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SUMMARY, CONCLUSIONS, AND IMPLICATIONS

This chapter is divided into four sections. The first section provides an overview of the study. The second section discusses the general findings and the conclusion drawn from this research. Third section deals with implications of the study and final section attends to the issues related to future research.

5.1 OVERVIEW OF THE STUDY

We are undergoing an information revolution, a time of broad technological change, in which unprecedented "information power" is available to employees. The world is becoming increasingly turbulent. Therefore, efficient monitoring requires more information, making computers an integral part of our corporate life. End-user computing refers to emerging section of employees who use computers in their profession, but are not considered computer professionals.

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Effective and efficient information technology and its absorption will be crucial for meeting the challenges of organisational prosperity in the 1990's and early 2000's. Appearance of personal computers in the early eighties has raised the computer literacy requirement of employees. The rising personal computer market suggests that employees will continue to seek higher levels of computer literacy.

With the increasing importance of computer literacy at all levels in the organisation, the issue that needs to be addressed urgently, is that of the end-user support and method of acquiring computer know how in the organisation.

Variety of factors complicates end-user literacy demands. Such as, demand for support surpassing the facility available, high turnover among information systems professionals, and the lack of software standardisation. Further, literacy demands are becoming an unfolding process directly linking to end-user sophistication and technological advances.

All this means that organisation should employ a variety of learning techniques to meet the literacy demand of end-users. One alternative is to develop trainers from
within end-users working in different functional area. This can play a vital role in successful adaptation of information technology by end-users. Training of end-user on PC based software systems alone is not sufficient to motivate end-users. Training on issues related to analysis and use of information for better decision making, is a long term strategic issue that has to be addressed. Since, most of the professionals are strong on technological and software product knowledge, but have little or no functional and application knowledge, involvement of end-users in T&D activities is required to overcome this hurdle.

The purpose of this study was to find the extent of involvement of end-users in T&D activities, measure the end-users level of satisfaction with training programmes and their perception about the role that they play in T&D activities. The purpose of the study was also to identify the most preferred mode of learning and the type of relationship that end-users prefer between trainer and learner. Results derived were used for identifying the factors effecting the extent of involvement of end-users in T&D activities.
End-users were classified into three types, based on the research of Rockart and Flannery:

1) **Menu driven end-users** (Type 1) - who use someone else software through pre-established procedures or menus.
2) **Command level end-users** (Type 2) - who have the ability to manipulate information by using report generators.
3) **Programming end-users** (Type 3) - who use both command and procedural languages to develop applications for their own need and for others.

Eighty end-users were selected from each of the above three categories using quota sampling. A self-reporting questionnaire with Likert type responses was used to assess the degree of end-users involvement in T&D activities, satisfaction with training programme and their perception about the role that they play in T&D activities. This end-user questionnaire was also used for collecting demographic data, total number of hours spent on computer, time spent on self learning to improve their computer skills, number of years of computer experience, number of training programmes attended and most preferred mode of learning.
5.2 OVERVIEW OF THE RESULTS AND CONCLUSIONS

5.2.1 Difference among End-user types

Type 1 end-users comprised the highest percentage of females, the lowest mean age, lowest level of formal education, the lowest level of computer experience, lowest number of hours of computer usage. Type 1 end-users were in a typically clerical position. They used personal computer mostly for word processing and data entry. Thus having a routine type of computer related job responsibility.

Type 2 end-users ranged from clerical to mangers to professional staff to line managers to staff specialist. Their demographic data, extent of involvement in T&D activities and satisfaction with training programme generally ranged between the Type 1 and Type 3 end-users. Their computer applications included word processors, spreadsheet packages, graphic generators, desktop publishing programs, database and query languages.

