

The characteristics of microcomputer support personnel: A normative perspective

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Microcomputers are being used extensively for business purposes. This use has created new jobs and careers for microcomputer support personnel. Definitions of three new positions: the microcomputer support person, the microcomputer-manager, and the super-user are presented, along with their selection, training and career needs. Additionally, suggestions for where to locate the micro support function are made.

North-Holland
Human Systems Management 7 (1988) 321-331

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This paper may be used by researchers and practitioners as a source of questions, needing investigation, regarding the microcomputer support function. Further, this paper may serve as an outline for educational and training programs for microcomputer support personnel.

Keywords: Microcomputer personnel, microcomputer managers, super-user, career paths, end-user computing.

1. Introduction

Microcomputers are becoming as pervasive and as essential to many organizations as the telephone. This growth in the business use of personal computers has created a need for personnel to support the users of these microcomputers. The bulk of the literature refers to these new professionals as micro-managers (e.g., [4,7]). The essential activities, according to Engstrom [4], for a micro-manager include answering questions from users, evaluating suppliers and products, setting standards and long-run goals for micro computing within the organization, purchasing hardware and software, developing applications for micro-users, and providing training services. Micro-managers have learned that sorting through the countless packages and products available for the microcomputer is a full-time job in and of itself. *

Petrosky [7] reports that it requires a certain personality to be an effective micro-manager. It requires an individual who likes to help people.



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Additionally, micro-managers need a moderately technical background so that they are able to distinguish between the microcomputer products available. In general, a consulting background is very helpful as many of the duties involve the training and education of users.

Warner [8] found that micro-managers are responsible for recommending software and hardware as well as providing support for training, installing and testing new products. It is important for the micro-manager to take a long-run view so that he or she is aware of how microcomputer technology fits into the corporate information processing environment. It becomes quite evident from the above descriptions of the micro-manager that supporting microcomputer use in organizations is no longer a job for one person but rather requires a diverse staff with a variety of skills and duties.

In all organizations there is a need to support users of microcomputers. Organizations, however, cope with this support problem in many different ways. Some organizations do not have a *formal* microcomputer group. In these organizations the work is done in an informal manner by some of the more skilled users. Occasionally a skilled user within a business department is formally assigned the job of supporting other departmental microcomputer users. Other organizations use the 'Information Center' approach where a group, independent of the MIS/DP department, is set up to provide organization-wide microcomputer support. Another option is to have microcomputer support provided by the MIS/DP department. As can be seen, there are many different ways to meet the microcomputer support needs of an organization or department. This paper discusses the emergence of microcomputer support staff and the job-related issues which surround this staff.

In particular we explore:

- (1) What are the various new professions that exist (or should exist) to support the business use of microcomputers?
- (2) Where should these people 'live' within the organization?
- (3) How do we select and train these individuals?
- (4) What will their career paths look like?

Our approach to answering these questions is normative, based on the limited research done so

far, and on our own experience in training microcomputer support personnel for corporations. In a search of the literature regarding microcomputer personnel the bulk of the references found (over thirty) were prescriptive trade articles providing little insight or guidance.

While a body of research is beginning to emerge regarding mainframe programmers, systems analysts, and project leaders (e.g. [2,5]) little, if any, research has been conducted focusing on microcomputer support personnel. This paper is, therefore, a first attempt to discuss a number of the issues that we believe are important regarding microcomputer support personnel. The purpose of this paper is not to test hypothesized relationships but rather to structure questions which need investigation. The description and recommendations which follow are therefore not based on a body of empirical research, as none exists, but rather on our analyses of current organizational policies regarding microcomputers, as well as, our experience in training individuals to assume an organizational microcomputer support role.

Section two of this paper defines three classes of microcomputer personnel: The 'SuperUser', the microcomputer support person, and the micro-manager. The skills and duties of each are outlined and discussed.

Section three discusses where within the organization the microcomputer support function should be located. Additionally, this section discusses the possible career paths of those within this function.

Section four outlines a selection procedure that has proven to be successful in other companies in filling each position within the microcomputer support function.

Section five discusses the training programs that are needed to prepare microcomputer support personnel for their jobs. The section includes a case description of a training program implemented in a large corporation.

The last section provides some concluding remarks.

