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A PROTOTYPE OF A FACULTY AND STAFF
EXECUTIVE INFORMATION SYSTEM

by

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A Prototype of a Faculty and Staff Executive Information System

by

P. Denise Hutton
B.A., Mary Baldwin College, 1983

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ABSTRACT

This thesis prototypes an alternative *Naval Postgraduate School Faculty and Staff Resume Book*. It designs and begins the development of a multimedia faculty and staff executive information system (EIS). This EIS is being developed using Asymetrix's Multimedia ToolBook authoring software. It uses computer graphics capability to display faculty and staff member photographs. In addition, the database component supports the manipulation and storage of large text fields. This thesis also discusses the hardware and software components of multimedia computing.

THESIS DISCLAIMER

The reader is cautioned that computer programs developed in this research may not have been exercised for all cases of interest. While every effort has been made, within the time available, to ensure that the programs are free of computational and logic errors, they cannot be considered validated. Any application of these programs without additional verification is at the risk of the user.

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I. INTRODUCTION

This thesis is a study of multimedia technology and its application to an executive information system prototype for the Naval Postgraduate School (NPS). Chapter I of this thesis describes the need for the Executive Information System, the objective of this study, and other research related to this topic. Chapter II provides a discussion of multimedia technology and its components. Chapter III discusses the development of the prototype framework for this executive information system. Finally, Chapter IV addresses the proposed structure of the Naval Postgraduate School Faculty and Staff Resume Executive Information System.

A. THE NEED FOR THE EXECUTIVE INFORMATION SYSTEM

The *Naval Postgraduate School Faculty and Staff Resume Book* serves as a central repository for biographical information about tenure track faculty and selected staff members. The Resume Book is used to identify faculty members' expertise and research interests. Additionally, Public Affairs finds the personal and professional information useful for their purposes.

Currently this book contains approximately 150 resumes. Roughly 50 copies of the book are distributed across the Naval Postgraduate School campus, including the offices of the

Superintendent, Deanery, and Department Chairs. During a biannual update process, approximately 30 resumes are produced, 20 new and 10 updates.

The Office of Research Administration is responsible for maintaining the book of faculty and staff resumes. Professor Paul Marto, the Dean of Research, and a Total Quality Leadership Process Action Team have determined that the update process is ineffective. They recommended an executive information system as an alternative method of maintaining the Resume Book.

Implementing the *Naval Postgraduate School Faculty and Staff Resume Book* as a multimedia system could provide numerous benefits. Benefits of creating an executive information system include:

- administrators, faculty members, thesis students, and staff could easily identify faculty members;
- thesis students could easily identify faculty's research interests;
- faculty members could more easily identify other faculty with similar research interests which might enhance interdisciplinary work;
- with the system's greater visibility, faculty members might be more motivated to update the information; and
- research sponsors might have better access to information about NPS's faculty and their research.

Multimedia technology can enhance the Resume book, because it allows the inclusion of video segments, such as the Superintendent delivering an overview of the school's mission

or a faculty member demonstrating a research project. Also, audio abstracts of publications can be attached to publication fields, to give the end-user an overview of the publication. In addition, the ability to connect keywords or buttons to database fields or records through hyper-linking increases data access. For example, by clicking a key word in a faculty member's area of research, information pertaining to the research sponsor or a list of other faculty members with similar research interests would appear on the screen.

B. OBJECTIVE

The objective of this thesis is to prototype an alternative *NPS Faculty and Staff Resume Book* using multimedia technology. The goal of the prototype is to design an executive information system that is easy to use, contains the necessary information, and has the long-term potential to improve access to the information in the book and improve the update process. Asymetrix's Multimedia ToolBook, an off-the-shelf multimedia software package, was selected to prototype this faculty and staff executive information system.

C. RELATED WORK

Two other Naval Postgraduate School master's theses have been written about multimedia. Metcalf investigated the applicability of using multimedia in U.S. Coast Guard information systems [Ref. 1]. Although no current uses were

identified, he recommended structuring future computer acquisitions so that the Coast Guard would be prepared to move to multimedia computing when a suitable application presents itself. Thur set up a multimedia prototype to enhance the U.S. Army's war game system [Ref. 2]. This prototype combines the text, audio, and video features of multimedia to increase the realism of war games. This prototype was created for "read-only" end-users, who do not modify the data in any way. Users can experience the data using this multimedia prototype. The prototype executive information system developed in this thesis is similar to the multimedia enhancement of war gaming, in the sense that it brings addition visual and dynamic enhancements to a system that exists in the traditional form of a single page static description.

II. MULTIMEDIA COMPUTER APPLICATIONS

A. MULTIMEDIA DEFINITION

Multimedia is a term applied to both software and hardware. Multimedia software brings information to life via the integration of audio, video or both. A multimedia software application is called a *multimedia title*. Multimedia titles are created using Multimedia development software commonly called authoring software or an authoring package. Many of these authoring packages include a powerful object-oriented programming, or *scripting*, language. Authoring packages require additional special hardware peripherals to take advantage of the Multimedia features.

Text, graphics, animation, audio, and video combine to create multimedia applications. Multimedia is commonly described as the merger of "... television, stereo, and computer" [Ref. 3] capabilities into a computer application. The main element in this merger is the computer. Without it, one can envision multimedia applications in education by remembering Saturday morning cartoons (animation) - following the bouncing ball, as we were encouraged to sing-a-long as the ball touched each word of text displayed on our television screen. Nonetheless, the computer element of multimedia components dates to the beginning of multimedia in 1984, when

the Apple Macintosh made the graphical user interface a reality and the foundation of its desktop computer [Ref. 4].

As consumers tired of the interactive frenzy of video games and passive television viewing, the mainstream computing environment (IBM compatibles) began moving to a graphical interface environment with "the introduction of Microsoft Corporation's Windows in 1986." [Ref. 5] [Ref. 6] The leaders of the Intel processing environment, Microsoft and IBM, are learning from and teaming with Apple Computer [Ref. 4]. These efforts resulted in multimedia becoming available to the public.

This new information platform allows even the most novice of computer users to get involved. Research has shown that interactive learning generally results in higher retention rates over audio and visual.[1] Multimedia applications, in a time of reduced resources, are popping up, in both the education and training environments.

B. MULTIMEDIA INDUSTRY

The multimedia information platform can be divided into hardware and software. A consortium of hardware and software vendors has joined to create standards for multimedia hardware and software products. Two groups, the Multimedia Personal

[1] "Audiences retain 20 percent of the information they hear, 40 percent of the information they see, and 60 to 70 percent of the information they learn through interaction." [Ref. 6]

Computer (MPC) Council and the Ultimedia Tools Series (UTS) Technical Committee, are attempting to standardize the architecture of the multimedia environment.

1. Multimedia PC Marketing Council

The Multimedia PC Council hopes to promote multimedia by ensuring that the various components will interact with minimal anguish for the user. The MPC Council is composed of the following software and hardware manufacturers:

- CompuAdd,
- Creative Labs,
- Fujitsu,
- Headland Technology/Video,
- Seven,
- Media Vision,
- Microsoft,
- NCR,
- NEC Technologies,
- Olivetti,
- Philips Consumer Electronics,
- Tandy,
- Zenith Data Systems, and
- dozens of applications developers[2] [Ref. 8]

[2] "System manufacturers can become council members and get full MPC trademark licensing privileges for a $250,000 fee..." [Ref. 7]

The MPC Council maintains minimum hardware specifications, which it labels "Multimedia PC Specification, Version X." The current version, as of April 5, 1992, is Version 1.0, with the following minimum components:

CPU
386SX processor or compatible
RAM
2 MB of RAM
Magnetic storage
3.5" floppy drive, 1.44 MB capacity
30 MB hard drive
Optical Storage
CD-ROM with CD-DA outputs
Audio
8-bit DAC, Linear PCM sampling, 22.05 & 11.025 Khz rate, DMA/FIFO with interrupt
8-bit ADC, Linear PCM sampling, 11.025 kHz rate, microphone level input
Music synthesizer
On-board analog audio mixing capabilities
Video
VGA graphics adapter
Input
101 key keyboard
Two button mouse
I/O
Serial Port
Parallel Port
MIDI I/O Port
Joystick Port [Ref. 9]

"Products with the MPC logo essentially carry a promise from vendors that the product meets minimum MPC standards." [Ref. 5] MPC specifications are attempts to ensure hardware components are compatible, and software will perform properly on MPC hardware.

2. Ultimedia Tools Series Technical Committee

IBM is not a part of the Multimedia PC Council. Throughout the literature, IBM has stated that the Multimedia PC Council has set the standard hardware configuration too low. Rejecting the MPC specification, IBM developed the IBM Ultimedia PC. In addition, IBM organized the "Ultimedia Tools Series Technical Committee." This partnership includes

- MacroMedia,
- AimTech
- Assymetrics [*sic*],
- Mammoth Micro,
- Fractal,
- Humancad,
- Vision Imaging, and
- Allen Communications,
- among others. [Ref. 3]

Like the MPC, the UTS trademark promises that software bearing this logo "... can be mixed and matched in a seamless, interoperable fashion." [Ref. 3] [Ref. 10] In contrast to the MPC Council, the UTS only monitors software and supports a variety of operating environments: DOS, Windows, and OS/2. IBM tests each piece of software for UTS compliance and certification.

From current literature it is not clear that the IBM Ultimedia PS/2; with a 80386SX processor, XGA graphics, built-

in SCSI, 16-bit audio, and CD-ROM/XA; is the UTS hardware architecture of choice. Instead, the UTS states, concerning architecture:

> The UTS architecture is a set of implementation agreements and protocols...which allow UTS products to work together with compatibility and consistency.[3] [Ref. 10]

C. MULTIMEDIA HARDWARE COMPONENTS

Given these minimum system requirements, the key multimedia hardware components are the audio and the video adapters. For this discussion, the terms adapter, board, card, and controller are all synonymous when prefaced by the term audio or video.

1. Audio

The audio adapter, commonly called a sound board, enables music, sound effects, and voice annotations to be embodied in applications. It does this by receiving either analog or digital sounds from an external source (i.e., microphone, CD-ROM drive, musical synthesizer, or cassette deck). These sounds are then sent to either the hard drive for storage, or to memory for immediate playback. The sound is played back by converting it to an analog signal that is output to speakers. The audio adapter must be capable of

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[3] The IBM UTS architecture document, which defines file formats and exchange protocols, in addition to other UTS standards, was not available at this time.

processing CD-Audio signals and two audio file formats: Waveform and Musical Instrument Digital Interface (MIDI). These sound files tend to be very large and require continuous access; thus, CD-ROM provides the best storage medium.

a. CD-Audio

Besides file storage, the CD-ROM drive may also be used to play background music. The audio adapter passes control of the speakers to the CD-ROM drive to allow the playing of conventional CD-Audio. For processing other than simple playback, the CD-Audio signal must be input to the audio adapter and converted to the waveform format.

b. Waveform

The waveform file format is used to store digital representations of analog sound. These files may be made up of digital sound from the CD-Audio drive, or analog sounds from a microphone or cassette tape player that are converted into a digital signal. The waveform file is made up of discrete samplings of the audio input. The accuracy of this waveform representation is determined by the sampling rate and the sampling size.

Sample sizes, measured by the number of bits required to store a sample, are typically either 8-bit or 16-bit. The dynamic range of waveform sound, softest to loudest, is determined by the sample size. Eight bit samples are suitable for voice annotations, however, in order for quality

music to be created or played backed, the 16-bit sample size is needed.

Sample frequency, or rate, is the number of samples taken per second, measured in Hertz (Hz). Higher frequencies translate into sound that is closer to the original audio signal. The sampling rate standard for multimedia-generated sound is 11 kHz, while the typical sampling rate for CD-Audio sound is 44 kHz. This low standard for sampling frequency limits the sound quality available for multimedia applications. However, audio adapters with a sampling rate of 44 khz are becoming available.

Sample frequency and sample size are two key factors in figuring out the amount of storage space required for each waveform file. Waveform file storage requirements are calculated by multiplying the sample size by the sample frequency and the duration of the piece of music. The product, in bits, is then divided by eight, giving the resulting storage requirement in bytes. For example, a 16-bit sample size, with a 44 kHz sampling rate, and a minute of sound requires slightly over 5 MB of storage. Even waveform files created at the minimum standards, 8-bits at 11 kHz, require just over *1/2 MB to store a minute of sound.*

c. MIDI

Musical Instrument Digital Interface (MIDI) files require much less storage space. Using a MIDI file, an *hour*

of sound can be stored in 1/2 MB of disk space. Less storage space is required because the MIDI protocol converts sound to a series of instructions that, when executed, replicate the actual sound. MIDI files are created using an internal or external synthesizer connected to an audio adapter via MIDI Input/Output ports. The MIDI controller chip, housed on the audio adapter, contains an instruction set capable of replicating musical instruments along 16 separate channels.

Waveform and CD-Audio files can also be combined with MIDI sound tracks in a mixer, or synthesis chip. This audio board component provides the ability to overlay voice messages (waveform) over a music background (MIDI). The resulting arrangement is converted to an analog signal and output to the attached speakers.

2. Video

a. Graphics Adapter

The *minimum* display configuration for a multimedia system specifies a Video Graphics Array (VGA) monitor and adapter. This analog monitor, coupled with a VGA adapter, can display up to 256 colors on a single screen with a resolution of 640 x 480 picture elements (pixels). In addition, the VGA adapter provides the facility to display graphics, including animation and scanned images, and text on the screen. [Ref. 5] Higher resolutions and infinite colors are available with

existing hardware suites. A more promising technology for multimedia is full-motion video processing.

b. Video Adapter

This higher level of visual processing is in such an early development stage that minimum multimedia standards have not yet been set for full-motion video. A video adapter is required to transition from animated graphics to full-motion video. This adapter is essential to input, process, and output video segments. Currently, input from a VCR, camcorder, videodisc, or any source meeting the National Television Standards Committee (NTSC) standard is acceptable to all video boards.[4]

These boards vary greatly in their range of capabilities. The least capable products are "display" only boards, which simply display the input. The most capable video adapters provide for the conversion of these analog signals to digital signals so that video segments may be processed, stored, or both, by the computer. Several of these boards provide for the capture of individual frames of video, or still-images, in addition to the capture of video segments. Moreover, some boards allow storage to video-tape and to disk. To store video segments, they must first be converted from analog to digital, and then compressed.

