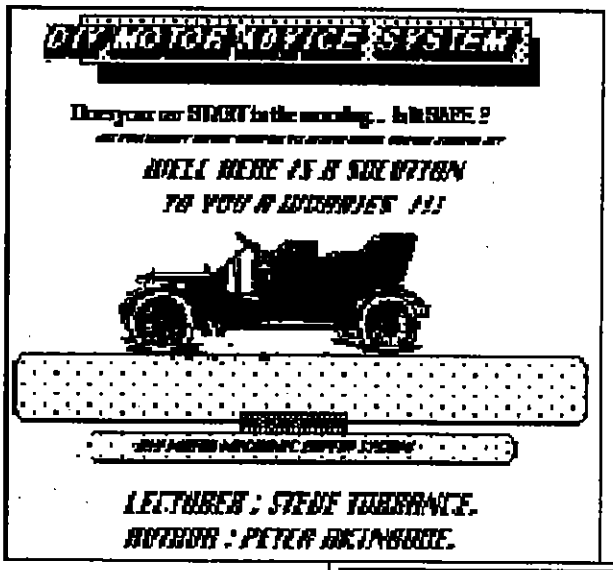
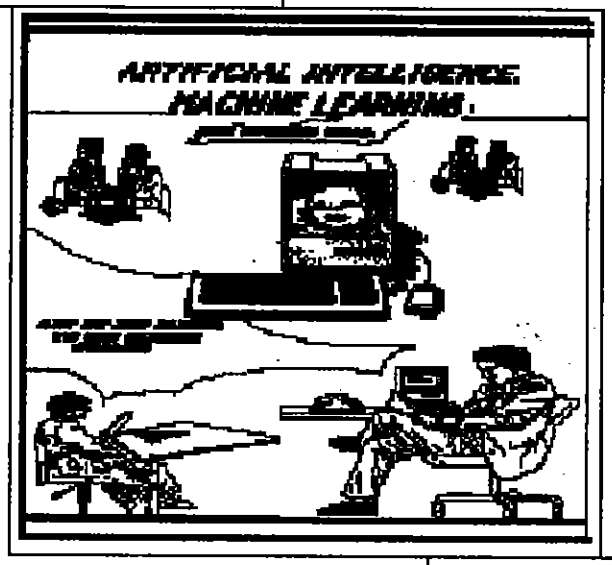
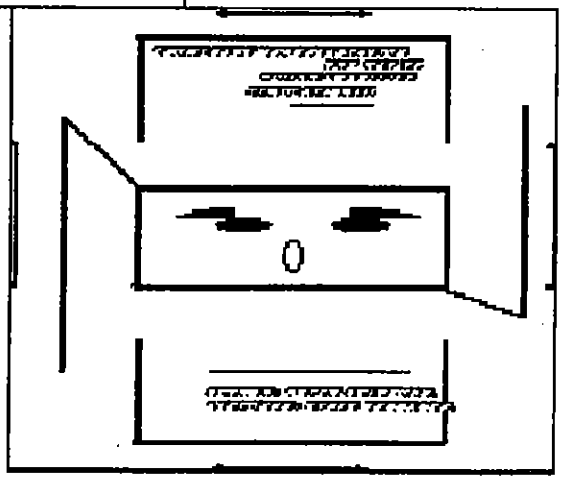
THE IMPACT OF COMPUTING ON THE AGEING POPULATION !!!!!!!

BY
AKINBODE O. K. PETER
INFORMATION SYSTEMS 1998

SUPERVISED BY
DR. KAREN A. SAWYER
DEPARTMENT OF ACADEMIC RESEARCH
ALL SAINTS UNIVERSITY OF AMERICA, IN







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THE IMPACT OF COMPUTING ON THE AGEING POPULATION

Written By

AKINBODE O. K. PETER
Ph.D. (1998)
Department of Academic Research

ALL SAINTS UNIVERSITY OFAMERICA, INC.

VERSION

Cover Designed By Akinbode O. K. Peter

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APPENDICES

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Special thanks go out to Mr. John Crinnion for his contributions firstly of all for providing me with copies of the SYSTEMSCRAFT manuals and with detailed facts about SSADM and its variant namely, Micro-SSADM. Secondly, for his assistance, and of introducing me to Derek Godden a Senior Consultant at Olivetti and Nick Gill ASIS Division Olivetti UK Limited.

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Finally, special thanks goes out to all the authors whose books have also inspired me and increased my thirst for knowledge, thereby enabling me to broaden my horizons with regards to this research.

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DEPARTMENT OF ACADEMIC RESEARCH
ALL SAINTS UNIVERSITY OF AMERICA, INC.
STUDENT ID: UK-001/98/3AK.

