towards one extremity or the other could be strong, moderate, or mild (Felder & Spurlin, 2005, p. 103). Individuals could gain knowledge through all the learning styles but have preferences.

The first learning dimension was perception, which relates to Jung's (1990) personality type theory. A person either perceived information as a Sensory (S) or Intuitive (N) learner. A sensory learner liked concrete facts, figures, data, and experimentation. They preferred to solve problems through standardized and tested methods. They resolved issues slowly and methodically. In contrast, intuitive learners preferred theory and principals as their perception. They liked solving problems through innovation. They were often quick in problem solving and could be somewhat careless. The teaching style for this dimension used concrete content for a sensory learner and abstract theory for an intuitive learner. This dimension originated from Kolb's (1984) experiential learning model. For a teacher to reach both learning styles, it was important to have a mix of concrete facts and abstract theory (Felder & Silverman, 1988, p. 676).

The second learning dimension was how a learner received input of content. People received information through visual, auditory, or kinesthetic means. Felder and Silverman (1988) concentrated on the Visual (V) and Verbal (B) input, as they addressed kinesthetic learning through the learning dimensions of perception and processing of

information. Visual learners remembered pictures, diagrams, and flowcharts. Verbal learners remembered spoken information that they had heard and discussed. To satisfy both learners, lectures needed to include discussion periods, visual materials, and illustrations of complex problems (pp. 676-677).

The third learning dimension was the way an individual preferred to process information. This dimension closely related to Jung's (1990) Extravert and Introvert personality indicators. An Active (A) learner liked to learn through hands-on experience or through discussion of the information. A Reflective (R) learner needed time to think about what they were learning, and they learned best by understanding theory. Lectures did not give the activity needed for an active learner, or time for a reflective learner to contemplate. It was therefore important to have some pauses in lectures for the reflective learner, as well as some discussion or hands-on activity for the active learner (Felder & Silverman, 1988, p. 678).

The fourth learning dimension considered the way a student understands information. According to Felder and Silverman (1988), Sequential (Q) learners preferred a logically, ordered progression. Most curricula followed a sequential order, where students mastered one body of material before proceeding to the next step. Global (G) learners gained knowledge by connecting individual aspects to the big picture rather than learning the individual parts. Global learners needed to understand the whole picture before seeing the individual details. To reach global learners, instructors needed to present the global view before focusing on details. They also needed to use possible scenarios that allowed a global learner to make connections to the material presented (pp.

679-680). Sequential order needed to correlate with the Sensing personality preference, whereas global learners favored the Intuitive personality dichotomy in MBTI.

Jung (1970) wrote, "The achievement of personality means nothing less than the optimum development of the whole individual human being" (p. 171). Just as the MBTI looked at an individual's whole personality, Felder and Silverman's (1988) ILS attempted to encompass the various dimensions of an individual's learning style. Thus, ILS might be considered a comprehensive assessment tool to be utilized both in the development of curricula and by corporate trainers.

Curriculum Design and Corporate Training

Kolb (1984) noted: "For individuals and organizations alike, learning to adapt to new 'rules of the game' is becoming as critical as performing well under the old rules" (p. 2). Corporate training, unlike formal education or employee development, was intended to have a direct and specific impact on employee performance. Corporate requirements and culture designed corporate training. According to the American Society of Trainers and Developers' *ASTD Reference Guide to Workplace Learning and Performance*, "Training is a short-term learning intervention. It is intended to build on individual knowledge, skills, and attitudes to meet present or future work requirements" (Dubois & Rothwell, 2004, p. 48).

In order to achieve prescribed work outcomes, organizations focused on employee competencies in knowledge, skills, and attitudes (KSA) (Kirkpatrick, 1998, p. 6). When developing formal training programs to address KSA, many organizations used the instructional systems design (ISD) model (Dubois & Rothwell, 2004, p. 48). Some of the steps in the ISD model were as follows:

1. Analyze the performance problem and determine if the cause of the problem was a lack of KSA.
2. If the cause of the problem was due to a lack of a KSA, then determine who needs the training, their work requirements, and their work conditions.
3. Conduct a training needs assessment on the targeted employees.
4. Determine instructional objectives of the training.
5. Determine the training materials.
6. Decide on the delivery of the training. This includes classroom and electronic media.
7. Test the training through a pilot session and adjust accordingly.
8. Deliver the training.
9. Assess the training through an evaluation (Dubois & Rothwell, 2004, pp. 49-50)

The problem with the ISD model was that it placed the responsibility for effective outcomes on the curriculum designer or corporate trainer instead of employees. The training would be ineffective if the delivery of the training failed to reach the employees trained. Dubois and Rothwell (2004) noted the need to modify ISD to a more comprehensive design called strategic systems model (SSM). This specifically targeted the trainer to also "identify how workers. . .think (including knowledge and skills acquisition), feel, and act to perform their work successfully" (p. 51).

