


Identification of Predictor Variables Influencing Learning Style Preferences of Knowledge Workers in Indian IT Service Companies


**BRIEF PROFILE OF THE AUTHORS**

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Identification of Predictor Variables Influencing Learning Style Preferences of Knowledge Workers in Indian IT Service Companies

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Learning and development of employees is an essential process in an organization. This is fulfilled by training interventions, which can ensure better learnability of employees. This makes it essential to ensure that an employee is trained in an environment cohesive to individuals’ learning style preferences. Indian Information Technology (IT) service companies devise learning and development programs to train large number of employees. But, the elements ensuring learnability of one employee may be significantly different from that of another employee. If organizations have to achieve excellence in learning, they need to assess learning styles of employees before providing them the training. Therefore, this research work attempts to assess learning styles of knowledge workers in Indian IT service companies. In this study, Peter Honey and Alan Mumford’s Learning Styles Questionnaire (LSQ) was used to conduct primary data collection through online platform. Thereafter, Multinomial Logistic Regression was used to identify significant predictor variables influencing learning style preferences of knowledge workers in Indian IT service companies. Practical implications of this research work can help learning and development managers in Indian IT service companies to understand learning styles preferences of knowledge workers in order to improve learnability.

Keywords: Learning styles, Andragogy, Experiential Learning Theory, Knowledge worker, Learning Styles Questionnaire, IT Company.

INTRODUCTION

Globalization has brought whirlwind changes in the conduction of business. In such a whirlpool, organizations need to adapt quickly to new technologies producing exponential effects, and the Indian software industry is not an exception. With a whopping revenue of US$ 143 billion, the Indian software industry is a darling sector to investors, which involves US$ 110 billion worth exports, which is approximately 49% of total Indian services export. This industry is also a regular breadwinner to 3.9 million people working under direct employment (NASSCOM, 2017). India is strengthening its position as a global resource centre for IT and ITeS services by providing digital transformation solutions to clients in North America and Europe. In the domestic market, e-Commerce is attracting investment from venture capitalist from all across the world. This is providing the base to Indian e-Commerce firms to invest in building technological platforms. The software service business provided by Indian e-Commerce firms is increasing with 33 per cent year on year growth. The IT sector contributes more than 7.7 per cent of the Indian Gross Domestic Product (GDP) (NASSCOM, 2017). It is also the largest private sector employer and leading global sourcing destination. With 1.3 million women working in the IT sector, it is
one of the biggest promoters of gender diversity. Due to its potential, the IT sector receives continuous investment from venture capitalists, boosting entrepreneurship in India (NASSCOM, 2016).

In this agile world of business, human capital is the cornerstone of an organization. Often, it is the proficiency of human capital, which can make or break the future of an organization. Nevertheless, the proficiency of human capital is not constant. Technological advancements render skills acquired by humans obsolete. Therefore, it is essential for an organization to train their employees by promoting a conducive learning environment (Lancaster & Di Milia, 2015). It is the responsibility of the human resource (HR) department of an organization to facilitate a learning environment that encourages employees not only to learn but also to develop cutting-edge skill sets (Pokharel, & Choi, 2015). The HR department provides training and development programs to encourage learning attitude among the workforce. However, learning capability of an individual is highly influenced by their learning style (Chen &Macredie, 2001). Learning styles vary depending on inclination of individuals to learn the same concepts (Coffield, Moseley, Hall, & Ecclestone, 2004).

It is the capability of employees to embrace learning in their practice, which decides the trajectory of growth of an organization. Investment in strategizing training and development plays a vital role in achieving organizational goals (Simpson, Schraeder, & Borowski, 2015). Therefore, in order to enhance the outcome of training and development programs, it is essential to assess learning styles of the participating employees. Leaders of an organization must encourage HR department to provide effective training to employees (Amitay, Popper, & Lipshtiz, 2005).