1. INTRODUCTION

The thesis focuses on the limited use of new technology by the aging population (henceforth referred to as AP). The key factors focuses on the fear of computing and computer based inventions, mainly due to cumbersome design plans and a less than adequate trouble-shooting after- sales service. Attempts to uncover flaws within System Designs Methodologies contributing in the decline of technology by the AP will be of paramount concern. Noticeably, ambiguities surrounding system and software planning and designs, (conceptual models, stages in design, and the provision of adequate literature detailing concise procedural instruction on usage, i.e. hardware and Software) will be at the forefront. Moreso, the research will examine the intricacies of four system methodologies (i.e. NCC, SSADM, INFORMATION ENGINEERING and to a lesser extent SYSTEMSCRAFT), with a view to highlighting, the pro and cons within their system development Life-cycles and attempt to suggest possible alternatives to address the intellectual gaps between the Youth of today and the AP.

The research will also attempt to show to a large extent that the majority of these fears can be overcome with a shift of emphasis towards end-user involvement (i.e. simply involving the End–User - AP within the developmental process and by moving towards an online helpdesk system (IOHS) trend. It highlight potential declines likely to occur, if the trend persist among the AP. It will indicate direct correlation between those concerns (i.e. future generations facing a dip in technical know-how, while a mistrust of computer based technology by the AP continues to persist), that may eventually lead to a loss of valuable skills and knowledge etc. In my view, we need to expose the AP to computer-based technology on a large-scale. In order to extract their knowledge for future use, bearing in mind changes in Social trends (child-bearing, family planing, advance medical facilities- resulting in longevity within the human race)and increases in the number of working women in the population (AP). Note these trends continue to widen the intellectual gaps between the Youth of today and the AP. we are continuing to loose tested knowledge that can be imparted to younger generations, if the AP can channel and impart knowledge gained over their extended working life to the younger generation. Thus, the use of knowledge acquisition programs in computers. The thesis also focuses on alternative areas of concerns noticeably user documentation for novice (from a perspective of development), advanced system development techniques and the design of futures computer related **Software** and **Hardware Systems.**

PROBLEM OR HYPOTHESIS.

The hypothesis which I am addressing concerns existing difficulties encountered by non-computer literate people (the impact computer based technology on the AP) i.e. the use of Software packages and Systems documentation. Consequently, through conducting this research I am able to deduce that certain Software packages have declined in usage during recent years, thus producing a spiraling effect in which the resulting effect has contributed to a decline in the purchasing of intelligent Hardware (smart computer Systems and Software) Systems. Therefore, in order to redress the balance an investigation into reasons concerning user skepticism of the value and immense benefit achievable using System and Software is warranted.

METHODS AND TECHNIQUES FOR INVESTIGATION.

I have the use of chosen to use **Questionnaires** at an initial stage of the investigation. This will be supplemented with random Software Packages and Systems architecture testing, i.e., using existing computer **Hardware** IBM DOS, WIN-95, NT 4.0, UNIX and software packages e.g. **WP, Mac-write, ClarisWorks** etc, and Systems documentation to sample users general awareness.

I will proceed to discuss a sample prototype of future user-documentation and selected interview held randomly with results collated and use as a basis for understanding various user-levels and for determining other areas for future improvements(chapter 7). Note, the use of diagrams will form an integral part of the **Systems and Software** testing processes along with the use of Systems documentation. This research will likewise discuss the use of touch-type monitors (Magic Touch Screens in chapter 7), incorporating the use of buttons, i.e., color coded keys for ease of use and understanding(bearing in mind the principle of HCI's) facilitating a better understanding of the collated data. I envisage incorporating graphics, i.e. photos and Menu-Driven applications thereby facilitating users' ease of understanding etc.

RELATIONSHIP OF PROPOSED RESEARCH TO PUBLISH AND CURRENT RESEARCH INDICATION OF THE CONTRIBUTION YOUR THESIS WOULD MAKE.

It is presumed that possible research into user documentation will reduce the fears of non-computer literate, since it will suggest possible alternative for future software and system development . whilst increasing the use and popularity of earlier-mentioned Systems. A trial test of existing Software and Systems documentation will be incorporated and any such findings will then be highlighted detailing areas to be improved upon and methods and ways of achieving these goals. The research will identify areas to be research in the near future,(i.e. **Software** and **Hardware** System and user documentation). A positive approach is being spearheaded to check the decline in the use of technology by the AP.

OUTCOME OF RESEARCH

Note the research will highlight the areas listed below:

- Guides For User - Preferably Modular In Nature (i.e. A 10 Minute Guide Via a Short Series Of Sessions).
- Present Commands
- Explain Commands.
- Present Shortcut and Exercises.
- Give Answer and Response To Questions and Problems.

MAIN OBJECTIVES.

Note the research are as follows:

- Spiraling a Shortening Of **System Development Life-Cycles** Without Sacrificing Important Life-Cycle and Procedures.
- spear-head Incorporating Programs To Draw BFDs, DFDs and So On Upon Entering Process Names
- and Links whilst generating simplistic clarifying each stage of development i.e. Instant Graphic - Generation - cf. With Application Such As Visual Basic and Access Windows.

