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AN ANALYSIS OF THE EFFECTIVENESS OF AIR FORCE INFORMATION MANAGEMENT OFFICER TRAINING BASED ON THE PERCEIVED NEEDS OF CURRENT INFORMATION MANAGEMENT OFFICERS

THESIS

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THESIS

Presented to the Faculty of the School of Systems and
Logistics of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Information Resource Management

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Preface

The purpose of this study was to determine if Air Force Information Management (IM) officers who have had formal computer skills training through the information management program at Keesler AFB perceived themselves to be better prepared to meet the demands of their jobs than officers who lacked such training. The objective was to identify IM officers who had the computer skills training and those who completed the IM course prior to the implementation of the training to determine if that training made a difference.

In order to obtain the data, a questionnaire was administered to a stratified random sample of Air Force IM officers. The software used for compiling and manipulating data was Quattro Pro 3.0. Tables and pie charts to highlight given findings were created in Quattro Pro 3.0 and Word Perfect 5.1.

David P. Biros
Stewart J. Cole

During the course of producing this thesis, I have had a great deal of help from others. First and foremost, I am greatful to my wife, Pam, for creating a supportive atmosphere for me at home, listening to my gripes and problems, and understanding when my thesis work had to take precedence over other activities. I would also like to thank my thesis partner, Captain Stewart J. Cole, for

keeping this whole thesis business in the proper perspective. Finally, I wish to thank my thesis advisors, Lt Col John Huguley Jr. and Dr Ben Williams. Together they made a most supportive and helpful advising team.

David P. Biros

Through some twist of fate I was fortunate enough to have a thesis partner who was able to tolerate me, and I him, through the year this thesis took to produce. I am also greatful to his wife for the many meals when I happened to show up at dinner time. Our classmates were very helpful and always available for advice throughout this process. Finally, I would like to thank Kathy for her encouragement and support via AT&T.

Stewart J. Cole

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Abstract

The purpose of this study was to determine if the computer orientation courses provided Air Force information managers are properly focused and to identify any areas that may need more attention. Four investigative questions were proposed: (1) Did the courses meet the perceived computer training needs of the information management officers now working on the job? (2) Can all information management officers benefit from the same computer training? (3) Are the information management officers who complete a course including computer orientation and training better prepared to meet the computer related tasks and challenges than those officers who completed a course prior to the incorporation of computer training into the program and those officers who did not complete a course at all? (4) What are the main strengths and weaknesses, as perceived by the alumni, of the current information management officer programs as related to the instruction of computer oriented information management systems?

This study found that the courses have made the desired impact and, with minor exceptions, information managers perceive themselves to be more knowledgeable after the training. From the results of the survey it is apparent that information managers are more knowledgeable of computers than they were in a study completed in 1988. The

officers who attended training after the course was modified tc include computer orientation were much more satisfied with their training than previous graduates. They indicated a need for even more training on specific packages and applications.

One recommendation from this study is to include a self-paced computer aided instruction block on computers in place of the lock-step training currently provided. This training will be flexible enough to allow those managers with advanced skills to move at their own pace and use the course as a refresher. Another recommendation was to provide training on more of the specific word processing and data base packages and demonstrate methods of communication between packages. Finally, more applications of computer power should be addressed in the schools.

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I. Introduction

General Issue

In 1990, the United States federal government spent over $20 billion on acquiring new information systems (30:60). A large portion of these acquisitions were by the Department of Defense. In response to this growing trend, the Air Force placed the responsibility of many of those information systems into the hands of the information managers along with their other duties. To keep pace with the growing technology of information systems and ensure those systems are effectively used, logic would indicate that information management officers should be trained to meet those challenges.

Currently, the information management training program at Keesler Air Force Base, Mississippi, operates two courses to prepare information management officers for duties at either their current or next assignment. In an attempt to ensure the students' needs are being met, the base training center sends out a questionnaire to each of the course alumni as a means of acquiring feedback on program

effectiveness. According to Major Dale Beardall, director of the information management courses, the current feedback system does not properly evaluate the information management program for two major reasons (3). First, the questionnaires are generic and do not specifically investigate individual course content. In fact, the questionnaire given to the information management alumni is the same questionnaire given to the alumni of all other courses taught at Keesler. Second, very few of the questionnaires get returned by the alumni. Due to the poor response rate, the current system to evaluate course effectiveness cannot do the job. In order to properly evaluate course effectiveness, a comprehensive evaluation must be completed. Studies by individuals outside of Keesler's evaluation program proved to be useful in the past. A study by Captain Cheryl Coleman on the perceived level of computer knowledge of information management officers was the impetus toward the school incorporating a computer training block in its program (8). Furthermore, because of its impact, the study proved that more could be learned about the effectiveness of the program from studies dedicated to information managers than from a generic evaluation program.

In short, the information management courses at Keesler are in need of a comprehensive evaluation. Because the current system is not equipped to handle such an evaluation,

an external evaluation could give the program the information it needs to properly tune its computer training to meet the job demands of information management officers.

Specific Problem

Air Force information management officers are responsible for a myriad of Air Force computer oriented information management systems and each year that responsibility grows. This situation dictates the need to know if the current training programs meet the needs of Air Force information officers, and, if not, what can be incorporated into the program to meet the objectives. The purpose of this research was to evaluate the effectiveness of the information management officer courses and determine if they were meeting the needs of information management officers who attended them.

Investigative Questions

The following investigative questions were proposed to contribute to the solution of the specific problem mentioned above:

1. Did the courses meet the perceived computer training needs of the information management officers now working on the job?

2. Can all information management officers benefit from the same computer training?

3. Are the information management officers who complete a course including computer orientation and training better prepared to meet the computer related tasks and challenges than those officers who completed a course prior to the incorporation of computer training into the program and those officers who did not complete a course at all?

4. What are the main strengths and weaknesses, as perceived by the alumni, of the current information management officer programs as related to the instruction of computer oriented information management systems?

By answering these questions, inferences can be drawn to solve the specific problem and improve the effectiveness of the information management officer courses.

Justification of Research

Billions of dollars are being spent by the Department of Defense on information systems each year. The lost resources that coincide with the inability to effectively employ those systems is quite clear. Air Force information management officers must have a satisfactory level of computer literacy before arriving at their first duty station as an IM officer. Without such knowledge, they will not be able to comprehend the potential of the information systems under their purview, nor will they be able to effectively ensure their subordinates have such knowledge. Giving these officers an introduction to computer concepts

will at least give them the knowledge they need to put the information systems to work. If they do not receive any computer skills through Air Force training, it is quite possible that their unit's information system will see only a fraction of the use for which it was intended.

This study was also necessary due to the lack of a comprehensive evaluation process. The current course evaluation process at Keesler Air Force Base is not equipped to handle the such a specific focus. Further, since other independent studies have set a precedence of improving the information management courses, the potential is there for this study to be of value as well (2) (8).

Scope of Research

The scope of the research was limited to Air Force information management officers who are currently on the job in information management positions to include executive officers, section commanders, and Base Information Management officers. Further, the research was limited to information management officers in the continental United States (CONUS). An attempt to survey officers in information management positions outside the CONUS was not feasible due to time limitations.

Limitations

The following limitations were identified as possible hindrances to the research.

1. Sample Selection: Information managers outside the CONUS were excluded from the survey. However, since their duties vary little from those of fellow CONUS officers, this limitation did not appear to be restricting.

2. Bias/Apathy: The mood of the individual at the time the survey was administered may cause bias. Also, the overall experience or remembrance of the experience the individual had while attending the course (good or bad) may cause bias. Finally, the extent to which the individual taking the survey cared about what the survey accomplished is a factor involving the level of response.

Definition of Terms

Computer literacy is defined many different ways. One article reviewed suggests that "computer literacy is not a single set of skills. You may be literate in one of four different areas: hardware, languages, operating systems, and applications" (40:87). While an individual may be literate in one area, he may be considered illiterate by someone who is literate in another area. The varying definitions of computer literacy make it difficult to compare attitudes expressed in some studies. Chester Delaney stated in the Training & Development Journal, "Computer literacy should mean what literacy has always meant--an appropriate degree of fluency in a particular medium" (10:49). For the purpose of this study, the term computer literacy is broadly defined as a knowledge of

computers sufficient to understand possible applications and limitations in the manager's specific area of expertise.

Training, in comparison to literacy, is not as elusive a term to define. In the computer world, training is different from education. Training must include more than education in understanding a particular function of the computer. It includes the practical application of that knowledge base.

> Training is guiding or controlling organizational members to enable proficient and qualified performance of tasks and decisions. In this view, the training concept extends beyond mere skill acquisition. It includes the learning and background necessary to make informed choices or decisions. (36:6)

Overview

The following chapter is a review of the current literature relevant to the study. Chapter 3 is a complete description of the methodology used in the study. Chapter 4 is an analysis of the data collected from the respondents in the study. Finally, in Chapter 5, conclusions are drawn from the analyzed data to answer the investigative questions in support of solving the specific problem. Further, recommendations were made for course improvements and suggestions are offered toward areas of future research.

II. Literature Review

Introduction

This literature review presents the level of computer literacy in management, the requirement for managers to become computer literate, the type of literacy training needed, and the best way to provide the training, considering expectations and limitations of the trainees, as well as training obstacles.

Considering the technology available and the reliance of government and business on the personal computer, it is important to recognize any deficit in implementation to enable management to make the best possible use of these tools. Recognizing the need for computer literacy, Warren McFarlan, head of the Management Information Systems faculty at Harvard Business School, stated, "The general managers of the next 30 years will be unable to do their jobs without a firm grasp of information management" (14:70). Harvard requires courses in information management to ensure computer literacy in its MBA graduates (14:70).

Level of Computer Literacy

Computer literacy in management is lacking. Despite the controversy over a specific definition for computer literacy, there is a consensus among managers throughout business and government on the need for more computer literacy. A survey of business managers conducted in 1986

pointed this out. "The executives who were surveyed had very limited education in computers" (28:38). Well over 50 percent of the business managers in that survey had one course or less in computers (28:38).

Government managers also face computer literacy difficulties. "When asked to anticipate the greatest training needs facing local government during the next ten years . . . computer literacy and budgeting will be most needed as they gear up for the twenty-first century" (38:398-399). A 1988 study of computer utilization by managers and staff in US city governments found a lack of computer literacy. Despite reported extensive use of computers, 75 percent of managers rated their training as less than acceptable in preparing them to deal with applications they needed. Their training in undergraduate programs was reported to be "too short, too sporadic, and too poor in quality" (22:451). Although their training allowed some use of the computer systems, it also resulted in systems not being used to their full potential.

The Air Force mirrors the public's lack of literacy at all levels of management. A survey conducted in 1987 indicated over 75 percent of officers attending Air Command and Staff College owned a personal computer (20:14). Although this may lead to the conclusion that upper level managers in the Air Force are computer literate, the same survey queried the respondents on the need for an

introduction to microcomputers. A majority felt such a course would be beneficial (20:15). Clearly, by this study, it is evident that these senior Air Force managers also recognize a deficit in their level of computer literacy.

At the mid-management level, Capt Cheryl Coleman also noted a low level of computer literacy among Air Force information management officers (8:75). She specifically noted:

> More than one half of the comments were concerned with the lack of computer training available. One respondent commented that, 'understanding computers is essential to all we do and computer skills courses must be mandatory in technical training schools programs.' (8:75)

In his thesis, 1st Lt Howard Bass determined the difference in the perceived level of computer literacy was insignificant between senior non-commissioned officers compared to the lower enlisted ranks in the information management field, but overall perceived literacy was only slightly above 60 percent (2:45).

Need for Computer Literacy

Just as there are varying opinions on a definition for computer literacy there are also opposing opinions on the need for computer literacy training. As Tania Zouikin, a partner in an investment-management firm, points out, "Even if you don't apply it yourself, you have to manage it, and you can't manage it if you don't understand it" (14:70). The Training Development Journal supports that position.