LITERATURE REVIEW

Till the end of 1980's, most of the research work involved theory building by underpinning constructs in learning styles of an individual. During the span of 1981-2000, learning styles research progressed on empirical studies which were focused on learning styles of graduate and post-graduate students. With the dawn of the 21st century, awareness came regarding learning styles of employees working in organizations. Most of the work done on learning styles of employees is from UK and USA (James-Gordon & Bal, 2001; Wyrick, 2003). Looking at differences in how people learn, many researchers have even used personality type as an indicator to assess learning styles (Sirman, 2002). It was observed that with an understanding of one’s personality type, it is possible to predict preference towards particular learning styles. (Pittenger, 1993). Especially, researchers have used Myers-Briggs Type Indicator (MBTI) extensively to predict the learning styles of an individual. Therefore, it is understood that the phenomenon of personality type indicator and learning styles is coherently related (Ashraf, Fendler, &Shrikhande, 2014; Seiver, Haddad, & Do, 2014). Table 1 has key findings from highly cited empirical studies on learning styles of students in higher education settings or employees in organizations. In the Indian context, there are few studies of learning styles of students in higher education settings (Manikutty, Anuradha, &Hansen, 2007; Sharma, 2009).

Wyrick (2003) used Kolb’s LSI to assess learning styles of industrial engineering students and industrial management students to understand most preferred learning style. It was a longitudinal study over a period of 1992-2000 by taking small samples from American and Swedish students in each assessment. Wyrick found that both engineering and industrial management students tend to have converger as their preferred learning styles. Penger & Tekavčić (2009) used Dunn and
Dunn’s LSI and Honey and Mumford’s (LSQ) to compare the results of two instruments over learning styles of students in higher education at University of Ljubljana. The study found there is no correlation between factors of two instruments viz. Dunn and Dunn’s LSI and Honey and Mumford’s LSI and therefore they are independent of each other. The study concludes that it is necessary for students to understand their learning style preferences in order to adapt themselves for lifelong learning.