DETAILS OF WORK EXPERIENCE RELATING TO PROPOSED FIELD.

Previous employment opportunities enable me to develop a mini Expert **Systems**, i.e., a Motor Mechanical Expert System (**MMES**) diagnosing defects in the auto-mobile trade. In addition, I have been involved in developing a Procyn Lisp graphics project i.e., the designs and implementation of Aunt Eugenia Automaton that is to be used as lecturing materials. Therefore, I am able to compare and use four methodologies as the base for examining the impact of their End Product in terms of strengths and weaknesses, evaluating the impact of computer based technology on the AP.

Latter employment opportunities Focused on using **Systems Design Methodologies**, i.e., **SSADM, SYSTEMSCRAFT** and **INFORMATION ENGINEERING** as work tools. This has enabled me to produce a detailed comparison of their development life cycles, including the use of diagrams and levels of documentation involved. I have also been able to draw valid conclusion as to their placement within the **Toolbox and Cookbook Continuum,** used within systems design, development, and their ease of development for various **Systems** using these methodologies.

The Ph.D. thesis will evaluate the impact use emphasis from a perspective of development (drawing upon the review of the system design methodologies whilst using the methodology in chapters 1 to 5 to analyze the impact of computer based technology on the AP), i.e. Program development oriented, to user-document oriented. The aim of this research is to find and achieve a sophisticated method for introducing and understanding **Systems** and **Programs** to and by the non-computer literate. It aims to suggest possible solutions, be it incorporating the use of a graphical interfaces (a minimal, into a help-desk library **System** generic or specific). Note, the aim here is to cater for the user novice at any stage whilst using or attempting to use and understand **Software** and **Systems** areas and reduce the AP mistrust of computer based technology.

In addition the Ph.D. thesis will be divided into two section, one section reviewing system design methodologies namely NCC, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING. While the other section focuses on evaluating the impact of computing on the AP(specifically) and the rest of the population in general.

Presently, systems are using two known approaches, i.e. , the scientific paradigm, described by Checkland as learning systems characterized by REDUCTION, REPEATABILITY and REFUTATION (Checkland, 81), and the System paradigm described as a HOLISTIC approach to systems design and development. The science paradigm has often been proven to be inadequate when faced with designing systems for living creatures, especially human actions (i.e. such systems exhibit openness, low separability and high independence, Checkland, 81). Therefore, these reasons can be seen as the cause of rejection of the End Products (hardware and software) among the AP. With this thoughts in mind, there is a need for a thorough appraisal of computer-based technology in relation to various sectors of society. Note, the two paradigms are crucial to the discussion simply because they form the base for system developments and I will be reviewing the way there End-Products affect productivity among the AP using comparability, contrast and taxonomy, in light of their effects concerning modern-day systems building, their places on the 'the toolbox-cookbook continuum, and furthermore, how the use of these systems design methodologies fits within present-day (chosen) industries or industry. Moreso, we ought to remember that computer based technology has continued to evolve and mature, making systems design, feasibility studies and design patterns more sophisticated with new inventions, while fostering greater prospects, competitive edge, fame and fortunes to various sectors of the economy. It has also led to a remarkable shift of emphasis, from the sole dominance of system analysts in the past(within system designs), to the present involvement of systems-user and owners in the development of applications and systems design. Noticeably, this process has contributed to a smoother implementation End- product (ease of understanding to potential system-users and owners), and in the amicable acceptance of the finished system.

Moreso, the use of modern time saving methodologies, has further eliminated the need for certain processes deemed necessary in traditional methodologies, such processes i.e., knowledge elicitation etc., can be achieve at a much faster pace with the use of tools and certain techniques. One of such technique, is PROTOTYPING a tool allowing for rapid and evolutionary systems development process (see chapter 5 IE) . It is also noticeable that the use of modern methodologies incorporating techniques such as those mentioned facilitates systems and model reuse i.e. the reuse of previous systems without the need for major alterations. Likewise, modern structured methodologies, i.e., methodologies using entity modeling and entity-life-history approaches, have the potentials to be updated and incorporated to cater for the rapid development of modern systems .

Finally, with the existence of similarities between most modern methodologies (the hybrid nature of most systems design methodologies). It is now easier to substitute one methodology for another with compromising the design and development of systems (See Appendix A2 for Useful Contact Addresses).

2. SUMMARY

The objective of this thesis is "to review four systems development methodologies, i.e., SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING" and evaluate the impact of computing on the aging population. Included in Appendix A are copies of the thesis proposals.

Presently, systems productivity has increased, this is attributable to the arrival of modern development methodologies such as, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING methodologies. Noticeably, they assist analysts in the rapid development of system and therefore contributing towards better deliverables (i.e. with the use these systems development methodologies deliverables namely, computer systems, and applications can be produced at a much faster rate). Moreover, SYSTEMSCRAFT and INFORMATION ENGINEERING enable potential system users to participate partially or fully in the development of systems along side the Analyst.