2. Definitions of microcomputer support personnel

2.1. Job categories

Support staff for microcomputers can be divided into three categories:

- The microcomputer departmental specialist;
- The microcomputer support person;
- The microcomputer manager.

2.1.1. *The microcomputer departmental specialist*

The microcomputer departmental specialist, sometimes referred to as the 'SuperUser', is a support position which is evolving in most line departments which are heavy users of microcomputers. This support position, however, is informal and would not be found on most organizational charts. The microcomputer departmental specialist is a line person who in the course of his or her career 'discovered' the microcomputer and now makes heavy use of it. This person's involvement with microcomputers is voluntary and informal. He or she develops spreadsheets, databases or other microcomputer applications for him or herself as well as for other people in the department. The SuperUser is the first person other people in the department will turn to for help and advice. The SuperUser, while in no way a formal part of the microcomputer support group, is essential to the successful use of microcomputers in a department and should be cultivated. In a way, the SuperUser plays the role of a local Information Center (IC), and may formally develop into such a function should the departmental needs justify it.

2.1.2. *The microcomputer support person - MCSP*

Unlike the 'SuperUser' the MCSP is part of the formal microcomputer support group. Unlike his or her contemporaries in the MIS department, where computer science degrees may dominate, this person should have a business background with a degree in business administration, industrial engineering or a related area. This position requires an individual to be user-oriented rather than technically oriented. The MCSP must have strong interpersonal communication skills [6] as this position requires heavy user contact. The MCSP is not part of management but rather reports to the micro-manager.

The MCSP's job is to provide support to users who work with microcomputers. By support we mean providing what the user population requires to make microcomputers useful business tools. This may include ordering equipment, providing individual or group training, preparing documentation and/or training material. The MCSP may also build microcomputer applications, install

hardware, select software, and troubleshoot.

The MCSP is a highly visible position. He or she may work with many microcomputer users in many different departments and at many different levels (e.g., from data entry clerks to senior vice-presidents) - thus the importance of strong interpersonal communication and business skills. Additionally, the MCSP will have to be sensitive to the different microcomputer skill levels of the user population. The MCSP may have to provide extra 'hand holding' for new or novice users.

2.1.3. *The micro-manager*

The micro-manager is the person who oversees all microcomputer activities in the organization. This is a senior managerial position and should be filled with an experienced individual. The micro-manager needs a good understanding of the business culture and environment as this position will require the micro-manager to establish corporate standards regarding microcomputers hardware and software. The micro-manager will also have to work with senior management in MIS to make certain that the microcomputer policies integrate with the company's overall computing strategy. The micro-manager is primarily a strategist, setting goals and planning activities for his staff. This person is the agent that introduces microcomputers into the organization, introduces microcomputer awareness to top management, and coordinates with traditional MIS.

Fig. 1 graphically displays the different mix of business skills (skills relating to a particular business function such as accounting or finance, as well as, skills relating to understanding how the organization functions) and technical skills (skills relating to microcomputer hardware and software) required by each position.

2.2. *Duties of the microcomputer support staff*

In order to understand in detail the various tasks and duties of the microcomputer support staff, we will use the system life cycle phases [3]:

- (1) Problem and solution identification;
- (2) Software selection;
- (3) Hardware selection;
- (4) Procurement;
- (5) Application programming;
- (6) Training;

x - Denotes the minimal skills required

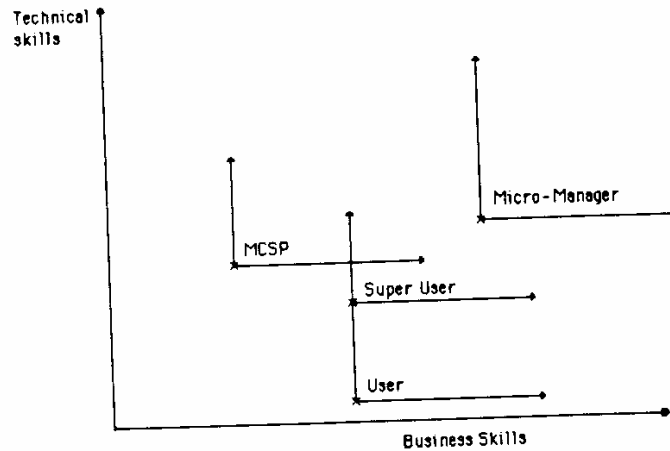


Fig. 1. Mix of skills required.