### Table 1: Key Findings from Empirical Studies

<table>
<thead>
<tr>
<th>Authors</th>
<th>Purpose</th>
<th>Sample Size (N)</th>
<th>Model/Instrument</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>McKee, Mock &amp; Ruud (1992)</td>
<td>To perform a comparative study on learning styles of Norwegian accounting student with their counterparts in the USA.</td>
<td>350</td>
<td>Keib’s LSI</td>
<td>Dominating learning styles of Norwegian accounting students is assimilator while that of their counterparts in USA, is converger.</td>
</tr>
<tr>
<td>Booth &amp; Winzar (1993)</td>
<td>To find evidence of Myers-Briggs personality type bias for accounting students in Australian Universities.</td>
<td>200</td>
<td>MBTI</td>
<td>Myers-Briggs personality preferences are associated with significant differences in how students prefer to learn.</td>
</tr>
<tr>
<td>Chi-chang &amp; Noi (1994)</td>
<td>To identify the influence of culture on learning styles.</td>
<td>1032</td>
<td>Keib’s LSI</td>
<td>People with science and mathematical background tend to be assimilators while those with management education tend to be accommodators.</td>
</tr>
<tr>
<td>Sadler-Smith (1999)</td>
<td>To provide empirical elaboration, in the context of business and management education, for models of cognitive style.</td>
<td>225</td>
<td>Onion model and Cognitive Control Model</td>
<td>The results provide support for the onion and cognitive control models.</td>
</tr>
<tr>
<td>James Gordon &amp; Bal (2001)</td>
<td>To investigate learning styles of engineers in the automotive design industry.</td>
<td>45</td>
<td>Honey and Mumford LSQ</td>
<td>No need to have different training and learning method for engineers and managers.</td>
</tr>
<tr>
<td>Buch &amp; Bartley (2002)</td>
<td>To understand the relationship between learning styles, preference and training delivery mode among employees.</td>
<td>165</td>
<td>Keib’s LSI</td>
<td>Convergers show a strong preference for computer-based delivery while assimilators show a preference for print-based delivery.</td>
</tr>
<tr>
<td>Alfonseca et al. (2006)</td>
<td>To understand learning style for collaborative learning in a group of students.</td>
<td>166</td>
<td>Felder and Silverman model</td>
<td>There exist a relationship between the ways in which students group themselves with respect to their learning styles.</td>
</tr>
<tr>
<td>Charlesworth (2008)</td>
<td>To identify the relationship between different cultures (Indonesian, Chinese, French) and learning styles in higher education settings.</td>
<td>113</td>
<td>Honey and Mumford LSQ</td>
<td>Indonesian students are preferably reflectors while Chinese are more inclined towards being activists. French students were found to have higher tendency as pragmatist.</td>
</tr>
<tr>
<td>Wyrick (2003)</td>
<td>To understand suitable learning style to be an effective team leader and manager.</td>
<td>Not Defined</td>
<td>Keib’s LSI</td>
<td>Engineers are predominantly convergers while people with management skills tend to be assimilators.</td>
</tr>
<tr>
<td>Kloppe et al. (2009)</td>
<td>To examine the predictive validity of Honey and Mumford’s learning style LSQ among higher education settings in Netherlands.</td>
<td>90</td>
<td>Honey and Mumford LSQ</td>
<td>LSQ revealed no predictive validity, however, we can report good test-retest reliabilities over a two year time period.</td>
</tr>
</tbody>
</table>
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</tr>
</thead>
<tbody>
<tr>
<td>Peng &amp; Tekeva (2009)</td>
<td>To explore learning styles of Slovenian students in higher education settings.</td>
<td>63</td>
<td>Honey and Mumford LSQ, Dunn and Dunn LSI</td>
<td>The study resulted in a clear extraction of all four factors of Honey and Mumford LSQ.</td>
</tr>
<tr>
<td>Chan &amp; Mak (2010)</td>
<td>To examine the use of LSQ in educational settings in Macao.</td>
<td>135</td>
<td>Honey and Mumford LSQ</td>
<td>Differences in learning styles were found on the basis of gender among students.</td>
</tr>
<tr>
<td>Goulding &amp; Syed-Khuzman (2014)</td>
<td>To develop a four variant diagnostic learning styles questionnaire using earlier learning styles measures.</td>
<td>90</td>
<td>Kolb's LSI, Honey and Mumford LSQ, Felder and Silverman model</td>
<td>More thoroughly instructors understand the differences in learning styles, the better chance they have of meeting the diverse learning needs of their learners.</td>
</tr>
<tr>
<td>Jepeen, Verhegyl, &amp; Teo (2015)</td>
<td>To identify relationship between students' learning styles and perception of teaching quality.</td>
<td>272</td>
<td>Honey and Mumford LSQ</td>
<td>Students with reflector and theorist learning styles are influenced in their perception of teaching quality.</td>
</tr>
<tr>
<td>Gemmell (2017)</td>
<td>To assess learning styles of entrepreneurs in knowledge intensive industry.</td>
<td>168</td>
<td>Kolb's LSI</td>
<td>Preference for the Kolb Active Experimentation (AE) learning mode over Reflective Observation (RO).</td>
</tr>
</tbody>
</table>

Table 2: Key Learning Styles Instruments

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Measure</th>
<th>Key Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isabel Myers &amp; Katharine Briggs</td>
<td>1962</td>
<td>Myers-Briggs Type Indicator (MBTI)</td>
<td>Perceiving- judging, sensing- intuition, thinking- feeling, extraversion- introversion</td>
</tr>
<tr>
<td>Rita Dunn &amp; Kenneth Dunn</td>
<td>1975</td>
<td>Learning Styles Inventory (LSI)</td>
<td>Environmental, emotional, sociological, physiological processing</td>
</tr>
<tr>
<td>David Kolb</td>
<td>1976</td>
<td>Learning Style Inventory (LSI)</td>
<td>Accommodating, diverging, converging, assimilating styles</td>
</tr>
<tr>
<td>Anthony Gregorc</td>
<td>1977</td>
<td>Gregorc Style Delineator (GSD)</td>
<td>Concrete sequential, abstract random, abstract sequential, concrete random</td>
</tr>
<tr>
<td>Peter Honey &amp; Alan Mumford</td>
<td>1982</td>
<td>Learning Styles Questionnaire (LSQ)</td>
<td>Activist, reflector, theorist, pragmatist</td>
</tr>
</tbody>
</table>