The methods used involved a review of NCC, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING using textbooks, manuals and short interviews with experts on the various methodologies, and learning to use the CASE Tools namely, INFORMATION ENGINEERING WORKBENCH available from City University's laboratory. From the results obtained evidence showed that SYSTEMSCRAFT and IE possess excellent features, providing analysts with the best form of tools, for systems development (planning and analysis of the systems requirements), in comparison to SSADM (most significantly in the development of smaller systems). Prototyping, a striking feature present in both methodologies, makes it easy for potential system user to follow systems designs as it is user friendly. Nonetheless, referencing Crinnion, 'coming into the market soon is a revised version of SSADM, namely SSADM version 4.2. It is a Micro version of the previous methodology, capable of tackling most criticisms leveled against big brother SSADM. Furthermore, it contains Object-Oriented features facilitating systems and models re-use (Crinnion, pers. comm.). Note in light of this comment , it shows the acknowledgment of the SSADM methodology, still as one of the best.

The research also focuses on the AP particularly concerning their fears of computer based technology, whilst examining possibly hypothesis behind them. For instance, can the fear of computing and computer based technology be attributed to a fear of science subjects in general,
i.e., Mathematics, Physics, Chemistry and Biology. Is it a more deeply rooted fear of computers based on the premise that computing, computers and computer -based technology all come under the classification as sciences, and that this ultimately leads to an award of B.Sc., M.Sc., and D.Sc. degrees. Note the classification of degrees, have often indicate that the recipient's are brainy individual). Can it be that the ordinary man's fear is based on his association of computing and computer based technology with the study of robots. Moreso, does the terminology; used to describe the computing and computers parts confuse mere mortals e.g. chips, scuzzy, backstroke and return and alt and ctrl to mention but a few. Will it help if every child (or children) pre and post schooling age become exposed to computers. Moreover, will it help bridge the gap by making computer subjects a compulsory core subject alongside Mathematics and the use of English Language (note changes in UK schools National Curriculum 1998).

Alternatively, should we be encouraging the taking of future aptitude test on computers, will this sort of exposure to computing eradicate common fears, and possibly help in increasing people's awareness concerning its use. Moreover, since a majority of the AP's dislike of computers
stems from a challenges of learning to use it, an individuals time factor, and possible rewards associated with a mastering of the technology. Will we(analyst) not gain from the design of user-friendly interfaces to encourage use. Moreso, does the problem further stem from people humanizing computers (i.e., thinking computers contain a homunculus - a little man. cf. **Physicalist** and **Functionalist** approaches), In addition, can emphasizing the realms and limits of computing solve this problem and computer based technology, i.e., by being clearly and concisely. Particularly, since the demand for home computers have rocketed in the last decade.

Finally, the credibility of these claims have been deduce from the analysis of the impact of computing on the AP. It is of immense concerns, possibly leading to further evaluation of other system methodologies, i.e. "A Review of Systems Development Methodologies III" (Robinson et al., 94),(Hares, 94). Moreover, other areas that has become known concerns possible future research on, The ratio of computer usage between countries. Can the impact of computing and computer based technology be use to determine a countries Gross Domestic Productivity (henceforth referred to as GDP) for the future and so on.

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3. PREFACE

3.1 Terms of reference

A full copy of terms of reference is attached on appendix A. The main subject features a "Reviews of systems development methodologies namely SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING and an evaluation of the impact of computing on the AP."

Note the objectives based on the terms of reference are as follows:

- ¥ To examine the methodologies used in systems design past and present by way of an Introductory chapter titled 'Review of System Designs General'.
- ¥ To review four system design methodologies namely, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING.
- ¥ To compare and contrast their similarities and differences namely, science or systems Paradigm.
- ¥ Attempt to evaluate their impact within present systems design methodologies.
- ¥ Review the use of these methodologies within industries or industry.
- ¥ Finally an evaluation of the impact of using the methodologies and techniques and tasks for designing Hardware and Software bearing in mind that there is a decline in terms of the use of these and computer, based technology by the AP.

3.2 Methods

In reviewing the systems design methodologies and drawing valid conclusion, the methods use involved selecting and agreeing on a number of systems design methodologies, namely, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING, as the methodology so far widely used for substantial development therefore, these methodology provide a panoramic view of present-day Systems and Software designs by Professor Hanson. This, was followed by a general discussion of the systems methodologies namely, Traditional and Structured methodologies. These methodologies namely, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING are then reviewed separately, tabulated into a summarized sequence with headings namely, science and system paradigms followed by definitions, approaches, their conceptual models and their respective objectives, strengths and weaknesses are also listed. In addition, an examination of the systems design methodologies (employed by a specified industries or industry, such as, Olivetti), was carried out evaluating how there uses have been effected so far.

Finally, detailed conclusions and valid suggestions are given concerning the future use of these methodologies.