"The gains a company realizes from new technologies reflect the expectations of the company's managers" (29:83). A study done at the Massachusetts Institute of Technology made it clear that managers who understood the capabilities of the computers were able to employ them more effectively. Further, Steven Appelbaum and Brenda Primmer point out "managers who are more receptive to computers will be more effective in getting their employees to accept them" (1:10). This sentiment is echoed by Shazly and Durand in their article "User Training is Necessary Throughout the SDLC":

> The previous emphasis on technological advances has obscured the most important element in the information life cycle: the human factor. Without training, managers, systems personnel and users are less able to specify, guide development or effectively utilize available systems...If managers are not sufficiently knowledgeable (i.e., trained), then they may decide erroneously to abandon a feasible or important system, or even worse they may approve an inappropriate system. (36:8)

A study completed in 1987 on high school teachers supports this position (26:72).

Major Thomas James, in his report to the Air Command and Staff College, quoted the Air Force Management Analysis Group on Data Systems Management: "A major campaign should be conducted to improve the computer literacy of Air Force personnel. A need exists to develop short term courses for commanders and senior managers" (20:17). As pointed out in The Behavioral Side of MIS, the blame for shortcomings in the management information systems field is on "top managements' lack of involvement in the design of corporate

systems" (12:261). Leslie Bryan goes directly to the point in addressing the need for computer literacy in management, "First-line supervisors must become computer literate or they will not be productive" (5:38).

McCullough and Wooten explain that top executives feel they do benefit from computer skills and output. Like the article by Dickson and Simmons, this article says that "Executives spend little time working directly with computers," but it also states that 67 percent of the executives polled felt that computer skills were either "very important" or "extremely important" (28:40). Further, none of the executives thought computer skills were unimportant (28:40).

An MIT study which examined how three companies treated new management information systems in their organizations found that many executives took computer skills very seriously, resulting in the highest level of usefulness in the company's information system (29:83). Again, this suggests that many executives feel they have a real need for computer skills. The findings of the researchers in the MIT study further support the idea that executives will need these computer skills in the coming years (29:84). Their conclusions also imply that managers need computer skills to perform their duties efficiently. The MIT study adds the weight of experts in the field to that of researchers on the subject and of executives themselves concluding that

computer skills are necessary (or will be soon) for managers to effectively perform in the future.

Another impact caused by the lack of computer literacy was pointed out by Raho and Belohlav. Already heavily tasked in most companies to provide customized, sophisticated applications, management information systems departments are also inundated with requests for support from uneducated users (31:18). The secondary costs involved in failure to train personnel are miniscule when compared with the costs of equipment that is either idle or improperly employed.

Over one and a quarter million microcomputers were in government offices at the end of 1990 (21:37). The Office of Management and Budget is expected to spend over $20 billion on new computer systems in 1991 and estimated "that obligations for federal agencies' information technology rose from $9 billion in 1982 to $17.6 billion in 1989" (32:44). With this type of computing power available, a vast resource and significant investment is severely limited through lack of proper training. "Organizations are spending too much money on hardware, software, and networks without appreciating what they are actually getting" (35:50).

The General Accounting Office is also taking note of the high costs of information technology. In 1983, they created a new division, Information Management and

Technology (IMTEC), which focuses on the direct and indirect costs of information management. The Government Executive article goes on to point out, "In the end, IMTEC's agenda is not just to increase awareness, but to warn managers to pay attention, get involved and educate themselves about information technology" (30:60). Information managers must be trained for the task at hand. Without proper training more waste and inefficiency is inevitable. "In GAO's view it is public managers who are ultimately charged with correcting the mess" (30:60).

Not all authors were as enthusiastic in embracing computer literacy training as a panacea for the problems associated with computer literacy of management. In an article published in Technology Review, an opposing view is presented. "As a fundamental skill, computer literacy is oversold, misapplied, and basically trivial in most schools" (33:59). The results of a study published in the Journal of Computer Based Instruction concur with this view, indicating "that neither the awareness of what computers can do nor the knowledge of a programming language is sufficient enough to change subjects' attitudes toward computers" (27:26).

Although it may seem we are at a point in information technology where technology is driving business instead of managers driving it, managers must learn how to use available tools and learn to recognize future applications or be doomed to always be used by the tool. Over two thirds

of a manager's time is involved with passing information. Without the knowledge to tap all resources of information, the manager becomes less productive and millions of dollars will continue to be wasted on information systems that they, and their subordinates, are not prepared to operate. Computers and their surrounding technology cannot be effective unless we properly train personnel to apply them (39:196).

What is Needed

"The knowledge of technology should be like the knowledge of marketing or advertising--how it fits into the whole scheme of things" (14:76). Several other authors support this position. Among them, Paul Strassman, Director of Information Management for the Department of Defense, stated:

> It is more important to learn how information technology can be shaped to meet the needs of organizations. The sequence, evolution, and application of information technology must be secondary to the pursuit of managerial objectives. (39:202)

Computer literacy classes often "focus inappropriately on the technology" (33:62). More consideration must be given to using computers, ethics of computer usage, and the implications of creating computer systems (33:65). Computer literacy training has previously been misdirected. James Slack suggests, "computer training might call for simply instructing staff members how to 'plug in' the PC" (38:402). This approach, although seemingly simplistic, is more in

line with the attitude of Steven Appelbaum and Brenda Primmer in their article in Personnel. They state the first step is to identify the specific needs and then to follow up the training with confidential feedback to ensure the training is meeting the required need (1:11). The typical computer literacy course of the past will be insufficient to meet the needs of tomorrow's managers. Companies "must ensure that their employees are thoroughly and properly trained in the uses and possibilities of the equipment" (29:84). This is reiterated by Jim Hall-Sheehy in a report on 21 Houston-based companies. "In almost every situation, there was little or no emphasis on understanding the capabilities of a computer or how to use it to solve problems" (17:25).

Lisa Long, in the Government Executive, listed these staples for a productive office: "A PC network with word processing, spreadsheet, personal information management and data base software; an electronic mail system; modems; facsimile communications; and voice mail" (25:45). Most systems in the Air Force contain most or all of these tools but often are unused, or used to less than their full potential, due to lack of trained users. These staples are considered only a beginning. An information manager trained in some of the capabilities of the PC would find uses well beyond this start. "The user typically does not need to learn a complex computer language or details about the

hardware, but rather the production requirements and tasks the computer supports" (5:39). However, as Dr Cary Hughes points out, "The user must thoroughly understand how to use the system or the natural concentration patterns are sure to be interrupted" (19:15).

When small businesses responded to a survey documented in the Journal of Systems Management, they indicated more formal training would have been beneficial in implementing their computer systems. Computer jargon, software applications, and operator training were specifically mentioned (34:9). The time involved in training to use a particular applications program is often vastly underestimated. The new manager on the job seldom has the time to devote to learning software simultaneously. "It takes 8 to 12 hours to learn enough to be comfortable using one of the more popular electronic spreadsheet software packages... Nothing fancy, mind you. Just getting to the point where you can do something yourself" (17:24).

To ensure managers have the needed skills, they will have to be trained in the basics before they arrive for work. However, teaching specific packages alone is not enough. "In short, a lot of people are learning the basics of products and not much about the computers" (17:24). The authors are not suggesting full blown computer engineering, rather an understanding of applications.

Ronni Rosenberg warns in her article, "Debunking Computer Literacy," computer literacy training alone "teaches shallow recognition of jargon, components, and a few applications on very simple computers. It produces students who may believe themselves to be computer literate but who know nothing about real world computing" (33:60). Christopher Daniel makes a seemingly obvious suggestion, "(1) Determine which computer skills and systems will be most important to the future success of the department and (2) develop expertise in those areas" (9:28).

It is important to recognize that computer training, like all other forms of learning advances through stages. Just as a karate student would not be expected to successfully ward off an attacker with his new skills after only a few lessons, a new computer user cannot be expected to demonstrate an increase in productivity until after considerable training. This training is one of the associated costs of the new technology. Lack of proper training in the basics, such as disk operating systems and file system structures, "could result in additional costs--in short a drop in productivity." (6:1) Managers without proper training may end up corrupting irrecoverable important data through their sincere good intentions to learn the system on their own.

After learning the basics, the next step is to provide training on packages that are similar to software tools the

manager may encounter and may be able to apply to his existing work. Finally, after having an introduction to the basics and some common computer tools, the manager is ready to apply computer use to organization problems (6:1). In summary, it is essential that personnel are trained to understand the potential of the information systems they use so they can adapt it to their work environment effectively.

Computer Orientation and Training of Managers

There are many considerations that must be taken into account when planning the computer orientation and/or training of managers (or any other individuals who need to learn computer skills). A study published in Personnel Psychology, "The Influence of Training Method and Trainee Age on the Acquisition of Computer Skills," tentatively concluded that "age-related differences in confidence could inhibit training program performance for older trainees" (15:257). Since many managers fall into the category of "older trainee," this could have a profound influence on training success. The study went on to look at two styles of training and determined which would be better for the older trainee. The older trainees seem to prefer and perform better when learning under a modeling approach as opposed to a tutorial approach (15:262). With modeling the trainee sees a program run through to its conclusion whereas with a tutorial the trainee sees a step-by-step process (15:259).

Bass surveyed respondents on their preference for learning environment and concluded:

> Over 60% of those participating in this study revealed they prefer learning in a group as opposed to 32% who believed they learned best alone. Learning by doing was definitely preferred by the respondents as 94% said they like to learn using this method. Responses to the questions concerning specificity of instructions indicated that the respondents desired to have general instructions as opposed to more specific. Over 60% of those surveyed revealed a lack of concern for specific instructions indicating instead a preference for more generalized guidance. When it came to the specifics of how something operates, however there was a different opinion. Over 50% of the respondees said they wanted to know how something works before using it. They were not satisfied in knowing just how to operate it. (2:71)

Another consideration that must be taken into account when developing a training program is that of end user learning styles. In "The Importance of Learning Style in End-User Training" two methods of training were used. The first was "exploration oriented (inductive, trial and error, high learner control, incomplete learning material irrelevant task focus)." The second method was "instruction oriented (deductive, programmed, low learner control, complete materials, features focus)" (4:103). The study concluded that the abstract learner usually performed better than concrete learners, but emphasized that "training methods need to be tailored to individual learning modes" (4:113). As with the age of the trainee, the learning style also has to be taken into consideration when developing a training program.

Continuing in this train of thought, Dickinson and Simmons point out that all new learners need time with their instructors to learn about the system (12:263). Specifically, they state that to "minimize the dysfunctional consequences of a general lack of understanding of the system, a substantial percentage of the analyst's time--perhaps 25-30 percent--should be reserved for communication with the users of the information" (12:263). Leslie Bryan concurs. "When the supervisor does need to be trained, using a trainer--even a trained co-worker--is easier and more effective than self-study" (5:39). Since, in many organizations the analysts are the instructors (to the managers) this must be considered when teaching computer skills. In presentations to audiences all over the world, Rear Admiral Grace Hopper, USN, facetiously suggests bringing in 12 year-olds to teach computer literacy to top managers because they are not afraid of the managers or the systems.

"An HR_I for Computer Anxiety" discusses the human factor in system and training design (1:10). The authors provided a number of suggestions to help develop the training process in such a way as to account for the human factors. One such way is to tailor training materials. In the case of the top level manager, tailoring would mean presenting material in the context he might receive it on the job to give him realistic training. Further, as top

level managers usually only need to generate reports, a basic course may be all that is needed for them (1:10). Another suggestion the authors provide is to build flexibility into the training schedule "so that individuals can choose a time frame that meets their work demands" (1:10). As top level managers often have rigorous schedules, this suggestion may be vital in ensuring they get the training they need. A final note warns that it is important not to "expect miracles overnight" (1:10).

The levels of learning must be understood to have a successful training program. Many courses of study encourage nothing more than rote learning. "The lowest level, rote learning, is the ability to repeat back something which one has been taught without understanding or being able to apply what has been learned" (11:12). This level, while appropriate for some situations, is totally inappropriate for computer training. "Progressively higher levels of learning are understanding what has been taught, achieving the skill to apply what has been learned and to perform correctly, and correlating" (11:12). The user must be trained to at least the level of application and preferably to the level of correlating. At this latter level, users will be able to see beyond the simplest applications of the computer. The benefits will include more insightful computer use, computer products that are

better suited to needs, faster development times, and generally higher productivity (24:38).