Synthesizing and analyzing previous literature lead to the identification of five major model (refer Table 2) which are widely cited by researchers in learning styles area. These are models which are currently at the forefront of learning styles research in different capacities.

Hayes & Allinson (1998) raised the need for assessing learning styles of employees in organization. It was found that there is a lack of empirical studies on assessing learning styles of employees in organization vis-à-vis students in higher education settings (James-Gordon &Bal, 2001; Buch & Bartley, 2002; Wyrick, 2003; Khatun, 2015; Gemmell, 2017).

Khatun (2015) emphasized on the lack of research work to assess learning styles of employees in Indian organizations.

THEORETICAL FRAMEWORK

With this systematic literature review, it was evident that theoretical research in learning styles has matured in the 20th century. There are many
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empirical studies on students in an education setting, but, learning styles area needs more empirical evidence from organizational context to plan and strategize development of human capital. Such evidence and insights on individual learning styles can immensely benefit organizations.

Kolb (1984) asserts the types of profession plays a key role in determining learning styles preferences of an individual. Baldwin & Reckers (1984) used Kolb’s LSI to investigate learning styles preference for undergraduate students. They identified that students in different year of study has got significant difference in their preference for learning styles. Baker, Simon, & Bazeli (1986) also used Kolb’s LSI and found that preference for a learning style is significantly related with experience of students in educational settings. They identified that final year managerial students have developed preference for Converger as their learning style. McKee, Mock, & Ruud (1992) performed an empirical study to compare learning styles preferences of accounting students from Norway and USA. They found that age and study experience in the course plays a significant role in deciding learning styles preference. Chi-chang & Noi (1994) found that educational background plays a significant role in determining learning styles preference. While educational background was used in higher education setting studies, type of jobs were taken in research studies on employees in organizations. In their study on learning styles preferences of Singaporean and USA students using Kolb’s LSI they found that Assimilators have an education background in Science or Mathematics while business management students prefer Accommodators as their learning style. Khutan (2015) used Kolb’s LSI to examine influence of learning styles on instructional method preference of employees in Indian organizations. She used chi-square test to find that gender, age, education and learning styles play crucial role in influencing instructional method preference of employees.

However, according to Khutan, type of industry and experience were found to be insignificant in deciding instructional method of preference. These results need to be probed further because research method used for this study is not based on robust foundation. Moreover, using chi-square technique to establish models is always under the questions.

There are studies which critic Kolb’s learning styles inventory stating that it is limited factors in capturing learning styles (Vince 1988; Holman, Pavlica & Thorpe 1997, Hopkins 1993). Vince (1988) argue LSI has ignored demographics aspect related to individuals. Also, there has been consistent criticism over the validity of Kolb’s LSI because of poor factor loadings analyzed by researchers in various empirical studies (Freedman & Stumpf, 1978; Katz, 1986). Newstead (1992) found low reliability score of on administering LSI among psychology students. While on the other side Alinson & Hayes (1988, 1990) argued that Honey & Mumford’s LSQ has better validity and reliability than Kolb’s LSI.

Therefore, after having detailed review of theoretical literature and assimilation of empirical research studies, it was finalized that this research study will have gender, age, work experience and job role as demographic variables. Through this systematic literature review, it is derived that Honey and Mumford’s LSQ is the best suited model to assess learning styles of knowledge workers in organizational context. LSQ is best suited when it is required to assess learning styles of individuals where intellectual capabilities are the driving force behind providing quality services or building products. Therefore, four learning styles parameters of LSQ viz. activist, reflector, theorist and pragmatist were included as psychographic variables. Figure 1 depicts theoretical framework for this research study.