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[4] The NTSC standard is 30 frames-per-second (fps).

Without compression, the size of video files would prohibit their manipulation using current computer technology. For example, 30 seconds of digitized, uncompressed NTSC video would exceed the storage capacity of a CD-ROM and would require more than an hour to playback.[5] There are presently three compression techniques widely used: the Joint Photographic Experts Group (JPEG) standard for still images, and the Motion Picture Experts Group (MPEG) standard for motion video, and INTEL's Digital Video Interactive (DVI) technology for both. [Ref. 6] [Ref. 11]

The Joint Photographic Experts Group (JPEG), a subcommittee of the International Standards Organization (ISO), originally organized to establish still-image compression and decompression standards [Ref. 6]. The group is currently working on compression and decompression algorithms for motion video, based on its still-image algorithms [Ref. 11]. Its still-image compression scheme gained popularity due to its hardware platform independence. This is an intraframe compression algorithm, where each frame is compared to the previous frame and duplicate data are eliminated. This elimination scheme is called *lossy compression*.

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[5] "The motion video we are used to, such as videotape, television, and videodisc, plays 30 frames each second. Film plays at 24 *frames per second* (fps). These are the rates our eyes are used to, and accept as moving image." [Ref. 6]

> ...JPEG has the advantage in that each frame is independently coded and can be edited or rearranged with reference to neighboring frames. [Ref. 12]

In addition, this algorithm yields high compression ratios, high quality images, and higher storage requirements than the MPEG and DVI compression methods.

The Motion Picture Experts Group (MPEG), also a subcommittee of the International Standards Organization (ISO), is tasked with the development of compression and decompression algorithms for motion video [Ref. 6]. Having developed a standard for decompression that accepts input from a variety of compression algorithms, MPEG is currently pursuing an algorithm that compresses not only intraframe data, but also interframe data [Ref. 11]. This lossy technique, though similar to DVI, should yield much lower compression ratios while maintaining image quality.

Intel's DVI technology is a combination of programmable chips can use several compression algorithms, including Real-time Video (RTV), and Production Level Video (PLV). Real-time video compression can be accomplished on a Personal Computer (PC) using varying frame rates and screen sizes. Each frame of the video segment is stored in its entirety, with "the average frame size ranging from 7 to 10 Kb." [Ref. 6] Intel's most prominent compression algorithm is PLV. For PLV, the video segment must be sent to professional compression studio. At the compression studio, each frame of

the video segment is compared to the previous frame. Only data in the current frame which is different from the previous frame are stored, with "an average frame size of 5 Kb." [Ref. 6] The advantages of DVI technology are that "... it can support other standards and process video at various quality levels." [Ref. 11]

The required video quality decides the compression algorithm to be used in each multimedia application. As these and other compression standards are refined, the quality differences will decrease. In addition, video technology is advancing so rapidly that graphics, sound, and video capabilities are being combined on a single adapter.

3. CD-ROM

Large quantities of data and rapid data transfer rates are required for audio and video technology to be included in multimedia applications. These large quantities and rapid rates have forced the portable storage medium of choice to shift from the 1.44 floppy disk to a compact disk read only memory (CD-ROM). On average, a CD-ROM can hold up to 650 megabytes (MB) of data. This translates into thousands of hours of stereo quality sound stored in MIDI files, roughly an hour of stereo quality sound stored in CD-audio files, or "72 minutes of Full Screen, Full motion video, using DVI files." [Ref. 6] Besides large storage capabilities, a CD-ROM can transfer data at up to 300 kbytes per second (Kbps) with data

access rates of 280 milliseconds (ms) [Ref. 13]. Although the standard data access and transfer rates for multimedia components are less stringent, 150 Kbps and 1000 ms or less, respectively. In fact, CD-ROM drives are becoming so popular that many software companies are offering CD-ROM as a distribution medium.

D. MULTIMEDIA SOFTWARE

Multimedia software is the tool that enables applications to come alive. It provides the avenue to make applications interactive and to provide sensory stimulation to our sense of sight and hearing. Multimedia software packages can be all inclusive, such as authoring software packages, or they can be highly specialized like audio, video, graphics, or animation software packages.

1. Authoring

Authoring software provides a means to develop full feature multimedia applications. The creation of graphics and animations, and the manipulation of sound and full-motion video are the basic components of authoring packages. High-end packages include a powerful programming language, typically a *scripting language*. These packages are generally object-oriented.

2. Graphics

Graphic capabilities come as part of authoring software packages. More powerful graphics packages may be

purchased separately. Separate graphics packages specialize in one of two areas: drawing or painting. Painting packages require more artistic ability, allowing the user to illustrate using tools that resemble chalk, charcoal, watercolor, and pencil. Many of these packages offer several brush and paper options to truly emulate traditional artistic mediums.

In contrast, drawing programs offer a palette of predefined geometric shapes, including curves and lines, for those with less artistic ability. In addition, many packages come with slide templates and pre-drawn pictures, or *clip art*.

Several high-end packages support standard backgrounds for slides, slide-show functions, and spell-checkers. Many painting and draw programs accept scanned images. Both programs also feature coloring, sizing, texturizing, and rotation facilities. A few of the high-end packages include animation and sound capabilities.

3. Animation

> Animation defines anything that moves over time, including colors, texture maps, lights, objects, a camera that's looking at objects, objects following other objects, and morphs (the dissolving of one image into another to create a third image). [Ref. 14]

Path-based and cel-based animations are two common techniques used to create animated applications. In the path-based method, the object follows a user defined path. In the cel-based method, the computer plays back an ordered series of

images created by the user. Besides providing movement, many packages provide support for sound and video incorporation.

4. Video

Software that allows the processing of video is called a *video-editing* system. There are three grades of video-editing systems: cuts-only, off-line, and on-line systems. Cuts-only systems display the video segment on the screen or copy it directly to another medium. Off-line systems create edit decision lists (EDLs). On-line systems occasionally create EDLs, but their main function is to allow graphics and titles to be overlaid onto frames. Many systems support non-linear editing of digitized video segments and controllers for VCRs and camcorders.

Lacking a video compression standard, editing software packages frequently use the JPEG compression algorithm, "... while DVI and MPEG are gaining popularity." [Ref. 15] Besides using a variety of compression techniques, video-editing software systems also use a variety of user interfaces. From point-and-click graphical user interfaces to the more traditional "...lists of numbers and cryptic abbreviations," [Ref. 15] software package interfaces are attempting to reach experienced video editors, as well as the most novice editors. Newer video-editing systems are including audio editing support.

5. Audio

Sound-editors and MIDI sequencers are the two types of software available to edit audio files. Pre-recorded music is the target of sound-editors, while MIDI Sequencers enable developers to create original musical scores.

a. Sound-Editing

Preferred by non-musical developers, sound-editors edit and transform existing music. Cut, copy, paste, rearrange, mix, and playback are the basic editing features supported by most sound-editing software packages. Compression, pitch shifting, crossfading, and frequency analysis are features characteristic of the more powerful packages [Ref. 16]. Although sound-editors can process a variety of file formats, MIDI sequencers, as the name implies, can only process MIDI files.

b. MIDI Sequencer

Beyond the editing features listed above, MIDI sequencers also provide quantization, "...pitch correction, transposition, inversion, retro-grade, and tempo change" [Ref. 17] support. Using MIDI sequencers, musicians can create original musical pieces, and to edit musical data at the track level. Tracks of data may be displayed on the screen as

> ...an alphanumeric event list (giving the letter name and number of notes along with their velocity and duration),

graphic notation (sometimes called "piano-roll" notation), and conventional music notation (CMN). [Ref. 17]

MIDI sequencer output is a standard MIDI file, with either single or multiple tracks and multi-channeled. Higher-end packages support creative musical endeavors, by allowing "musical building blocks" [Ref. 17], such as melodies, patterns, and phrases, to name a few, to be manipulated. New MIDI sequencers are standardizing instrument lists and incorporating digital audio editing.

E. ADVANTAGES OF MULTIMEDIA APPLICATIONS

Sound effects, music, animation, video, graphics, and text combine to provide users with an information experience that is not attainable with any single media. Multimedia hardware and software work together to create this multisensory platform. Automating the *Naval Postgraduate School Faculty and Staff Resume Book* provides an opportunity to use the audio and video features of multimedia, which require both multimedia hardware and software.

III. A FACULTY AND STAFF RESUME BOOK PROTOTYPE

In searching for an alternative method of maintaining the Resume Book, multimedia hardware and software emerged as an ideal platform for this purpose. Multimedia features, such as text and graphics, are well suited to handle the large quantities of text and photographs currently included in the Resume Book. The authoring package selected for this prototype, Asymetrix's Multimedia ToolBook, offers several multimedia features: graphics, text, and audio capabilities. Moreover, this multimedia software package supports hyper-linking, or non-linear navigation, and a powerful programming language called *Open Script*. Object-oriented databases are also supported.

The resulting prototype is an executive information system (EIS) database. EISs are actually derivatives of decision support systems. Decision support systems blend powerful query language technology with database technology.

A. PROTOTYPE DEVELOPMENT METHODOLOGY

Several system development methodologies exist for decision support systems, database systems, and information systems. Despite this, there is no standard development methodology for EISs. Similarly, a development model has yet to be established for multimedia applications. Therefore,

this thesis will borrow from both decision support system and database development methodologies to prototype the *NPS Faculty and Staff Resume Book*.

The specific decision support system model is the representation, object, memory-aids, and control model (*R.O.M.C.*) developed by Carlson and Sprague [Ref. 18]. This model provides the framework from which object and control aspects will be drawn to develop the *NPS Faculty and Staff Resume Book* prototype. This prototype is defined in terms of objects. An object can represent a person, place, or an area of interest. Control refers to the method of navigation the system will use. Navigation controls include commands typed at the command line, menus, and buttons. These two elements of the R.O.M.C. easily adapt to multimedia's extensive use of a graphical user interface and object-orientation.

From the database development life cycle, the following stages will be used: the requirements definition and the logical design stages. The requirements definition stage provides the procedures to gather information regarding system functionality and objects to be included in the database. Interviews, meetings, and surveys are tools used to collect this information. The logical design stage ensures all objects have been identified and relationships among objects have been established.

The prototyping process began by conducting interviews to answer four basic questions: What information is contained in

the Resume Book? How is the Resume Book used? What is the process to create or update the book? and What additional information is desired? To gather this information, interviews were conducted with the Dean of Research, Professor Paul Marto, and the Manager of Academic Services, Ms. Maryann Clarey. In addition, results of a Total Quality Leadership Process Action Team survey of the effectiveness of the book were analyzed. The following sections describe the process of maintaining the book and the analysis of the Process Action Team survey.

B. THE UPDATE PROCESS

Currently, the Office of Research Administration is responsible for the book of faculty and staff resumes that serves as a central repository for biographical information about tenure track faculty and selected staff members. This book contains approximately 150 loose-leaf resumes, contained in a three-ring binder.[6] Almost 50 copies of the book are distributed across the Naval Postgraduate School campus. Academic Department Chairs Offices, Curricular Offices, the Deanery, the library, and the Superintendent's Office each receive one copy.

The book's update schedule has recently been reduced from quarterly to biannually. To begin the update process, the

[6] Sample resumes are contained in Appendix A.

Academic Services Manager, Ms. Maryann Clarey, verifies the current Resume Book's index with the NPS on-line telephone directory. Faculty and staff names that no longer appear in the directory are placed on a list of resumes to be deleted and will not be included in the *new index*.

To continue this discussion of the update process the book's resumes will be divided into three categories:

- New military faculty and staff;
- New tenure track faculty;
- Faculty and Staff currently in the Resume Book, and those who have previously been requested to submit a resume that have not responded.

Next, Ms. Clarey cross-checks military faculty and staff names in the current index with the "Precedence List." Names appearing in the "Prospective Losses" section will be used to create a *list of resumes to be deleted* from the Resume Book, and will be deleted from the *new index*.

In addition, the "Prospective Gains" section of the "Precedence List" is probed for military faculty and staff members. All military faculty and selected military staff members are requested to fill out a resume form, as a part of their in-processing when they join the NPS staff.

Similarly, faculty members who have recently been promoted to tenure track status or who have recently joined NPS with tenure track status are asked to submit their resumes. These

professors are sent a memo requesting a resume.[7] Sources of information, for these additions, are "Promotion and Tenure" letters and the Dean of Faculty and Graduate Studies Office.

Next, each department secretary is sent a *new index* to verify. Departmental responses are used to create an *updated index* and *a list of resumes to be deleted.* This updated index identifies those resumes to be included in the updated Resume Book.

The current Resume Book's index is cross-checked with the *updated index.* Faculty and staff appearing on both lists *should* already have a resume in the book. These individuals are sent a memo requesting updated resumes, pictures, or both.[8] Most of the faculty and staff responds to the first request. For those who do not, second and third notices are sent. If no response is received then the request is dropped and the outdated resume remains in the book. Currently, there are no adverse consequences for non-compliance.

When the book is updated, Instruction memos[9], with the new and updated resumes, are sent to holders of the Resume Book. These resumes must be inserted in the 3 ring binder, and inactive resumes are to be deleted.

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[7] A sample resume request memorandum is contained in Appendix B.

[8] Sample update request memoranda are contained in Appendix C.

[9] A sample instruction memorandum is contained in Appendix D.

One-fifth of the book is updated with each iteration of the process. Each time the book is updated, roughly 10 resumes are updated, 20 are added, and 20 are deleted (i.e., due to promotions, faculty and staff retirements, and military rotations). Two reasons contribute to this problem:

- Individual faculty and staff often fail to participate in the update process; and
- Resume Book holders often neglect to revise their books.

Because of the ineffective update process, the Dean of Research, Professor Paul Marto, recommended the Resume Book be evaluated as a part of the NPS Total Quality Leadership Program.

C. PROCESS ACTION TEAM SURVEY

NPS has recently decided to implement Total Quality Leadership. As a part of this effort, a Process Action Team (P.A.T) was convened to review the Resume Book process and to recommend alternatives. After analyzing customer surveys[10] and process flowcharts, the P.A.T. came to these conclusions:

- The pictures and the professional history are an essential part of the information in the Resume Book;
- Accessibility to the information should be increased;
- The update process needs improving; and

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[10] A summary of the P.A.T. survey results are contained in Appendix E.