Through SSM, Dubois and Rothwell (2004) illustrated the importance of personality in corporate training. Furthermore, they wrote that training might require "changing individual motivation levels and cultivating the development of personality traits. Those will, of course, call for actions different from traditional training methods"

(p. 52). The five advantages to focusing attention on training to build individual competence through SSM were:

1. Individualized training met learner's needs.
2. There was an increased focus on learning objectives and expected performance outcomes.
3. Learners could structure their own learning activities and process information in ways that were meaningful.
4. Different learning resources were identified for meeting diverse audience needs.
5. A practical training design for organizations, which placed high strategic value on training to reach organizational success, could be achieved (Dubois and Rothwell, 2004, p. 53)

"Organizations need new ways to renew and revitalize themselves and to forestall obsolescence for the organization and the people in it. . . learning is no longer 'for kids' but a central lifelong task essential for personal development and career success" (Kolb, 1984, p. 3). The purpose of this research project was to determine if different Myers-Briggs Type Indicators (MBTI) had distinct learning styles and, if so, to provide insights to curriculum designers and corporate trainers for training employees. Dubois and Rothwell (2004) indicated that curriculum designers and corporate trainers needed to address differences in employee personalities and learning styles in order to conduct training that would have effective outcomes (p. 52). As technology evolved and jobs increased in complexity, greater corporate training effectiveness needed to be able to meet the challenges of the future.

Chapter 3

METHODOLOGY

The study had two sequential phases and used quantitative research to ascertain if there was a correlation between MBTI and learning styles. Phase one research was through a combined assessment of MBTI and ILS to determine if the results from the assessment provided the researcher with a correlation between MBTI and ILS instruments. Phase two research was through an additional LP assessment given to three participants of the MBTI personality types who had participated in the phase one study. The follow-up assessment assisted the researcher in further defining learning styles.

Phase One – MBTI and ILS Assessment

First, the researcher developed a combined assessment of the MBTI and ILS using web survey software. This allowed the researcher to ensure that the answers from an individual for both assessments remained together. The researcher emailed a link to the web site with the combined assessment to participants. The participants received results of their assessments as a benefit of participating in the study. In addition, the researcher notified the participants beforehand of their possible selection to participate in a follow-up assessment.

In order to remove any bias from the study, the researcher used a third party research assistant to act as a filter between the researcher and participants. All returned assessments went to the third party, who replaced the name and email address with a participant number before sending the assessment on to the researcher. The researcher scored the assessment and sent the individual results back to the third party to forward to participants. This allowed participants to remain anonymous and the researcher's work to remain unbiased.

The researcher conducted a pilot test of the assessments with ten individuals to determine if the delivery method and format of the assessment were effective and necessary adjustments were made. The pilot test included interviews with the ten participants in the pilot to ensure that the instructions, assessment format, and information were clearly defined and easy to undertake. Furthermore, the researcher asked questions about the delivery of the assessment to ensure that the delivery method was effective.

The researcher sent out an email that contained a website link to the phase one assessment to two groups. In addition, the researcher requested that participants forward the email to others who might be interested in finding out more about their personality and learning style. After a month, when there was an insufficient number of participants, the researcher sent out the aforementioned email to an additional two groups, who were also asked to forward the email to others who might be interested in participating.

After each assessment was completed, the researcher scored and returned the results to the participants through the third party assistant. Each participant's MBTI and ILS scores were compiled in a computerized tabulation. The researcher analyzed the

information generated by comparing the distinct MBTI personality types with their learning styles, comparing their Keirsey Temperament with their learning styles, and through computer tabulation using scatter diagrams to illustrate different coefficient correlations between the results of the MBTI and ILS dichotomies.

The distribution and completion of assessments to participants occurred over a time-period of two months. When the phase one assessment closed, 105 individuals had participated, with at least three participants for all but two of the MBTI personality types. There was no participation by either the ESTP or the ISFP personality types. According to Kroeger and Thuesen (1988), ISFP had "little interest in conceptual and abstract and are most responsive to what is pragmatic" (p. 237) and ESTP was "the ultimate realist with the lowest tolerance for unrelated theory" (1988, pp. 247-248). These attributes seemed to explain the lack of interest in participating in a theoretical research study by these two personality types.