Type 3 end-users comprised the highest percentage of males, the highest mean age, highest level of formal education,
the highest level of computer experience, highest number of hours of computer usage. They had integrated personal computer into their job. Most of them were either working in Production or in Finance area. Type 3 end-users ranged from supervisor to engineer to accountant to financial analyst to corporate planner. Their extent of involvement in T&D activities was highest. Approximately 31 percent of the total time that they spent on computer was devoted to improving their skills. Therefore, the researcher concludes that they exert a lot of effort to remain update with the changing technology. Typical applications for this group of end-users are word processing, spreadsheet, spreadsheet macros, data base management systems (DBMS), query languages, fourth generation non-procedural languages, report generators, graphic programs and project management packages.

5.2.2 Extent of involvement in T&D activities.

The first hypothesis tested whether there is a difference in the extent of involvement in T&D among the three types of end-users. ANOVA single factor test was applied and it was found that there is a significant difference between the extent of involvement. Subsequently, using Tukey's
Method of Multiple Comparison, it revealed that Type 3 (programming end-users) end-users were more involved in T&D activities compared to Type 1 (Menu end-users) and Type 2 (Command end-users).

The next point of interest would be the nature of involvement of end-users in T&D activities. The findings of this study have shown that responding Type 1 and Type 2 end-users are mostly involved in the activities related to pre-training phase of the training process. Most of the time they are involved in determining the content of training, identifying training needs and initiating training programmes. In training phase they are usually involved with scheduling training sessions followed by training and instructing others. They have a very negligible role in preparing reading materials. Their involvement in evaluating training programme in terms of overall effectiveness, content and methods used, the participant's attitude and behaviour, trainer behaviour and participant's behaviour on the job is also limited. On the other hand, Type 3 end-users are equally involved in all the three phases of training process. The average response of 2.011, 2.054 and 2.620 for Type 1, Type 2 and Type 3
end-users, respectively, indicates that involvement of end-users in T&D activities is in an infancy stage.

The second hypothesis shows that end-user in Personnel area are more involved in T&D activities as compared to end-users in Finance, Marketing and Production area. Difference in the mean score may be because of the nature of their job. The mean score for end-users in the Finance area was higher than that of end-users in Production and Marketing area. This may be attributed to more years of computer experience of end-users in Finance area.

Hypothesis three to eight tested the relationship between the extent of involvement in T&D activities and other related variables for each of the three types of end-users. The variables considered for finding relationship were number of computer related training programmes attended; number of hours spent on computer; number of hours spent on self learning of computer skills; perceived usefulness with involvement in T&D activities; satisfaction with training programmes and number of years of computer experience.

Testing the third Hypothesis founds no significant relationship between extent of involvement in T&D
activities and number of computer related training programmes attended within two years preceding the study. Therefore, it may be concluded that by holding a large number of training programmes may not necessarily increase the involvement of end-users in T&D activities.

The mean number of programmes attended was highest for Type 3 end-users followed by Type 1 and Type 2 end-users. Further, most programmes that they attended had external faculty. This may be attributed to the fact that organisations do not have qualified trainers. This may lead to mismatching of tools and tasks as external consultants (IT professionals and vendors) do not fully understand the needs of end-users and lack functional and application knowledge.

Fourth hypothesis shows a positive relationship between extent of involvement in T&D activities and number of hours spent on computer per week by end-users type. Though relationship was not significant for Type 2 and Type 3 end-users it was significant for Type 1 end-users. This may be attributed to the fact that Type 1 end-users are more motivated due to their new experience with computers. Reduction in correlation as one moves from unskilled to
skilled end-users may be due to cumulative effect of computer literacy over a period.

The fifth hypothesis that evaluated the relationship between the extent of involvement in T&D activities and hours spent on self learning of computer skills showed significant positive relationship between them. This implies that as end-users master a set of computer related skills they try to learn more complex skills. It may also be concluded that the organizations should be supportive of personal computer use for self directed learning. This in turn may increase the involvement of end-users in T&D activities, making training sessions more meaningful and subsequently using them as trainers.