According to Honey and Mumford (2000), activists are the people who learn through action learning.
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They prefer job rotation to understand the overall situation of the organization. Training methods which involve role plays and outdoor activities are preferred a method to impart knowledge to such people. Reflectors prefer e-learning as it gives them an opportunity to go through a training program at a pace suitable to them by reflecting on concepts and review, till it is completely understood. They do not rush to take a decision. Theorists require a period to understand a situation in detail before taking any decision. Theorists are the people who prefer learning by understanding and applying theories. Their foundation lies in the constructs and variables of a phenomenon. They enjoy learning through lectures and prefer to develop theoretical foundation than going for practical aspects. While pragmatists are the people, who are interested in practical applications and are least interested in discussions and debates.

HYPOTHESES FORMULATION

As from previous research work it was found that gender, age group, work experience and job role can play important role in determining learning style of employees in organization. Considering this analysis, following hypotheses were created for gender, age group, work experience and job role as dependent variables influencing learning styles preference of knowledge workers in India IT service companies.

H1: There is a significant relationship between gender and learning styles of knowledge workers in Indian IT service companies.

H2: There is a significant relationship between age group and learning styles of knowledge workers in Indian IT service companies.

H3: There is a significant relationship between work experience and learning styles of knowledge workers in Indian IT service companies.

H4: There is a significant relationship between job role and learning styles of knowledge workers in Indian IT service companies.

RESEARCH METHODOLOGY

Considering theoretical framework, it was finalized that positivist as an epistemological position along with objectivists as an ontological position will be best suitable for this research work. Therefore, according to this philosophical position, it was decided to create a non-experimental research design.

![Figure 1: Theoretical Framework for Research](image-url)
For this research study, unit of analysis was identified as a knowledge worker in Indian IT Service Company. Review of literature revealed that Honey and Mumford’s Learning Styles Questionnaire (LSQ) is most suitable in the context to assess learning styles of employees in organization. Considering NASSCOM (2016) report, it was identified that Bengaluru, Delhi-NCR, Chennai, Mumbai, Hyderabad and Pune are the Indian cities where each city has greater than 5% accumulation of IT companies. Therefore, considering the purpose of study, it was decided to use clustered sampling to gather responses using LSQ through online platform. Required sample size for this study was calculated using Cochran’s (1977) sample size formula. Considering 95% confidence level it was found that 384 responses were required for the purpose of this research study. Thereafter, online questionnaire using Honey and Mumford’s LSQ was administered to get responses from knowledge workers having different demographic characteristics.

ANALYSIS AND RESEARCH FINDINGS

Total 437 responses were received from knowledge workers in Indian IT service industry. Thereafter, using Honey & Mumford (1982) LSQ, activist score, reflective score, theorist score and pragmatist score were transformed to identify learning styles of knowledge workers in Indian IT service companies.

Thereafter, pre-analysis measures were performed before proceeding with research methods (Figure 2).

It was found that there were total 388 responses which were useful for further analysis. Out of 388 responses, 267 were male while 121 were female. On the basis of age group, 179 were of 25 years or under, 83 were in between 26-30, 49 were in between 31-35, 39 were in between 36-40, 34 were in the age group of 41-45 and 4 were 45 and above. Based on work experience, 242 were having experience of 5 years or less, 68 were having experience ranging from 6-10, 43 were having experience in between 11-15 years, 23 were in the range of 16-20 years of work experience and 12 respondents were having more than 20 years of experience. Based on job role 236 were on engineering role while 152 were on managerial role. It was also found that respondents were having activist, reflector, theorist and pragmatist, activist-theorist and activist-pragmatist as their learning style. Out of which activist was the most preferred learning style while reflector was the least preferred learning style.

