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CHAPTER - 2

LITERATURE REVIEW

The purpose of this chapter is to introduce the reader with existing studies pertinent to earlier research and how they relate to this study. Care has been taken while scanning various sources of information with the view to enrich the literature with relevant and latest information. This chapter is divided into five sections. The first section deals with importance of training in information system development. Second section looks at the status of training and development in India. The third section concentrates on training and development in future. The fourth section reviews different aspects of end-user computing. The final section reviews literature related to attitude and involvement of users and its effect on information system success.

2.1 IMPORTANCE AND NEED OF TRAINING IN INFORMATION SYSTEM DEVELOPMENT

The development of progressive ideas in the sphere of adult education has strongly influenced the field of training and
development. Adult learning is more complicated than children or animals as scientific studies require strict control of variables that is not always possible in case of adults.

The three schools of thought that have strongly influenced training, education and development in organisations are progressive adult education, behavioral adult education, and humanistic adult education.

The progressive adult education movement advocated more individual involvement in the learning process than was found in earlier schools of thought. This school of thought gained popularity during 1921 to 1961 as more and more organisations started realising the importance of training. This school of thought was built on the notion that people can be trained to "participate actively in the learning experience and to assume responsibility for the success of the program..., in this training, persons, not subjects are taught.....the nature of the learner is explored.....relationships are forged with fellow learners, and the subject matter is treated in a different light."
Behaviour adult education movement has also influenced the training strategy in organisations. This school emphasises upon identifying the essentials of learning and then measuring the change in behaviour, a basis for accountability. The role of the teacher or instructor is to provide evidence regarding quality of learning and producing the responsibility for the results.

Carroll A. Londoner explicitly sums up the stages that are involved in this type of learning.

Need - the explanation of the need and problem the programme is trying to satisfy.

Objectives - the statement and definition of the objectives in terms of measurable goals.

Constraints - limitation or restriction that must be satisfied by the system before reaching the desired goals.

Alternatives - the possible approaches for attaining the desired goals.

Selection - the analysis and evaluation of alternatives in light of desired goals and possible restrictions.
Implementation - the adoption of selected alternatives to meet the desired goals.

Evaluation - the assessment of system performance in light of specified objectives.

Modification - the process of altering the designed system to meet the deficiencies in the stated objectives.

Another school of thought that has had a direct influence on organisational training is the humanist adult education system. This school of thought is based on self-initiated learning; group methods of learning; students' participation in each stage of training from planning to evaluation; and the teacher as a facilitator.

Carl Rogers' work highlights the significance of freedom and independence for an individual to develop the ability to be proactive rather than reactive. Carl Roger believes on the learning process that places a strong trust on the responsibility of the learner. Both A.H. Maslow and C. Rogers support the idea that educators "should foster self-actualizing and fully-functional individuals."
Within the humanistic adult education school Malcolm Knowles introduced the idea of andragogy "the art and science of helping human beings to learn." The emphasis here is on the learner and development of human beings. While addressing on adults, Knowles calls for a "technology for teaching adults that is distinguishable from teaching children." Malcom Knowles' andragogical theory of adult learning is based on the following assumptions:

- As people grow, they move from total dependency to increasing level of self-directedness.
- As an individual grows and matures he relies less on traditional method of teaching and more on experimental techniques that utilize the experiences of learners such as field experience, group discussion etc.
- As a person matures, his readiness to learn is less dependent on biological development and more dependent on developmental tasks required for the discharging of emerging social roles.
- A child learning is subject-oriented while adult tends to be problem-oriented.

Patricia Cross in her Chain-of-response (COR) Model has developed a method that an adult educator may use for
identifying how adult learners take decisions whether to participate in learning activities. This model is important, because for an effective training programme learner participation and involvement in organisational training is necessary.

Patricia Cross suggested several methods that can be used for increasing adult participation and involvement in learning. Some important ones are

- self-directed learning projects,
- televised course materials,
- competency based learning.