Phase Two – Learning Pattern Assessment

For the second phase of the study, the researcher adapted Goley's (1982) LP assessment into a self-assessment instrument. The intent of the questions was to validate the findings of phase one and to further define the learning styles needed for each of the sixteen personality types. Furthermore, the assessment assisted in the development of suggestions for corporate trainers and curriculum designers. The assessment used a Likert-type questionnaire. The questions effectively focused on the information needed to validate the assessment, and provide the additional information needed to define the learning styles.

The researcher then conducted a pilot test of the follow-up questions with ten participants to determine if the delivery method and questions for the follow-up questionnaire were effective and necessary adjustments were made. Participant interviews followed the pilot test on the format and effectiveness of the questions. In addition, the researcher confirmed that the delivery method was successful.

The researcher sent the third party assistant a list of numbers representing three participants from each of the sixteen personality types who had scored strongly in the combined MBTI and ILS assessment. The third party assistant then sent an email, with a website link to the phase two assessment, to the participants on the list. When there was not 100% participation by the second week, the researcher sent a second list of participants to the third party assistant, who then followed the same procedure as described above. The distribution of the assessment was electronic and completed within a period of four weeks. At the close of phase two, 37 individuals had participated, with at least one assessment for each of the MBTI personality types surveyed in phase one. The researcher added the LP assessment results to the computerized tabulation from the first phase. The researcher analyzed the information from phases one and two through a table comparing their Keirsey Temperament with the LP score.

Once all of the assessments were completed, the researcher analyzed the final data of the study to determine if there were correlations between MBTI, Keirsey Temperaments, ILS, and LP. The analysis showed some specific correlations, which allowed the researcher to develop suggestions for curriculum designers and corporate trainers. The researcher compiled the results and suggestions in a descriptive format as part of the final findings of the researcher's thesis.

Chapter 4

RESEACH RESULTS

This research study indicated that there appeared to be some correlation between specific dichotomies of MBTI, ILS, and LP. However, there did not appear to be any direct relationships between individual MBTI types or Keirsey Temperaments with ILS types. While the number of participants in this study was not large enough to draw conclusive results, it suggested that further research could be conducted.

Phase One - Correlation Between MBTI and ILS Types

The purpose of the phase one research was to measure possible correlations between MBTI and ILS types, between Keirsey Temperaments and ILS types, and between each of the individual MBTI and ILS dichotomies. The research showed there appeared to be no direct relationship between MBTI and ILS types, as participants who had the same MBTI type appeared to have multiple ILS types. The analysis showed that each MBTI type had more than one learning style based on the total number of associated ILS types for each MBTI type. As illustrated on Table 5 on page 40, there appeared to be a predominant ILS type for each of the MBTI types based on the frequency of distribution of the ILS dichotomies.

Table 5

Total Number of Participants by MBTI, ILS, and Predominant ILS.

MBTI types (total participants)	Number of different ILS types	Predominant ILS based on frequency of distribution (total participants)
ISTJ (7)	2	R(7), S(7), V(4), Q(7)
ISFJ (4)	2	R(4), S(3), B/V(2), Q(3)
ISTP (3)	3	R(2), S(2), V(2), Q(2)
ISFP (0)	n/a	n/a
INFJ (5)	5	R(3), N(3), V(3), G(3)
INTJ (6)	5	R(5), N(4), V(5), Q(4)
INFP (15)	7	R(11), N(12), V(11), G(12)
INTP (6)	4	R(5), N(5), V(4), G(5)
ESTP (0)	n/a	n/a
ESFP (3)	2	A(3), S(3), B(2), G(3)
ESTJ (6)	4	A(5), S(6), V(4), Q(4)
ESFJ (8)	4	A(5), S(7), V(5), Q(7)
ENFP (11)	6	A(9), N(10), V(9), G(7)
ENTP (7)	5	A(6), N(4), V(4), G(5)
ENFJ (14)	6	A(10), N(13), V(10), Q(8)
ENTJ (9)	5	A(7), N(6), V(7), Q(6)

The finding that there appeared to be a predominant ILS type for each of the MBTI types based on the frequency of distribution of the ILS dichotomies, might indicate a possible correlation between specific dichotomies in MBTI and ILS. Specifically, participants with the MBTI Introverted personality scored predominately as Reflective learners in ILS. Likewise, participants with the MBTI Extraverted personality scored predominately as Active learners in ILS. Furthermore, participants with the MBTI Sensing personality were predominately Sensory learners in ILS, and those participants with the MBTI Intuitive personality were predominately Intuitive learners. Only one of the MBTI personalities scored predominately as a Verbal learner in ILS and another split between Verbal and Visual. All of the other MBTI personalities surveyed scored predominately as Visual learners in ILS. All but one of the surveyed MBTI types with the Judging personality scored predominately as Sequential learners in ILS. Likewise, all but one of the surveyed MBTI types with the Perceiving personality scored predominately as Global learners. It should be noted that there appeared to be no connection between the MBTI Thinking and Feeling dichotomy to any of the ILS dichotomies.