After that, graphical test was conducted to check whether the data was normally distributed. Through this graphical test it was found that distribution of scale variables was not normal (refer Figure 3). Therefore, it was decided to consider logistic regression models that do not have assumption of normality.

![Figure 2: Pre-Analysis Measures](image-url)
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Figure 3: Histograms of All Learning Styles Score

It was identified that widely used logistic models in social science research are binomial logistic regression, multinomial logistic regression and ordinal logistic regression model. As in this research study, dependent variable was categorical in nature, therefore, possibility of using ordinal logistic regression was ruled out. Also, as dependent variables had more than two category, therefore using binomial logistic regression model was also not possible. Considering multiple categories of dependent categorical variable and four independent variables with categorical or ordinal data, multinomial logistic regression was correct choice to proceed further with analysis. Therefore, it was decided to develop logistic regression model using gender, age group, work experience and job role as predictor variables while type of learning styles was used as dependent variable.

On conducting multinomial logistic regression, it was found that value for Pearson's goodness of fit was 0.99828. This indicated that final model is adequately fit. Table 3 shows model summary indicating all four variables viz. gender, age group, work experience and job role was having significant impact in deciding type of learning styles.

Considering 95% confidence level, it was found that all variables have p-value less than critical value (0.05). Therefore, null hypotheses relevant to gender, age group, work experience and job role were rejected and their alternate hypothesis were accepted. Hence, it was found that gender, age group, work experience and job role have significant relationship in deciding learning styles preference of knowledge workers in Indian IT service companies.
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Table 3: Summary of Multinomial Logistic Regression Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model Fitting Information Criteria</th>
<th>Likelihood Ratio Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect</td>
<td>AIC of Reduced Model</td>
<td>BIC of Reduced Model</td>
</tr>
<tr>
<td>Gender</td>
<td>317.136</td>
<td>534.922</td>
</tr>
<tr>
<td>Age Group</td>
<td>323.096</td>
<td>461.731</td>
</tr>
<tr>
<td>Work Experience</td>
<td>299.060</td>
<td>457.500</td>
</tr>
<tr>
<td>Job Role</td>
<td>311.708</td>
<td>526.583</td>
</tr>
</tbody>
</table>

Source: Calculated by Researcher using IBM-SPSS

ASSUMPTIONS AND LIMITATIONS

Like all other social science research work, this research work also has certain assumptions and limitations. Considering this study used primary data collection we assume that respondents have read instructions carefully mentioned in questionnaire and they were honest and accurate while responding to questionnaire. As this study focuses only on knowledge workers in Indian IT service companies, the results of the study may not be applicable for other types of worker viz. support staff, maintenance workers and technicians in the IT service industry. Also, the study could not address to the possibility of establishing any fact regarding persistence of learning styles over a period of time. Also, it was out of scope of study to explain the reason behind acquisition of a particular learning style.

CONCLUSION AND PRACTICAL IMPLICATIONS

This research concludes that Gender, Age Group, Work Experience and Job Role have significant impact on learning style preference of knowledge workers in Indian IT service companies. Also, it was found that, Activist was the most preferred learning style among the knowledge workers in Indian IT service companies and Reflector was the least preferred learning style among the knowledge workers in Indian IT service companies.

Therefore, we recommend to learning and development managers in Indian IT companies that they should focus on gender, age group, work experience and job role of knowledge workers to understand the probable learning style preferences of knowledge workers. As Activist was found to be the most preferred learning style among knowledge workers in Indian IT service companies, job rotation and giving them chance to mentor others can be very effective strategy for boosting learnability. Also, as Reflector was found to be the least preferred learning style among knowledge workers in Indian IT service companies, training only through e-learning modules only may not be a suitable.

SCOPE OF FUTURE RESEARCH WORK

Future research work in this area can assess learning styles of employees in other industries in India. Future endeavors can also conduct exploratory research to understand reasons behind learning styles preferences. It is also possible to longitudinal study on learning style preferences of knowledge workers in Indian IT service companies.

REFERENCES