J. Farmer, A. Buckmaster, and B. LaGrande\textsuperscript{13} developed a model called Situation-Specific Approach. This model can be utilised by the trainers and adult educators to find out which approach is most appropriate to teach adults in a particular situation. This model requires an assessment of:

- situation involved in the training,
- the assumed value of the adult education,
- the people who are involved,
- the requirement of the learner, and
- the role of the trainer.
In a Delphi survey, Lucy Guglielmino identified the presence of attitudes, abilities and personality characteristics as important for self directed learning to take place and be effective. To measure this, Self Directed Learning Readiness Scale (SDLRS) was developed by Lucy M. Guglielmino. The Scale includes the following factors which are related to self-directed learning.

- love of learning,
- self-concept as an effective, independent learner,
- tolerance of risk, ambiguity and complexity,
- creativity,
- view of learning as a lifelong and beneficial process,
- initiative and self discipline in learning,
- knowledge of learning needs and progress, and
- acceptance of responsibility for one's own learning.

Lucy Guglielmino and Paul Guglielmino have further identified factors that may be essential for development of self-directed learning in an organisation; research findings favouring the need for self directed learning in organisations; and proposed a model for training and development programmes in organisations. They believe that "those employees who have learned how to learn will be in a best position to maintain or improve their job status and
adapt to the change which is inescapable." Growing importance of self-directed learning in organisations as Information Age continues to unfold itself has also been recognised by R. Naisbitt and A. Toffler.

Apart from user involvement in installation and conversion activities training provides an additional opportunity for users to participate in information system development process. The significance and importance of user training in the successful development and implementation of information system has been acknowledged by many academicians and practitioners in the literature related information system such as A. Rushinek and S.F. Rushinek, N. Pliskin, R. Kraut, S. Dumais, and S. Koch, A.K. Baronas and M.R. Louis, D.L. Amoroso, J. Miller and B.A. Doyle.

According to R.R. Nelson and P.H. Cheney training is crucial for system integration. J.F. Rockart finds user education and training to be a critical function of MIS department. L. Mohan and S. Belardo asserts that planned training methodology played a vital role in the successful adaptation of information technology by end-users.
L.E. Raho, J.A. Belohlav, & K.D. Fiedler\textsuperscript{28} found a positive correlation between successful assimilating PC technology and overall level of educational activity undertaken by the firm. J.D. Lees,\textsuperscript{29} found a similar relationship between training and successful implementation of small business information systems. In organisational development literature, the importance of training and education is recognized for preparing an organisation for a change or in realizing the change itself.\textsuperscript{30}

One of the major problem and difficulty with the existing information systems, is the lack of training asserts M. Major.\textsuperscript{31} According to R. S. Pawar\textsuperscript{32} it is necessary to understand the new emerging roles of Active end-users, Defacto end-users and Functional specialist end-users in terms of numbers and training needs (qualitative aspect).

J. Ward, P. Griffits and P. Whitemore\textsuperscript{33} the most important issues facing information technology are lack of skills, quality of users staffs, quality of data processing staff and training of developer and users.
2.2 TRAINING AND DEVELOPMENT IN INDIA

M.S. Saiyadain in a study funded by IIMA surveyed 49 companies and provided an overall picture of the training function in India. The main findings are as follows:

- One third of the organisations have separate training department under managers who are professionally trained,
- Those organisations that do not have separate units, their training department are managed by non-professionals.
- Only few of the organisations having training department had good infrastructure facilities and teaching facilities of their own. Most of the organisation depends on others for training.
- Only 0.017 percent of the total budget on human resources is spent on training.
- In majority of the cases training needs are identified on the basis of annual appraisal, growth and diversification of business. Few organisations take the help of external consultants in identifying training needs. The training needs of the supervisors are identified through appraisal feedback and that of worker on the recommendation of supervisors. In 42.8
percent of the case managers themselves identify their training requirement.