- The information should maintain its ease of use.

One way to meet these requirements would be through an electronic information system. A similar system, by the Academic Technology Services Department of the Wharton School at the University of Pennsylvania, has shown that the required technology exists [Ref. 19].

Using an authoring package that provides text, graphics, audio, and video support, the *NPS Faculty and Staff Resume Book* can be automated. The navigational system will allow the user to directly access the section of information desired. The consistent placement of information would enable the user to easily locate the section containing the desired data. Multimedia software would allow the large amounts of text, and the faculty and staff photographs to be incorporated into a single database. This database application could then be placed on a network, increasing its accessibility, and possibly easing the maintenance burden.

D. DATABASE DEVELOPMENT

Through interviews with the Dean of Research, and meetings with Professors Shu Liao and Gail Fann Thomas, co-advisors of this thesis, the scope of this project was defined. It was agreed that the *NPS Faculty and Staff Resume Book* would provide the basis for developing a prototype executive information system database. In addition, the prototype would

be designed and implemented using multimedia technology to take advantage of its advanced features.

Employing multimedia software is ideal for developing a database prototype. This new generation of software is well suited to the iterative design process of a prototype. Moreover, most of these multimedia authoring packages use an object-oriented approach to system design.

1. Objects

This object-oriented software approach corresponds to the object portion of Carlson and Sprague's R.O.M.C. model. This object model leads to the object-oriented data modeling methodology being applied to this project. Object-oriented models

> ... presume a computer representation of real-world entities as "objects" having attributes and participating in relationships, rather than as records in traditional file oriented systems. [Ref. 20]

In addition, object-oriented models reflect a design methodology independent of the implementation methodology, such as a relational or network database. Figure 1 depicts the general object model of the system. Derived from several interviews with Professor Marto, Dean of Research, this model provides an overview of the whole system. Each object represents an area of interest that may be included in the database.

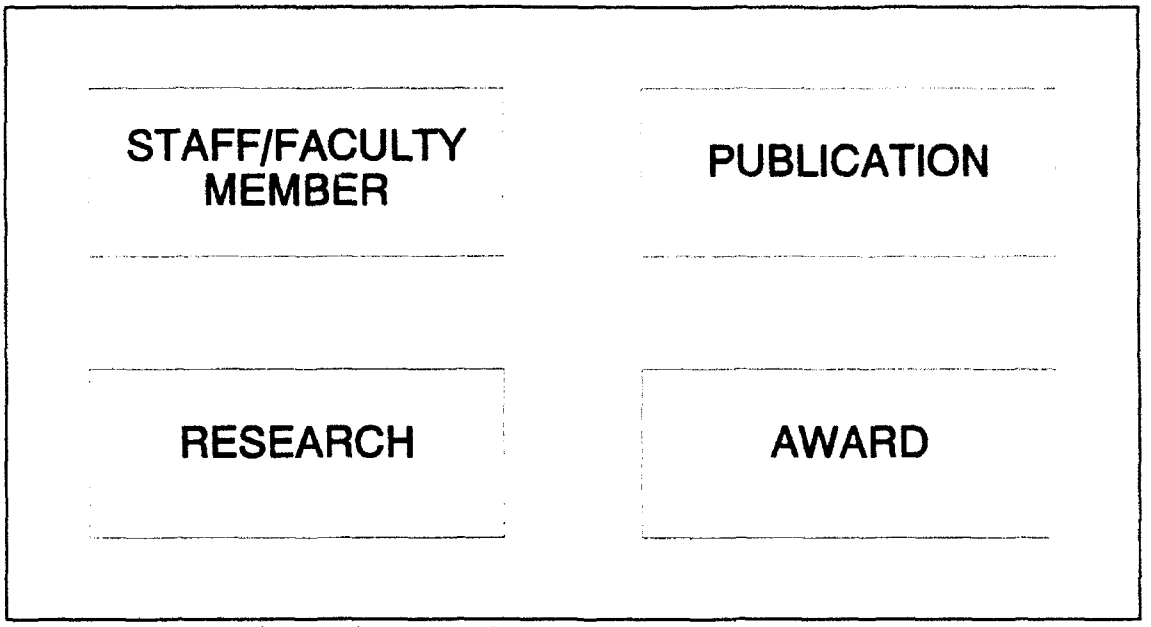

Figure 1 Basic Object Model.

2. Requirements Definition

Given the general object model, information requirements for each object were derived through interviews with Dean Marto and his staff, Professor Knorr and Ms. Clarey. Reviews of the current Resume Book resulted in additional information requirements being defined. In addition, P.A.T. survey summaries and findings were provided by Professor Thomas and Ms. Clarey, members of the P.A.T.

The main requirement for this executive information system prototype was to continue to include faculty and staff photographs. Other requirements included retaining the professional experience information and adding data about research interests. Also, a new requirement surfaced to provide "cross-indexing" or linkages among professors with

similar research interest. These requirements are well suited for the following multimedia features: graphics, text databases, and hyper-linking.

These refined information requirements are documented in the object relationship model, Figure 2. In addition, these information requirements lead to the following hardware and software configuration.

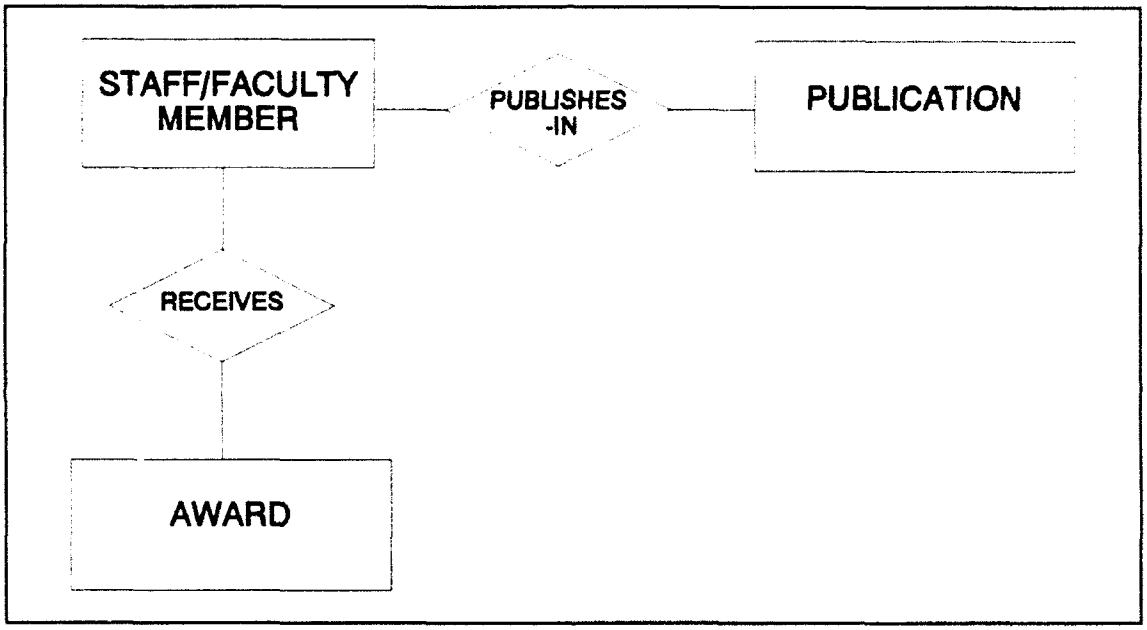

Figure 2 Object-Oriented Relationship Model.

The system was developed on an IBM compatible personal computer. The computer has an 80386 processor, running at a clock speed of 33 Mhz, with a standard VGA monitor and adapter, a 120 Mb hard drive with both a 1.44 Mb and a 1.2 disk drives, a standard keyboard, and a two button mouse. The software, Asymetrix's Multimedia ToolBook, required Microsoft's Windows 3.1 operating environment. A 300 Mb hard

drive is recommended for implementation due to the anticipated large storage requirements for the photographs and data for more than 150 resumes. Even greater storage capacity will be required if the current process is modified to include adjunct professors (roughly 320 total resumes).

3. Logical Design

Estimates of the storage requirements for the database can be calculated from the logical design. The logical design stage identifies all of the data elements to be stored in the database. These elements are documented in a project data dictionary.[11] A well developed logical design is independent of the database software and the physical implementation. The R.O.M.C object-oriented methodology promotes independent logical designs. An object-oriented data model documents this stage. Figure 3 shows the object-oriented data model for this prototype.

4. Controls

The control portion of the model is also drawn from the R.O.M.C. methodology. Navigation controls are easily mapped to multimedia authoring software. The authoring software, selected for this prototype, supports hyper-linking, or non-linear navigation. Non-linear navigation means fields, records, or both may be linked with other fields, records, or

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[11] A data dictionary for the NPS Faculty and Staff Resume EIS is contained in Appendix F.

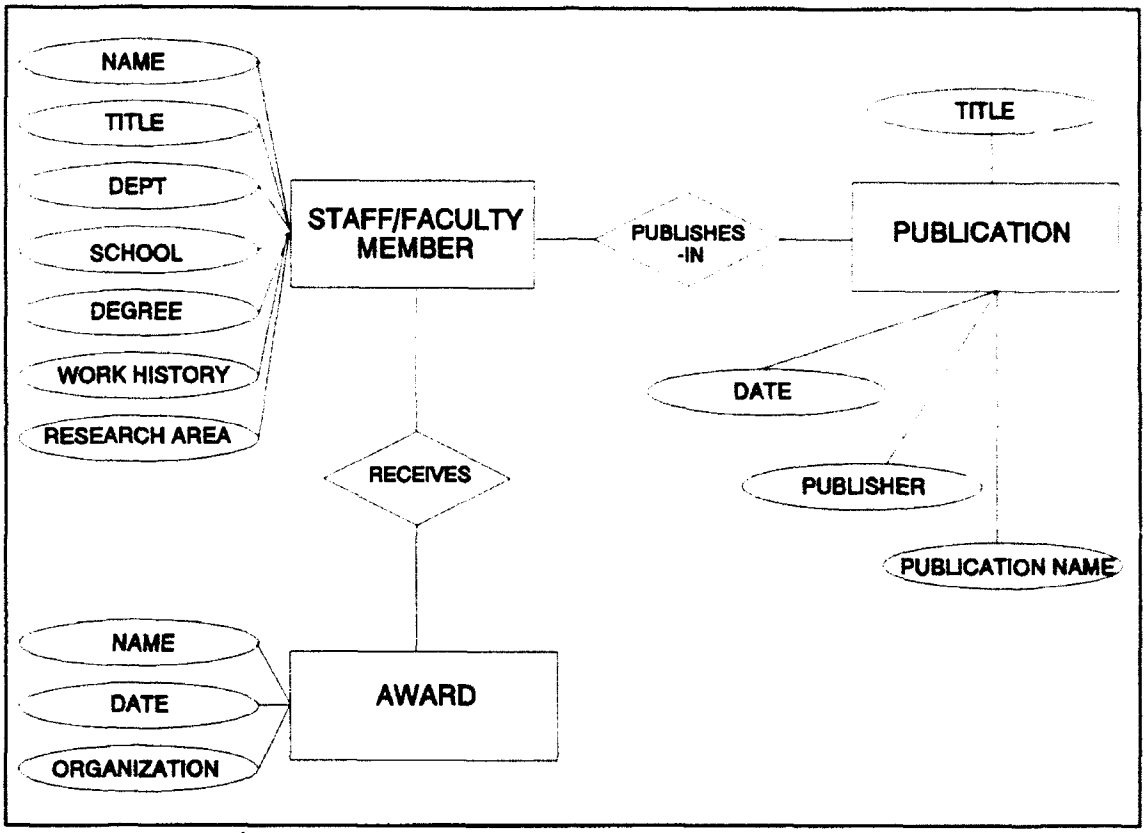

Figure 3 Object-Oriented Data Model.

both. This type of navigation transcends the traditional hierarchial or networked database navigation, allowing even greater access to the data. Furthermore, multimedia authoring packages simplify the use of hyper-linking by providing a special data structure called a *Button*. Buttons act as control structures that participate in linkages: field to field, field to record, record to record, etc.

Both the P.A.T. survey results and interviews with the Research Administration staff highlighted the need for non-linear navigation. Therefore, hyper-linking, using buttons, is the navigational method applied in this prototype. The

next chapter discusses other software-specific data structures and the structure of the prototype.

IV. STRUCTURING THE FACULTY AND STAFF RESUME PROTOTYPE

A. CREATING A BOOK

The program development is initiated using Asymetrix's Multimedia ToolBook software. This object-oriented software uses the metaphor of a *book* to represent a database. After constructing a book, it is saved by selecting the **Save as** option from the **File** pull-down menu and entering an eight-character file name. ToolBook adds the .TBK file extension to all books. Subsequent revisions to a book can be saved by choosing the **Save** option from the **File** pull-down menu.

Each book has pages that share common objects in the background and unique object instances on the foreground. As the number of backgrounds in a book increases, system performance decreases. With this in mind, the prototype was designed with four books: *INSTN*[12], *Resumes*, *Pubs*, and *Awards*. Using the object-oriented data model, pages were developed for the *Resume*, *Pubs*, and *Awards* books.

B. CREATING PAGES

The authoring software, ToolBook, provides two user levels, *Author* and *Reader*. The user level may be selected by

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[12] File names are limited to eight characters, so the book containing instructions was named *INSTN*.

toggling the **F3** function key, or by selecting **Reader** or **Author** from the **Edit** pull-down menu. Author level is used to create pages.

1. General Object Editing

In the Author mode, a tool palette is displayed. This palette contains tools to create standard geometric shapes, Buttons, Fields, and Recordfields. The tools from this palette can be used to create foreground and background pages. Except the Recordfield, which is only available on background pages, the palette is the same in both the foreground and background windows.

A Recordfield represents an object that will appear on every page. A *Recordfield* is analogous to a field in a database record. Each instance of an object is represented by an occurrence of a Recordfield on a page. Each page represents a unique database record. In contrast, a *Field* contains the same data on every page. Fields are similar to labels. Examples of Fields, Recordfields, and Buttons are illustrated in Figure 4.

