A Study in Learning Styles of Indian IT Professionals using Kolb's Experiential Learning Theory

Venkata NK Madireddy,

Research Scholar, Sri Sri University, Orissa
venkat.madireddy@hotmail.com

Abstract — **This research is an examination of learning styles in IT Service Management courses using David Kolb's experiential learning theory. The primary goal is to understand the learning preferences of working professionals in IT industry. Secondly, this is an effort to provide IT Management Trainers with additional insight on how to better design instructional strategies for the classroom. With a lack of learning style research (using Kolb's experiential learning theory) within the IT Management certification industry in India the finding may be useful to IT Management Teachers interested in designing a variety of instructional strategies and training aids to enhance the learning experience for the IT professionals in their continuing education. This study was successful in understanding how IT professionals think and learn. A close observation reveals that IT professionals were divided along the Concrete Experience and Abstract Conceptualization. This findings offer a significant implication for those in the field of adult learning.**

Keywords— **Learning Styles, Experiential Learning Theory, Kolb's Learning Style Inventory, Adult Learning, Active Learning**

I. INTRODUCTION

One of the most sought after certification training courses by IT professionals in India is ITIL. ITIL is the acronym of Information Technology Infrastructure Library. *ITIL is set of books that provide guidance on management of IT.* In layman's terms ITIL is a process approach to manage Information Technology Infrastructure.It provides a practical framework for identifying, planning, delivering and supporting IT services to the business.IT Service Management (ITSM/ITIL) training is delivered by various training organizations in India. Most of these courses are standard courses delivered with a set of teaching aids like power point slides, case analysis. Instructional Strategies are given least importance during the delivery of these courses. This leads to poor learning outcomes in ITIL courses. This research aims to understand the learning styles of IT professionals and provide the inputs required to design and develop the appropriate teaching aids and learning materials for ITIL courses.

Pallapu (as cited in Cuthbert 2005) stated that understanding the learning style of learner is important for teacher to make sure that the teacher adjusts his/her teaching strategies. There is no doubt that appropriate teaching strategies result in better learning outcomes. Pallapu (as cited in Baldwin &Sabry, 2003) indicated that learning can be effective if behaviour patterns of learners can be understood and incorporated in to the collaborative learning systems.

There is a need to examine the learning style difference of IT professionals in India as no research was done in this area. Understanding of learning styles of Indian IT professionals will aid the instructional designers, Trainers, Facilitators to develop courses that address the individual learning needs. Pallapu (as cited in Baldwin and Sabry, 2003) stated that "research continues to build a strong case for the impact of learning styles in understanding how learns learn and thus how to support them in their task". Pallapu (as cited in Kolb, 1984; Gardner, 1985; Slavin, 2000; Woolfolk, 1998) stated that learner acquire skills better when the content is presented to them in a style that is suits to their preference and this has been agreed by some researchers. Pallapu (as cited in Felder and Silverman, 1998) sated that if instructors include few activities in instruction then it will meet the varying learning styles of many students in the class.

Kolb (as cited in Kolb 1984) stated that Experiential learning theory is the basis of pioneering work some 20th century scholars who gave experience a major importance to develop human learning theories and they are John Dewey, Kurt Lewin, Jean Piaget, William James, Carl Jung, Paulo Freire, Carl Rogers and others and to derive a model of experiential learning process.

II. RELATED LITERATURE REVIEW
David Kolbs Experiential Learning Model

Experiential learning Theory says that learners use their prior experience in the learning process and also the experience arising out of learner's participation in the activities implemented by teachers. The significance of experiential learning cannot be ignored in adult education. Laila Rizk (2011) claim that 'According to the experiential learning theory, learning is "the process whereby knowledge is created through the transformation of experience'. Kolb (1984, p41) claims learning styles as 'the process whereby knowledge is created through the transformation of experience'.
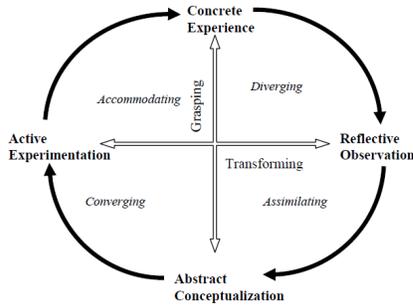
Figure 1 :David Kolb's Experiential Learning Cycle