- (7) Support;
- (8) Security and backup;
- (9) Accessing the mainframe;
- (10) Upgrading and expanding.

The MCSP and microcomputer manager's roles and duties in each stage are detailed below.

2.2.1. Problem definition and solution identification

In this stage, the decision to use microcomputers rather than rely exclusively on the central computer facility is made. Ideally, in an environment in which the micro support group already exists, the micro-manager has a critical role in making this decision along with the effected users. This decision is often made in conjunction with senior MIS management. The MCSP has little involvement in these decisions.

2.2.2. Software selection

Software selection is more important, more critical and usually more complex than hardware selection [3]. Once software needs are established, a two-step process takes place:

- (1) *Selection of software types.* Within this step a decision is made whether spreadsheets or databases or some other application will be used. Both the MCSP and the micro-manager are the main players in this process.

- (2) *Selection of a specific brand.* The MCSP is the individual who actually reviews the various software packages (e.g., Paradox vs. dBase III plus), evaluates them and reports the results to the micro-manager. The role of the micro-manager is to select a certain package as a standard and make certain adequate support can be provided for the package.

2.2.3. Hardware selection

The decision to go with a particular hardware manufacturer (e.g., IBM versus Zenith) is usually made at a high level in the organization perhaps by the VP of MIS based on recommendations from the micro-manager. Decisions involving specific types of micro's (e.g., XT or AT, graphic monitors, expanded memory cards) are usually made by the micro-manager.

The MCSP acts as the micro-manager's assistant with regard to hardware selection. The MCSP reads the reviews on the various options, conducts tests of compatibility and capability and so forth, and forwards this information to the micro-manager.

2.2.4. Procurement

The micro-manager is responsible for the procurement process. The MCSP assists in evaluating vendors, and specifying the exact products they are to purchase.

2.2.5. Applications programming/customizing software applications

In this stage, the micro-manager sets the priorities of the various jobs for the MCSPs. The primary function of the MCSP is to develop these applications. Much of the work, however, is not really 'applications programming' in the traditional sense. Today's technology enables the MCSP to build most business applications without the need for conventional programming. Most applications will be using spreadsheet (Lotus 1-2-3, Symphony, etc.), and databases (dBase III, Paradox, etc.).

2.2.6. Training

The micro-manager establishes training programs. In some cases, companies may hire external consultants for training, or do the training in the company's training center using professional trainers. In this case the micro-manager sets the goals and outlines for the specific training programs, and the MCSP is not involved. In many cases however, the MCSP conducts classroom training and as the microcomputer staff grows large enough certain MCSPs may find they spend their time exclusively doing classroom training while other MCSPs do the development and support work.

2.2.7. User support

This is the main duty of the MCSP. His or her activities are to support the software packages, hardware, and communication links that have been provided to the microcomputer users.

2.2.8. Security and backup

The micro-manager is responsible for developing the security and backup procedures. The MCSP implements these procedures in the various departments.

2.2.9. Accessing the main computer system (networks and communications)

The micro-manager sets standards in conjunction with the management of the MIS department while the MCSP supports the users who need micro-mainframe links. Additionally, there is growing demand by users to tie their microcomputers into a LAN so they can share resources. The micro-manager is responsible for choosing the hardware and software for the LAN as well as

deciding on the configuration (file servers, etc.). The MCSP supports and trains those users who are hooked into and using the LAN.

2.2.10. Upgrading and expanding

Upgrading and expanding the microcomputer is a continual process. The MCSP evaluates new options, while the micro-manager makes the decisions regarding which options the company will support.

We can summarize the microcomputer personnel duties as follows:

The micro-manager:

- Makes decisions concerning microcomputer/mainframe solutions.
- Establishes software and hardware standards.
- Sets priorities for microcomputer application 'programming'.
- Develops training goals and programs.
- Develops appropriate security and backup procedures.
- Sets procedures for micro-mainframe connection and microcomputer networks.
- Makes decisions with respect to upgrading and expanding microcomputers.