To create a Recordfield, Field, or any other object on the tool palette, the tool icon must first be selected. Then, using *drag-and-drop* capability, the item may be moved and sized anywhere on the screen. Objects can also be copied. Copied objects retain all the properties of the original object. Double-clicking the left-mouse button in a Field or

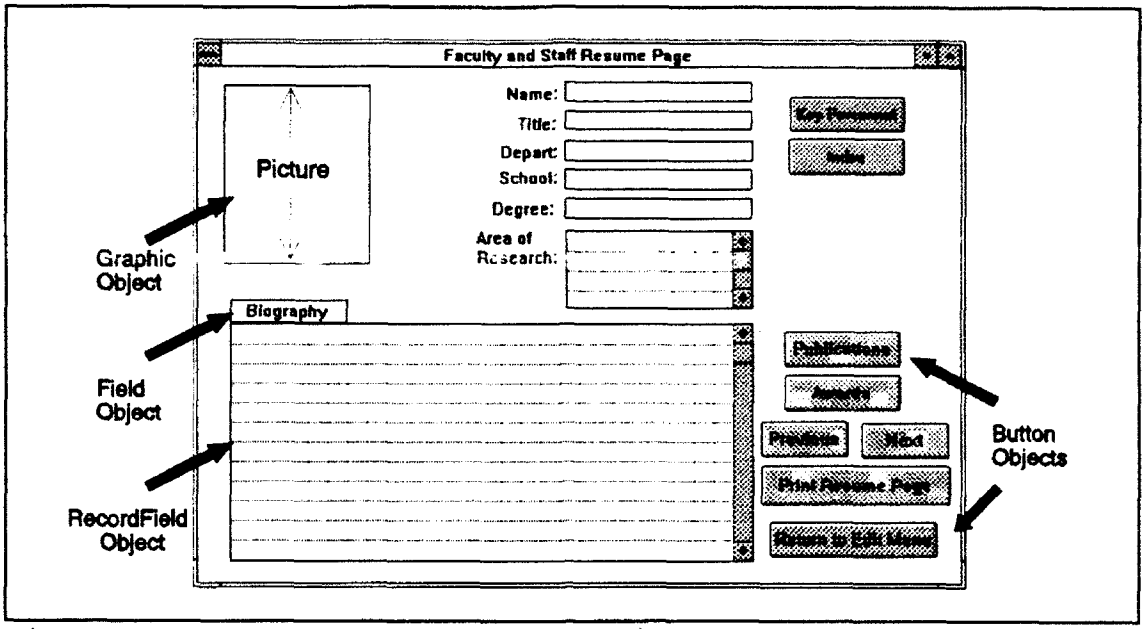


Figure 4 Examples of ToolBook Objects.

Recordfield object allows text to be typed in the object. The books in this prototype were created using tools from the tool palette and these techniques.

2. The EIS Instruction Book

These pages introduce the prototype EIS and provide guidance for maintaining the database. The *INSTN* book has two pages, both of which were created on the foreground. The first page of the *INSTN* book shows the name and logo of the school and consists of one Field object and one Graphic object. Figure 5 displays the fields of the title page of the *INSTN* book. The Graphic object was imported using the **Import Graphic** selection from the **File** menu. The Field object was created using the object-editing and data entry techniques discussed above. The second page of the *INSTN* book provides

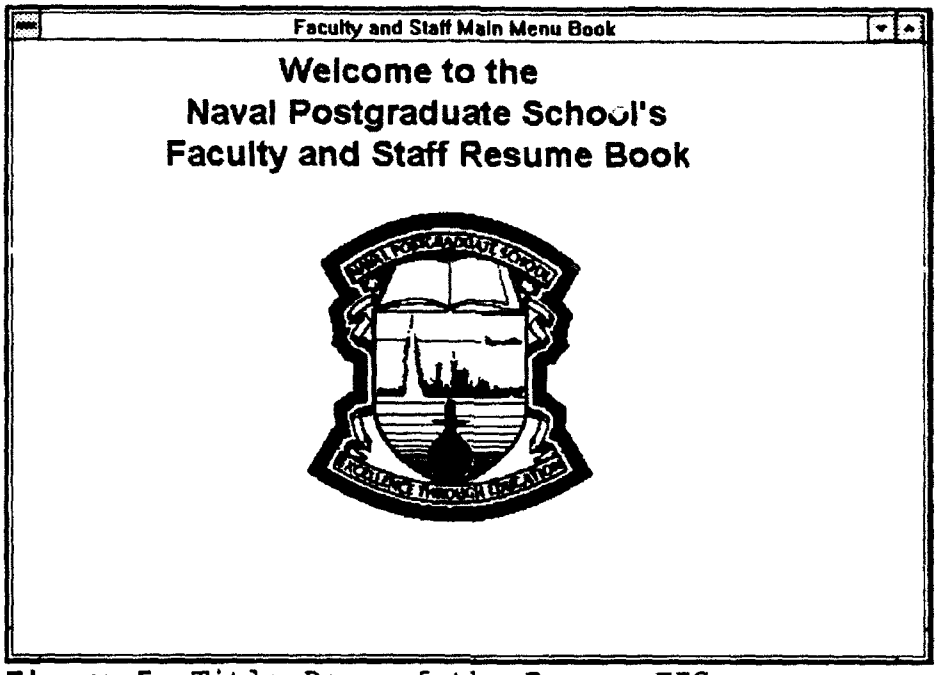


Figure 5 Title Page of the Resume EIS.

input instructions to the reader, and was created similarly, with the addition of Button objects. These buttons are also created using drag-and-drop techniques. Figure 6 depicts the layout of this page.

3. EIS Database Books

The other books were created in a similar fashion, with the exception that they were created in the background rather than in the foreground. The *Pubs* and *Awards* books use one Field object, one or more Recordfield objects, and three Button objects. Figures 7 and 8 reflect the design of these pages respectively.

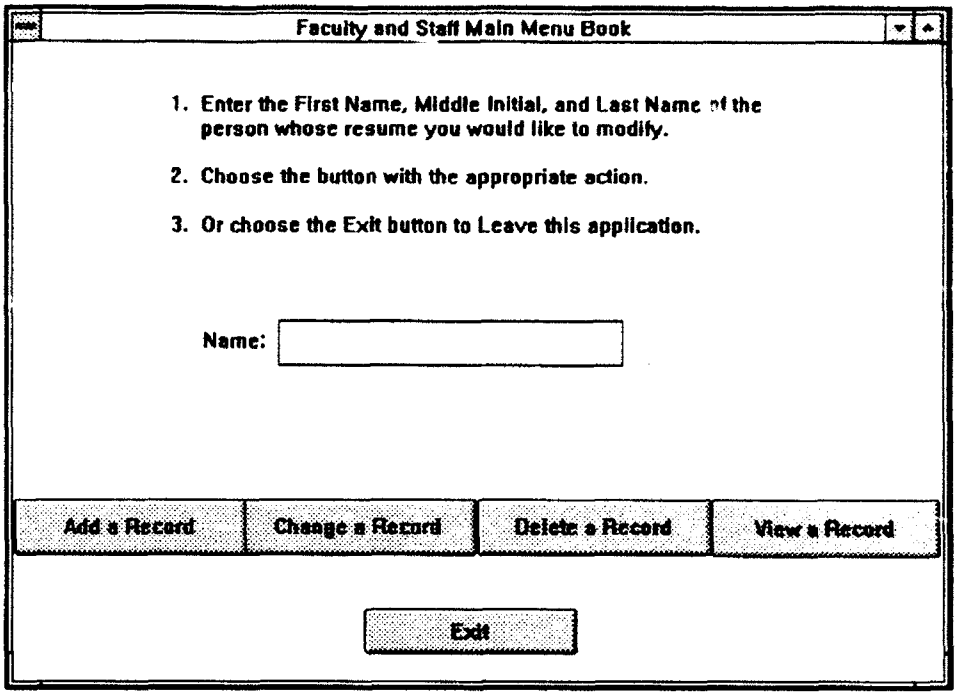


Figure 6 Instruction Page of the Resume EIS.

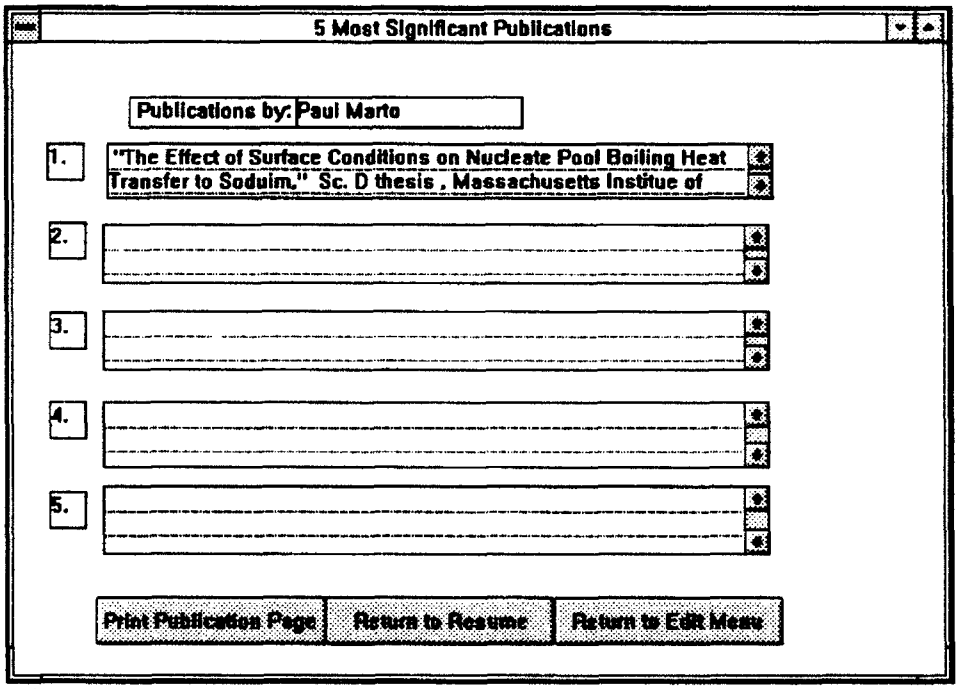


Figure 7 Sample Page from the Pubs Book.

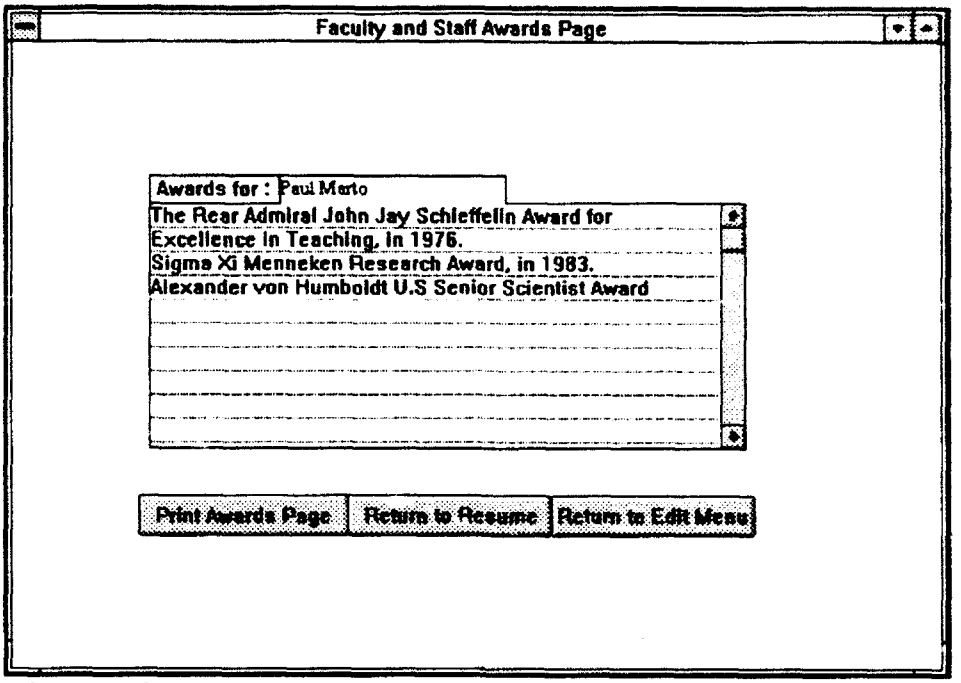


Figure 8 Sample Page from the Awards Book.

Although quite similar to the *Pubs* and *Awards* books, the *Resume* book makes use of Foreground and Background objects. Figure 9 shows the screen design of the *Resume* book. In the Foreground, a Graphics object was created using the graphics import method described above. This Graphic object will contain the photograph of the faculty or staff member. Two of the background buttons, *KEY PERSONNEL* and *INDEX*, are *Dialog Box Buttons*. These special buttons are created using the Dialog Box Editor. When developed, they will provide indexes of resumes to be used in hyper-linking to a specific faculty or staff member's resume. ToolBook's script-based programming language is used to write scripts to provide Button objects with hyper-linking functionality.

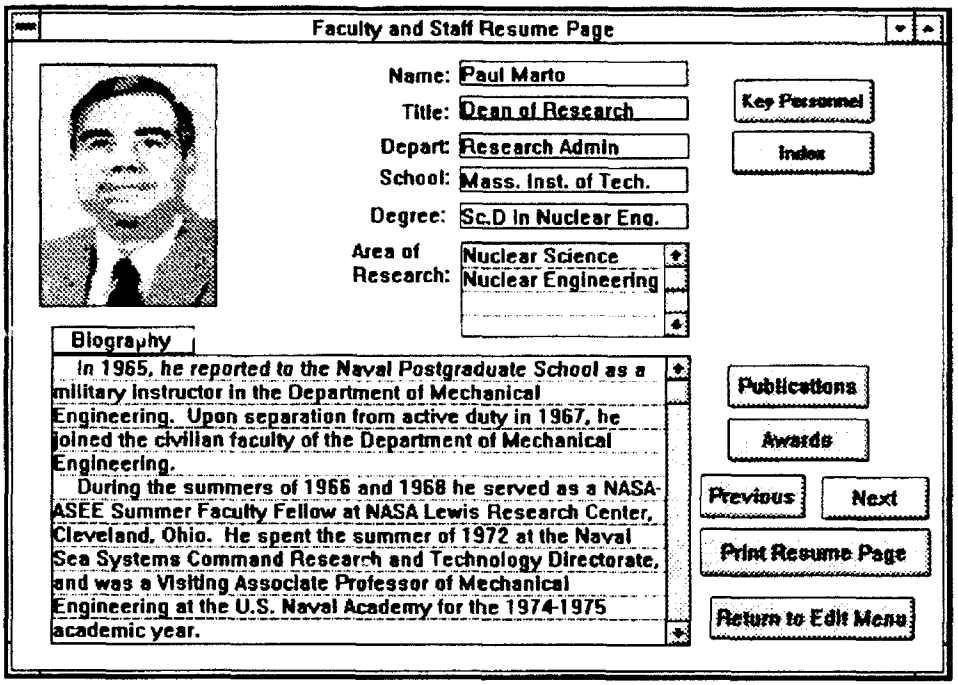


Figure 9 Sample Page from the Resume Book.