The four learning styles conceptualised by David A Kolb in his Experiential Learning cycle are:

Diverging. The Diverging style's dominant learning abilities are Concrete Experience (CE) and Reflective Observation (RO). People with this learning style are best at viewing concrete situations from many different points of view. It is labeled "Diverging" because a person with it performs better in situations that call for generation of ideas, such as a "brainstorming" session. People with a Diverging learning style have broad cultural interests and like to gather information. Research shows that they are interested in people, tend to be imaginative and emotional, have broad cultural interests, and tend to specialize in the arts. In formal learning situations, people with the Diverging style prefer to work in groups, listening with an open mind and receiving personalized feedback.

Assimilating. The Assimilating style's dominant learning abilities are Abstract Conceptualization (AC) and Reflective Observation (RO). People with this learning style are best at understanding a wide range of information and putting into concise, logical form. Individuals with an Assimilating style are less focused on people and more interested in ideas and abstract concepts. Generally, people with this style find it more important that a theory have logical soundness than practical value. The Assimilating learning style is important for effectiveness in information and science careers. In formal learning situations, people with this style prefer readings, lectures, exploring analytical models, and having time to think things through.

Converging. The Converging style's dominant learning abilities are Abstract Conceptualization (AC) and Active Experimentation (AE). People with this learning style are best at finding practical uses for ideas and theories. They have the ability to solve problems and make decisions based on finding solutions to questions or problems. Individuals with a Converging learning style prefer to deal with technical tasks and problems rather than with social issues and interpersonal issues. These learning skills are important for effectiveness in specialist and technology careers. In formal learning situations, people with this style prefer to experiment with new ideas, simulations, laboratory assignments, and practical applications.

Accommodating. The Accommodating style's dominant learning abilities are Concrete Experience (CE) and Active Experimentation (AE). People with this learning style have the ability to learn from primarily "hand-on" experience. They enjoy carrying out plans and involving themselves in

new and challenging experiences. Their tendency may be to act on "gut" feelings rather than on logical analysis. In solving problems, individuals with an Accommodating learning style rely more heavily on people for information than on their own technical analysis. This learning style is important for effectiveness in action-oriented careers such as marketing or sales. In formal learning situations, people with the Accommodating learning style prefer to work with others to get assignments done, to set goals, to do field work, and to test out different approaches to completing a project.

Concrete Experiences	Reflective Observations
Small Group Discussions	Problem Solving
Practical Exercises	Discussion Groups
Role Plays	Observations
Personal Stories	Brainstorming
Active Experimentation	**Abstract Conceptualization**
Case Studies	Lectures
Homework	Analogies
Project work	Questioning
Fieldwork	Papers

Figure 2: Instructional strategies supporting the learning style

Mary McCarthy (2010) stated the having a comprehension of learning styles helps the Facilitator to plan the learning materials in such a way that participants can go through the entire learning cycle. Trainer and Facilitators of Adult Education should create learning activities that can address all types of learning styles.

Kolb (1984) stated that experiential learning theory is fundamentally different from the traditional behaviourist views or the inherent theories of learning that are underpinned by the rational idealist epistemology. Therefore he sated that from this perspective emerged the varied and different suggestions for organizing education which fosters proper relation between learning, work and other activities of life. This perspective is called "experiential" learning perspective for two good reasons. First is to relate this to the work of Dewey, Lewin and Piaget and the second reason is to emphasise the importance of experience to learning. Kolb (1984) sates that both the above emphasise the difference of experiential learning from the cognitive learning that usually focus more on knowledge acquisition and recall of concepts and from behavourial learning which does not agree on the subjective experience of learner in the learning process.

Kolb (1984) also states that the aim of his work is not to bring a third alternative to learning theories but suggest that through experiential learning an integrated and holistic learning perspective with a combination of experience, cognition and behaviour can be achieved.Kolbs Model originates from the learning models of Dewey and Piaget.