The MCSP:

- Reviews software and hardware. Tests and evaluates software.
- Reviews professional periodicals and keeps up with the latest news in the field.
- Tests and evaluates hardware. Recommends configuration and hardware products.
- Develops microcomputer applications using software tools and existing software packages.
- Trains users.
- Supports users having problems with hardware, software or communication links.
- Tests, reviews and evaluates new software and hardware or upgrades.

3. Location of the micro-support group and career paths

In this section we will discuss where the micro-support group should be located as well as the career paths of three categories of personnel:

- The SuperUser;
- The MCSP;
- The micro-manager.

3.1. Location

The micro-manager does not fit well into the traditional DP shop [4]. Engstrom found that most micro-managers report to the director of MIS and when they don't there is often trouble resulting from a struggle for control. The micro-manager can be trapped between DP who want to maintain control and users who want fast service.

In general it seems to make more sense to have the micro support group lodged in the information center (IC) if one exists. Much of the philosophy of the information center, that of placing computing directly in the hands of the end users, is congruent with the goals of the micro support function. In fact, we expect that many information centers are currently providing microcomputer support.

Another possible option would be to locate the micro support group directly in the user department. This would assume that the department was large enough and, making sufficient use of microcomputers to justify the expense of their own microcomputer group. Such an option makes the most sense when a single line department is the primary user of microcomputers, otherwise, microcomputer support efforts will be duplicated in many departments. Such redundancy may not be bad but the company will have to decide if the cost of duplicate staff is justified over the savings provided by having a centralized support group.

3.2. Career paths

This section discusses the career options and career paths open to microcomputer personnel.

3.2.1. The SuperUser

The SuperUsers can remain within the line department and continue to be promoted within the normal line department channels. Alternatively, they can leave their departments and join the microcomputer support group as an MCSP. Thus, in many respects, the SuperUsers have a dual career path open for them.

3.2.2. The MCSP

The MCSP can be promoted to micro-manager. This requires that the MCSP develop the necessary managerial skills to supervise other MCSPs and the requisite technical skills to interface with the mainframe and communications staff.

The MCSP is a highly visible position. The MCSP may work very closely with senior managers in line departments and thus may have many opportunities for crossing over to a line department, perhaps as a SuperUser, and then moving up via the line department career opportunities. It is also possible that the MCSP may move into the MIS department as a systems analyst as the MCSP gains a great deal of analytic and design experience in solving microcomputer based problems.

3.2.3. The micro-manager

Microcomputers play an increasingly important role in the overall MIS computing strategy. The natural promotion for the micro-manager may be to IC department manager and ultimately MIS department manager. However, we expect that resistance to the promotion of the IC or micro-manager to MIS manager will be strong from senior levels of the traditional MIS department as they seek to retain the dominance of mainframe applications.

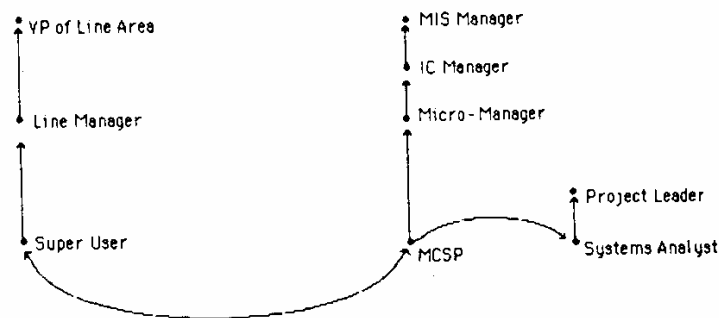


Fig. 2. Possible career paths.

It is unlikely that the micro-manager will be able to move into line departments as this position has little interaction with users. The micro-manager delegates much of the actual user services to the MCSPs while they plan overall strategy. Thus, if the corporation does not value microcomputers, the micro-manager may be a dead-end position.

Fig. 2 presents the possible career options for the three positions.

3.3. Career-related problems

Along with the career opportunities that microcomputers create we also expect to see a number of career-related problems as well. Some of these problems included:

- *Degradation of business skills*: As the microcomputer staff are involved in technical work, they may over time lose their business expertise (by business expertise we mean the functional area in which they are employed such as accounting). This may be particularly true for SuperUsers who have become MCPSPs and wish to return to their line departments. They may find that their business skills are no longer competitive and thus they may not have the option of returning to their prior line positions.