Phase One - Correlation Between Keirsey Temperaments and ILS Types

When comparing Keirsey Temperaments with their associated ILS types, there also appeared to be no direct correlation. Multiple ILS types appeared for each of the four Keirsey Temperaments. However, the SJ Keirsey Temperament appeared to have a different predominant ILS type than the other Keirsey Temperaments. Specifically, this difference was noted in the high frequency of Sensory and Sequential ILS dichotomies. In fact, both the Sensory and Sequential dichotomies had a higher percentage frequency

of distribution for the SJ Keirsey Temperament compared to any of the other three temperaments, as noted in Table 6. This may suggest the individual who showed a preference for the SJ Keirsey Temperament could have specific learning traits, which were different from the other Keirsey Temperaments.

Table 6

Total Number of Participants by Keirsey Temperament, and Predominant ILS

Keirsey Temperament (total participants)	Number of Different ILS types	Predominant ILS based on frequency of distribution (total participants)
NT (28)	14	A/R(14), N(18), V(20), G/Q(14)
NF (45)	12	A(25), N (35), V(33), G(29)
SJ (25)	8	R(13), S(23), V(14), Q(21)
SP (6)	4	A(4), N(5), V(3)/B(3), G(4)

Furthermore, there did appear to be some correlation between specific dichotomies. The Keirsey Temperaments of NF and NT that included the Intuitive dichotomy also had a predominately Intuitive ILS dichotomy. Likewise, the Keirsey Temperament of SJ that included the Sensing dichotomy also appeared predominately Sensory in the ILS dichotomy. On the other hand, the other Keirsey Temperament of SP that also included the Sensing dichotomy had a predominately Intuitive ILS dichotomy.

Phase One - Correlation Between Specific MBTI and ILS Dichotomies

There appeared to be three correlations when comparing the specific dichotomies of the MBTI and ILS, as well as an overall prevalence towards the ILS Visual dichotomy.

MBTI Extravert-Introvert and ILS Active-Reflective Dichotomies

As indicated in Figure 1, there appeared to be a connection between the Extravert and Introvert dichotomy in MBTI and the Active and Reflective dichotomy in ILS. The Active and Reflective dichotomy of the ILS indicated whether individuals preferred to process information through either Active learning or Reflective learning.