- More than two third of the organisations have induction training for managers, supervisors, and workers.
- For workers internal faculty is the major source for training and for managers it is external faculty that plays a major role.
- Managers are sponsored to external programme more than supervisors and workers.
- Most organisations take post training feedback and evaluation seriously.

T.V. Rao and E. Abraham S.J. conducted a survey covering 53 companies in mid-1984 and found training to be the most frequently used HRD mechanism in the country. The main findings of the study were:

- training is not properly exploited as organisations completely ignore the need for post training follow up,
- 55 percent of the organisations surveyed had formal policy on training,

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• 79 percent of the organisation had in-house facility for training.
• 81 percent of the organisation conducted training programme regularly for executives,
• 84 percent had separate budget for training,
• 81 percent made new employees in supervisory/managerial cadres go through induction programme.
• 88 percent encouraged executives to attend outside programmes without objection
• in 39 percent of the companies people were trained for the job before promotion.

K. Bannerji collected data on supervisors who had undergone training and found that it had little or no impact on their effectiveness. However, most of them felt that training did improve their self-confidence, motivation, and communication ability. B.L. Maheshwari collected data on 999 respondents from banking institutions and found training programmes less effective with respect to their contribution to job performance. However, they did endorse the usefulness of formal training

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S.K. Bhatia\textsuperscript{34} saw a shifting of the main objective of training from knowledge to attitude. According to him the areas that need training are:

\begin{itemize}
\item technical skills, and knowledge,
\item knowledge of organisation and external systems,
\item conceptual and interpersonal skills.
\end{itemize}

According to him the emphasis on these three must vary based on the level of employees. Training of workers should concentrate on technical skills and knowledge followed by conceptual and interpersonal skills, and knowledge of organisation and external systems. While in the case of supervisors, conceptual and interpersonal skill should be stressed, followed by technical skills, and knowledge of organisation and external systems. For managers, focus should be on conceptual and interpersonal skills, followed by knowledge of organisation and external systems and technical skills and knowledge.

In 1982 M.C. Agarwal\textsuperscript{39} studied a group of graduate engineering trainees in three large public sector organisations and found that the perception of the trainees regarding the method and the content of the training was discouraging and dissatisfying.
After administrating a seventy-two item questionnaire on 119 personnel managers P. Seth suggested that the aim of training programs directed towards personnel managers should be addressed towards attitude and belief underlying managerial philosophy and their inter-relatedness.

K.K. Jain collected data on 119 managers in the steel industry who had attended training programs - both external and in-house. He found that a majority of the respondents were satisfied with the size of training group and training duration.

D. Sinha suggested that training can show visible and effective results. And depending upon the nature of training participants could be helped to improve upon existing qualities and develop new skills.

N.N. Chatterjee mentioned different types of training programmes in India

- Induction training and under-study system. In induction training new entrants are introduced to the organisation, rules, service conditions etc. Under-study system popular in Government undertakings. In
this, an employee works with his prospective senior as under-study.

• Supervisory training in which technical skills are imparted to supervisors.

• Technical training used in case of new entrants for operational requirement and for improving the skills of existing employees for promotions etc.

• Management development in which managers are trained in analytical and decision making skills, values and attitude.

C. Gopalkrishna and S. Achuthan requested 39 executives from approximately 25 companies to rank different training programmes according to the requirements of the organisations. The executives ranked them as follows: The first rank was given to programmes that focused on attitude and behaviour of participants, the second rank was given to programmes focussing on strategic decision making, analytical ability etc., the third rank was given to training programmes devoted for broadening the knowledge area, and finally the programmes that highlight government policy in the area of interest.

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M.S. Saiyadain\textsuperscript{45} highlighted the problem of faculty, participants, and administration in implementation of training programmes.

P.K. Srinivasan and B.R. Virmani,\textsuperscript{46} found lack of seriousness on the part of the participants and different expectation form training as major problems in training.