3.3 Results

SSADM provides a form of systems development based solely on the analyst following a rigidly structured systems development path (Crinnion, 91) and (Godden, pers. comm.). This form of methodology contributes towards an understanding of system and software use. This varies in contrast to SYSTEMSCRAFT and INFORMATION ENGINEERING both allowing the analyst flexibility to (a step in the right direction),consults and discuss openly about the potential outcome of a system and its uses. Moreover, systems developed using either methodologies are often accepted outright. Reasons include the involvement of the user from the onset of the development life cycle of the system, and ease of understanding of model cf. to SSADM. This provides an added advantage for analysts because the correct systems can be achieve with relative ease (due the involvement of the system's user).

Alternatively, the INFORMATION ENGINEERING methodology and its workbench facilitate, checking of the validity of objects when they are drawn. Therefore, object modeled using IE are faster and allows complex diagrams to be drawn within a relative shorter period. Moreover, defining data items within INFORMATION ENGINEERING allows analysts, to create New
Encyclopaedias and software that is user-friendly where all the items and objects defined can be stored and maintained. Likewise, at every stage of data modeling, objects are defined first, then drawn. This is applicable to both objects such as, entity model and data flow diagram. Hence, data items contained in the New Encyclopaedia are those defined by the analyst.

Finally, the IE approach facilitates the overlapping of objects during its design processes and therefore, is flexible from providing analyst with the flexibility necessary to fabricate relationship and data flow diagrams of any type and size of system (Finklestein, 89).

3.4 Achievements

I have learnt a lot by carrying out this Thesis. This includes the:

¥ Understanding of how SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING can be applied to systems development and productivity;

¥ Identifying strengths and weaknesses arising from these methodologies;

¥ Planning and the analysis of user requirements undertaken;

¥ Graphical presentation (systems requirement) from Data Flow Diagrams, Business Flow Diagram and Entity Models.

¥ How tools such as, prototyping techniques used within SYSTEMSCRAFT and INFORMATION ENGINEERING supports the development of systems, by way of systems Analysis and designs.

¥ Examined existing difficulties encountered by non-computer literate people surrounding the use of certain software packages and system documentation.

¥ Been able to concluded that the uses of certain software packages are in decline., the resulting effect has contributed to a decline in the purchase of intelligent(smart computer system) Systems.

¥ Establish the need to balance the use of software and hardware with user-friendly version of existing designs.

¥ Note redress the balance an investigation into the reason supporting user's skepticism of the immense benefit achievable using system and software is warranted.

¥ The research has enable me through the use of questionnaires and short interviews to pinpoint possible ways (see chapter 7) of reducing the fear of non-computer literate whilst increasing the use and popularity of computer systems.

¥ Finally, the evaluations has shown areas to be improved upon, methods and ways of achieving these goals. Likewise, this research may further identify other areas to be investigated in the near future. May be software, hardware, and systems user documentation.

3.5 Abbreviations

- **AP** - **Aging Population.**
- **BAA** - **Business Analysis Area.**
- **BFD** - **Business Flow Diagrams.**
- **BIS** - **Business Information Systems .**
- **BP** - **Business Plan.**
- **BSC** - **Bachelors of Science.**
- **BSD** - **Business Systems Design.**
- **CAD** - **Computer Aided Design**
- **CCTA** - **Central Computing Telecommunication Agency.**
- **CF** - **Conferred.**
- **CMM** - **Capability Maturity Model.**
- **DFD** - **Data Flow Diagram.**
- **EDM** - **Evolutionary Development Methodology.**
- **ELH** - **Entity Life History.**
- **ESD** - **Evolutionary Systems Development.**
- **ETC** - **Et cetera.**
- **GE** - **Generation Environment.**
- **GUI** - **Graphics User Interface.**
- **HND** - **Higher National Diploma.**
- **HCI** - **Human Computer Interface.**
- **IBM** - **International Business Machines.**
- **IE** - **Information Engineering.**
- **IEF** - **Information Engineering Facility.**
- **IEW** - **Information Engineering Workbench.**
- **IOHS** - **Instant Online Help System.**
- **IS** - **Information System.**
- **ISEB** - **Information Systems Examining Board Certificate.**
- **ISP** - **Information Systems Planning.**
- **JMA** - **James Martins Associates.**
- **JSD** - **Jackson Structured Diagrams.**
- **JSD** - **Jackson Structured Diagramming.**
- **KBS** - **Knowledge Based System.**
- **LBMS** - **Learmonth and Burchett Management System.**
- **MSC** - **Master of Science.**

¥ NCC - National Computing Centre.

¥ NB - Nota Bene.

¥ PHD - Doctor of Philosophy.

¥ PM - Thesis Management.

¥ PW - Planning Workstation.

¥ RAD - Rapid Application Development .

¥ SAO - Specificat Assiste Organization.

¥ SFD - System Flow Diagram.

¥ SSA - Structured Systems Analysis.