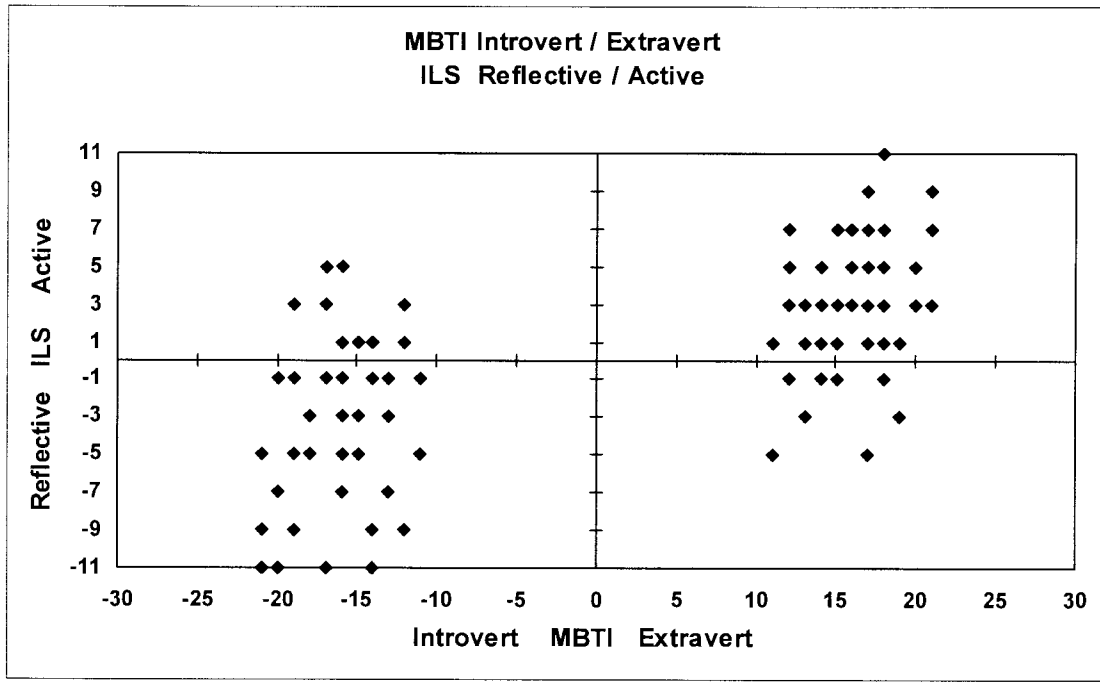

Figure 1

Correlation between MBTI - E and I with ILS - A and R dichotomies.

An Active learner liked to learn through hands-on experience or through discussion of the information. A Reflective learner needed time to think about what they

learned, and they learn best by understanding the theory and principals (Felder & Silverman, 1988, p. 678). Overall, Extraverts preferred Active learning and Introverts generally preferred Reflective learning. There appeared to be no correlation between the MBTI Extravert and Introvert with any of the other three ILS dichotomies.

MBTI Sensing-Intuitive and ILS Sensory-Intuitive Dichotomies

As Figure 2 illustrates, there appears to be some connection between the Sensing and Intuitive dichotomies in MBTI and the Sensory and Intuitive dichotomies in ILS. According to Felder and Silverman (1988), sensory learners liked concrete facts, figures, data, and experimentation. They preferred to solve problems slowly and methodically through standardized tested methods. Intuitive learners preferred theory and principals as their perception. They liked solving problems quickly through novel methods (p. 676).

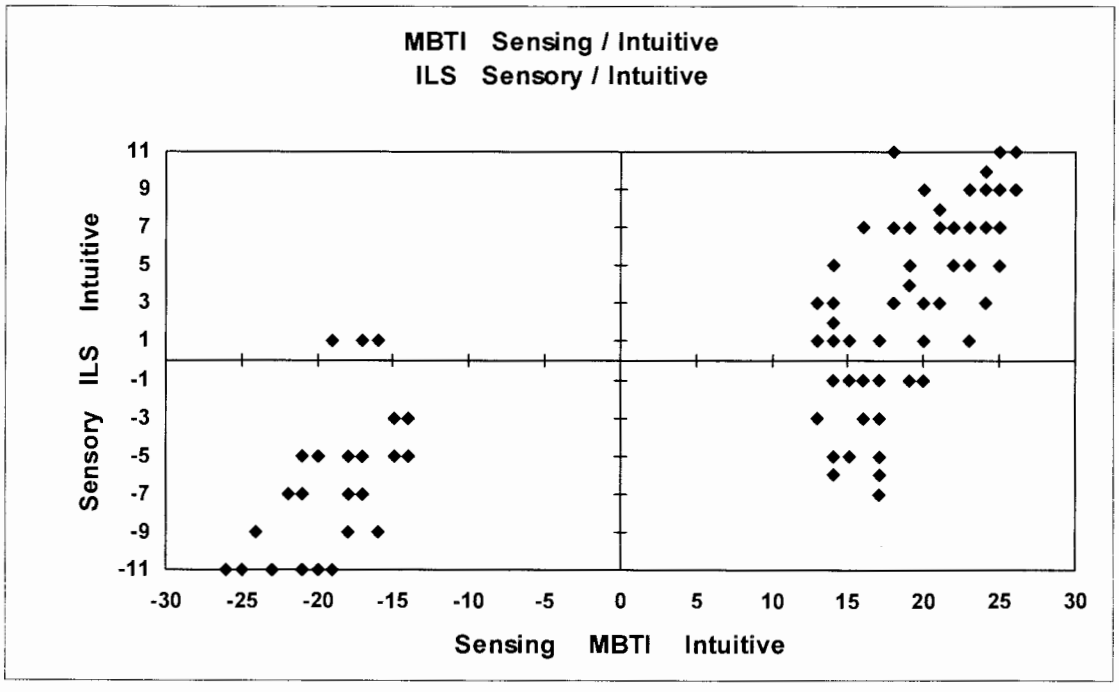

Figure 2

Correlation between MBTI - S and I with ILS - S and I dichotomies.