Learning Style Assessment:
David A Kolb developed the Learning style inventory (LSI) in 1971 to assess individual learning styles. The tool helps in understanding the learning process through experience. It also helps in understanding an individual's approach to learning. Alick Y Kolb and David A Kolb ((2005) stated majority of the research on Experiential Learning theory

focussed on the concept of learning style using Learning style inventory (LSI) to assess individual learning style. Alick Y Kolb and David A Kolb ((2005) claimed (as quoted in Kolb 1984) following summary of the four basis learning styles is based on research and clinical observation of the patterns of LSI scores.

III. RESEARCH METHODOLOGY AND SAMPLE SIZE
The methodology used in this study was purposive sampling. This methodology was appropriate for this study as researcher's intent was to study the learning style of Indian IT Professionals in ITIL Certification courses. Author was interested to know the learning styles of IT professionals contributes to the Instructional Design of Professional development courses like ITIL. In this study the Experiential Learning cycle theory as proposed by Kolb (1984) was used as the theoretical framework guiding this study. The experiment in this study involves the distribution of the Kolb learning Style Inventory 3.1. This study used the David Kolbs Learning Style Inventory 3.1 survey developed by David Kolb as part of its research design.

A sample of 81 participants from four batches of ITIL Foundation certification courses conducted in the year 2014 are the sample of this study. Purposive sampling was used as the participants have to meet certain criteria like working in IT services and an doing an ITIL course. The gender break down is 86.41% male and 13.58% female.

Techniques used for data collection: David Kolb's Learning Style Inventory (LSI)

The Kolb LSI was the instrument used to determine learning style. It consists of 12 incomplete sentences where participants are asked to rank order four possible choices to end the sentence. From this information their learning mode was determined dependant on their score on each of the dimensions. These dimensions were then grouped together to determine an individual's learning style. The Kolb LSI was chosen for ease of use, short number of questions and because of its relationship to the theory of experiential learning which measures learning as a cycle. The experiential learning cycle as presented by Kolb (1984) offers an explanation of the interrelation of a number of learning strategies employed by individuals and suggests that educators can facilitate learning around the cycle to optimize growth towards independent learning.

David Kolbs Learning style inventory (LSI) was administered to the participants in the classroom. All participants were explained the method of completing the LSI and also the Demographic information. Participant demographics like Age, Education Qualification, Degree (Technical and Non-Technical), Native Language, Gender, Specialization (Computer and Non-Computers) taken along with the LSI data. Kolbs LSI examines differences in individual learning styles, used a forced-choice method by which to measure an individual learning orientation towards four learning modes: Concrete experience (CE), Abstract conceptualization (AC), Reflective observation (RO) and Active experimentation (AE). The LSI is composed of 12 questions, each of which asks someone to complete a sentence by ranking four choices that correspond to four

learning modes encompassed by Experiential Learning Theory. For example the first question is LSI is: "When I learn" and four choices to be ranked are: "I like to deal with my feelings; I like to think about ideas; I like to be doing things; and I like to watch and listen." These four items reflect in turn, the CE mode, the AC mode, the AE mode, and the RO Mode of learning. The sum of a number ranked from '4=you learn most' to '1=you learn least' on each four modes represents the degree of how much a person relies on each of the four different modes of learning.

Data analysis and Statistical Methods

All statistical analyses were performed using the R software (version 2.12). Means with standard deviations were reported for continuous variables. Simple and multiple linear regression model was used to assess the relationship between the learning styles in ITIL courses (CE, RO, AC, AE, AC-CE, AE-RO primary outcome measures) and IT professionals with regard to Age Group, Gender, Education Qualification, Technical, Medium, Specialization, Language and Experience variables.

IV. INTERPRETATION OF DATA AND FINDINGS
This chapter offers the analysis and interpretation of the data. In the first part percentage of respondents based on learning styles is tabled. The second part is the plotting of the percentile scores on the Grid and interpretation of the plotted grid.