C. CREATING SCRIPTS

A script can be written for Books, Pages, Buttons, Fields, Recordfields, or any object. Scripts are segments of computer code, similar in format to C and Pascal programs. The scripts control hyper-linking, object content editing (data edits), and object movement. Open Script is the programming language of Asymetrix's Multimedia ToolBook. ToolBook also provides a script debugging tool to aid in script error-checking. Scripts can only be written at the Author-level.

To enter a script, the author selects an object on the screen and then selects **Object Properties** from the **Object** pull-down menu. In the resulting *Object* Properties Box, click the *Script* button to bring up the object's script window.

Script code can be copied to and from any object, page, or book. Similarly, when objects are copied, all of their properties are also copied, including their script. About ten scripts were written for this faculty and staff prototype, three of which were copied from other Multimedia ToolBook applications[13] and modified. The scripts for this EIS prototype are included in Appendix E.

Figure 5 shows the initial screen of this prototype, it is briefly displayed before the instruction screen, Figure 6. Automatic *page turning* is accomplished through a script. This script was copied from another ToolBook application, and modified to fit this specific book.

The instruction page contains five buttons: *ADD*, *CHANGE*, *DELETE*, *VIEW*, and *EXIT*. Each of these buttons has a script. Button scripts are executed when a button is clicked. The *ADD* and *EXIT* button scripts transfer control to other books, or to the system respectively. When fully developed, the other buttons will function as follows:

- *CHANGE* any data field on a page in the *Resume*, *Pubs*, and *Awards* books;
- *DELETE* a page from the *Resume*, *Pubs*, and *Awards* books; and
- *VIEW* will display a page from the *Resume* book without allowing any update capability.

[13] Asymetrix encourages code sharing.

The *Resume* book, Figure 9, contains six standard buttons and two Dialog Box buttons. The six standard buttons provide the navigational tool for the user to access the desired section of the system. The *PUBLICATIONS* button script closes the *Resume* book and opens the *Pubs* book to the page of the member whose resume was previously displayed. Similarly, the *AWARDS* button script closes the *Resume* book and opens the *Awards* book to the page of the member whose resume was previously displayed. The *PREVIOUS* and *NEXT* button scripts *turn* the pages of the book, backward and forward respectively.

When fully developed, the *PRINT RESUME PAGE* button will transfer control to and from a printer, providing the user with a hardcopy of the screen's contents. This button and script were created in the *Resume* book and copied to both the *Pubs* and *Awards* books. Therefore, the scripts for the *PRINT PUBLICATION PAGE* button of the *Pubs* book, and the *PRINT AWARDS PAGE* button of the *Awards* book, will perform the printing functions when they are developed.

Similarly, the *RETURN TO EDIT MENU* button and script were created in the *Resume* book and copied to both the *Pubs* and *Awards* books. Therefore, this button functions the same in all three books. Click the *RETURN TO EDIT MENU* button, in any of these three books, and the current book will be closed, and the *INSTN* book will be opened to the *Instruction* page.

The *RETURN TO RESUME* button and script were created in the *Awards* book and copied to the *Pubs* book. Therefore, this

button performs similarly in each book. Clicking this button closes the current book and opens the *Resume* book to the page of the member whose publications or awards were displayed.

Two special buttons, displayed in the *Resume* book, are Dialog Box buttons. These buttons were created using the ToolBook Dialog Box Editor, a specialized piece of software. The Dialog Box Editor is selected from a Microsoft Windows' window. Dialog Box buttons are created using the Dialog Box Editor's tool palette. The *KEY PERSONNEL* button will, when fully developed, provide a list of faculty or staff members in the same department as the member whose resume is displayed. When fully developed, the *INDEX* button will provide a list of all faculty and staff members included in the *Resume* book. Click either of these buttons and a pull-down menu of faculty and staff member names, or department names will appear. When fully functional, highlighting and clicking a name will result in that faculty or staff member's resume to be displayed or a second pull-down menu of the selected department's personnel to be displayed. Portions of each of these buttons' scripts are system generated; therefore, the scripts for these buttons are not displayed. To make the buttons fully functional, additional Open Script programming is required.

ToolBook provides an additional source of scripts, system generated scripts. Two standard scripts can be generated from the Button Properties Box. In addition to the script button mentioned earlier, this box has *LINK TO* and *LINK WITH* buttons

allowing the author to select a destination object, page, or book. Once a destination is established, the system generates the script to establish linkages between the button and the object, page, or book. The difference between the *LINK TO* and *LINK WITH* buttons is that the *LINK WITH* button also generates a button and a script to link back to the object, page, or book of origin. Buttons and their associated scripts combine to provide powerful, non-linear navigation capabilities to a variety of multimedia applications.

D. NAVIGATION

Buttons, a graphical user interface object, are used to navigate throughout this faculty and staff prototype. *Object* Properties Boxes support object naming. Buttons, books, pages, and other objects can be named in the *Object* Properties Box. Hyper-linking, or non-linear navigation, becomes possible using these author assigned names. Object scripts can be written for various objects, sending control to a specific object name (i.e., a Page-name, or Field-name.) Buttons are the only data structure used for navigation in this prototype. Whenever possible, buttons remain in the same location across books to make this application easier to use.

When fully functional, the prototype will provide the capability to add, change, view, and delete a resume. Figures 5 and 6 are current pages of the *INSTN* book. These pages introduce the system and provide guidance for

maintaining the database. When the user enters a name and clicks the ADD button, pages are added to the *Resumes*, *Pubs*, and *Awards* books. Each of these pages is named and displays the user entered name. Seconds later, the user is placed on a *Resume* page, where he may began tabbing from field to field entering data. The Author may set the tabbing order by selecting each object and selecting **Object Properties** from the **Object** pull-down menu, then changing the *layer number*. The layer numbers result in the objects *tab-order* sequence.

PUBLICATION and *AWARD* buttons at the right of the screen link this biographical data page to pages in the *Pubs* and *Awards* books, respectively. The user may click either of these buttons to add the corresponding data. Figures 7 and 8 show the fields of an *Pubs* and an *Awards* page. Buttons on these pages provide navigation back to the *Resume* page, to the *Instruction* page, or allow the user to exit the system. Figure 10 illustrates the current and proposed navigation paths.

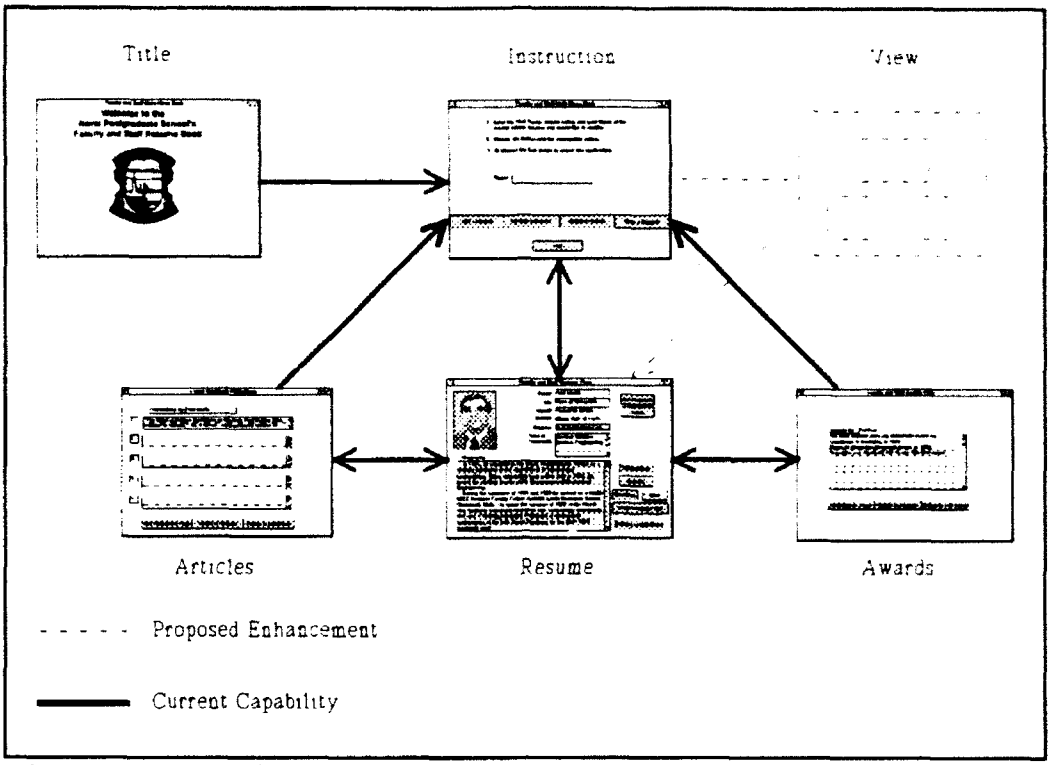


Figure 10 Navigation Paths in the Resume EIS.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Asymetrix's Multimedia ToolBook's database and graphics capabilities are well suited to handle the large quantities of text and photographs currently included in the Resume Book. Buttons, one of Asymetrix's powerful graphical user interfaces, enable end-users to easily navigate through the database. Additionally, data access is increased through ToolBook's support of non-linear navigation, hyper-linking. This powerful authoring package provides many features that are beyond today's system requirements.

ToolBook provides many components that could enhance the Faculty and Staff Resume Executive Information System, such as audio and video. Sound effects, music, voice annotations, video clips, or any combination of these features, would add a new dimension to information contained in this Faculty and Staff Resume EIS.

Multimedia, a current computer technology buzzword, may soon become the mainstream of desktop computing. With the current economic state expected to deteriorate, multimedia offers a way to stretch educational dollars, by allowing educators a better way to share scarce resources. Considering this, the *NPS Faculty and Staff Resume Book* is an excellent

opportunity for the Naval Postgraduate School to experience the capabilities of multimedia technology.

B. RECOMMENDATIONS

This prototype provides an outstanding opportunity for follow-on theses to complete this "book" and potentially to link it to other books. In addition, putting this book on the INTERNET could result in greater exposure for the school, which could translate into research funding. Access to this system through internetworking connections depends on large scale wide-area network setups and is beyond the scope of this thesis.

Further refinement of this prototype system is needed to enhance the potential capability and ease of use of the system. To begin, the ADD module may require a check for duplicate data to prevent a resume from being entered twice. Also, when a record is added, the person's name should be added to the index, and all the appropriate links established. In addition, the view, change, delete, and print functions need to be developed.

Other desirable features include:

- On-Line help;
- Button or menu item to import the picture, if possible; and
- Button or menu item to create a runtime module for read-access only.

This system provides substantial opportunity for creativity using multimedia. For example, adding a video segment of the Superintendent describing the school's mission, and highlighting research accomplishments and facilities. Another possibility could be individual professors narrating abstracts of research projects, expanding on current research interests, or simply reading their resume. Enhanced graphics capabilities combined with the audio and video elements provide a powerful applications development environment for transforming the *Naval Postgraduate School Faculty and Staff Resume Book* into an effective executive information and database system.

APPENDIX A: SAMPLE PAGES FROM THE CURRENT RESUME BOOK

This appendix contains a representative sample of resumes currently included in the *Naval Postgraduate School Faculty and Staff Resume Book*. The information derived from these pages was used to design this multimedia executive information system.

RESUME OF RICHARD SANFORD ELSTER

Richard Elster was born in Deadwood, South Dakota on 3 December 1939. He attended the University of Minnesota in Minneapolis where he received the degrees of Bachelor of Arts in Psychology, Master of Arts in Industrial Relations, and Doctor of Philosophy in Psychology (1967).

After graduate school, he was employed by Litton Industries as a behavioral scientist and later as a project scientist.

In January of 1969, he joined the faculty of the Naval Postgraduate School. His teaching focused on industrial psychology topics relevant to DoD manpower, personnel and training policies. From 1 July 1945 to 1 July 1978, he was on leave from the Naval Postgraduate School. During that period, he worked five months in the Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs), and 31 months as Senior Scientific Advisor to the Deputy Chief of Naval Operations (Manpower)/Chief of Naval Personnel.

On 1 October 1979, he was promoted to professor in the Department of Administrative Sciences at the Naval Postgraduate School. In July of 1983, he became Chairman of the Department of Administrative Sciences.

During the period of 1984-1988, he served three years as Deputy Assistant Secretary of the Navy for Manpower and one year as Director of the Defense Personnel Security Research and Education Center (PERSEREC).

In 1989, he filled the CNO's manpower chair at the Naval Postgraduate School. During January-September 1990, he worked as Deputy Assistant Secretary of Defense for Resource Management and Support. He was named Dean of Instruction at the Naval Postgraduate School in September 1990.

12/90

RESUME OF PAUL JAMES MARTO

Paul Marto was born in Little Neck, Long Island, New York, on August 15, 1938. He attended the University of Notre Dame and was graduated magna cum laude in June, 1960, receiving a B.S. degree in Engineering Science and a commission in the United States Naval Reserve.

He was released from active duty to attend graduate school at Massachusetts Institute of Technology in the Nuclear Engineering Department. Under an Atomic Energy Commission Special Fellowship in Nuclear Science and Engineering, MIT awarded him the M.S. degree in 1962, and the Sc.D. degree in 1965. His Sc.D. thesis, "The Effect of Surface Conditions on Nucleate Pool Boiling Heat Transfer to Sodium," was under Professor Warren M. Rohsenow.

In February, 1965, he reported to the Naval Postgraduate School as a military instructor in the Department of Mechanical Engineering. Upon separation from active duty in 1967, he joined the civilian faculty of the Department of Mechanical Engineering.