A stronger correlation appeared between the MBTI Sensing dichotomy and the ILS Sensory dichotomy than between the MBTI and the ILS Intuitive dichotomies. Perhaps the difference between these two MBTI dichotomies was that individuals who preferred to gather information intuitively were also able to gather information through concrete facts, whereas individuals who preferred to gather information through their five senses were less inclined to learn through theory and principals.

MBTI Sensing-Intuitive and ILS Sequential-Global Dichotomies

Felder and Silverman (1988) thought there were two types of learners: Sequential learners, who preferred a logically, ordered progression of information, and Global learners, who needed to understand the whole picture before connecting the individual details (pp. 679-680).

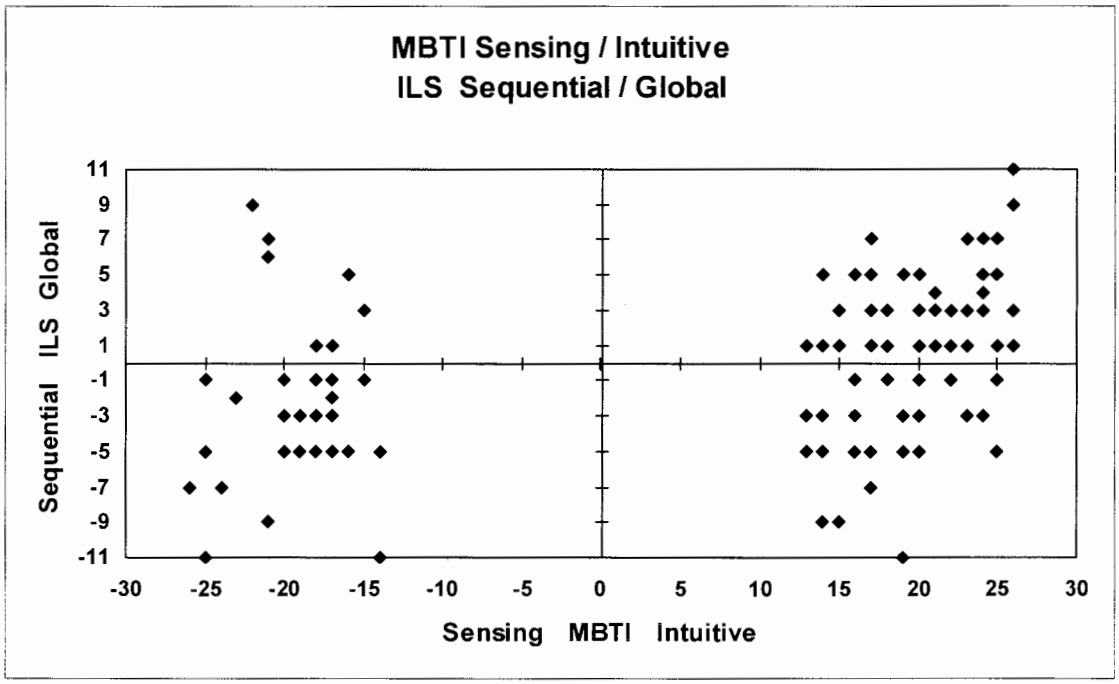

Figure 3

Correlation between MBTI – S with ILS - Q dichotomies

As illustrated in Figure 3 on page 45, participants who preferred the Sensing dichotomy of the MBTI generally preferred Sequential learning. On the other hand, there appeared to be little or no correlation between those participants with an MBTI Intuitive dichotomy preferring Global learning. It appeared that individuals who had an Intuitive personality in MBTI could be either Sequential or Global learners. As most curricula are created using a sequential pattern, Intuitive MBTI personalities may have developed this learning style and consider it their preferred learning style.

Prevalence of the ILS Visual Dichotomy

The Visual and Verbal dichotomy in ILS, which indicated a learner's preference in receiving information, did not appear to have any correlation with any of the MBTI dichotomies. According to Felder and Silverman (1988), people gathered information kinesthetically through visual and verbal input. Visual learners remembered pictures, diagrams, and flowcharts. Verbal learners remembered spoken information that they had heard and discussed (pp. 676-677).

Table 7

Percentage of Participants in Each of the ILS Dichotomies.

Percentage of Participants	ILS Dichotomy	Percentage of Participants
53%	Active / Reflective	47%
46%	Sensory / Intuitive	54%
68%	Visual/ Verbal	32%
50%	Global/Sequential	50%

As noted in Table 7 on page 46, although there was no apparent correlation with any of the MBTI dichotomies, it was interesting to note that 68% of the participants were visual learners and only 32% of the participants were verbal learners. All other learning dichotomies had ratios closer to 50%. This suggested that most individuals, regardless of their MBTI personality type, preferred to learn though pictures, diagrams, and flowcharts.