Testing of hypothesis six showed a significant positive relationship between extent of involvement in T&D activities and perceived usefulness with the involvement in T&D activities for each of the three types of end-users. Since most of the end-users feel that their involvement in training programme is very useful. Consulting and involving them properly will lead to better understanding of the information system and will help them to learn new skills in a better way.

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The seventh hypothesis also found a significant relationship between extent of involvement and satisfaction with training programmes attended. Thus to make training programme more meaningful their involvement in T&D activities is necessary.

Hypothesis eight found a significant positive relationship between extent of involvement in T&D activities and number of years of computer experience for Type 2 and Type 3 end-users, concluding that as end-users gain experience they get more involved in T&D activities.

5.2.3 Satisfaction with training programme

In the entire sample only 35 percent of the end-users were satisfied with training programmes attended in the last two years preceding the study. The end-user wise breakup shows that Type 1 end-users were most satisfied with 37.50 percent indicating satisfaction with training programmes. The percentage of end-users satisfied, in Type 2 and Type 3 category, were 33.75 percent. For all categories of end-users significant negative relationship were found between the satisfaction derived from training programmes and number of years of computer experience. Showing that as
their experience increases with computers they find training programme less educative. This may be attributed to the lack of depth in training programmes. This is further supported by the fact that end-users in more technical areas such as Production and Finance were less satisfied than end-users in Personnel and Marketing areas.

5.2.4 Perceived usefulness of involvement in T&D activities

Majority of the end-users in all the three categories indicated that they perceive their role in T&D activities as very useful and constructive. Type 3 end-users were most satisfied by their role in T&D activities followed by Type 2 and Type 1 end-users. When the end-users were asked to identify the most preferred relationship between trainer and learner in training programme, 46 percent said that they believe in "both the trainer and learner should work together in designing and carrying out training programmes"; 30 percent said that "the trainer or learner should dominate the design and carrying out of training programmes while other play only a minor role; 20 percent saw "trainer should only design and implement training programmes"; and the remaining 4 percent saw trainer and
top manager should design and implement training programmes. This indicates that end-users want to get involved in training programmes and when they get an opportunity to do so they appreciate it and find it very useful.

5.2.5 Other findings

This study asked the end-users to specify their most preferred type of learning resource. The end-users gave preference to peers followed by reference manual/text books/workbooks showing that they find themselves in a more comfortable position with peers and are in a better position to interact with them. High preference of end-users for peers in all the categories has a significant implication for trainers. The researcher believes that proper recognition is not given to this type of resource. Preference to formal classes goes down as the end-users move from menu to command to programming end-user. Further, importance of experimentation/trial and error increases as end-users become more skilled. The researcher believes that reliance on experimentation is attributable to the advanced nature of the expertise required for Type 3 end-users. Low usage of computer tutors as the end-users
increases their skill may be attributed to the lack of depth in most of the tutors, coupled with the availability of peers and willingness to experiment.

5.3 IMPLICATIONS OF THE STUDY

This section discusses the theoretical as well as practical implications resulting from this study. This chapter also offers practical alternatives to existing practices in the training and development profession.

5.3.1 Theoretical Implications

Several aspects of this study support earlier adult learning and training research in this area. They are.

1) The study observed a high level of self-directed learning activity within all types of end-users. Further, as end-users gain experience with computer they tend to be more involved with T&D-activities. They rely more on experimental techniques such as utilising the experiences of co-worker, experimentation/trial and error, and other action learning techniques. This is
consistent with M.S. Knowles' findings that adult learning process tends to be problem oriented and as they grow older they rely less on traditional teaching and more on experimental techniques that utilise the experience of other learners.

2) A positive correlation was found between extent of involvement in T&D activities and number of hours spent on self learning, supporting earlier researches conducted by L.M. Guglielmino and P.J. Guglielmino, and A. Tough. These researches also identified the importance of self directed learning and learning resource centers as an important aspect of innovative and future oriented training systems.