¥ SSADM - Structured Systems Analysis And Design Method.

¥ TNF - Third Normal Form.

¥ VIA - Through.

3.6 Conclusion

Nowadays, the demand made on conventional methodologies far outweigh their capacity to cope with new system designs adequately. Thus producing ambiguous software and sometimes difficult to use. Consequently, this led to a decline in the use of certain hardware systems and software applications, furthermore a fear of computers by the AP. The need for flexibility in systems design has prompted system developers to incorporate flexibility into system development frameworks thereby covering a much wider area of the continuum (refer to Appendix A for reference). Moreover, modern systems are now being developed in a 'lean' and professional way using the rapid application designs methodology (RAD) and taking into account what system developers already know and how they set out to accomplish it, using certain tools and techniques. Noticeably, this avoids the unnecessary gathering of information, duplication of efforts and over-normalization of requirements, a danger hitherto present in many conventional system design methodologies. Moreso, the extensive use of tools and techniques in SSA aids and continue to assist analysts with the processes of recording and analysis and design, providing full definition of design requirements in forms clearly understandable to designers, implementers, owners and most of all the system user.

Alternatively, the continuously changing nature of system analysis and developments makes it difficult to find complete solutions to the problem of system development. Nonetheless, we have at present come a long way to bridging the gaps (allowing flexibility for the analyst's creativity), i.e., the provision of tools and techniques in revised editions of system development methodologies. Noticeably the flexibility given by these tools and techniques given the opportunities for analysts to avail themselves with the best modern systems analysis and design tools. Note some methodologies allow more flexibility than others (i.e. permitting the analyst to adjust their uses to a wider scope of varying circumstances) do. Such methodologies, including INFORMATION ENGINEERING and SYSTEMSCRAFT, (the former making extended use of entity modeling, while the latter looks conclusively at the data view of the system requirements, constructed from a full 'Business Model' for each Thesis), provide formal set models for representing the existing systems and for systems development utilizing End-users (i.e., end-user as part of the process of development).

In order to determine the best choice of methodology for systems design it has resulted in my review of four methodology. In doing so, analysis of the methodology has shown that there is a need to draft the end users in the process of developments in order to achieve a user friendly End Product (User Interface). My reviews and evaluations are focused, on drawing attention to strengths and weaknesses in respect of the use of Tools, Techniques, and flexibility given to Analyst, Designers, Owners, and least of all potential Users concerning systems development (bearing the AP in mind).

SYSTEMCRAFT as a methodology, places more emphasis on the examining of existing systems in detail for establishing requirements. Particularly, in areas where system user and seldom have a clear understandings of the End Products. The methodology focuses more on the use of tools and techniques for supporting and documenting business models. It is clearly is ahead of its rivals, and in comparisons to SSADM, SYSTEMSCRAFT does not propose rigid standards to be followed, but advances suggestions as to the type of documentation's to be used and levels to which they should be implemented. Again, this shows a more flexible approach to the needs of modern system and user requirements, especially in the areas of tools and techniques used for tackling discrepancies (allowing the adding of new system requirements to existing models). Moreso, whenever there is the need for adjusting Business Function Diagrams, the renaming of models SYSTEMSCRAFT has shown itself as a leader in the field. Referencing Crinnion, Analyst will find that using SYSTEMSCRAFT preserves the simplicity, accuracy and logical reasoning present in earlier versions of the system models, but allows for the analyst creativity (Crinnion, 93c). Another benefit derivable from the methodology concerns the leeway given to analysts and designers, further constrained by their DP department managers to adhere to existing standards, i.e., SSADM 'Cookbook' type methodology. Note that this is a more positive methodology facilitating analyst creativity (Crinnion, op. cit.).

In fairness to traditional methodology (NCC included), most still considered to be better, by virtue of them being comprehensive methodology, i.e., covering a much wider area of the continuum (refer to Appendix B for illustration) in comparison to most modern methodologies. Other areas covered by traditional methodologies include the following listed below:

- ¥ Training in interviewing (physical file design).
- ¥ Aspects of Project management.
- ¥ Basic understanding of how the business operates.

Finally, it should be remembered that the successful implementation of any systems development methodology, depends heavily on the skills of key personnel available, i.e., skilled Analyst. Most significantly, skilled Analyst trained in the conventional approach often recognize many inter-linking features applicable to modern methodologies (particularly the emphasis on documentation standards, detailed guidelines and quality assurance standard embedded in the SSADM approach) which can be refined using their individual creativity.