Regarding the methodology of training different views exist among writers and researchers. According to M.M.A. Bhasha\textsuperscript{47} in India, lecture cum discussion method is better than business game T-Groups, case methods and workshops. C.K. Prahlad and K.M. Thiagarajan\textsuperscript{48} recommended structured exercises to be followed in training of employees.

2.3 TRAINING AND DEVELOPMENT IN FUTURE

Literature focusing on modification in training environment began to emerge in the 1980's. James Schreier\textsuperscript{49} findings support the awareness for development of self-directedness in learning among the employees. The following are some perceived impacts on the future of training and development as listed by the subjects in Schreier study:

- massive need for retraining and cross-training,
• need for training and development of professional to be resource specialist, and
• more computer-assisted training and self-directed learning.

Schreier's research also focused on the type of learning that will be needed in the workplace of the future. According to him the future training and development programmes must be based on individual needs rather than group needs; more specific tailoring of programmes will be required; training and development services must be more flexible in design and delivery; and finally a need for "Cafeteria style" of learning by which employees will be able to choose their time, schedule and location to undergo training and education rather than being placed in a set of curriculum.50

Tom Peter51 identifies ten important factors that may be taken into consideration for developing training system for the future. These factors are:

1) extensive entry-level training focusing on exactly the skills in which the organisations want to be distinctive,
2) treating employees as potential career employees,
3) regular retraining,
4) generously expending both time and money to training,
5) promoting and nurturing on-the-job training,
6) understanding the fact that there is no limit to the skills that can be profitably taught to everyone,
7) using the training to herald a commitment to a new strategic trust,
8) stressing on training at the time of crises,
9) strengthening line-driven training,
10) using training to teach the organisation's vision and values.

L.M. Guglielmino and P.J. Guglielmino, propose development of organisational learning resource centers to meet the emerging needs of the Information Age in the years to come. These resource centers may offer different resources for self-directed learning for employees such as:

- audio-visual materials catalogued by topic,
- computer assisted reading materials,
- self-teaching texts,
- indexes of individuals within the organisation who have specific expertise in the topic area,
- facilities conducive to learning such as meeting room, video materials etc.
William Bridges has addressed the need for various types of training and development required by the organisations as they adapt to changing environment, this includes new skills and knowledge needed for fresh types of roles, ability to visualize and understand things in new and different situations, understanding of how employees will have to behave and develop different attitudes to meet the changes, and training in techniques for handling self doubts.

Many others like Amir Levy has focused on the need of planned change. Louise Lovelady has highlighted the need for an open climate in an organisation, with supportive relationships and a participative style of management for training to be more effective.

2.4 END-USER COMPUTING

2.4.1 Growth of end-user computing

During the early days of computerisation, end-users rarely interacted with computer system at all. This was because computing environment in those days was user-hostile. The need of the users had to be translated into programmes by
the programmers as emphasis was on third generation language and low-level languages. In 1970's with the introduction of minicomputers, direct involvement of end-users in computing activities started taking place. In recent past end-user computing has experienced a rapid growth in India. S.K. Sharma, J.F. Rockart and L.S. Flannery, and J. Martin have given several reasons that have lead to an increase in end-user computing. They are:

- increase in computer literacy of end-users,
- proliferation of PC's in organisations,
- development of non procedural languages,
- development of user-friendly software,
- improved hardware technology,
- increased complication in business conditions,
- bottleneck and backlogs in development of applications by MIS departments,
- realization of the potential advantages of computer based tools, and
- inability of MIS department to respond satisfactorily to the needs of the users.

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2.4.2 End-users Types

The term end-users have been defined in number of ways. J. Martin classified the end-users into two categories. The first type of end-users according to him are those who use applications created by others but they themselves do not develop applications. The second type of end-users are those who develop their own application and also use applications created by others.

E.E. Tozer categories end-users in four types, they are Manager, Specialist, DP specialist and Clerical. Each of these was further divided into expert users and causal users.