Expectations and Limitations of Trainees

To adequately determine what level of training is needed, realistic expectations must first be agreed upon. This is the central theme of the article, "End User Training In Office Automation: Matching Expectations." "Knowing the commands does not automatically increase your ability to carry out more advanced spreadsheet analysis" (18:7). In further explanation the authors continue:

> End user training involves three components: (1) conceptual perspective of the business problem, (2) conceptual perspective of the software tool and (3) task domain knowledge. (18:8).

Although training a user to employ a word processor does not breed expectations of improving writing abilities, teaching the use of productivity software often leads to expectations of increased analytical ability (18:8). If that is the end goal, then training will have to encompass situation analysis and problem solving.

Just as managers need to be familiar with the computer's applications, they also need to understand its limitations. This is graphically brought out by a reminder in the Technology Review:

> Consider the 1988 episode in which the USS Vincennes shot down an Iranian passenger plane in the Persian Gulf. A narrow perspective focuses on the ship's computerized sensors. A wider perspective includes the Vincennes personnel who operated intelligence-processing equipment and

> made decisions based on its output. The widest perspective considers the context in which the incident took place--in a politically unstable location, in an ongoing military crisis (the ship had been under attack), and in a setting very different from the open seas for which the computerized intelligence system was designed. This wide perspective teaches an important general principle: unexpected problems arise when a computer-driven system is used in unusual ways. (33:64)

Training Obstacles

Two primary obstacles must be overcome when acquainting managers with computers. The first is the obstacle of computer anxiety. Managers, like all other new computer users, may find themselves very intimidated by computers. They could have concerns that if they cannot adapt to the new technology, they will fall behind. They may also feel they will look foolish as a novice with this new tool. Because of this, many managers try to avoid the information system and rely on subordinates to run it for them. To deal with this anxiety, those individuals instructing top level managers (or anyone else) have to start with the basics and develop a systematic training program which eventually eases the anxiety (37:15).

A second obstacle that must be overcome is the resistance to change in the work place. This not only includes introducing computers into the work environment, but also involves changing the way work is done (i.e. switching to an automated way of doing things as opposed to a manual way). "There is nothing new about resistance to

a manual way). "There is nothing new about resistance to technical change ...workers [at all levels] have resisted changes that threatened their accustomed way of life" (23:67). One way to overcome this resistance is by initiating the transfor- ation at a speed that the employee is able to accept and digest it (23:69). In terms of introducing computer skills, this may mean implementing the new user's instruction and use of the computer in small increments.

Summary

Despite some controversy over the definition of computer literacy, the majority of the articles included in this review agree that some form of computer literacy is needed to be able to effectively manage and use all of the computer resources available. The example of the USS Vincennes illustrates the devastating effects a computer can have when its limitations are not recognized. Although less dramatic, failure to recognize applications for computer systems can result in loss of a competitive edge.

This literature review also points out the low level of current computer literacy in management, as managers recognize their needs compared to their skills. To be effective, computer literacy training must be directly concerned with the specific needs of each manager and avoid the typical plunge into training on computer technology. Computer users must not only be taught the basics, but they

must also have an awareness of the information system's potential if that system is to be employed cost effectively.

III. Methodology

Introduction

As stated in Chapter 1, the purpose of this research was to evaluate the effectiveness of the information management officer courses and determine if they are meeting the needs of information management officers who attend them. The following is an explanation of the method taken in the problem solving process including information on the size of the population under study, sampling frame, and sample to be taken. It also covers the method in which data was collected, how it is organized, and which statistical tests have been performed.

Explanation of Research Method

The method used to gather information for the investigation was a mail survey in the form of a questionnaire. A review of all possible methods revealed that the questionnaire is more advantageous than other means of survey data collection (specifically telephone interview and personnel interview). First, a mail questionnaire is the least expensive in terms of time and money. Second, there is more opportunity for a dispersed sample. Third, a mailed questionnaire is perceived as more anonymous. Fourth, it requires less manpower than the other means of data collection. Finally, it allowed the respondents time

to think back to when they took one of the courses as opposed to making hasty or unsure answers.

There are certain disadvantages to the mail survey as well. A low response rate is the primary disadvantage. This may be offset by accomplishing follow-up calls to the respondents, providing an addressed and stamped envelope for easy return, and introducing the survey to the individuals by means of a letter stressing the importance of their feedback. Another disadvantage is that there is no means for intervention or probing deeper into an answer as the interviewer is not present. The questionnaire used for this research countered this problem by encouraging the respondents to add additional comments they feel would be helpful may allow for more extensive feedback. Care was also taken to ensure the survey was neither long nor complex. Finally, there was a concern that the respondents who do return the surveys represent the extremes of the population. Efforts were made to avoid this impact by ensuring validity and reliability in the survey instrument.

In view of the number of information management officers and the need for a low cost method which can cover a large area, the mail survey was the best of the three survey methods for the task at hand (13:338). Other studies dealing in the same realm as this study also found the mailed survey to provide appropriate and useful data (8).

Population

The population of study in this project was comprised of all Air Force Information Management officers in information management positions.

Sampling Frame

The sampling frame consisted of all information management officers with at least 60 days in their current jobs. To limit the population to only those who have had one of the courses offered at Keesler Air Force Base would not allow the study to compare the perceived skills of those who have had the course and those who have not. The restriction to those who have had at least 60 days of experience on the jobs is required to allow the respondents to have some time to learn exactly what their jobs require.

Sample

A stratified random sample was taken from the sampling frame. First, the required sample size was calculated based on a 90 percent confidence interval. The size was calculated as follows (16:11-14):

$$n = \frac{N(z^2)p(1-p)}{(N-1)(d^2) + (z^2)p(1-p)}$$

where: n = sample size
p = maximum sample size factor (.5)
d = desired tolerance (.05)
z = factor of assurance - 1.645 for a 90 percent confidence level.

Once the appropriate sample size was calculated, care was taken to overcome the major shortcoming of a mailed

survey--poor rate of response. In order to lessen this problem, the sample size was doubled. Therefore, if the response rate is only 50 percent of the mailed surveys sent out, it was still enough to meet the needs of a 90 percent confidence interval. In this case, however, the response rate was over 60 percent. Further, the sample was stratified in an attempt to mirror the population of officers who completed the courses before and after computer training was incorporated into the program.

Instrument Development and Testing

The proposed instrument consisted of a series of measurement questions designed so that when their answers are combined with answers of other measurement questions, they would comprise the answers to each of the investigative questions. For convenience, the investigative questions are repeated:

1. Did the courses meet the perceived computer training needs of the information management officers now working on the job?

2. Can all information management officers benefit from the same computer training?

3. Are the information management officers who complete a course including computer orientation and training better prepared to meet the computer related tasks and challenges than those officers who completed a course prior to the incorporation of computer training into the

program and those officers who did not complete a course at all?

4. What are the main strengths and weaknesses, as perceived by the alumni, of the current information management officer programs as related to the instruction of computer oriented information management systems?

Again, each investigative question was represented by a number of measurement questions. For instance, to answer investigative question 2, some of the measurement questions involved asking the respondents what level of computers skills they had before going to the course and what type computer applications they currently use on the job.

In order to test the content of the survey, it was administered to 8 information resource management graduate students at the Air Force Institute of Technology who had considerable experience in positions currently held by the respondents. Feedback was noted and used to ensure the survey was comprehensible, could be accomplished in a minimal period of time, and the answers were relevant to the investigative questions.

Data Collection Plan

Evidence of Data Validity. By administering the survey to the graduate students mentioned in the last paragraph, the measurement questions were evaluated for validity. Both internal validity and external validity were of concern in this study. Internal validity is concerned with the ability

of the measurement instrument to measure what it was designed to measure (13:180). By using the information management experts to test the study, internal validity was strengthened. As for external validity, the ability of the data to be "generalized across persons, settings, and times," the emphasis is different (13:180). Since this study used a stratified random sample of all information management officers covering all realms of the field, the ability to generalize the findings was not hindered.

Scoring, Grouping, and Summarizing Data. Most of the measurement questions had answer sets in the form of Likert scales. That is, the respondent had a given number of possible answers from which to choose. For example, some of the questions had the six following possible answers: 1) very unfamiliar, 2) moderately unfamiliar, 3) slightly unfamiliar, 4) slightly familiar, 5) moderately familiar and 6) very familiar. Some of the other questions required answers that were nominal in nature. For instance, "Have you taken an information management course at Keesler Air Force Base?" can only be yes or no. There was also an opportunity for the respondents to answer some of the questions in their own words.

The measurement questions had no particular grouping. Care was taken to avoid grouping all questions employed to answer a single investigative question. If all like questions were grouped, a respondent's answers may be biased

because the answer of one question could influence the answer of following like questions. By spreading like questions throughout the measurement instrument, reliability was improved by ensuring the respondent answered consistently without influence from a previous question.

To summarize the collected data, answers to the measurement questions were collected and noted, totaled, and regrouped with their corresponding investigative questions. After analysis, generalizations to the investigative questions were made from the data collected through the measurement questions.

Statistical Tests

Much of the data collected was summarized through the use of spreadsheet software. The program used for this study was Quattro Pro 3.0. Some of the procedures used for data analysis were frequency distributions, percentage calculations, and pie charts. An analysis of the data is presented in Chapter IV.

IV. Questionnaire Response Analysis

Introduction

The intent of this research was to evaluate the effectiveness of the information management officer courses and determine if they are meeting the needs of information management officers who attend them. Further, if it was determined that those needs were not being met, then the research also made an attempt to identify problem areas and to offer solutions toward the improvement of those areas.

A questionnaire composed of 83 questions was used. A stratified random sample of 400 information management officers was selected (twice the number needed for the selected confidence interval), the questionnaires were mailed, and 255 (over 63 percent) of the sample officers responded.

The questionnaire was comprised of six sections. The first five sections included demographics, familiarity of computer concepts, place where knowledge of each concept was obtained, importance of each concept on the job, and applicability of computer education. The final section consisted of three open-ended questions designed to allow respondents to give their own opinions regarding the computer training in the information management officer courses, what improvements could be made, and how the Air Force manages computers in general. Data from each of the

sections of the questionnaire are reported in this chapter through the use of tables and pie charts.

Respondent Demographic Data

The purpose of Part I of the questionnaire was to gather demographic data about the respondents. The demographic data included age, rank, gender, educational level, number of years of active military service, current Air Force Specialty Code, time in current job, and questions regarding attendance at the information management courses at Keesler Air Force Base.

Age. Nearly half of the respondents were 20 to 30 years of age. Those 31 to 40 years of age were in the second largest group followed by those 40 and over. A thesis produced four years ago researching the same population with the same sample size found the largest age group to be the 31 to 40 year group (8:36). This finding suggests that the average age of the population is decreasing. A pie chart illustrating current research findings is shown below in Figure 1.

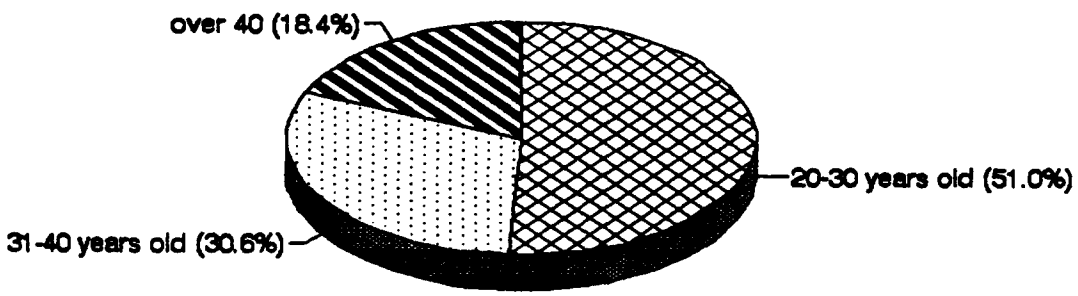

Figure 1. Age Distribution

Rank. The clear majority of respondents for this research were company grade officers. Captains account for nearly one half of that majority. Field grade officers account for only 35 responses. Since the program at Keesler is design for officers entering the IM and Base IM fields and company grade officers are usually at the entry level, it appears the correct officers were contacted for the research. A breakdown of the respondents by rank is illustrated in Figure 2.