Category	Frequency	Percentage	Cumulative
Diverging	18.00	22.22	22.22
Accommodating	21.00	25.93	48.15
Converging	20.00	24.69	72.84
Assimilating	22.00	27.16	100.00

TABLE 1: RESPONDENTS BASED ON LEARNING STYLES

Interpretation of Plotting of Grids (Appendix A)

Interpretation of Grid 5:
Current samples mean combination scores based on Gender were plotted on the Kolbs Learning style grid. Plotted results in Grid 5 (Provided in Appendix 2) represented that Males preferred Assimilating Learning Style and Females preferred Diverging Learning Style. A closer look indicated that Females are closer to the middle which is an indication that they are more balanced in their learning style preferences. It is important to note that there is no better learning style. Being balanced is not better. Female participants are active learners and prefer small group discussions and self-paced activities and projects as their preferred learning style. For male participants deductive reasoning and thinking is the preferred learning techniques for knowledge acquisition.

Interpretation of Grid 6:
Mean combination scores based on Native Language plotted in Grid 6 indicated that North Indian and South Indian language speaking participants preferred the Assimilating Learning style. This indicated that the learning methods that can be adopted in classroom for North and South Indian language speaking participants are case studies, lectures and

analogies. East and West Indian Native language speakers prefer Diverging learning styles. The learning methods and tools that can adopted in classroom for East and West Indian Native Language speaking participants are demonstration, brainstorming and collaborative learning. Data points of North, South and West Language speaking participants fall in the shaded area of Assimilating and Diverging, this means that these participants learning style is characterised by combination of Assimilating and Diverging learning style types.

Interpretation of Grid 7:
Mean combination scores based on Technical and Non-Technical qualification plotted in Grid 7 indicated that Technical Education participants preferred Assimilating Learning style and Non-Technical education participants preferred Diverging Learning style. Here there could be a variety of learning methods and tools such as case studies, demonstrations, videos, analogies, lectures, real life examples which can be used for Assimilators and Divergers. Since the data point of Non-Technical participants falls slightly at the far corner of the grid, the Non-technical educated participants tend to rely heavily on that particular learning style.

Interpretation of Grid 8:
Mean combination scores based on Computers and Non-Computers specialization in education Grid 8 indicated that Participants with Computers and Information Technology specialization prefer Assimilating Learning style and participants with Non-Computers specialization prefer Diverging Learning Style. The Learning styles of these two Education specializations is characterised by Assimilating and Diverging learning style types.

V. CONCLUSION AND IMPLICATIONS FOR PRACTICE

This is an effort to provide the IT Management training professionals to get an insight into learning styles of Indian IT Professionals. The LSI revealed that all learning styles were represented with the sample. This has been the first attempt to understand learning styles of IT Professionals in India using David Kolb's experiential learning theory. The scores indicated in the LSI correspond to the learning styles. The complete learner will use all the four stages of the learning cycle for advanced learning. Learner can begin or start anywhere in the learning cycle. For complete and full learning the learner should pass through all stage of the cycle. Using the four stages the facilitator should be able to direct and help the students in ear part of the cycle which will make them deepen the level of understanding of the subject.

Suggestions for further research

This study suggest implications for adult learning, particularly in the area of instructional design for developing appropriate teaching aid and methods for effective training in IT certification courses. A bigger and wider sample of participants from IT Management certification courses will offer a better picture of the Indian IT Professionals learning style. The relationship between the

specialization, native language, educational qualification and learning styles will definitely be an important area to investigate further.

Going beyond ITIL courses, covering Project Management, Six Sigma, Agile, Information Security courses will provide more detailed results than those found in the current study. A comparison study between IT Professionals with experience and Higher Education Students will give a better idea about the perception of adult learner about industry experience as a prerequisite for learning in skill development courses.

For further research it would also be wise to include some other factors influencing the learning styles in the questionnaire such as subject and course level (advanced or basic course)

It would also be very useful if this research is done in for Distance Learning Students, E-Learning students and Blended Learning students of such Professional IT Management courses in India. The research can also be extended to other geographical regions such as Asia Pacific and Middle East.

Different studies can also be designed where instructor can design and deliver a class with learning style matching to one section of students and then investigate whether the students with matching learning style has better takeaways compared to students with non-matching learning style.

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APPENDIX A