- *Quickly changing technology*: Microcomputer technology changes rapidly, and it is difficult to keep pace with these changes. This puts the MCSP and micro-manager in very pressured positions: On the one hand, they must invest much time just to keep technologically current. On the other hand, as a result of the introduction of new technology, many more people may find the microcomputer a useful business tool, expanding further the base of users. The result of these pressures are to further strain the already over-extended micro support staffs.

- *The 'closing' of the users' microcomputer literacy gap*: Initially MCSPs have much more knowledge of microcomputers than the users they support. Over time, this gap closes as the users spend more and more time with the microcomputer. MCSPs may find they are in the uncomfortable position of knowing less regarding a particular package than many of the day-to-day users they support.

- *The DP department 'Syndrome'*: As the variety of microcomputer-related issues broadens, MCSPs

will tend to specialize on a narrower facet of skills. Consequently, the support group will start to develop subgroups of experts, each proficient in a limited area. This stands in contradiction with the entire spirit of the MCSP profession which is to be an overall helper. Users will be referred from one MCSP to another, similar to what happens when they request assistance from traditional DP departments. Users' frustration will grow, and the whole philosophy of microcomputer support may be hampered.

Overall these problems may result in a great deal of frustration for the micro support staff. They find that as they try to keep pace with the rapidly changing technological environment they lose some of their business skills. Yet, while trying to serve an ever growing user base, their technological expertise is lessened as users have the 'luxury' of learning and using one or two packages in great depth while the micro support staff must learn a multitude of packages for their large client base.

4. The selection process

In this section we will deal with the selection criteria of the MCSP and the micro-manager.

4.1. Selecting the MCSP

The MCSP should be a college graduate with an educational background that suits the business environment of the organization. Possible majors would include business administration, engineering, economics, etc. As noted in section 2, this person must have strong communication skills as much of his or her time is spent in direct client contact. Additionally, good technical knowledge regarding microcomputer hardware and software is essential as is a desire to work closely with people.

Ideally, the MCSP would have 2-5 years of line experience in the organization, as this provides credibility with the client population. The ideal recruit for an MCSP will be a SuperUser who desires to spend more time working on microcomputers. It probably will not be possible nor necessarily desirable to recruit all MCSP staff from the ranks of your SuperUsers. Removing a SuperUser

from a line department may reduce the penetration of microcomputers in that department and increase the work load for the micro support staff as all questions are now referred to your group until a new SuperUser emerges within the line area.

Newly graduated students with degrees in business or management information systems are other potential sources of recruits for MCSP staff. Traditional mainframe computer science majors should be avoided as they tend to become bored with the microcomputer environment and have less of a business and service orientation than their business counterparts. If possible, all new hires should be rotated through line departments or placed in the company's management training program so they can acquire knowledge of the organizational culture and line operations. Regardless of the source of the staff, our experience in the recruiting and training of MCSP staff for other organizations has shown that the most successful MCSPs are those who have been 'bitten by the microcomputer bug' and are eager to spread their enthusiasm to others.

4.2. *Selecting the micro-manager*

The selection process of the micro-manager is unique for each company. However, there are some common characteristics that should be looked for in selecting this individual:

(1) This person should be able to join the company as senior management, preferably with several years of experience within the company. Although microcomputers may already be widely used in the organization much of this use is very limited (e.g., only word processing or simple spreadsheets) [9]. An important role for the micro-manager is to communicate to the user population the other business uses of the micro-computer. Accordingly, much of what this person will be doing is acting as an organizational change agent - changing the means (and perhaps the way) that the line accomplishes their work. In order to successfully accomplish this, the micro-manager will require a great deal of political sophistication and the ability to deal with pressure, from both the line departments and MIS (as MIS will probably perceive this person's activities as reducing their power). Thus the need for the

micro-manager to be relatively senior with political and business acumen.

(2) This person should have strong managerial skills and should have had prior experience supervising personnel. Managerial skills are important because as the microcomputer gains increasing business acceptance this individual's staff can grow rapidly.