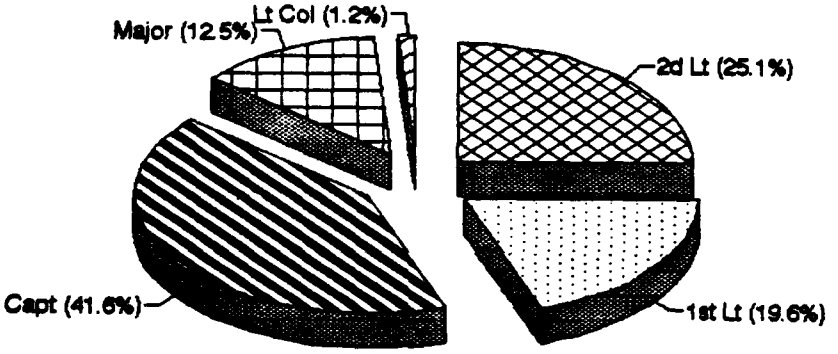

Figure 2. Rank Distribution

Gender. Of the 255 respondents 164 were males and 91 were females. Overall, the percentage of female respondents who have completed a course with computer training is roughly equal to that of males. Whereas 29.88 percent of the males completed an IM course with computer training, 30.77 percent of the females had the same type of course. This suggests that males and females as groups have had roughly the same amount of IM computer training. A breakdown by gender is shown in Figure 3.

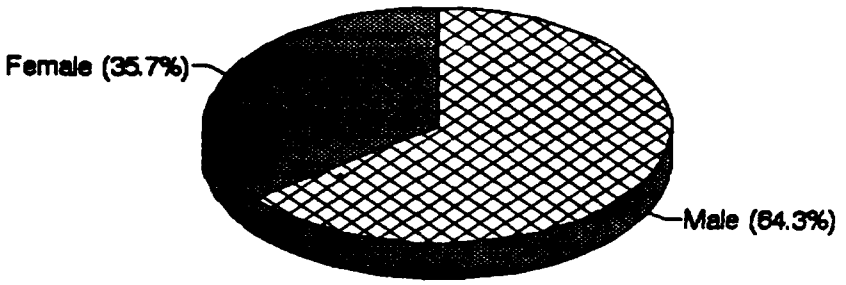

Figure 3. Gender Distribution

Educational Level. Nearly two thirds of the officers who responded had attained an educational level beyond a Bachelors degree. While none of the respondents had a doctoral degree, 19 had completed some post-graduate work. Since there is such a large number who either have a graduate degree or are working on one, civil education was listed as the source of computer training in questions 33 through 54. A break down by education level is illustrated in Figure 4.

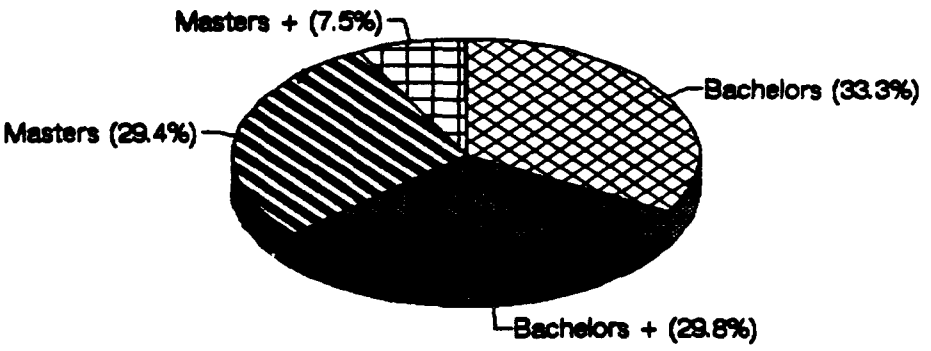

Figure 4. Educational Level Distribution

Active Military Service. The two largest categories of respondents in terms of Total Military Active Duty Service were those who had less than 3 years of service and those who had more than 15 years of service. The former category consisted of 26.27 percent of the respondents while the latter consisted of 24.31 percent of the respondents. The majority of respondents had less than 9 years of service. The frequency distribution of active military service is illustrated in Figure 5.

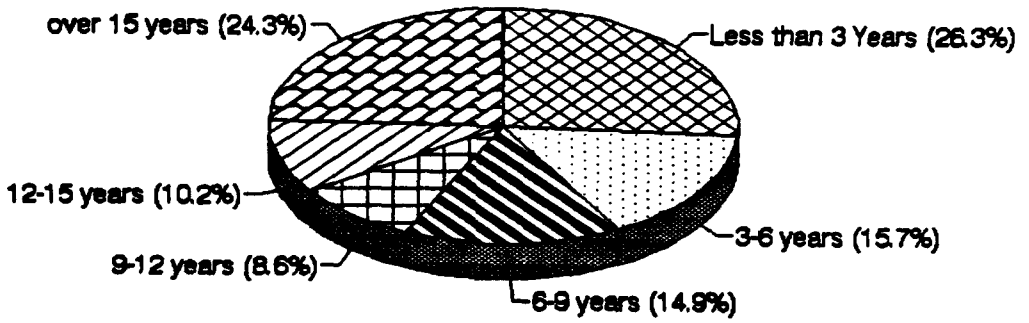

Figure 5. Active Military Service Distribution

Duty AFSC. Over 81 percent of the respondents in the study held a 7024 duty AFSC indicating their current duty assignment was probably as an executive support officer. Almost 11 percent of the respondents reported a duty AFSC of 7034, indicating they were currently performing duties as functional information managers (e.g. Base IMs). Further, 5 percent of the respondents reported an AFSC other than one of the four IM AFSCs. However, when considering all respondents were selected from an ATLAS inquiry of 70XX officers, some of the respondents who may have been in

training status (AFSCs 7021 or 7031) might have considered their AFSCs different from the four listed on the questionnaire. The distribution of all respondent AFSCs appeared to be consistent with the distribution indicated on a 16 April 92 ATLAS Inquiry. The frequency distribution of AFSCs is shown in Figure 6 below.

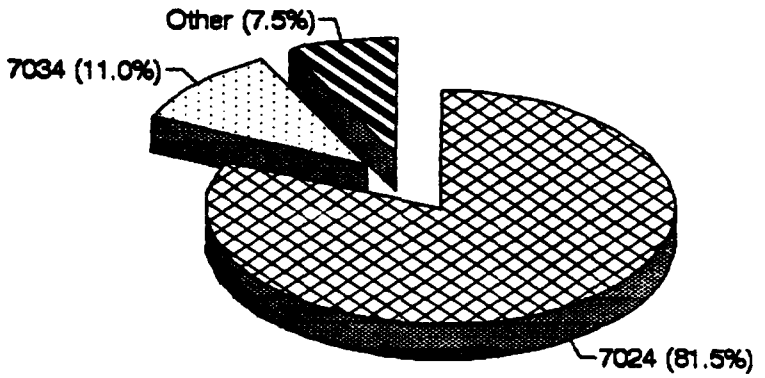

Figure 6. AFSC Distribution

Years in Current Job. Over 75 percent of the respondents had less than 2 years of service in their current duty positions. Further, over 53 percent had less than 1 year of service in their current duty positions. In contrast, only 5.8 percent of the respondents had more than 4 years in their current duty positions. The distribution of respondents by years in current job is illustrated in Figure 7.

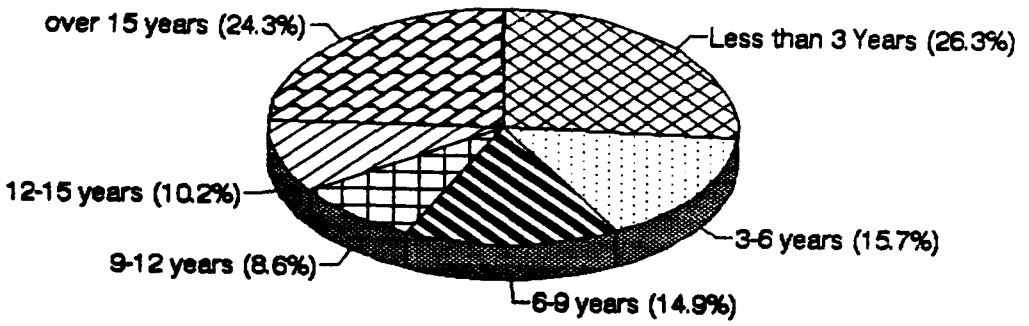

Figure 7. Years in Current Job Distribution

IM Course Attendance. Over 78 percent of the officers who responded to this survey had taken one or both of the IM courses offered at Keesler AFB. Of those who took the Basic Information Management officer course, 62.5 percent did so before the computer block of instruction was added to the course. Of those who took the Base Information Manager course, 75 percent did so before the computer training was added. These figures are representative of the total population according to the class rosters provided by the Director of Information Management course at Keesler AFB. A break down of the figures is presented in Tables 1, 2, and 3 below.

TABLE 1

OVERALL IM COURSE ATTENDANCE

Attended Course	Frequency	Percentage
Yes	200	78.43%
No	55	21.57%

TABLE 2

BASIC IM OFFICER COURSE ATTENDANCE

Date Attended	Frequency	Percentage
Before March 1991	120	62.50%
After March 1991	72	37.50%

TABLE 3

BASE IM OFFICER COURSE ATTENDANCE

Date Attended	Frequency	Percentage
Before March 1991	24	75.00%
After March 1991	8	25.00%

Familiarity With Computer Concepts

Part II of the questionnaire asked the respondents to indicate how familiar they were with a list of computer concepts and terms. The respondents were required to answer on a scale lettered A to F where A was "Very Unfamiliar" and F was "Very Familiar." The frequency distributions for questions 11 through 32 are presented in Table 4.

TABLE 4

FAMILIARITY WITH COMPUTER CONCEPTS

Concept	Frequency	Percentage
Microcomputer		
A	14	5.49
B	12	4.71
C	11	4.31
D	33	12.94
E	74	29.02
F	111	43.53
	255	100.00
Mainframe Computer		
A	11	4.31
B	15	5.88
C	20	7.84
D	46	18.04
E	55	21.57
F	108	42.35
	255	100.00
Floppy Diskette		
A	6	2.35
B	2	0.78
C	3	1.18
D	9	3.35
E	40	15.69
F	195	76.47
	255	100.00
Disk Drive		
A	6	2.35
B	2	0.78
C	4	1.57
D	16	6.27
E	42	16.47
F	185	72.55
	255	100.00

Table 4 (Cont)

Concept	Frequency	Percentage
Hardware		
A	10	3.92
B	2	0.78
C	3	1.18
D	26	10.20
E	46	18.04
F	168	65.88
	255	100.00
Bit		
A	15	5.88
B	10	3.92
C	13	5.10
D	54	21.18
E	72	28.24
F	91	35.69
	255	100.00
Byte		
A	13	5.10
B	11	4.31
C	16	6.27
D	45	17.65
E	77	30.20
F	93	36.47
	255	100.00
Operating Systems		
A	15	5.88
B	7	2.75
C	24	9.41
D	46	18.04
E	78	30.59
F	85	33.33
	255	100.00

Table 4 (Cont)

Concept	Frequency	Percentage
Software		
A	9	3.53
B	3	1.18
C	8	3.14
D	25	9.80
E	52	20.39
F	158	61.96
	255	100.00
Interface		
A	17	6.67
B	13	5.10
C	22	8.63
D	55	21.57
E	60	23.53
F	88	34.51
	255	100.00
Random Access Memory (RAM)		
A	23	9.02
B	11	4.31
C	24	9.41
D	46	18.04
E	59	23.14
F	92	36.08
	255	100.00
Read Only Memory (ROM)		
A	24	9.41
B	15	5.88
C	24	9.41
D	47	18.43
E	59	23.14
F	86	33.73
	255	100.00

Table 4 (Cont)

Concept	Frequency	Percentage
Program Language		
A	25	9.80
B	19	7.45
C	23	9.02
D	53	20.78
E	50	19.61
F	85	33.33
	255	100.00
Word Processing		
A	9	3.53
B	0	0.00
C	0	0.00
D	17	6.67
E	50	19.61
F	179	70.20
	255	100.00
Spreadsheet		
A	13	5.10
B	9	3.53
C	7	2.75
D	63	24.71
E	67	26.27
F	96	37.65
	255	100.00
Database		
A	12	4.71
B	6	2.35
C	11	4.31
D	60	23.53
E	68	26.67
F	98	38.43
	255	100.00

Table 4 (Cont)

Concept	Frequency	Percentage
Graphics Applications		
A	20	7.48
B	14	5.49
C	29	11.37
D	55	21.57
E	52	20.39
F	85	33.33
	255	100.00
Electronic Mail (Email)		
A	17	6.67
B	10	3.92
C	13	5.10
D	52	20.39
E	67	26.27
F	96	37.65
	255	100.00
System Analysis		
A	45	17.56
B	30	11.76
C	47	18.43
D	58	22.75
E	37	14.51
F	38	14.90
	255	100.00
System Design		
A	55	21.57
B	31	12.16
C	50	19.61
D	45	17.65
E	37	14.51
F	37	14.51
	255	100.00

Table 4 (Cont)

Concept	Frequency	Percentage
Local Area Network (LAN)		
A	43	16.86
B	20	7.84
C	33	12.94
D	50	19.61
E	40	15.69
F	69	27.06
	255	100.00
Baud Rate		
A	99	38.82
B	21	8.24
C	25	9.80
D	30	11.76
E	36	14.12
F	44	17.25
	255	100.00

The computer terms listed in Parts II, III, and IV of the questionnaire were ordered such that like terms would be together. For instance, applications like word processing, spreadsheet, and database were listed near each other. The items were arranged in that order to avoid requiring the respondents to jump back and forth between different realms of computer concepts.