During the summers of 1966 and 1968 he served as a NASA-ASEE Summer Faculty Fellow at NASA Lewis Research Center, Cleveland, Ohio. He spent the summer of 1972 at the Naval Sea Systems Command Research and Technology Directorate, and was a Visiting Associate Professor of Mechanical Engineering at the U.S. Naval Academy for the 1974-1975 academic year.

In 1976 he received the Rear Admiral John Jay Shieffelin Award for Excellence in Teaching and in 1983 he received the Sigma Xi Menneken Research Award.

He was promoted to Professor of Mechanical Engineering in 1977 and served as Chairman of the Department of Mechanical Engineering from 1978 to 1986. In June 1985, he was appointed Distinguished Professor of Mechanical Engineering and in October 1990 he was appointed Dean of Research.

He spent a sabbatical year in 1987-1988 as a Visiting Research Fellow at Queen Mary College, University of London and a NATO Senior Guest Scientist at the Nuclear Research Center, Grenoble, France. In 1990, he received an Alexander von Humboldt U.S. Senior Scientist Award to conduct research for six months in Germany.

He is a member of Tau Beta Pi, Sigma Xi, the American Society for Engineering Education, the American Society of Naval Engineers and is a Fellow of the American Society of Mechanical Engineers. He is listed in "American Men of Science," "Who's Who in the West," and "Outstanding Young Men of America."

12/90

APPENDIX B: RESUME REQUEST MEMO

MEMORANDUM

From: Manager, Academic Services, Code 82
To:

Subj: **UPDATE OF FACULTY & STAFF RESUME BOOK**

Encl: (1) Sample page showing format.

1. The Faculty and Staff Resume Book is a very useful tool for many people on campus. If you would care to look at one all chairmen, deans, etc have a copy. **Your resume is needed to make this book complete.**

2. **Please prepare your resume today.** Enclosure (1) shows the general format for both information and spacing. Please adhere to the spacing indicated and make sure your resume does not exceed one page so that we may have a more uniform appearance to the book. Please proof read your resume carefully. **Letter quality printing is a necessity.**

3. A 2"x3" photo for the resume may be obtained from the Photo Lab. These photos are taken on Wednesdays only (preferably in the mornings). You must make an appointment by calling x2336.

4. A copy of your photo specially prepared for printing will be delivered to our office. (Do not send photos to us.) **Please forward your resume to this office as soon as possible.** Thank you.

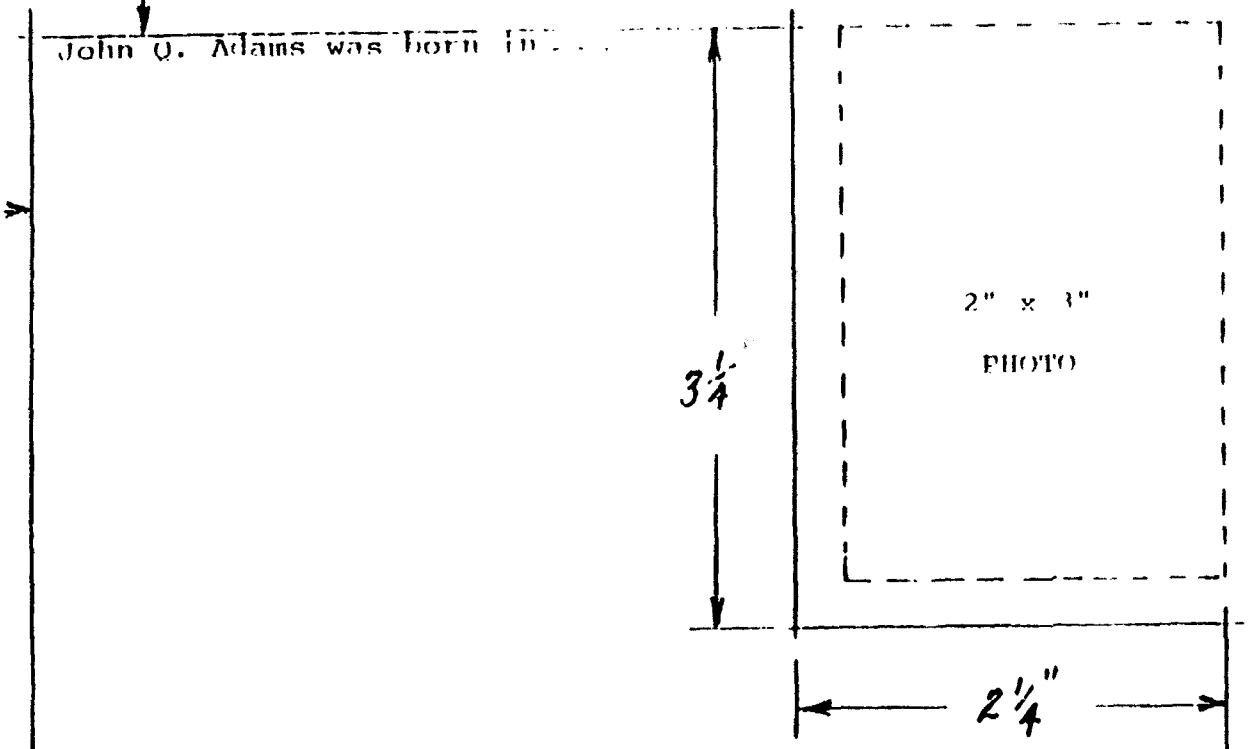
MARYANN CLAREY

1½"

1"

RESUME OF JOHN QUINCY ADAMS

John Q. Adams was born in . . .



The information format should be as follows:

(a) First paragraph should include name, place and date of birth, and summary of education.

(b) Following paragraphs should include:

(1) Prior positions held and major professional activities.
(2) Date joined NPS, including position, department, rank, and subsequent promotions.
(3) Major fields of teaching and scholarly activities at NPS, professional society participation, DOD activity, etc.

Submission to be on one sheet of paper - one side only

1¼"

Enclosure (1)

APPENDIX C: RESUME UPDATE MEMO

MEMORANDUM

From: Manager, Academic Services,82

To:

Subj: **UPDATE OF FACULTY AND STAFF RESUME BOOK**

1. ___ We received your new resume but have not seen your picture. Did you stop at the photo lab to have one taken?

___ We received a revised resume from you. Should we use your old photo or are you going to get a new one taken?

___ We received a picture of you from the Photo Lab but have not seen your resume. Please prepare one ASAP.

___ We received a new photo of you. Should we use your old resume or are you going to update it for us?

___

___

2. Please respond below and return to Code 82 ASAP.

MARYANN CLAREY

- -

From:

To: Manager, Academic Services, 82

1. With respect to the above, my reply is:

NPS(82)

MEMORANDUM

From: Maryann Clarey
To: Department Chairmen

Subj: **UPDATE OF FACULTY AND STAFF RESUME BOOK**

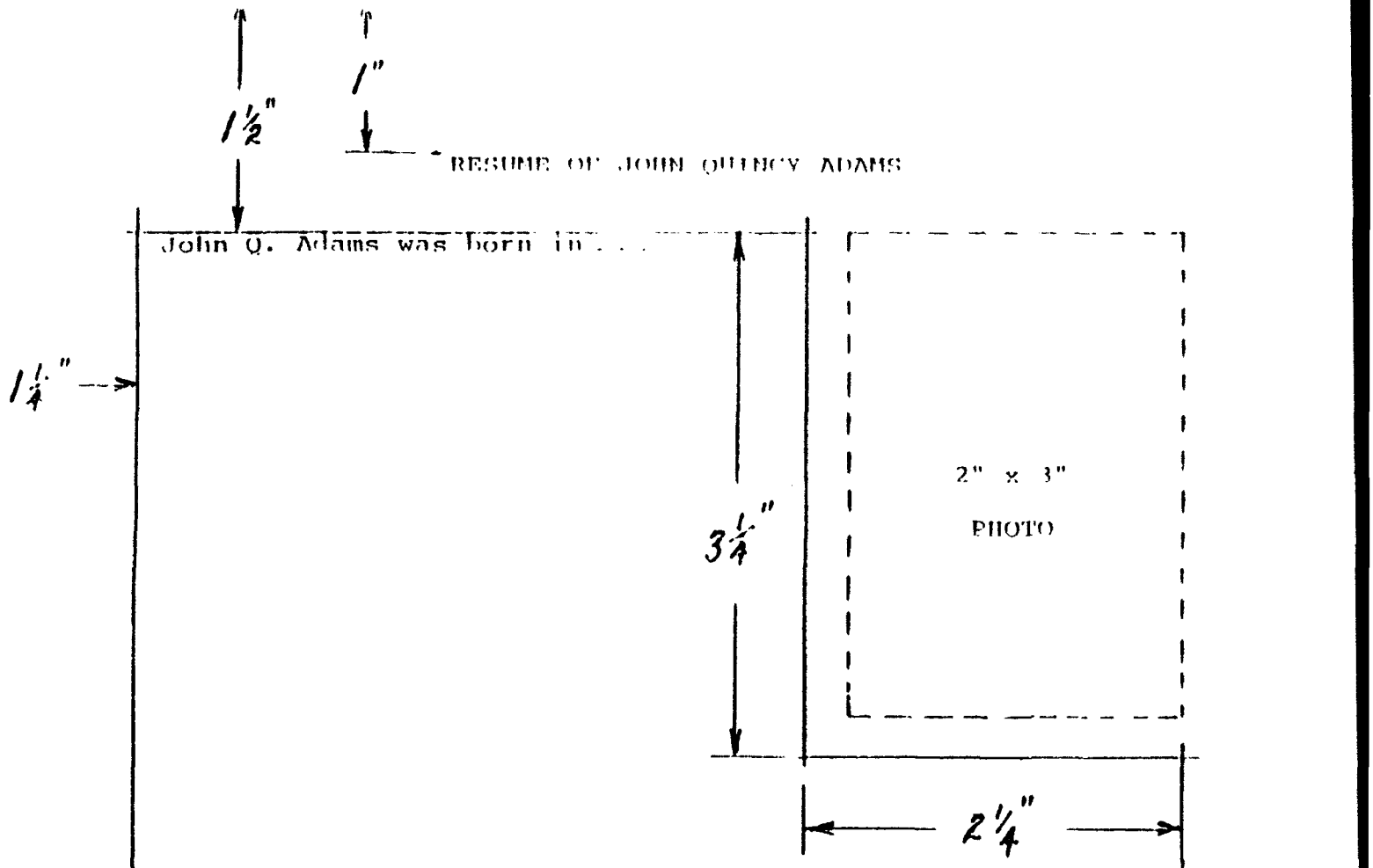
Encl: (1) Sample page showing format.

1. We are still trying to get the Faculty Resume Book up to date. Individual memos are sent to all new faculty as they come on board.

2. Enclosure (1) shows the proper format. Letter quality printing is a necessity. Photos are taken on Wednesdays by appointment. Call the Photo Lab at x 2336.

3. Listed below are faculty in your department who are delinquent in either their resume, photo, or both. We are enlisting your aid to move this project along. PERHAPS A NUDGE FROM YOU WILL HELP.

MARYANN CLAREY
Academic Services Manager



The information format should be as follows:

(a) First paragraph should include name, place and date of birth, and summary of education.

(b) Following paragraphs should include:

(1) Prior positions held and major professional activities.
(2) Date joined NPS, including position, department, rank, and subsequent promotions.
(3) Major fields of teaching and scholarly activities at NPS, professional society participation, DOD activity, etc.

Submission to be on one sheet of paper - one side only

1¼"

NPS(82)
27 Jan 1993

APPENDIX D: INSTRUCTION MEMO

Memorandum

From: Manager, Academic Services, Code 82
To: Distribution

Subj: **UPDATE OF FACULTY & STAFF RESUME BOOK**

Encl: (1) Alphabetical Index
(2) Department Index
(3) New Resumes

1. Enclosure (1) contains a current alphabetical list of faculty and staff that belong in the Resume Book. Enclosure (2) has these same names arranged by department so that you may easily check the contents of your book. If you find errors in these lists please let me know. (Remember that current policy is not to include adjuncts.)

2. People whose names are preceded by an asterisk still need to forward a resume or photo to this office. Your assistance in this regard will be appreciated.