(3) This person must have strong technical skills. These skills include both in-depth knowledge of microcomputer hardware and software, and knowledge of mainframe-micro communication networks and LANs. Networking skills are crucial because as the micro-manager's client base grows in sophistication, they will insist on facilities that permit data to be downloaded and uploaded directly from the mainframe as well as micro to micro communication.

(4) Experience has shown that the ideal micro-manager should not be recruited from the mainframe area. Mainframe personnel, in general, tend to have biases about microcomputers that limit their effectiveness in a role that requires them to be a microcomputer spokesperson.

5. **Training the MCSP**

This section of the paper will describe a training program designed for MCSPs. This program has been utilized very successfully by several corporations and is presented here as a prototype. The section consists of two parts. In the first part we provide the principles of the MCSP training program. The second part is based on a real case where a training program was applied. It outlines the program, describes the student selection process, and touches on follow-up practices.

5.1. *Training principles*

The MCSP training program has to cover three different areas:

- (1) Technical topics;
- (2) Business and organizational topics;
- (3) Interpersonal communication skills.

5.1.1. *Technical skills*

The MCSP training program must cover the following topics:

- Introduction to microcomputers: the micro-

computer revolution, the microcomputer marketplace.

- PC hardware: Input devices, output devices, system hardware, microprocessors, storage devices, cards, monitors and graphic devices.
- PC software: Operating systems, spreadsheets, databases and DBMS packages, utilities, word processing software, project management software, graphics, integrated software packages, window environment software, and specific training in certain standard software packages used by that organization.
- Microcomputer communications: Concepts, hardware, software.
- Networks and microcomputer to mainframe connections.
- Choosing software packages: Sources of information and methodologies.
- System analysis and design of microcomputer applications.
- Decision Support Systems on the microcomputer.
- The microcomputer application life cycle.

5.1.2. *Business and organizational skills*

The MCSP must be exposed to the following issues:

- The organizational structure of the Information center and DP department(s) (e.g. [1]).
- Modelling business problems.
- Management and control of microcomputer hardware and software acquisition, implementation and use.
- Costs and benefits of microcomputers.
- Microcomputer maintenance: Costs, timeliness and maintenance alternatives.
- Microcomputer life cycle costs.
- Managerial considerations in choosing hardware and software.
- End user computing in distributed environments.

5.1.3. *Interpersonal communication skills*

One of the most important skills of the MCSP is his or her ability to communicate with, train, and support various types of users. Therefore, the training program must sharpen the communications skills of the MCSPs. The training program includes:

- Oral communications: interviewing techniques;
- Presentations;
- Technical writing.

The above program can be developed and offered both by industry and universities. Such a program can be offered to either undergraduate MIS majors or MBA students. The training offered to undergraduates would focus on preparing them to enter organizations as MCSPs while the graduate training would prepare the student to enter as an MCSP and then to rapidly move into a micro-manager position. The next section portrays a training program recently implemented in a large corporation.

5.2. *A training program for MCSP*

Based on the aforementioned principles a training program was devised and implemented in a very large corporation. The corporation is a holding company, specializing mostly, but not exclusively in manufacturing. The company consists of a large number of plants and marketing firms organized in divisions according to product categories (e.g., food, steel, construction, chemicals). All together the company employs about 35,000 person. The target population for the first MCSP course was the manufacturing divisions.

We will first delineate the student selection process, then detail the course outline, and finally discuss some conclusions and follow-up procedures.

5.2.1. *The student selection process*

A 'Call for Registration' was distributed among all the subsidiary companies. The call described the contents of the course, the nature of the MCSP tasks, and the preferred background for candidates. All applicants were required to have taken a two-day microcomputer workshop offered by the corporate training center. About thirty application forms were submitted, from which, after initial screening, twenty five were summoned to an interview with the selection committee.

The selection committee consisted of four members: the director of the executive school of the company; a micro-manager in one of the divisions; the course coordinator; and one of the major instructors in the course (the two latter members were external consultants; they are also two of the co-authors of this paper).

The selection criteria were based on the guidelines presented in section 4.1 above, so they are not reiterated here. The students major varied

from Industrial and Production Engineering to Accounting, Economics, and Business Administration. The positions they held were in production management, financial analysis, financial control, economic analysis, and office administration. None had any professional experience with mainframe programming. Most of them, however, had been exposed to computer programming and use during their studies or as part of their job. The VP-Planning of the corporation had expressed his desire to participate and was also admitted.