Overall, the respondents appeared to be familiar with most of the concepts listed. Very few were unfamiliar with the basic computer terms like disk drive, floppy, hardware, and software. Also, most respondents were familiar with the

basic applications concepts such as word processing, spreadsheet, and database. In fact, over 88 percent of the respondents had a familiarity with the concepts. The concepts from Part II were then rank ordered by level of knowledge. The concept receiving the most "F's" was ranked first, followed by the others in descending order. The respondents who had the most knowledge of the concepts are listed in Table 5 below.

TABLE 5

MOST FAMILIARITY WITH COMPUTER CONCEPTS

	Concept	Frequency
1.	Floppy Diskette	198
2.	Disk Drive	185
3.	Word Processing	178
4.	Hardware	168
5.	Software	158
6.	Microcomputer	111
7.	Mainframe Computer	108
8.	Database	98
9.	Spreadsheet	96
10.	Electronic Mail	96
11.	Byte	93

The concepts from Part II of the questionnaire were also ranked in terms of the most unfamiliarity by the respondents. The concept that received the most "A's" ranked first, followed by the others in descending order. The respondents who had the least knowledge of the concepts are listed in Table 6.

TABLE 6

LEAST FAMILIARITY WITH COMPUTER CONCEPTS

Concept	Frequency
1. Baud Rate	99
2. System Design	55
3. System Analysis	45
4. Local Area Network (LAN)	43
5. Program Language	25
6. Read Only Memory (ROM)	24
7. Random Access Memory (RAM)	23
8. Graphic Applications	20

Respondents who had completed one of the IM courses at Keesler AFB after March 1991 (when computer training was adopted) had the highest level of familiarity with all but five of the concepts: interface, system analysis, system design, LAN, and baud rate. However, those five concepts are only part of the Base IM course curriculum. Combined frequencies of those slightly familiar, moderately familiar, and very familiar with the concepts on the list were created for the group of officers who completed a course after March 1991 and compared with the group of officers who either had not completed a course or did so before March 91. This comparison is depicted in Table 7.

TABLE 7

CONCEPT FAMILIARITY COMPARISON

Concept	Post-March 1991	Others
Microcomputer	80.26%	79.38%
Mainframe Computer	80.26%	74.74%
Floppy Diskette	97.37%	85.57%
Disk Drive	96.05%	85.57%
Hardware	94.74%	84.54%
Bit	86.84%	75.77%
Byte	85.53%	75.77%
Operating System	85.53%	72.68%
Software	90.79%	83.51%
Interface	71.05%	74.74%
Random Access Memory (RAM)	77.63%	69.07%
Read Only Memory (ROM)	78.95%	65.98%
Program Language	69.74%	67.53%
Word Processing	98.68%	85.57%
Spreadsheet	89.47%	79.38%
Database	90.79%	78.87%
Graphics Applications	71.05%	69.07%
Electronic Mail (EMAIL)	84.21%	75.77%
System Analysis	43.42%	50.00%
System Design	35.53%	45.36%
Local Area Network (LAN)	53.95%	58.76%
Baud Rate	26.32%	45.36%

How Knowledge Was Obtained

Part III of the questionnaire was designed to identify where the respondents obtained their knowledge of the computer skills on the list. The possible responses were Unfamiliar, Civilian Eduction, On-the-Job Training (OJT), Self Study, Basic IM course, Base IM course, and Other. Responses were arranged in the order of A through G. As expected, those respondents who completed an IM course after

March 1991 indicated more often than the others that they had obtained some knowledge through the IM courses.

Overall, most of the respondents indicated that they obtained the majority of their computer related knowledge through civilian education and OJT. The frequencies for each concept and where the knowledge of that concept was obtained are presented below in Table 8.

TABLE 8

SOURCE OF KNOWLEDGE

Concept	Frequency	Percent
Microcomputer		
A	10	3.92
B	85	33.33
C	82	32.16
D	52	20.39
E	7	2.75
F	0	0.00
G	19	7.45
	255	100.00
Mainframe Computer		
A	8	3.14
B	99	38.82
C	82	32.16
D	44	17.25
E	4	1.57
F	2	0.78
G	16	6.27
	255	100.00

Table 8 (Cont)

Concept	Frequency	Percent
Floppy Diskette		
A	2	0.78
B	88	34.51
C	88	34.51
D	60	23.53
E	3	1.18
F	0	0.00
G	14	5.49
	255	100.00
Disk Drive		
A	1	0.39
B	85	33.33
C	90	35.92
D	60	23.53
E	5	1.96
F	0	0.00
G	14	5.49
	255	100.00
Hardware		
A	3	1.18
B	96	37.65
C	80	31.37
D	53	20.78
E	6	2.35
F	0	0.00
G	17	6.67
	255	100.00
Bit		
A	16	6.27
B	118	46.27
C	52	20.39
D	44	17.25
E	9	3.53
F	2	0.78
G	14	5.49
	255	100.00

Table 8 (Cont)

Concept	Frequency	Percent
Byte		
A	11	4.31
B	119	46.67
C	52	20.39
D	50	19.61
E	7	2.75
F	2	0.78
G	14	5.49
	255	100.00
Operating Systems		
A	21	8.24
B	96	37.65
C	66	25.88
D	44	17.25
E	13	5.10
F	3	1.18
G	12	4.71
	255	100.00
Software		
A	5	1.96
B	95	37.25
C	86	33.73
D	51	20.00
E	3	01.18
F	0	0.00
G	15	5.88
	255	100.00
Interface		
A	27	10.59
B	91	35.69
C	72	28.24
D	45	17.65
E	5	1.96
F	2	0.78
G	13	5.10
	255	100.00

Table 8 (Cont)

Concept	Frequency	Percent
Random Access Memory (RAM)		
A	28	10.98
B	108	42.35
C	46	18.04
D	52	20.39
E	10	3.92
F	0	0.00
G	11	4.31
	255	100.00
Read Only Memory (ROM)		
A	30	11.76
B	109	42.75
C	42	16.47
D	51	20.00
E	12	4.71
F	0	0.00
G	11	4.31
	255	100.00
Program Language		
A	28	10.98
B	118	46.27
C	55	21.57
D	38	14.90
E	3	1.18
F	0	0.00
G	13	5.10
	255	100.00
Word Processing		
A	3	1.18
B	73	28.63
C	110	43.14
D	51	20.00
E	6	2.35
F	1	0.39
G	11	4.31
	255	100.00

Table 8 (Cont)

Concept	Frequency	Percent
Spreadsheet		
A	11	4.31
B	74	29.02
C	88	34.51
D	50	19.61
E	23	9.02
F	2	0.78
G	7	2.75
	255	100.00
Database		
A	8	3.14
B	79	30.98
C	94	36.86
D	44	17.25
E	17	6.67
F	2	0.78
G	11	4.31
	255	100.00
Graphics Applications		
A	22	8.63
B	59	23.14
C	108	42.35
D	52	20.39
E	3	1.18
F	1	0.39
G	10	3.92
	255	100.00
Electronic Mail (Email)		
A	11	4.31
B	41	16.08
C	132	51.76
D	34	13.33
E	21	8.24
F	4	1.57
G	12	4.71
	255	100.00

Table 8 (Cont)

Concept	Frequency	Percent
System Analysis		
A	78	30.59
B	73	28.63
C	51	20.00
D	34	13.33
E	4	1.57
F	2	0.78
G	13	5.10
	255	100.00
System Design		
A	77	30.20
B	77	30.20
C	48	18.82
D	36	14.12
E	3	1.18
F	3	1.18
G	11	4.31
	255	100.00
Local Area Network (LAN)		
A	51	20.00
B	45	17.65
C	106	41.57
D	28	10.98
E	11	4.31
F	4	1.57
G	10	3.92
	255	100.00
Baud Rate		
A	107	41.96
B	36	14.12
C	49	19.22
D	50	19.61
E	2	0.78
F	1	0.39
G	10	3.92
	255	100.00

Respondents who completed a course after March 1991 identified civilian education as their greatest source of knowledge of the concepts. Respondents who either did not complete a course or completed a course before March 1991, attributed most of their knowledge of the computer concepts to OJT. However, civilian education was identified by the pre-March 1991 group as a close second source.

There are two possible explanations. First, the respondents who completed a post-March 1991 course are probably younger and had little opportunity to gain from OJT. Second, more computer skills were demanded from the post-March 1991 group while they attended college. A comparison of the sources of knowledge of both groups is listed in Table 9 below.

TABLE 9

COMPARISON OF SOURCE OF KNOWLEDGE

Concept	Post March 1991 Freq--Percent	Other Freq--Percent
Microcomputer		
A	4--5.19	6--3.47
B	36--46.75	47--27.01
C	17--22.08	63--36.21
D	7--9.09	45--25.86
E	6--7.79	0--0.00
F	0--0.00	0--0.00
G	7--9.09	13--7.47
	77--100.00	174--100.00

Table 9 (Cont)

Concept	Post March 1991 Freq--Percent	Other Freq--Percent
Mainframe Computer		
A	1--1.30	7--4.02
B	38--49.35	58--33.33
C	18--23.38	63--36.21
D	8--10.39	36--20.69
E	4--5.19	0--0.00
F	0--0.00	0--0.00
G	6--7.79	10--5.75
	77--100.00	174--100.00
Floppy Diskette		
A	0--0.00	2--1.15
B	42--54.55	45--25.86
C	16--20.78	70--40.23
D	11--14.29	48--27.59
E	3--3.90	0--0.00
F	0--0.00	0--0.00
G	5--6.49	9--5.17
	77--100.00	174--100.00
Disk Drive		
A	0--0.00	1--0.57
B	41--53.25	42--24.14
C	15--19.48	74--42.53
D	11--14.29	48--27.59
E	3--3.90	0--0.00
F	1--1.30	0--0.00
G	5--6.49	9--5.17
	77--100.00	174--100.00
Hardware		
A	1--1.30	2--1.15
B	42--54.55	51--29.31
C	13--16.88	67--38.51
D	10--12.99	42--24.14
E	5--6.49	1--0.57
F	0--0.00	0--0.00
G	6--7.79	11--6.32
	77--100.00	174--100.00

Table 9 (Cont)