Phase Two - Correlation Between Keirsey Temperaments and LP Types

Phase two research compared the Keirsey Temperaments with the LP assessment to see if there was a correlation between them. Most individuals who had either the NF or SJ Keirsey Temperament were generally linked with their associated LP learning style. Those individuals who had the NT or SP Keirsey Temperament did not generally show a relationship with their associated LP learning style. Some participants scored equally high in two of the LP learning styles. In Table 8, the preferences of these individuals were divided into the two LP learning styles.

Table 8

Number of Participants by Keirsey Temperament and Their LP Assessment.

		LP Assessment Rating			
Keirsey Temperament	Total Participants	CGL (NF)	CSL (NT)	ARL (SJ)	ASL (SP)
NF	12	10	1	1	0
NT	12	7	2.5	0.5	2
SJ	10	2	1.5	5.5	1
SP	3	1.5	1.5	0	0
Total Participants	37	20.5	6.5	7	3

Overall, it appeared that a majority of the NF, NT, and half of the SP Keirsey Temperaments showed a preference for the CGL (NF) style of learning. Only the SJ Keirsey Temperament appeared to prefer the ARL (SJ) learning style. As previously noted, a similar distinction also appeared in Table 6 on page 42, where the SJ Keirsey Temperament appeared to have a different predominant ILS type compared to the other Keirsey Temperaments. This offers further support to the idea that individuals who showed a preference for the SJ Keirsey Temperament had specific learning traits that were different from the other Keirsey Temperaments.

Chapter 5

DISCUSSION, RECOMMENDATIONS, AND CONCLUSIONS

Introduction

The purpose of this research project was to determine if individuals with different Myers-Briggs Type Indicators (MBTI) had distinct learning styles, and if so, to provide insights to curriculum designers and corporate trainers for training employees. The methodologies used in this research study looked to see if there were any correlations between MBTI, Keirsey Temperaments, ILS, and LP. This research showed that there appeared to be some correlation between specific dichotomies of MBTI, ILS, and LP. By applying these correlations, suggested teaching methodologies could be applied. In addition, while the number of participants in this study was not large enough to draw conclusive results, it suggested that further research could be conducted.

Restatement of the Problem of the Study

The problem of this study was to determine the types of learning styles associated with MBTI. Research questions answered during this study included:

1. How would the ILS correlate to each of the sixteen MBTI personality preferences?
2. How would each of the four MBTI dichotomies measure against the ILS?

3. How would the proposed findings translate into suggested applications for curriculum designers and corporate trainers?
4. What would the trainers or curriculum designers need to know about the personality make up of the training participants to be able to use the proposed suggested applications?
5. What would the trainers or curriculum designers need to know about the learning style of training participants to be able to use the proposed suggested applications?

Restatement of the Purpose of the Study

The purpose of this study was to determine if different MBTI had distinct learning styles associated with them and to provide suggestions to curriculum designers and corporate trainers.

Discussion

Quantitative research validated the hypothesis and confirmed correlation between specific MBTI and ILS dichotomies. There did not appear to be any direct relationship between the 16 distinct MBTI types or the four Keirsey Temperaments with the ILS types. The researcher followed up with an LP assessment to three individuals of each of the participating MBTI to confirm the hypothesis. This follow up assessment helped define learning styles and their application for corporate trainers and curriculum designers. Although the number of participants in this research study was too small to draw any conclusive evidence, it did offer some findings that warrant further exploration.

As illustrated in Figure 1 on page 43, there was a correlation between the MBTI Extravert and Introvert dichotomies and the ILS Active and Reflective learners. Based on this correlation, individuals with an Extravert MBTI dichotomy were Active learners

in ILS. According to Felder and Silverman (1988), Active learners preferred to convert information into knowledge through active experimentation and enjoyed working in groups. They indicated that active experimentation involved discussing, explaining, or testing information (p. 678). Conversely, individuals with an Introvert MBTI dichotomy were Reflective learners in ILS. Reflective learners preferred to convert information into knowledge through reflective observation by "examining and manipulating the information introspectively" and preferred to work by themselves or work with one other person (Felder & Silverman, 1988, p. 678). Since the Keirsey Temperament did not utilize this dichotomy, phase two did not support or contradict this correlation. This finding suggested that trainers should use active experimentation for Extraverts to use in a group, but also allow Introverts the time and opportunity to reflect.