3) In this study a positive correlation was found between extent of involvement and number of years of computer experience for Type 2 and Type 3 end-users. While a negative relationship was observed between level of satisfaction with training programmes and number of years of experience. Further, as end-users gained experience and moved from Type 1 to Type 3 they increasingly
relied on peers and experimentation/trial and error as a resource. All these supports A.H. Maslow's findings that as adult learner masters a set of skills he goes in for richer and more complex experience.

4) After interviewing numerous end-users in varying positions inside the organisations, it was found that end-users expressed the importance of learners' role in designing and implementing training programmes. They preferred individual end-user or group of end-users working together along with trainers in designing and implementing of training programmes. Thus, highlighting the importance of team work in future training programme. This conclusion is supported by the findings of B. Geber.

5) The study found that extent of involvement in T&D activities is positively correlated to the level of satisfaction and perceived usefulness of end-users involvement in T&D activities. This indicates that there are psychological dimensions
to implementation of information systems that cannot be ignored.

5.3.2 Practical implications

The findings of this study provide many practical implications for raising computer literacy of end-users in organisations. The extent of involvement in training and development is influenced by number of factors they are: number of hours spent on self learning; perceived usefulness of involvement in T&D activities; satisfaction with training programmes, number of years of experience with computers. Therefore, in this section, the researcher discusses the practical implications of the findings as policy recommendation for future training programmes.

1) In this study it was found that end-users find it useful to be involved in T&D activities. But at the same time their extent of involvement in all the three phases (i.e., pre-training phase; training phase; and post-training phase) of training is less and in infancy stage. Therefore, effort should be made by the organisations to involve qualified end-users in
T&D activities. As end-users attitude towards involvement in T&D activities is positive the organisation will not need much effort to involve them in T&D activities. The researcher advocates that all end-users effected directly or indirectly by training and development should be involved from the inception to the implementation of computer training programmes.

2) R.S. Pawar\(^7\) has identified new roles of active end-users, defacto end-users, and functional specialist end-users in Indian context. Active end-users are executives who have become conversant with PCs and use spreadsheet and database with certain degree of comfort. While, defacto end-users are executives and other professionals in the organisations who have acquired a very high level of skills in the use of wide range of software tools on PCs. They are widely consulted by other departments in the organisation to solve PC related software development problems. Due to high level of acceptance that they are receiving they have started playing a parallel role to the EDP
function. On the other hand there are also functional specialists. This category includes senior executives/professional from various departments, who have high level of skill in their functional area. They have started taking interest in computers and as they have access to powerful software tools they have become a source for most powerful applications of computers. The involvement of peers in training process is strongly supported by this study. Therefore, the service of these types of end-users can be taken for designing and implementation of training and development programmes. These end-users are in a better position to assess the literacy need of novice end-users, which will help speeding the process of identifying and addressing the computer literacy needs. But before embarking on such a policy these types of end-users should be trained in the rudiments of training and development skills.

3) The companies should encourage qualified end-users to participate in T&D activities with the aim of making them familiar with the rudiments of
training and counselling others. This will help the organisations to increase the computer literacy of end-users and help identifying the most potential group of end-users who may act as trainers.

4) Effort should be made to involve end-users in all the phases of training process. At present Type 1 and Type 2 end-users are mostly involved in the pre-training phase of the training process. They hardly participate in training and post-training phase of the training process. This will go a long way in developing end-users as trainers.

5) Most of the training programmes are conducted by using external faculty comprising information system specialists or vendors. Since these people are external to the organisation, they are not familiar with the working of the organisation. Such training lacks depth and is skill oriented. The end-users are hardly trained to use computers to enhance their decision making power. Therefore, to make training more meaningful end-users from different functional areas should
be asked to participate in all the phases of training process along with external faculty. This will help qualified end-users to keep themselves abreast with the changing technology. Further, it will overcome the lack of functional and application knowledge of information system professionals and vendors who are engaged in the training of end-users. Thus, creating a learning environment in the organisation not just increasing computer literacy.