3. The new resumes in enclosure (3) should be inserted into the appropriate section of your book as indicated below.

(a) Superintendent
Insert: Mercer
Remove: West

(b) Director Students & Programs
Remove: Proses

(c) Deans
Remove: Frew

(d) Curricular Officers
Insert: Rosner, Toft
Remove: Allen, Allion, Brennan, Tiernay, Williams

(e) Administrative Science
Insert: Doyle, Thomas, Mitchell
Remove: Eberling, Fitzgerald

(f) Aeronautics & Astronautics
Remove: Healey

(g) Aviation Safety
Insert: Hazard, Grohsmeyer, Paskulovich
Remove: Bulwicz, Figlock, Nation, Rygg, Thorn, Yasment

(h) Computer Science
Remove: Barnes, Kodres

(i) Electrical & Computer Engineering
Insert: Butler, Fargues, Loomis, Michael, Skinner
Remove: Chen, Won-Zon

(j) Mathematics
Remove: Wilde

(k) Mechanical Engineering
Insert: Kelleher, McNelley, Mukherjee
Remove: Chang, Ligrani, Shin

(l) Meteorology
Remove: Dunnavan

(m) Operations Research
Insert: Bailey, Read
Remove: Poock, Wood

(n) Physics
Insert: Kite
Remove: Heinz

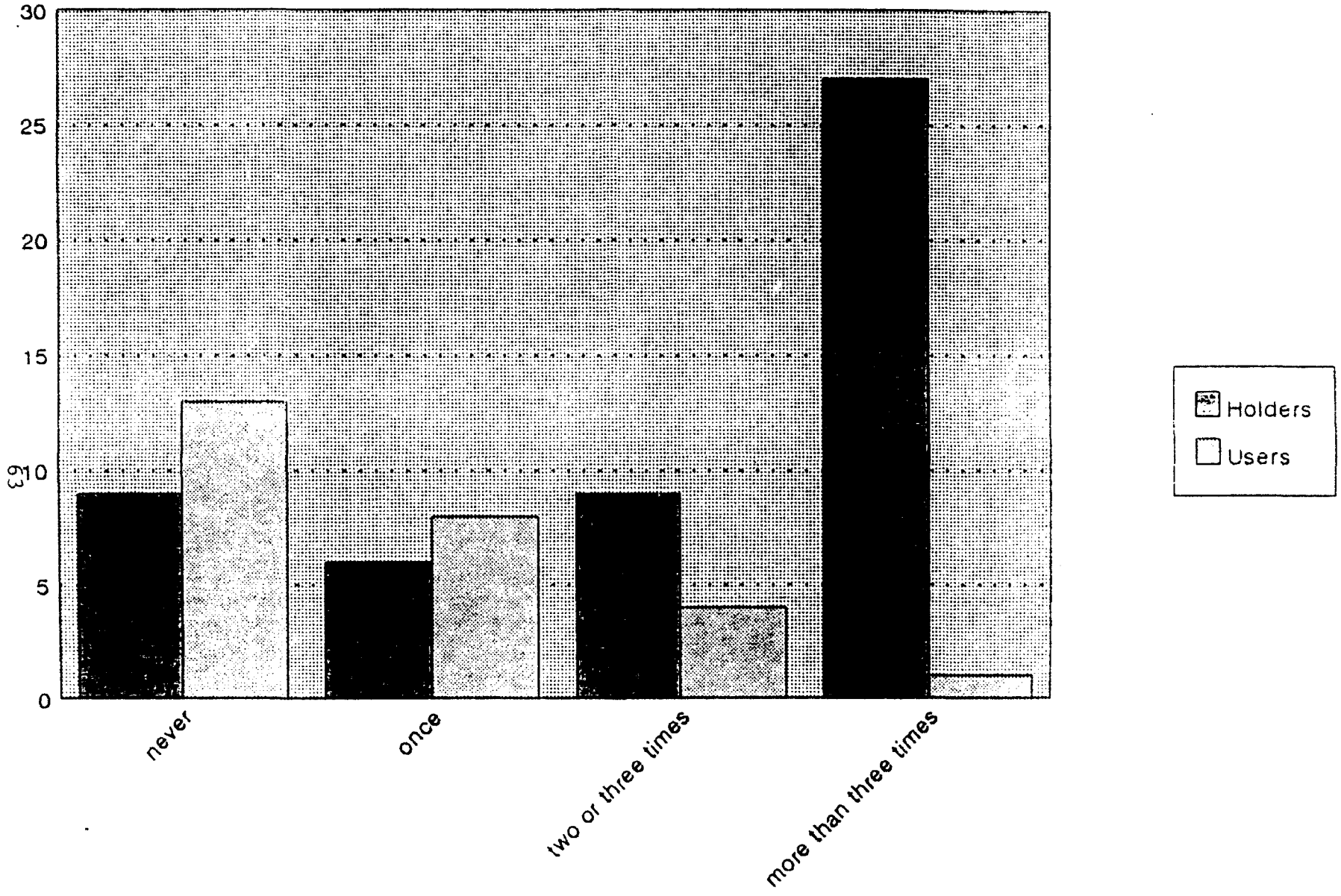
2. **Please review your departments resumes to see if any need to be updated.**

MARYANN CLAREY

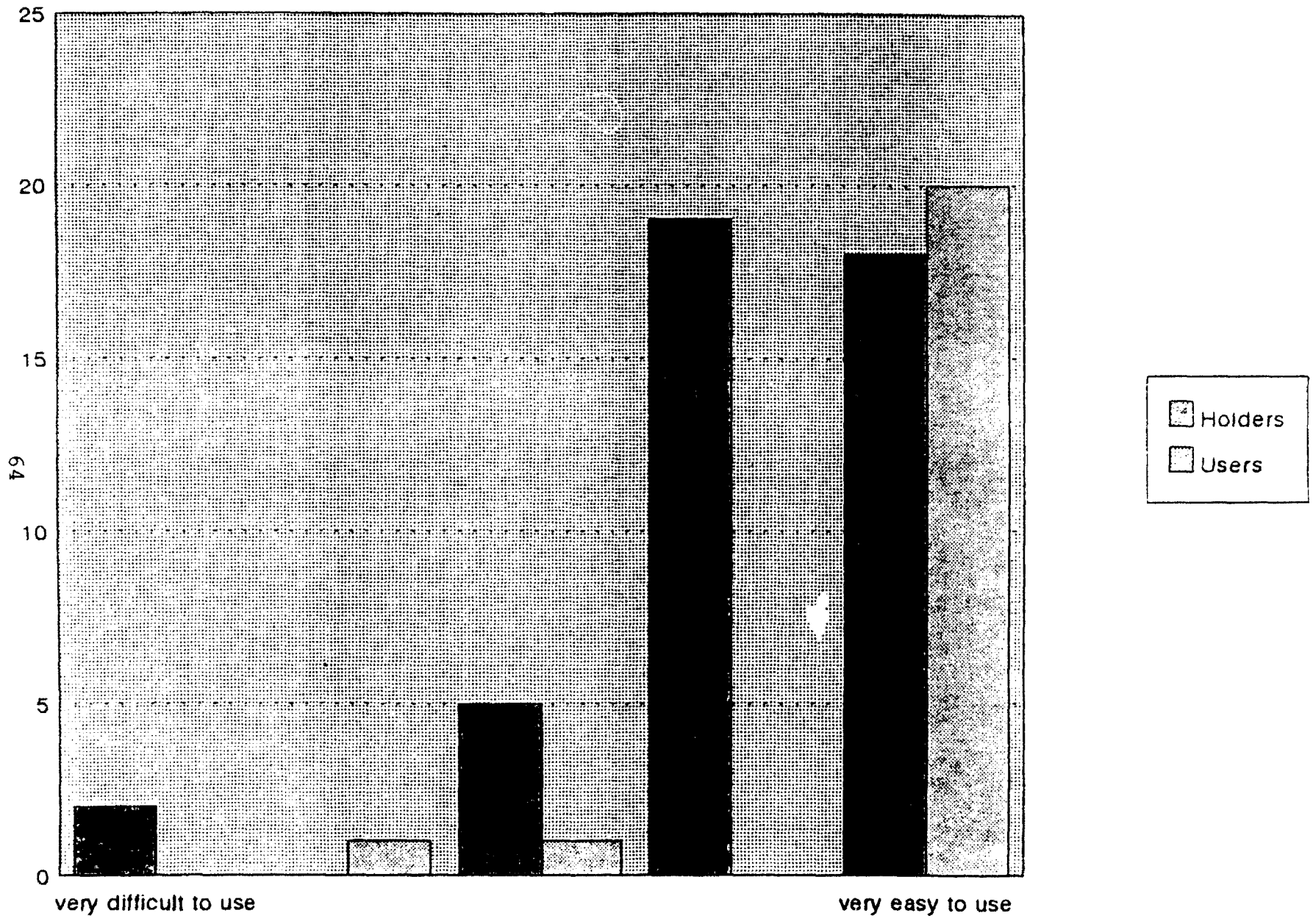
Distribution: 00, 01, 011, 0112, 03, 04, 042, 05, 51, 52, 06, 61, 612, 62, 07, 08, 81, 034, 035, 037, 30, 31, 32, 33, 3A, 34, 35, 36, 37, 38, 39, 64, AA, AS, AW, CC, CS, DIS, EC, EW, MA, ME, MR, NS, OC, OR, PH, SP

APPENDIX E: PROCESS ACTION TEAM SURVEY RESULTS

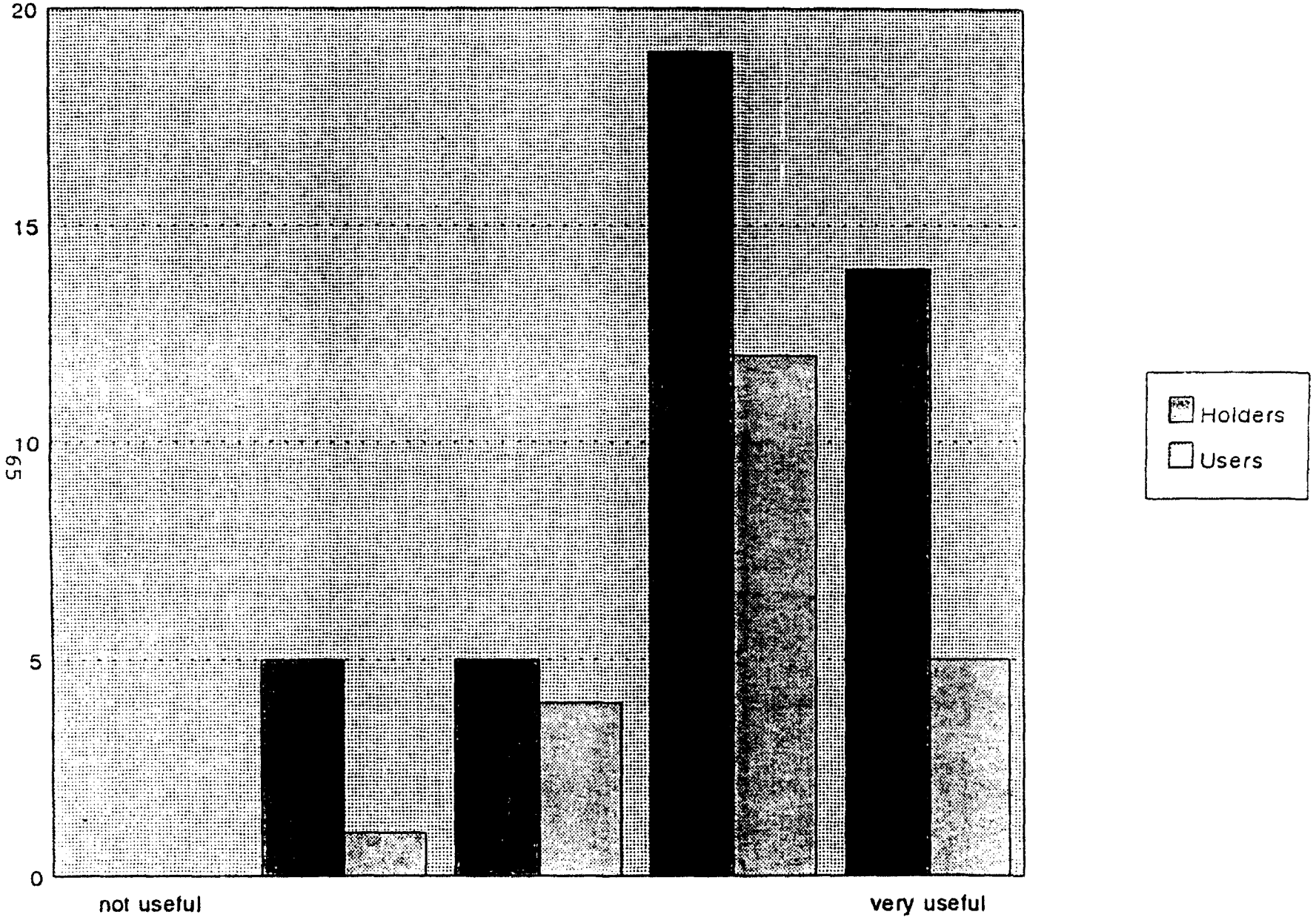
This appendix contains a summary of the Process Action Team survey results. Each page states the survey question and summarizes the responses with a bar graph.



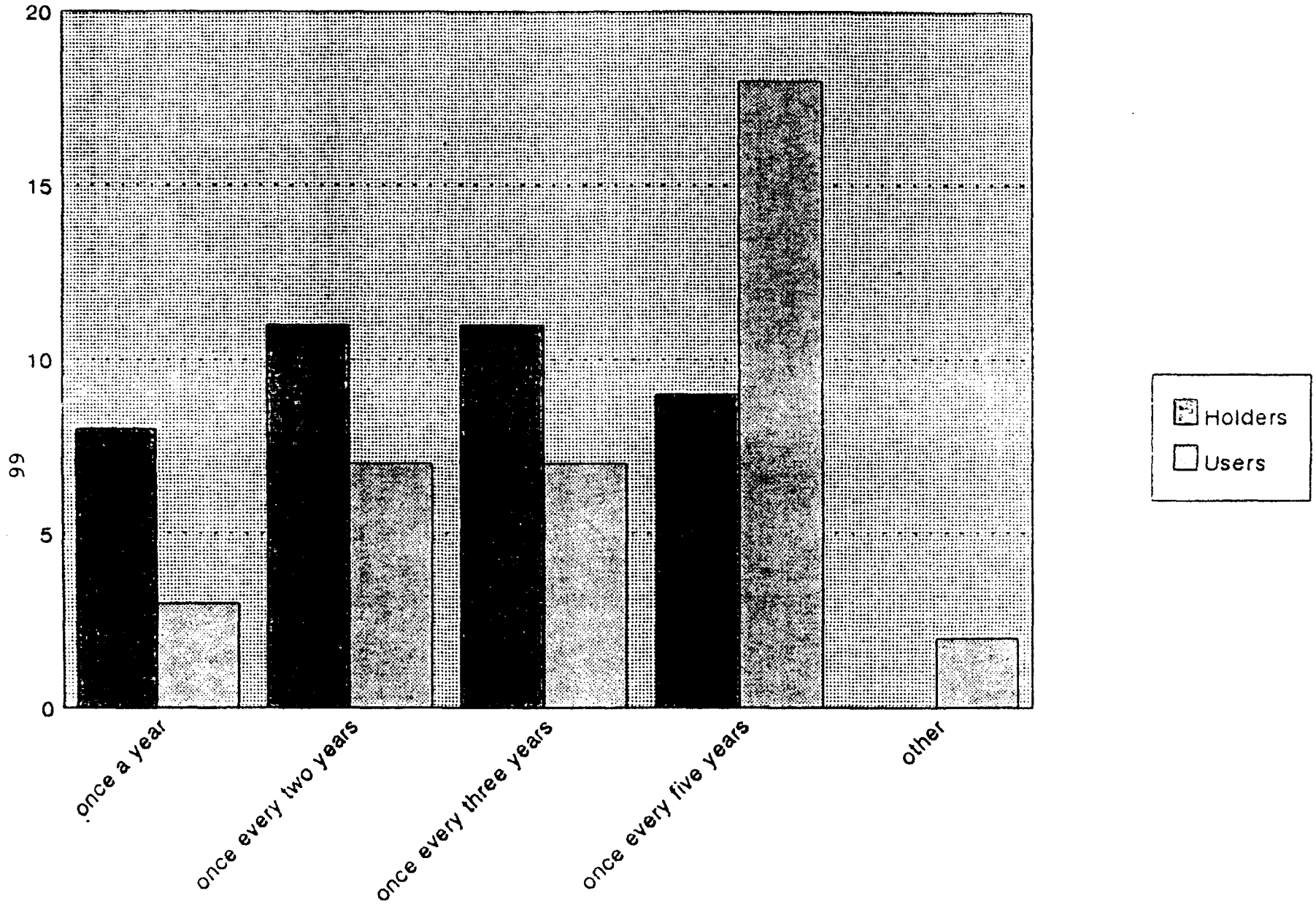
How many times have you or others used the Resume book during the past year?