J.F. Rochkart and L.S. Flannery identified six types of end-users in organisations, after conducting research on 200 end-users and 50 Information Services Managers. These were:

a) Menu Driven End-users (Non-Programming End-users) - imply those types of end-users who use someone else's software through pre-established procedures or menus. They do not generate programs nor use report
generators and fall in the category of non-skilled end-users.

b) Command Level End-users - imply those types of end-users who are able to generate simple inquiries, perform calculations and create simple reports and documents. They can manipulate information by using report generators and fall in the category of semi-skilled end-users.

c) Programming End-users (End-user Programmers) - imply those types of end-users using both command and procedural languages. They develop their own applications to be used by themselves or by others and fall in the category of skilled end-users.

d) Functional Support Personnel - imply those types of end-users who support and assist other end-users in their own functional area. They never count themselves as computer professionals. They have experience in vast range of software tools and by virtue of this power in end-user languages, have become informal EDP centres within the organisation.

e) End-users Computing support Personnel - imply those end-users who are located in Information Center and who are well-versed in end-user language. They aid and
assist end-users or develop applications software for them.

f) Data Processing Programmers - They are basically programmers except that most of their effort is directed towards end-users language.

According to J.F. Rockart and L.S. Flannery, in PC environment, the most common type of end-users were Programming End-users constituting 30 percent followed by command level end-users making up 29 percent of the population.

2.4.3 End-users computing management and control

There are three principle approaches to management of end-user computing according to T.P.Gerrity and J.F. Rockhart:

• the monopolist approach,
• the laissez-faire approach, and
• the information center approach.

In monopolist approach various types of control mechanisms are developed and end-user computing is completely controlled by the MIS department. M. Alavi and I.R. Weiss suggested number of control mechanisms:
• cost/benefit analysis for controlling inefficient use of capital,
• setting of hardware and software standard to control compatibility of tools and threats to data security,
• user training to avoid unrealistic and sketchy analysis, and
• involvement of computer professional in technical reviews to avoid using of wrong models, working out wrong problems and mismatching of tools and applications.

In laissez-faire approach end-user computing is left completely to the discretion of the end-users themselves. In this economy of scale cannot be realised as that in centralised purchasing. Further, shared knowledge is impossible in this approach. Despite many drawbacks this approach is feasible during the early stage of end-user computing in the organisation.66

Information center approach is the latest approach. In this approach the end-users are allowed to retain the autonomy to care for their own needs but some controls are exercised over them to arrest uncontrolled proliferation of end-user system.
R.L. Leithesiser and J.C. Wetherbe have identified strategies for management of end-user computing in organisations. They are:

- stressing of efficient use of computer resources,
- allowing development to occur only in critical area of business,
- encouraging development based on incentives,
- adoption of laissez-faire strategy for allowing end-users to develop and maintain their own environment, and
- establishment of Information Center with the aim of facilitating and coordinating end-user computing by offering support service.

2.4.4 Information Center

The concept of information center "evolved from the need to help end-users and end-user department, learn about and take advantage of decision support resources." The aim of the Information Center according to E.E. Tozer is to provide the tools, furnish resources, and equip the end-users with the techniques and environment to make end-user computing widespread, viable, effective, efficient and self-sufficient as possible. He also divided the functions and
the role of information system into two: Primary - active and Passive - reactive. According to him the primary functions are:

- to deliver or organize training on a wide range of topics,
- application prototype, i.e. fostering on site development,
- requirement recognition, preliminary allocation of design development and operational responsibility,
- installation and maintenance of approved systems,
- assimilating and disseminating experience from other comparable sites,
- advocating end-user computing,

While passive functions of information center are:

- advising and consulting users concerning services and opinions,
- hotline service,
- administrating and security/access control,
- data administration,
- system certification.

L.W. Hammond\(^7\) has suggested following strategies for Information Center:

- for decision making and organisational support provide a set of packaged tools,
• make hardware accessible to users,
• information analyst or consultants in information center should provide help to end-users in formulating an approach, and
• user should be trained in the use of support packages.