The second correlation found was that the MBTI Sensing dichotomy showed a relationship between the ILS Sensory learner and the ARL (SJ) learning style. As illustrated in Figure 2 on page 44, individuals with a Sensing MBTI dichotomy were Sensory learners in ILS. According to Felder and Silverman (1988), Sensory learners preferred "facts, data, and experimentation." Sensory learners tended to be slow and methodical learners, enjoyed details but not complications, and were good at memorizing facts (p. 676). Table 8 on page 47 showed that individuals with the Keirsey SJ Temperament generally had an ARL (SJ) LP learning style. According to Goley (1982), ARL (SJ) learners needed structure with lessons that were "presented sequentially and in increments that make sense" and enjoyed "completing workbooks, programmed learning materials, worksheets and the like" (p. 66).

Another correlation was a connection between the MBTI Intuitive dichotomy, the ILS Intuitive learner, and the CGL (NF) learning style. As illustrated in Figure 3 on page 45, most participants with the MBTI Intuitive dichotomy were also ILS Intuitive learners, although some scored as Sensory learners. According to Felder and Silverman (1988), those who preferred to learn intuitively preferred principals and theory. Intuitive learners liked innovation, were bored by details, and enjoyed complications. Working quickly, Intuitive learners were sometimes careless in their work (p. 676). Table 8 on page 47 indicated that both the Keirsey NF and NT Temperaments preferred to learn through the CGL (NF) learning style. According to Goley (1982), the CGL (NF) learning style liked emotionally moving presentations and wanted the trainer to be enthusiastic. They enjoyed small group discussions that provided an opportunity for personal interaction (p. 68). They also wanted to gain the skills and knowledge needed to have a meaningful life and learn how to inspire others to be more caring and productive (p. 70).

The last correlation appeared between the MBTI Sensing dichotomy and the ILS Sequential learner, as noted in Figure 3 on page 45. Felder and Silverman (1988) wrote that students who learned sequentially preferred to master material in a steady, progressive method. Sequential learners solved problems by following a linear reason process and generally were "strong in convergent thinking and analysis." Most curricula and course materials were developed for sequential learners (p. 679). As illustrated in Figure 3 on page 45, there appeared to be no connection between the MBTI Intuitive dichotomy and the ILS Global learner. Felder and Silverman (1988) indicated that teaching had traditionally leaned towards Sequential learning, and this could explain why

many participants with the MBTI Intuitive dichotomy preferred ILS Sequential learning. Global learners may have become skilled at how to learn sequentially (p. 679).

According to Table 7 on page 46, there appeared to be more Visual learners compared to Verbal learners in the ILS assessment. Felder and Silverman (1988) indicated that "visual learners remember best what they see: picture, diagrams, flow charts, time lines, films, demonstrations" and will often times forget what was said to them (p. 676). This finding suggested that trainers should include visual materials to illustrate key points or complex materials to encourage learning (Felder and Silverman, 1988, p. 677).

The research study indicated that corporate trainers or curriculum designers would not need to know the personality or learning style of the training participants to use the proposed suggested applications. In addition, they would not need to be certified as a MBTI administrator. However, corporate trainers or curriculum designers should know the behaviors of different personalities and the different learning styles. This would enable them to use different learning methodologies, a variety of resources for diverse learning styles, and encourage participants to individualize their learning.

Recommendations for Further Study

The findings of this study suggested that further research is warranted. The number of participants in this study was not large enough to draw conclusive results and more participation would provide a broader review of the correlation between certain dichotomies in the MBTI and ILS. Furthermore, this research study did not take into account gender, age, or cultural background that might have affected the research.

In addition, the LP assessment did not show any differences between the MBTI Thinking – Feeling dichotomy. Likewise the MBTI assessment did not show any correlation with the LP Visual – Verbal dichotomy. In fact, a trend appeared that adult learner's preferred information presented visually. It is possible that another learning style assessment would show results that were more conclusive. Moreover, it may be worthwhile to develop a learning style assessment that used MBTI as a basis.

Finally, if this research study were expanded, it would prove interesting to conduct a series of interviews with curriculum designers and corporate trainers on the results, with the purpose of identifying specific training techniques to address the findings of this research. This would offer some useful practices that could be applied to corporate training.

Conclusion

The findings indicated personality does affect learning style. As such, trainers should be cognizant of each student's personality type and use a mixture of all learning styles in corporate training methodologies to increase employee learning effectiveness. Although the number of participants was small, the findings are significant enough to indicate that further research could improve training effectiveness and should be conducted.

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