Concept	Post March 1991 Freq--Percent	Other Freq--Percent
Bit		
A	3--3.90	13--7.47
B	46--59.74	69--39.66
C	6--7.79	46--26.44
D	9--11.69	35--20.11
E	8--10.39	1--0.57
F	0--0.00	1--0.57
G	5--6.49	9--5.17
	77--100.00	174--100.00
Byte		
A	3--3.90	8--4.60
B	45--58.44	71--40.80
C	7--9.09	45--25.86
D	10--12.99	40--22.99
E	7--9.09	0--0.00
F	0--0.00	1--0.57
G	5--6.49	9--5.17
	77--100.00	174--100.00
Operating Systems		
A	5--6.49	16--9.20
B	40--51.95	54--31.03
C	9--11.69	56--32.18
D	7--9.09	37--21.26
E	13--16.88	0--0.00
F	0--0.00	2--1.15
G	3--3.90	9--5.17
	77--100.00	174--100.00
Software		
A	2--2.60	3--1.72
B	42--54.55	51--29.31
C	16--20.78	68--39.08
D	9--11.69	42--24.14
E	3--3.90	0--0.00
F	0--0.00	0--0.00
G	5--6.49	10--5.75
	77--100.00	174--100.00

Table 9 (Cont)

Concept	Post March 1991 Freq--Percent	Other Freq--Percent
Interface		
A	12--15.58	15--8.62
B	37--48.05	51--29.31
C	9--11.69	62--35.63
D	7--9.09	38--21.84
E	5--6.49	0--0.00
F	1--1.30	1--0.57
G	6--7.79	7--4.02
	77--100.00	174--100.00
Random Access Memory (RAM)		
A	5--6.49	23--13.22
B	42--54.55	63--36.21
C	6--7.79	39--22.41
D	12--15.58	40--22.99
E	9--11.69	1--0.57
F	0--0.00	0--0.00
G	3--3.90	8--4.60
	77--100.00	174--100.00
Read Only Memory (ROM)		
A	4--5.19	26--14.94
B	43--55.84	63--36.21
C	5--6.49	37--21.26
D	12--15.58	39--22.41
E	10--12.99	1--0.57
F	0--0.00	0--0.00
G	3--3.90	8--4.60
	77--100.00	174--100.00
Program Language		
A	9--11.69	19--10.92
B	46--59.74	69--39.66
C	7--9.09	47--27.01
D	9--11.69	29--16.67
E	2--2.60	0--0.00
F	0--0.00	0--0.00
G	4--5.19	10--5.75
	77--100.00	174--100.00

Table 9 (Cont)

Concept	Post March 1991 Freq--Percent	Other Freq--Percent
Word Processing		
A	0--0.00	3--1.72
B	37--48.05	35--20.11
C	22--28.57	85--48.85
D	7--9.09	44--25.29
E	6--7.79	0--0.00
F	0--0.00	1--0.57
G	5--6.49	6--3.45
	77--100.00	174--100.00
Spreadsheet		
A	2--2.60	9--5.17
B	31--40.26	42--24.14
C	12--15.58	74--42.53
D	7--9.09	43--24.71
E	23--29.87	0--0.00
F	0--0.00	1--0.57
G	2--2.60	5--2.87
	77--100.00	174--100.00
Database		
A	1--1.30	7--4.02
B	29--37.66	49--28.16
C	19--24.68	73--41.95
D	8--10.39	36--20.69
E	17--22.08	0--0.00
F	0--0.00	1--0.57
G	3--3.90	8--4.60
	77--100.00	174--100.00
Graphics Applications		
A	6--6.49	16--9.20
B	31--40.26	27--15.52
C	20--25.97	86--49.43
D	13--16.88	39--22.41
E	3--3.90	0--0.00
F	0--0.00	0--0.00
G	4--5.19	6--3.45
	77--100.00	174--100.00

Table 9 (Cont)

Concept	Post March 1991 Freq--Percent	Other Freq--Percent
Electronic Mail (Email)		
A	2--2.60	9--5.17
B	17--22.08	22--12.64
C	24--31.17	106--60.92
D	5--6.49	29--16.67
E	21--27.27	0--0.00
F	4--5.19	0--0.00
G	4--5.19	8--4.60
	77--100.00	174--100.00
System Analysis		
A	32--41.56	46--26.44
B	26--33.77	45--25.86
C	5--6.49	45--25.86
D	5--6.49	29--16.67
E	3--3.90	1--0.57
F	1--1.30	0--0.00
G	5--6.49	8--4.60
	77--100.00	174--100.00
System Design		
A	30--38.96	47--27.01
B	28--36.36	48--27.59
C	6--7.79	41--23.56
D	6--7.79	30--17.24
E	2--2.60	1--0.57
F	1--1.30	0--0.00
G	4--5.19	7--4.02
	77--100.00	174--100.00
Local Area Network (LAN)		
A	21--27.27	30--17.24
B	20--25.97	24--13.79
C	16--20.78	88--50.57
D	3--3.90	25--14.37
E	10--12.99	1--0.57
F	3--3.90	0--0.00
G	4--5.19	6--3.45
	77--100.00	174--100.00

Table 9 (Cont)

Concept	Post March 1991 Freq--Percent	Other Freq--Percent
Baud Rate		
A	48--62.34	59--33.91
B	10--12.99	25--14.37
C	4--5.19	43--24.71
D	10--12.99	40--22.99
E	2--2.60	1--0.57
F	0--0.00	0--0.00
G	3--3.90	6--3.45
	77--100.00	174--100.00

Importance of Computer Concepts to Job

Part IV of the computer skills questionnaire sought to learn which computer concepts were important to the respondents in the course of their current duties. The categories the respondents could choose were Not Important, Moderately Not Important, Slightly Not Important, Slightly Important, Moderately Important, and Very Important. The respondents were required to answer on a scale from "A" to "F" respectively. Overall, there was little difference in the two categories of respondents. Those who completed a course after March 1991 generally agreed with those in the other group as to what skills were important on the job. Further, there was little difference between 7024 and 7034 information management officers regarding the importance of concepts on the job. A frequency distribution of the

importance of each concept to all the respondents is shown below in Table 10.

TABLE 10

IMPORTANCE TO JOB

Concept	Frequency	Percent
Microcomputer		
A	26	10.20
B	10	3.92
C	6	2.35
D	38	14.90
E	53	20.78
F	122	47.84
	255	100.00
Mainframe Computer		
A	73	28.63
B	29	11.37
C	19	7.45
D	48	18.82
E	31	12.16
F	55	21.57
	255	100.00
Floppy Diskette		
A	8	3.14
B	5	1.96
C	5	1.96
D	34	13.33
E	59	23.14
F	144	56.47
	255	100.00

Table 10 (Cont)

Concept	Frequency	Percent
Disk Drive		
A	9	3.53
B	5	1.96
C	5	1.96
D	39	15.29
E	59	23.14
F	138	54.12
	255	100.00
Hardware		
A	9	3.53
B	10	3.92
C	11	4.31
D	47	18.43
E	54	21.18
F	124	48.63
	255	100.00
Bit		
A	57	22.35
B	45	17.65
C	22	8.63
D	47	18.43
E	42	16.47
F	42	16.47
	255	100.00
Byte		
A	53	20.78
B	44	17.25
C	24	9.41
D	47	18.43
E	43	16.86
F	44	17.25
	255	100.00

Table 10 (Cont)

Concept	Frequency	Percent
Operating Systems		
A	26	10.20
B	21	8.24
C	28	10.98
D	55	21.57
E	58	22.75
F	67	26.27
	255	100.00
Software		
A	5	1.96
B	7	2.75
C	5	1.96
D	40	15.69
E	68	26.67
F	130	50.98
	255	100.00
Interface		
A	28	10.98
B	28	10.98
C	14	5.49
D	68	26.67
E	61	23.92
F	56	21.96
	255	100.00
Random Access Memory (RAM)		
A	57	22.35
B	23	9.02
C	23	9.02
D	56	21.96
E	43	16.86
F	53	20.78
	255	100.00

Table 10 (Cont)

Concept	Frequency	Percent
Read Only Memory (ROM)		
A	65	25.10
B	27	10.59
C	26	10.20
D	57	22.35
E	43	16.86
F	38	14.90
	255	100.00
Program Language		
A	69	27.06
B	34	13.33
C	41	16.08
D	45	17.65
E	32	12.55
F	34	13.33
	255	100.00
Word Processing		
A	3	1.18
B	1	0.39
C	1	0.39
D	17	6.67
E	56	21.96
F	177	69.41
	255	100.00
Spreadsheet		
A	37	14.51
B	28	10.98
C	18	17.06
D	57	22.35
E	63	24.71
F	52	20.39
	255	100.00

Table 10 (Cont)

Concept	Frequency	Percent
Database		
A	19	7.45
B	16	6.27
C	16	6.27
D	55	21.57
E	63	24.71
F	86	33.73
	255	100.00
Graphics Applications		
A	33	12.94
B	21	8.24
C	24	9.41
D	66	25.88
E	64	25.10
F	47	18.43
	255	100.00
Electronic Mail (Email)		
A	39	15.29
B	15	5.88
C	17	6.67
D	47	18.43
E	59	23.14
F	78	30.59
	255	100.00
System Analysis		
A	99	38.82
B	38	14.90
C	36	14.12
D	50	19.61
E	19	7.45
F	13	5.10
	255	100.00

Table 10 (Cont)

Concept	Frequency	Percent
System Design		
A	104	40.78
B	36	14.12
C	31	12.16
D	46	18.04
E	22	8.63
F	16	6.27
	255	100.00
Local Area Network (LAN)		
A	69	27.06
B	23	9.02
C	25	9.80
D	54	21.18
E	37	14.51
F	47	18.43
	255	100.00
Baud Rate		
A	130	50.98
B	26	10.20
C	22	8.63
D	40	15.69
E	20	7.84
F	17	6.67
	255	100.00

The list of concepts from Part IV was ordered from most important to least important. Those concepts receiving the most "F's" (very important) were ranked at the top while those receiving the least "F's" were ranked at the bottom. The top ten and bottom ten concepts identified are listed with their frequencies in Table 11 below.

TABLE 11

COMPUTER CONCEPTS MOST/LEAST IMPORTANT TO JOB

Concept	Frequency	
Most Important		
1. Word Processing	176	
2. Floppy Diskette	143	
3. Disk Drive	137	
4. Software	130	
5. Hardware	123	
6. Microcomputer	120	
7. Database	86	
8. Electronic Mail	77	
9. Operating System	66	
10. Interface	55	
Least Important		
1. System Analysis	13	
2. System Design	16	
3. Baud Rate	17	
4. Program Language	34	
5. Read Only Memory (ROM)	38	
6. Bit	42	
7. Byte	44	
8. Graphics Applications	47	(tied with 9)
9. LAN	47	(tied with 8)
10. Spreadsheet	52	

Applicability of Computer Applications Training to Job

Casey and Kveene concluded that the applications used most by Air Force IM officers on the job were word processing, spreadsheets, and databases (7:81). Part V of the questionnaire asked respondents to identify what type of word processor, spreadsheet, and database they used most often and the extent to which the courses at Keesler AFB

helped them to understand those programs. As expected, those who completed a course after March 1991 found the courses to be more helpful than those who completed a course prior to March 1991.

Of the post-March 1991 respondents, only 38 percent found the course helpful in preparing them to use their current word processing program. The percentages are even lower in the cases of spreadsheets and databases. Table 12 illustrates the types of application programs the information managers are using and the extent to which the courses at Keesler AFB helped them prepare for these programs.