6) Conducting more training programmes and encouraging end-users to spend more time on computers alone will not increase their involvement in T&D activities. Self learning should be encouraged as positive correlation was found between extent of involvement and time spent on self learning. In other words, the study shows that the sole use of traditional training programmes is not sufficient. Self directed learning should also be formally recognised within the organisation.

7) The researcher advocates that computer training should not be only skill oriented and knowledge
based. Conceptual and interpersonal skills should also be imparted by the organisation along with computer skills. This will lead to better interaction among end-users and will help them in applying, in an efficient and effective way, new skills learned to their jobs. Further, end-users whether they are workers, supervisors or managers should be imparted both types of training. This will help the end-users to learn from each other experience irrespective of their position in the organisation.

8) At present trainees are asked to adjust with the training programme. The need is to adjust training programmes to the needs of the end-users. The researcher advocates individualised approach to training. Job requirements and demographics should become a part of the planning process for enhancing the computer literacy of end-users. Further, training programme should be problem oriented rather than subject oriented as adult learner tends to be problem oriented in their learning process.
9) The study finds an increased trend toward computer related training as end-users move from Type 1 to Type 3 end-users. Type 3 end-users spend a higher percentage of their total time on computer for improving their skills compared to the other two types of end-users. As a result increased emphasis should be given on developing a variety of learning resources such as peers, experimentation, reference manuals, tutorials and not just formal classes to meet the growing demand for computer literacy.

10) The organisations should leave the options on individuals to decide how to learn while retaining control over the framework of education and training. Earlier researches have also shown that learner who can use their preferred resources tend to report higher satisfaction with learning projects.

11) The company should try to develop a culture within the organisation in which end-users learn from each other irrespective of their position in the organisation. Simultaneously qualified end-
users should feel proud in instructing and facilitating a class. The idea falls in the line of Boston Computer Society. The society relies on volunteers to raise the computer literacy of its members. Their idea is simple, share your knowledge and others will do the same. This can be an effective method as it supports the findings of M. Knowles that as individual grows and mature they rely less on traditional method of learning and more on experimental techniques that use field experiences of learner, group discussion, simulation and other action - learning techniques.

12) It is unreasonable to assume that end-users will assimilate volumes of information on computer usage beside maintaining other skills required to perform their jobs. Therefore, to ease the pressure of learning the companies can go in for software standardisation for controlling the demands for constantly increasing level of computer literacy. This will slow the rate of change thus allowing time for educational process to complete.
13) Training and development personnel in the organisation should become proactive in addressing the changing environments. They will have to be innovative in order to meet new computer training needs in the organisation.

14) The companies should maintain indexes of end-users within the organisation, who have been trained as trainers and has specific expertise in areas related to end-user computing. This will help the end-users to quickly identify the persons whom they should contact in case they have problems.

15) This study has documented the willingness of end-users to exchange information and develop their own computer literacy skills. Therefore, companies should go in for networking rather than stand alone systems as it will help end-users to interact with each other and share their experience.
5.4 DIRECTION FOR FUTURE RESEARCH

Based on the research work undertaken the following are the future research recommendations:

1. The effectiveness of peers as a resource for self learning needs evaluation. Pre-tests and post-tests along with longitudinal studies may be used for finding out changes in performance of end-users who are trained by their peers.

2. There is a need to identify the potential group of end-users among manager, executives and professional staffs who may act as trainers.

3. Research is required to identify the attributes that are essential for end-users to become effective trainers.

4. This study may further be extended by studying the end-users by company size, culture, competition and technology base.
5. Longitudinal studies though difficult will be useful in assessing how the extent of involvement in T&D activities changes over a period due to various motivational techniques.

6. The research is needed to find out the perception of training and development staff regarding the learners' role in needs assessment, design, and implementation phases of training process.

7) Research is needed to consolidate the findings of researches related to end-user computing so that the industry and end-users may obtain maximum benefit from the researches.

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