T.P. Gerrity and J.F. Rochkart\textsuperscript{71} have highlighted some problems in the implementation of an Information Center.

• centralised nature of Information center,
• lack of application knowledge of support staff,
• managing reactively rather than proactively,

According to them the need of the hour is that the Information Center must come out from their passive role and become more dynamic, active and assertive.

2.5 ATTITUDE AND INVOLVEMENT OF USERS AND INFORMATION SYSTEM SUCCESS

Attitude refers to a mental state of users, i.e., their attitude or outlook toward a product or process. Involvement on the other hand refers to the observable or noticeable behaviour of users in development activities.
According to B. Ives and M. H. Olson "It is almost an axiom of the MIS literature that user involvement is a necessary condition for successful development of computer based information systems." \(^{12}\)

The idea that people is the weakest portion in computer system\(^{13}\) and that information system development and implementation process has a potential for people problem\(^{14}\) is not new to information system literature.

According to M.J. Ginzberg\(^{15}\) each user is an individual and has his or her own need and goals and therefore it is an error to assume that users are homogeneous. This notion has been supported by others also like T. Kochan, J. Cutcher-Geshenfeld, and J.P. McDuffie,\(^{16}\) D. Levine and G. Strauss,\(^{17}\) and D. Levine and L.D. Tyson.\(^{18}\) J.A. Senn’s\(^{19}\) asserts that basic guidelines should be to fit the system to user rather user to the system.

Using a model as a framework, and examining over one hundred empirical studies, R.W. Zmud\(^{20}\) asserted that individual difference (demographics) inspire user attitude, which in turn affect the involvement of users in
information system development and implementation, thus affecting the information system success.

Similarly, B. Ives and M.H. Olsan\textsuperscript{81} examined about two dozen studies, which aimed on user involvement and information system success, and developed a descriptive model for user involvement shown in Figure 2.1 below.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2.1}
\caption{Descriptive model of user involvement (Adapted from Ives and Olson, 1984, p-588)}
\end{figure}

The model acknowledges the importance of individual differences, as well as motivational factors and organisational climate in information system success. B. Ivens and M.H. Olson described cognitive and motivational factors as "intervening mechanisms".

H.C. Lucas, E.J. Walton, and M.J. Ginzberg\textsuperscript{82} in a study of implementation of packaged software systems, found that computer skills of users and their earlier experience with computers have a positive correlation with their
satisfaction with information system as well as their satisfaction with its installation.

The importance of user involvement for the success of information system has been acknowledged by many. R.F. Powers and G.W. Dickson\(^3\) asserted that user participation is crucial for the success of MIS project.

B. DeBrabander and A. Edstron,\(^4\) declared that in relation to other factors like top management support, quality of EDP staff etc., user involvement is the only one that is invariably related to the quality of the final outcome.

According to H.C. Lucas a "change approach based on user participation is most likely to be successful."\(^5\)

R. J. Welke\(^6\) states that to avoid implementation failure we require a system development process and an approach that take users into consideration from the beginning.

In the study conducted by M.J. Cerullo\(^7\) it was found that involvement of operating and middle management in development in terms of definition and installation
activities was a critical success factor, second only to user attitude and quality of EDP personnel.

C.R. Franz and D. Robey found a moderate relationship between user involvement and perceived usefulness of information systems. They found a correlation of 0.33 between involvement of users in definition phase and user perceived usefulness of the information system and a correlation of 0.24 between involvement of users in installation phase and user perceived usefulness of the information system.

W.J. Doll and G. Torkzadah found an overall correlation between perceived involvement and end-users computing satisfaction.

In this dissertation attitude refers to a mental state of users, i.e., their attitude or outlook toward training and development and the extent of their involvement in training and development activities. Involvement on the other hand refers to the observable or noticeable behaviour of users training and development activities.
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