5.2.2. MCSP course outline

The first MCSP course took place in June 1985. The topics were classified into four categories:

Table 1

<i>Category 1: Profound learning of packages</i>	
1.1. Lotus 1-2-3	20
1.2. dBASE III	25
1.3. Framework	15
1.4. DOS	5
	<hr/> 65
<i>Category 2: Hardware</i>	
2.1. Microcomputer hardware (one day hands-on where the students are required to disassemble and reassemble a microcomputer and some peripherals). Topics include types of microprocessors, board selection, choosing hard disks, differences in printers.	8
2.2. Communications and LANs	5
	<hr/> 13
<i>Category 3: Additional software packages</i>	
3.1. Symphony	2
3.2. Word Processing	2
3.3. Harvard Project Management	2
3.4. File manager	2
3.5. Electronic mail	2
	<hr/> 10
<i>Category 4: General topics</i>	
4.1. Office Automation	2
4.2. Prototyping and system development	4
4.3. Documentation and working procedures	1
4.4. The microcomputer	1
4.5. The Information concept	1
4.6. The incorporation of microcomputer applications into MIS	1
4.7. Case study analysis	2
4.8. Software selection	2
4.9. Concluding session: the role of the MCSP	2
	<hr/> 16
Grand total	104

- (1) Software packages that have to be mastered: These were representatives of spreadsheets (Lotus 1-2-3), DBMS (dBASE III), and integrated packages (Framework). DOS was also included in this category.
- (2) Hardware topics that require familiarity: Microcomputer hardware options, telecommunications and LANs.
- (3) Software packages that had to be learned but not mastered: Word processing, additional packages such as Symphony.
- (4) General topics related to MIS: The microcomputer market, prototyping and system development, Information Center concepts, etc.

The duration of the course was 12 days. Each day consisted of about eight hours of formal class meetings, while the evenings were dedicated to individual practice in the microcomputer classroom (usually students were in the microcomputer classroom until after midnight).

Each topic was normally taught in 'one shot', namely, from the beginning to the end without being interwoven with other topics. This maintained continuity and partially alleviated the problems of introducing too many technical topics in so short a period.

Table 1 presents the list of topics and the amount of time spent on each of them (in class hours - not including self-practice).

5.2.3. Course conclusions and follow-up

In the concluding session of the course the students were asked to fill out evaluation questionnaires, and also to reflect on the course verbally. The questionnaires, as well as the open discussion, expressed a very high level of satisfaction. However, there was also a feeling of hesitation relating to the challenge they would face and their ability to fulfill their mission once they were back in their organization.

These concerns alarmed both corporate and management consultants. Consequently, a reinforcement program was tailored and a series of monthly meetings was scheduled. A typical agenda for such a meeting included a lecture on recent developments in the area of software and hardware, and, more importantly, an open conversation where the new MCSPs described their experience, introduced the problems they had been facing, and exchanged advice and encouragement.

The above outline is divided into approximately 80% hands on training and 20% 'theory'. We believe this is also an appropriate structure for a SuperUser course. The only difference would be that the variety of software in the SuperUser course should be narrower. For a micro-manager curriculum, however, we suggest that the proportion between theory and hands-on be altered to about 40% hands-on and 60% theory. The theoretical part should deal with topics such as computer economics, microcomputer life-cycle, selection processes, distributed systems, and the like.

6. Conclusions and recommendations

The primary conclusions and recommendations of this paper are:

The traditional structures which are in place to serve the data processing needs of the organization are not adequate to effectively service the needs of end users employing microcomputer-based technologies. A support unit designated specifically to service microcomputer users should be established with non-mainframe support staff. Specifically, this paper discussed three classes of microcomputer support personnel: the micro-manager, the microcomputer support person (MCSP) and the SuperUser.

The duties and roles of these people were de-

finied based on our organizational experiences. We have proposed career paths for these personnel and raised problems which these new professionals are likely to encounter.

Finally, an MCSP training program which in the past has proven to be successful was outlined. Such training can be provided by either academia or industry.

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