TABLE 12

TYPES OF APPLICATIONS PROGRAM USED AND EXTENT OF PREPARATION RECEIVED AT THE BASE/BASIC IM COURSE

1. What word processing program do you use on the job?

Program	Frequency	Percent
Enable	20	25.97
Word Star	26	33.77
Word Perfect	14	18.18
Other	14	18.18
None	3	3.90
	77	100.00

Table 12 (Cont)

2. Did your training at Keesler AFB help you to understand the word processing (WP) program you use now?

Answer	Frequency	Percent
Helped a lot	3	3.90
Helped in general	26	33.77
Was no help at all	37	48.05
It confused me	1	1.30
Do not use a WP	3	3.90
N/A	7	9.08
	77	100.00

3. What spreadsheet program do you use on the job?

Program	Frequency	Percent
Enable	18	23.39
Lotus 123	10	12.99
Quattro Pro	0	0.00
Other	7	9.08
None	42	54.45
	77	100.00

4. Did your training at Keesler AFB help you to understand the spreadsheet (SS) program you use now?

Answer	Frequency	Percent
Helped a lot	2	2.60
Helped in general	17	22.06
Was no help at all	18	23.39
It confused me	0	0.00
Do not use a SS	18	23.39
N/A	22	28.56
	77	100.00

5. What database program do you use on the job?

Program	Frequency	Percent
Enable	11	14.29
DBase I, II, or III	29	37.66
Oracle	1	1.30
Other	9	11.69
None	27	35.06
	77	100.00

Table 12 (Cont)

6. Did your training at Keesler AFB help you to understand the database (DB) program you use now?

Answer	Frequency	Percent
Helped a lot	2	2.60
Helped in general	20	25.97
Was no help at all	23	29.87
It confused me	2	2.60
Do not use a DB	14	18.18
N/A	16	20.78
	77	100.00

7. Did your training at Keesler AFB help you to understand the operating system (OS) you use now?

Answer	Frequency	Percent
Helped a lot	6	7.80
Helped in general	29	37.67
Was no help at all	21	27.27
It confused me	2	2.60
Do not use a OS	12	15.58
N/A	7	9.08
	77	100.00

Approximately half of the respondents who used word processors, spreadsheets and databases felt their training from Keesler was no help at all. However, over 45 percent of the respondents felt the courses helped them to understand the operating systems they currently use.

Open-Ended Questions

Section VI of the questionnaire consisted of three open-ended questions asking students about the adequacy of time spent on computer applications (like those in the table above), what could be done to improve computer training in the courses, and what thoughts they had on computers in the

Air Force in general. The responses to these questions were overwhelming. Nearly 95 percent of all respondents answered these open ended questions. Since all responses could not be listed, they were grouped in like categories with corresponding frequencies. Groups that had 5 or more entries were noted. The results of the compiled answers are presented in Table 13.

TABLE 13

SUMMARY OF OPEN-ENDED QUESTIONS

Category	Frequency	Percent
Respondents Overall		
1. AF should standardize software	55	21.57
2. More computer training is needed in AF	43	16.87
3. More/better equipment wanted/needed	22	8.63
4. Computer training not needed in AF	6	2.35
5. Difficult to obtain equipment in AF	6	2.35
6. Training should include education of PC-III	6	2.35

Table 13 (Cont)

Category	Frequency	Percent
Students who had a course with computer training		
1. Thought it was inadequate	36	46.75
2. Did not like Enable	18	23.38
3. Want it to be self-paced	13	16.88

There were many other comments offered by the respondents, but they were quite varied. Some respondents were able to make their thoughts known with just a few words while others wrote answers that were many paragraphs long. Many of the respondents complained that the Air Force should scrap Enable because "no one uses it," yet overall, Enable was one of the most used word processing and spreadsheet programs by the respondents (see Appendix C).

Summary

While the clear majority of respondents had taken an Information Management officer course at Keesler AFB, only 77 did so after computer training was added to the curriculum. The majority of those respondents were second lieutenants and in their twenties. Overall, two thirds of the respondents reported an education level beyond a Bachelor's degree; over 80 percent were assigned to

executive support officer positions; and over half had been in their current positions for less than one year.

The level of computer familiarity was quite high. This is important, since the majority of the respondents had no formal Air Force computer training. However, those respondents who completed a course at Keesler after computer training was added to the curriculum reported a higher degree of familiarity with most of the concepts on the list. Concepts reported as unfamiliar were not taught in the Basic Information Manager course.

Eighty-five percent of the group that went through training after March 1991 fell into the age group of 20-30. The group that received training prior to that date indicated over 63 percent were over the age of 30. Civilian education has increased their emphasis on computers over the years and this influence is apparent in the results of this study.

Respondents who completed a course after March 1991 identified civilian education as their greatest source of knowledge of the concepts. All other respondents attributed most of their knowledge of computer concepts to OJT with civilian education identified as a close second source.

When asked which concepts on the list were important to their jobs, the respondents overwhelmingly indicated word processing. Other items of importance were hardware and software related concepts, electronic mail, and other

applications related concepts. Those concepts indicated as least important to the job included baud rate, system analysis, system design, program language, and read only memory (ROM). Many of the concepts rated least important were related to higher level computer skills.

Finally, the open-ended questions help to shed light on other areas of concern in the realm of computer training. The high rate of response to the open-ended questions (95 percent) implies a great amount of interest in this subject by the respondents. This implication is supported by the 61 percent response rate of the questionnaire. Air Force Information Management Officers are concerned about their computer training.

V. Conclusions, Recommendations and Future Research

Introduction

Considering the enormous investment the government has made in computer resources, it is crucial these resources are effectively employed. Coleman determined 4 years ago that administrative officers are lacking in computer literacy (8:77). The Information Management and Base Information Manager Courses were changed in response to this documented finding. This research represents the first comprehensive study of the Information Management career field since the addition of computer literacy training to the Information Management courses at Keesler AFB. Administering a questionnaire to a random sample of Information Management officers created a snapshot of the current level of computer literacy across the career field. Four hundred surveys were distributed and a comprehensive analysis was performed on the 255 responses. Since the survey reached personnel that had training prior to and after the courses were changed, differences were computed that are attributable to the training and answer the following investigative questions.

1. Did the courses meet the perceived computer training needs of the information management officers now working on the job?

2. Can all information management officers benefit from the same computer training?

3. Are the information management officers who complete a course including computer orientation and training better prepared to meet the computer related tasks and challenges than those officers who completed a course prior to the incorporation of computer training into the program and those officers who did not complete a course at all?

4. What are the main strengths and weaknesses, as perceived by the alumni, of the current information management officer programs as related to the instruction of computer oriented information management systems?

Conclusions

Investigative Question 1. The perceived computer training needs of the information management officers were identified by those terms they classified as most important to them on the job. The graduates of the modified course indicated they are very familiar with these terms leading to the conclusion that the courses meet the perceived needs of the information management officers.

While the courses have considerably improved in their quest to meet the computer training needs of information management officers on the job, it is apparent from the responses that there is still room for improvement in their content and intent. For example, the percentage that found

utility in the training on word processors, the area selected as most important, was very low. Only 37 percent of the respondents who received the training found it either helped a lot or helped in understanding theory, while almost 50 percent felt the training was no help at all. These results seem to indicate the course needs to be further restructured for a better understanding of word processors. However, they may also indicate a failure on the respondents' part to understand the training was meant to be a familiarization with the capabilities of word processing and not directly related to the word processor they may use on the job.

Investigative Question 2. The benefit different information management officers could attain from computer training was compared by noting differences in "importance to job" of computer terms and concepts between the different AFSCs. These responses were relatively consistent among all officers. This indicates most information managers would benefit from the same computer training despite their AFSC within the information management field.

Investigative Question 3. The results of this survey lead to the conclusion that the graduates of the modified course at Keesler are better prepared to meet the computer related tasks and challenges than those who completed the training prior to the incorporation of the computer training. A significant difference exists between the group

of officers who attended the course at Keesler after the computer training was added when compared to those who did not receive this training. With the exception of only five terms, the officers who attended the modified training perceive themselves to be more knowledgeable than those who did not receive the training. However, this may be explained in part by the fact that the age group of the information managers that completed the modified training is significantly lower than those who attended the earlier version. Even though they were more familiar with terms and concepts, they credited their understanding primarily to civilian education. From this survey instrument, it is impossible to determine if the course at Keesler provided a good refresher and therefore aided the information managers more than they credited the course.

Investigative Question 4. The information managers who completed a course with computer training (a post March 1991 course) had a lot to say about the quality of their training. While many of the course graduates had high regard for the courses and the instructors, nearly half felt the computer training they received at Keesler was inadequate. Those who found the training inadequate were split on whether it needed to be more advanced or more simplified but all agreed that computer training is essential for today's information management officer.

Many of the post-March 1991 graduates commented that Enable, the multi-application program used at Keesler, was not the applications program they used on the job. They felt they had to "relearn" word processing. Many of the respondents' comments implied that the only base in the Air Force to use Enable was Keesler. These comments conflicted with the data collected for this survey. The data implied that Enable was one of the most used word processing, database, and spreadsheet packages in the Air Force. As mentioned earlier, it is possible that the students who took the post-March 1991 courses did not understand that the courses were designed to familiarize them with computers, not teach them to use specific applications programs. In order to teach students the exact programs they would use on the job, course instructors would be required to know how to teach at least six different word processing programs!

Another area the respondents indicated as requiring improvement was that of curriculum content. Many of the respondents cited wasted time on computer history. One individual gave the analogy of driving a car. He said, "I drive a car, but did not get lessons on the history of automobiles. Why must I have lessons on the history of computers in order to operate one?" In short, many of the respondents felt less time should be spent on the history of computers and more on hands-on training.

Recommendations

To ensure all information managers have a basic understanding of computer fundamentals, some computer training must be addressed in the Information Management and Base Information Manager Courses. Since most of the officers entering the career field today indicated they attained their knowledge in civilian institutions, the follow-on training at Keesler should be in the form of a refresher, demonstrating peculiarities and areas of importance in USAF information management. The call for standardization in software tools results from failure on the information managers' part to understand the purpose of the training at Keesler. The added computer training is offered to allow the information managers to see different capabilities of software packages and to gain a general understanding of terms and concepts. It may be beneficial to offer a review of more software packages, allowing each individual to evaluate differences themselves; and to demonstrate methods of interfacing different software packages. Again, this may be difficult to do, but even if only one or two more packages were reviewed, it may benefit the students.

The use of a self-paced block of instruction, possibly computer aided, should be explored. This would enable the students with more experience to review the material at a

faster pace while providing comprehensive training for novices.

An emphasis should be placed on the need for students to understand that the training is intended to introduce them to computers and their applications in general. The training is not designed to teach them the specific application package they will use. It should also start them toward considering possible applications for the computer in their job functions.

Future Research

The 4 years that have passed since Coleman's thesis have seen a large change in the level of literacy among Air Force information managers. It is important that future changes are monitored as well. As more and more colleges require students to use computers in the course of their studies, more young officers entering the Air Force will already have the basic skills the courses at Keesler are currently trying to teach. Therefore, similar research should be completed every 3 to 4 years to note any changes, and to make necessary modifications in the curriculum.

Since over 20 percent of the respondents indicated the Air Force should identify a standard word processing program, it would be of value to study the feasibility of such an endeavor. Such a study would need to review all major word processing packages, consider current level of

use by Air Force employees, and cost of conversion to the standardized program.

It would be enlightening to see the results of another study aimed at determining what weaknesses supervisors perceive in their information managers. This information, coupled with an updated study of the perceived computer training needs of information management officers would be valuable. It would provide the Air Force a better picture of exactly what type of computer training is needed based on the inputs of both information management officers and their superiors.

Appendix A: IM Officers Who Assisted on Pre-Test

The following Information Management Officers provided informal interviews and pretests of the survey questionnaire:

Terry Brown, Captain

Shelley Christian, Captain

Gregory Hurst, Captain

Kevin Kettel, Captain

James Hogue, Captain

Barry Kinter, Captain

Michael Mednansky, Captain

Fred Ziegler, Major

APPENDIX B: Survey Instrument

LSG (Capt Biros/Capt Cole, DSN 785-6569

Computer Skills Survey - USAF SCN 92-39

Survey Participant

1. Please take the time to complete the attached questionnaire and return it in the enclosed envelope by 1 July 1992.

2. The survey measures your perception of computer skills and seeks to learn where you obtained those skills. The data we collect will be part of an AFIT research project and may influence curriculum decisions involving the Information Management courses at Keesler Air Force Base. Your individual responses will not be attributed to you personally.

3. The estimated time to complete the survey is 15 minutes. Your participation is completely voluntary, but we would certainly appreciate your help. For further information, please contact me at DSN 785-2061.

JOHN T. HUGULEY JR., Lt Col, USAF
Director of Thesis Research

3 Atch
1. Questionnaire
2. Answer Sheet
3. Return Envelope

COMPUTER SKILLS QUESTIONAIRE

Please use a number 2 pencil to mark the enclosed answer sheet for Parts I - V. Mark only one space per question.