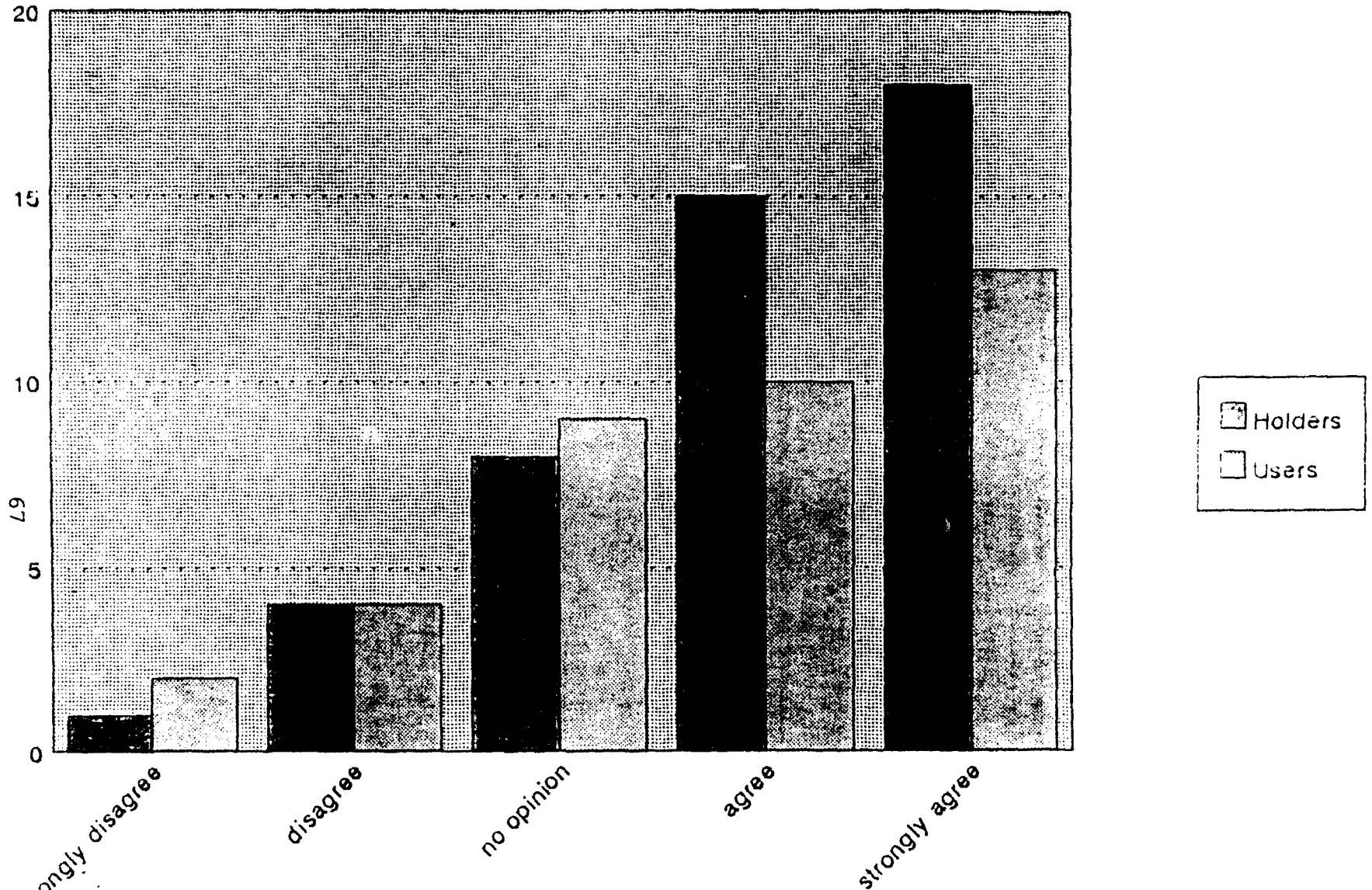
To what extent did you find the resume book easy to use?



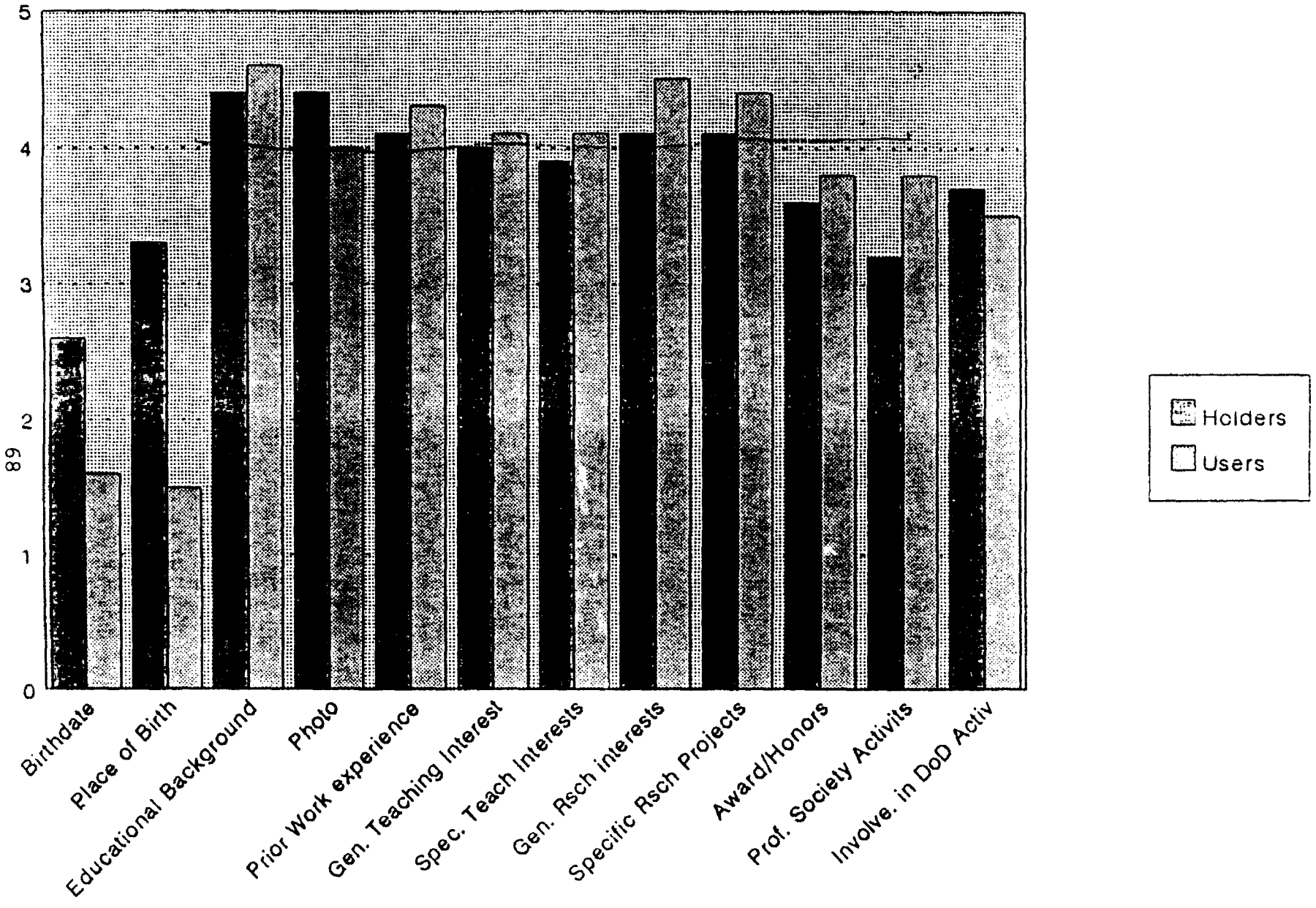
To what extent has the information been useful?



How often should an individual's resume be updated for the resume book?



To what extent do you agree that Adjunct faculty members who are here for a year or more should be included in the book?



How useful are the following types of information to you about NPS Faculty and Staff?

Element	Book	RecordField Type	Length	Description
Name	Resume Pub Awards	Single Line Text	20	Member's Name
Title	Resume	Single Line Text	20	Member's Title
Department	Resume	Single Line Text	20	Member's Department
School	Resume	Single Line Text	20	College or university where highest degree earned
Degree	Resume	Single Line Text	20	Highest degree held and discipline
Area of Research	Resume	Word Wrap Text	Max. 32K	List of current research interest
Biography	Resume	Word Wrap Text	Max. 32K	Description of professional experience
Publication_1	Pub	Word Wrap Text	Max. 32K	Bibliographic entry of one of the five most significant publications
Publication_2	Pub	Word Wrap Text	Max. 32K	Bibliographic entry of one of the five most significant publications
Publication_3	Pub	Word Wrap Text	Max. 32K	Bibliographic entry of one of the five most significant publications
Publication_4	Pub	Word Wrap Text	Max. 32K	Bibliographic entry of one of the five most significant publications
Publication_5	Pub	Word Wrap Text	Max. 32K	Bibliographic entry of one of the five most significant publications
Awards	Awards	Word Wrap Text	Max. 32K	Description of each award received

APPENDIX G: FACULTY AND STAFF PROTOTYPE SCRIPTS

Welcome Page Automatic Advance

```
-- modified Asymetrix Script
to handle enterPage

    set sysLineStyle to None  -- removes line around imported
graphic (NPS Logo)

    if syslevel is reader
        pause 150 ticks
        fxwipe left fast to next page
    end
end
```

"Add" Button Script

```
-- to add a record, a resume page, a publications page, and
--    an awards page must be added.

to handle buttonUp

    local LAST_PAGE, INPUT_NAME
    -- assigns renames the field of the user supplied name
variable
    set INPUT_NAME to text of Field "Name" of this Page

    set sysLockScreen to true

    -- assigns the value of the user supplied name to the local
variable
    get INPUT_NAME
    -- prevents the save changes dialog box from being displayed
    save changes to this book

    -- determines the number of the last page of the book
    set LAST_PAGE to pageCount of book
"C:\toolbook\resumebk.dir\Resumes.TBK"

    -- adds a Resume page to the Resumes.TBK book, after the
last
    --   page in the book
    go to  Page LAST_PAGE of  book
"C:\TOOLBOOK\resumebk.dir\Resumes.TBK"
```

```
    send newPage

    -- page is named whatever name the user entered in the Name
box
    set Name of this Page to INPUT_NAME
    -- puts the user entered name in the resume page of the book
    set text of recordfield "Name" of this Page to INPUT_NAME

    -- prevents the save changes dialog box from being displayed
    save changes to this book

    -- ******************************************************

    -- determines the number of the last page of the book
    set LAST_PAGE to pageCount of book
"C:\toolbook\resumebk.dir\Pubs.TBK"
    -- adds a Publications Page to the Pubs.TBK book, after the
last
    -- page in the book
    go to Page LAST_PAGE of book
"C:\TOOLBOOK\resumebk.dir\Pubs.TBK"
    send newPage

    -- page is named whatever name the user entered in the Name
box
    set Name of this Page to INPUT_NAME

    -- puts the user entered name in the publications page of
the book
    set text of recordfield "Name" of this Page to INPUT_NAME

    -- prevents the save changes dialog box from being displayed
    save changes to this book

    -- ******************************************************
    -- determines the number of the last page of the book
    set LAST_PAGE to pageCount of book
"C:\toolbook\resumebk.dir\Awards.TBK"

    -- adds a Awards Page to the book, after the last page in
the book
    go to Page LAST_PAGE of book
"C:\TOOLBOOK\resumebk.dir\Awards.TBK"
    send newPage

    -- page is named whatever name the user entered in the Name
box
    set Name of this Page to INPUT_NAME

    -- puts the user entered name in the resume page of the book
    set text of recordfield "Name" of this Page to INPUT_NAME

    -- prevents the save changes dialog box from being displayed
```

```
    save changes to this book
    go to Page "Instructions" of book
"C:\TOOLBOOK\resumebk.dir\INSTN.tbk"

    -- clears user input field Name
    set text of Field "Name" of  Page "Instructions" of this
book to null

    -- prevents the save changes dialog box from being displayed
    save changes to this book

    -- Places the user in the new resume record
    go to Page it of book "C:\TOOLBOOK\resumebk.dir\Resumes.TBK"
    set sysLockScreen to false

end buttonUp
```

"Exit" Button Script

```
- modified Asymetrix script
to handle buttonUp
    request "This will close the Resume window!" with "Cancel"
or "OK"
    if it is "OK" then
        send exit
    end
end buttonUp
```

Resume Page Buttons

Publications Linking Button

```
to handle buttonUp

    go to page (text of recordfield "Name" of this Page)\
    of book "C:\TOOLBOOK\resumebk.dir\Pubs.TBK"

end buttonUp
```

Awards Page Linking Button

```
to handle buttonUp

    go to page (text of recordfield "Name" of this Page)\
    of book "C:\TOOLBOOK\resumebk.dir\Awards.TBK"

end buttonUp
```

Previous Page Button

```
to handle buttonUp
    go to previous page
end buttonUp
```

Next Page Button

```
to handle buttonUp
    go to next page
end buttonUp
```

Return to Edit Menu

```
to handle buttonUp
    go to page "Instructions" of book
"c:\toolbook\resumebk.dir\INSTN.tbk"
end buttonUp
```

Award and Article Pages

Return to Resume Button

```
to handle buttonUp
    get name of this page
    go to page it of Book "C:\TOOLBOOK\resumebk.dir\RESUMES.TBK"
end
```

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