Part I. This part asks for background information. Questions will provide to help analyze perceptions from the information management career field.

1. What is your age group?

   a. 20-30
   b. 31-40
   c. Over 40

2. What is your current rank?

   a. 2d Lt
   b. 1st Lt
   c. Capt
   d. Major
   e. Lt Col
   f. Col

3. What is your gender?

   a. Male
   b. Female

4. What is your highest educational level?

   a. Bachelor's degree
   b. Bachelor's degree plus
   c. Master's degree
   d. Master's degree plus
   e. Doctoral degree

5. How many years active military service do you have?

   a. Less than 3 years
   b. 3 years, but less than 6 years
   c. 6 years, but less than 9 years
   d. 9 years, but less than 12 years
   e. 12 years, but less than 15 years
   f. 15 years or more

6. What is your current duty AFSC?

a. 7024
b. 7034
c. 7016
d. 7046
5. Other

7. How many years have you been in your current job?

a. Less than 1 year
b. 1 year but less than 2
c. 2 years but less than 3
d. 3 years but less than 4
e. 4 years or more

8. Have you taken an Information Management Officer Course (Administrative Officer Course) at Keesler AFB, either the basic course or the Base IM course?

a. Yes
b. No

9. When did you take the basic Information Management Officer Course?

a. Before March 91
b. After March 91
c. N/A

10. When did you take the Base IM course?

a. Before March 91
b. After March 91
c. N/A

Part II. Below is a list of computer terms and concepts. Please indicate your familiarity with these by filling in the appropriate blank on the answer sheet.

a = Very Unfamiliar
b = Moderately Unfamiliar
c = Slightly Unfamiliar
d = Slightly Familiar
e = Moderately Familiar
f = Very Familiar

TERM OR CONCEPT	KNOWLEDGE OF TERM					
11. Microcomputer	a	b	c	d	e	f
12. Mainframe Computer	a	b	c	d	e	f
13. Floppy Diskette	a	b	c	d	e	f

14.	Disk Drive	a	b	c	d	e	f
15.	Hardware	a	b	c	d	e	f
16.	Bit	a	b	c	d	e	f
17.	Byte	a	b	c	d	e	f
18.	Operating System	a	b	c	d	e	f
19.	Software	a	b	c	d	e	f
20.	Interface	a	b	c	d	e	f
21.	Random Access Memory (RAM)	a	b	c	d	e	f
22.	Read Only Memory (ROM)	a	b	c	d	e	f
23.	Program Language	a	b	c	d	e	f
24.	Word Processing	a	b	c	d	e	f
25.	Spreadsheet	a	b	c	d	e	f
26.	Database	a	b	c	d	e	f
27.	Graphics Applications	a	b	c	d	e	f
28.	Electronic Mail	a	b	c	d	e	f
29.	System Analysis	a	b	c	d	e	f
30.	System Design	a	b	c	d	e	f
31.	Local Area Network (LAN)	a	b	c	d	e	f
32.	Baud Rate	a	b	c	d	e	f

Part III. Using the same list of terms and concepts, please indicate where you attained your knowledge. If more than one answer applies, indicate only the one that applies the most.

a = N/A unfamiliar with term
b = Civil Education
c = On the Job experience
d = Self Study
e = Basic Information Management Course
f = Base IM Course
g = Other

TERM OR CONCEPT		KNOWLEDGE OF TERM						
33.	Microcomputer	a	b	c	d	e	f	g
34.	Mainframe Computer	a	b	c	d	e	f	g
35.	Floppy Diskette	a	b	c	d	e	f	g
36.	Disk Drive	a	b	c	d	e	f	g
37.	Hardware	a	b	c	d	e	f	g
38.	Bit	a	b	c	d	e	f	g
39.	Byte	a	b	c	d	e	f	g
40.	Operating System	a	b	c	d	e	f	g
41.	Software	a	b	c	d	e	f	g
42.	Interface	a	b	c	d	e	f	g
43.	Random Access Memory (RAM)	a	b	c	d	e	f	g
44.	Read Only Memory (ROM)	a	b	c	d	e	f	g
45.	Program Language	a	b	c	d	e	f	g
46.	Word Processing	a	b	c	d	e	f	g
47.	Spreadsheet	a	b	c	d	e	f	g
48.	Database	a	b	c	d	e	f	g
49.	Graphics Applications	a	b	c	d	e	f	g

50.	Electronic Mail	a	b	c	d	e	f	g
51.	System Analysis	a	b	c	d	e	f	g
52.	System Design	a	b	c	d	e	f	g
53.	Local Area Network (LAN)	a	b	c	d	e	f	g
54.	Baud Rate	a	b	c	d	e	f	g

Part IV. Read through the list and use the scale to indicate the importance of each term/concept in your current job.

a = this is not important at all to my job
b = this is moderately not important to my job
c = this is slightly not important to my job
d = this is slightly important to my job
e = this is moderately important to my job
f = this is very important to my job

55.	Microcomputer	a	b	c	d	e	f
56.	Mainframe Computer	a	b	c	d	e	f
57.	Floppy Diskette	a	b	c	d	e	f
58.	Disk Drive	a	b	c	d	e	f
59.	Hardware	a	b	c	d	e	f
60.	Bit	a	b	c	d	e	f
61.	Byte	a	b	c	d	e	f
62.	Operating System	a	b	c	d	e	f
63.	Software	a	b	c	d	e	f
64.	Interface	a	b	c	d	e	f
65.	Random Access Memory (RAM)	a	b	c	d	e	f
66.	Read Only Memory (ROM)	a	b	c	d	e	f
67.	Program Language	a	b	c	d	e	f
68.	Word Processing	a	b	c	d	e	f
69.	Spreadsheet	a	b	c	d	e	f
70.	Database	a	b	c	d	e	f
71.	Graphics Applications	a	b	c	d	e	f
72.	Electronic Mail	a	b	c	d	e	f
73.	System Analysis	a	b	c	d	e	f
74.	System Design	a	b	c	d	e	f
75.	Local Area Network (LAN)	a	b	c	d	e	f
76.	Baud Rate	a	b	c	d	e	f

Part V. The following questions will help determine the applicability of your computer education.

77. What word processing program do you use on the job?

a. Enable
b. Word Star
c. Word Perfect
d. Other
e. None

78. Did your training at Keesler AFB help you to understand the word processing program you use now?

a. It helped a lot. It was right on target.
b. It helped me to understand word processors in general.
c. It was no help at all.
d. It confused me and I had to relearn on the job.
e. I do not use a word processing program.
f. N/A

79. What spreadsheet program do you use on the job?

a. Enable
b. Lotus 123
c. Quattro Pro
d. Other
e. None

80. Did your training at Keesler AFB help you to understand the spreadsheet program you use now?

a. It helped a lot. It was right on target.
b. It helped me to understand spreadsheets in general.
c. It was no help at all.
d. It confused me and I had to relearn on the job.
e. I do not use a spreadsheet program.
f. N/A

81. What database program do you use on the job?

a. Enable
b. Dbase II, III, or IV
c. Orcacle
d. Other
e. None

82. Did your training at Keesler AFB help you to understand the database program you use now?

a. It helped a lot. It was right on target.
b. It helped me to understand databases in general.
c. It was no help at all.
d. It confused me and I had to relearn on the job.
e. I do not use a database program.
f. N/A

83. Did your training at Keesler AFB help you to understand the operating system you use now?

a. It helped a lot. It was right on target.
b. It helped me to understand operating systems in general.
c. It was no help at all.
d. It confused me and I had to relearn on the job.
e. I do not use an operating system.
f. N/A

Part VI. Here is your chance to tell it like it is! We want to know specifically, in your own words how you feel about your computer related training at Keesler AFB. Use the space provide below each question.

84. Was the emphasis on Computer Applications (i.e. Word processing, spreadsheet, database, etc) adequate? What is needed? Did the course spend too much time here, or too little? Tell us anything you feel could enhance the course in computer applications. Anything!!

85. What could be done to improve the training you received on operating systems and hardware (i.e. CPUs, peripherals, and accessories etc)?

86. Please use this space to speak your mind about computers in the Air Force, their applications, training, and any other comment or concern you may have.

APPENDIX C: Application Programs Used on the Job

1. What word processing program do you use on the job?

Program	Frequency	Percent
Enable	73	28.63
Word Star	75	29.41
Word Perfect	51	20.00
Other	49	19.21
None	7	2.75
	255	100.00

2. What spreadsheet program do you use on the job?

Program	Frequency	Percent
Enable	80	31.37
Lotus 123	27	10.59
Quattro Pro	7	2.75
Other	33	12.94
None	108	42.35
	255	100.00

3. What database program do you use on the job?

Program	Frequency	Percent
Enable	73	28.63
DBase I, II, or III	84	32.94
Oracle	2	0.78
Other	38	14.90
None	58	22.75
	255	100.00

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Vita

Captain David P. Biros was born on 21 November 1962 in Grand Haven, Michigan. He graduated from Grand Haven Senior High School in 1981. He earned a Bachelor of Arts degree in Secondary Education/History at Flagler College, St. Augustine, Florida in 1985. In July 1985, Captain Biros entered OTS where he received his commission on 31 October 1985. In 1990, he earned a Master of Science degree in Public Administration from Troy State University while stationed in Europe. He has served as a Squadron Section Commander at Plattsburgh AFB, NY and Spangdahlem AB, GE prior to entering the School of Systems and Logistics, Air Force Institute of Technology, in May 1991.

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Vita

Captain Stewart J. Cole was born 5 May 1953 in Kankakee, Illinois. He graduated from Caribbean High School, Ponce, Puerto Rico in 1971. After one year of college at the University of Arkansas he enlisted in the Air Force as an automatic flight control systems specialist and later retrained as a computer programmer. Attending college part time, Captain Cole graduated from the University of Nebraska in 1981. While working as an instructor in the enlisted programming course at Keesler AFB, Captain Cole was selected for officer training school. He was commissioned 9 June 1983. As an officer, he has served as an executive support officer for the 35th TFS, Kunsan Korea; and Section Commander for the 552d AWACS Component Repair Squadron and 33rd Component Repair Squadron. Before assignment to AFIT he was the Configuration Management Officer for the AMRAAM Missile Rail Launcher. Captain Cole has three children Todd, Scott and Lisa.

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13. ABSTRACT (Maximum 200 words)

The purpose of this study was to determine if the computer orientation courses provided Air Force information managers are properly focused. This study found that the courses have made the desired impact and, with minor exceptions, information managers perceive themselves to be more knowledgeable after the training. From the results of the survey it is apparent that information managers are more knowledgeable of computers than they were in a study completed in 1988. The officers who attended training after the course was modified to include computer orientation were much more satisfied with their training than previous graduates. They indicated a need for even more training on specific packages and applications. One recommendation from this study is to include a self-paced computer aided instruction block on computers in place of the lock-step training currently provided. This training will be flexible enough to allow those managers with advanced skills to move at their own pace and use the course as a refresher. Another recommendation was to provide training on more of the specific word processing and database packages and demonstrate methods of communication between packages. Also, more examples of computer power should be addressed in the schools.

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AFIT RESEARCH ASSESSMENT

The purpose of this questionnaire is to determine the potential for current and future applications of AFIT thesis research. Please return completed questionnaires to: AFIT/LSC, Wright-Patterson AFB OH 45433-9905.

1. Did this research contribute to a current research project?

a. Yes b. No

2. Do you believe this research topic is significant enough that it would have been researched (or contracted) by your organization or another agency if AFIT had not researched it?

a. Yes b. No

3. The benefits of AFIT research can often be expressed by the equivalent value that your agency received by virtue of AFIT performing the research. Please estimate what this research would have cost in terms of manpower and/or dollars if it had been accomplished under contract or if it had been done in-house.

Man Years _____ $ _____

4. Often it is not possible to attach equivalent dollar values to research, although the results of the research may, in fact, be important. Whether or not you were able to establish an equivalent value for this research (3. above) what is your estimate of its significance?

a. Highly Significant b. Significant c. Slighly Significant d. Of No Significance

5. Comments

_____ _____

Name and Grade Organization

_____ _____

Position or Title Address