CHAPTER 1

1. A GENERAL REVIEW OF SYSTEM DESIGN METHODOLOGIES

1.1 Traditional Systems Development Methodology

Introduction

Previous systems development methodology NCC included, follows a strict format concerning systems development and design. The life-cycle features a rigid structure, considered to be time consuming and difficult to follow, it also poses problems through lack of flexibility for analyst to be creative and resulting in systems (End-Product)being delivered late. These are some of the attributes that have led to a rejection of the traditional methodologies by system user, owners and has contributed to technology becoming unpopular with the AP alike. Note shown below is an example of the traditional methodology figure 1 below :

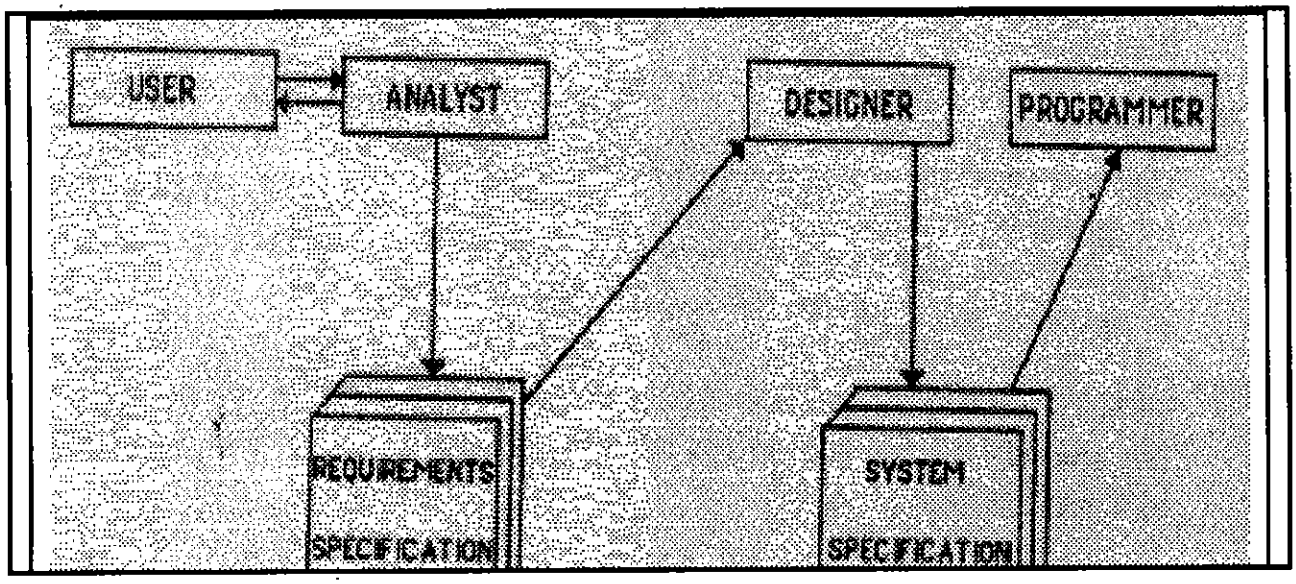


Figure 1 Transfer of Information in the Traditional Systems Development Approach (Crinnion, 1994 P. 15-10)

However, certain advantages can be derived using traditional methodologies namely, the NCC approach features a standard rigid pattern for systems development and in contrast to modern day methodologies (system building). In fairness to traditional system development approach (NCC included).

Note, NCCs rigid pattern and stages allows for an easy maintenance and reliability of the End-Products the approach posits a six-stage logical development cycle as in figure 1.2 shown in below:

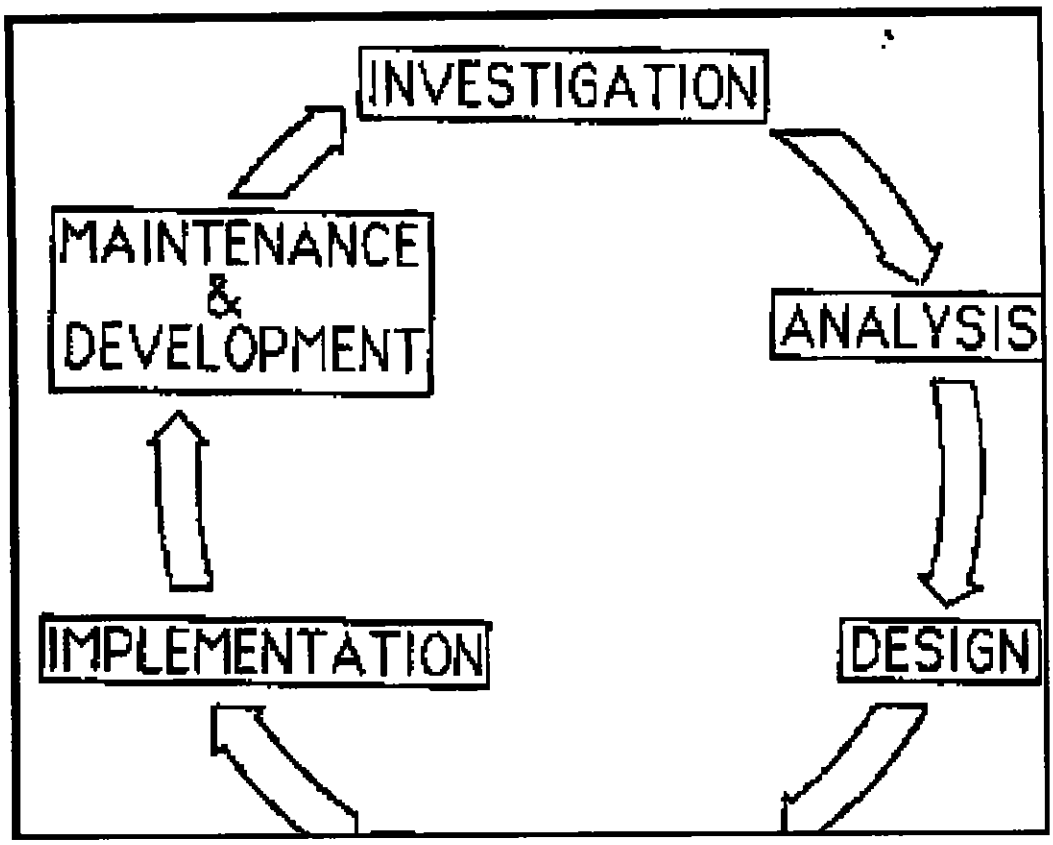


Figure 1.2 Traditional Systems Development Cycle

(Crinnion, 1994 P. 15-10)

Finally, the NCC approach also provides detailed guidelines concerning the following:

- A series of studies and specifications, consisting of standard formats incorporating Formal documentation for systems designs.
- Checklist of task to be performed during systems design and development.
- A detailed examination and recording of the existing system (i.e. the model of the existing system).
- Project management guidelines.

This shows without doubt that the End Products will almost certainly be non user-friendly.

1.1.2 Review of Advantages (NCC)

- Methodology covers a much wider area (cf. current structured system methodologies.
- Training in interviewing(physical file design).
- Covers aspects of project management.
- Basic understanding of how the business operates.

1.1.3 Review of Disadvantages (NCC)

- Systems often delivered late and often seriously over budget.
- Essential user needs not often satisfied.
- Lack of control.
- Lack of user involvement and understanding.
- Use of inappropriate tools
- The NCC approach suffers the moving target problem (Process structures).

1.2 STRUCTURED SYSTEMS ANALYSIS (SSA)

Structured Systems Analysis (henceforth SSA) focuses on requirement views obtained from data analysis modeling using tools and techniques. The extensive use of tools and techniques can aids and be seen to expedites the building of newer system and the proposed system models. Alternatively, it aids the analyst in the process of recording, analysis and design of systems, providing full definition of the requirements in a form that is clearly understandable to designer, implementers, owner and most of all the system user(particularly the AP). The commonest Tools associated with SSA are Data Flow Diagram, Entity Model, Relational Model, and Walkthroughs (see appendix B for Examples).

Most significantly, techniques used in SSA identify natural relationships between different types of entity(about which information is held). Data structures are used within SSA to back new systems since they are considered more stable and user friendly concerning understanding. Therefore, when the system owner or user wishes to make changes to the system, it is nearly always the case that data structures enable better use to be made of the existing information rather than obtaining information from additional sources, i.e., from the data analysis models (the potential of the system rather extracting current requirements of the user).

The arrival of structured systems analysis resulted in the separation of the Logical and Physical models (i.e. formal specification of the 'Physical' and Logical' views of systems). This distinction is an essential factor that should be present in all structured system methodologies. Moreso, the Physical view describes how a system performs its task and outlining its boundaries. In addition, it concerns the Physical constraints placed on the system by the owner, user, and designer in order for the system to function. Moreover, the models facilitate an investigation into the existing system and designs of new systems. On the contrary, the Logical model focuses on the functions specifically required by the system namely, the information needed to carry out instructions and, is used for the analysis of the systems requirement. Generally, SSA is much better at analyzing the Logical requirements of a system,(especially with a view to humans). Therefore, it provides a much deeper understanding of the business and range of designs, implementation options, and a wider choice for users. It is also serve as an effective risk minimizing approach tool. Finally, SSA is noted for putting forward a one-off constructive view of systems development. Hence, it is seen to be more analysis methodology.

1.2.1 Review of Advantages (SSA)

- Makes extended use of formalized sets of tools and techniques, identifies the best type of tools for tackling various situations.
- Culminates in standardization of a structure of the approach, laying out the essential stages inherent in the analysis and design process.
- Enables a distinction between, and the utilization of 'Physical' and 'Logical' views of the System.
- The provision of a substantial role for the user in the development process via:

  - Use of non-technical jargons.
  - Users encouraged to varify analyst findings in Structured Walkthrough and Presentations.
  - Possibility of user becoming members of the design teams.
  - System design based on Data Structures.

- Facilitates the use of inherent Data Structure as the basis for proposed design.
- Allows steps within the development process to be measured easily for there Product and facilitates better control.
- By utilizing Data structures it facilitates a smoother change of system, during maintenance and development stage within the system life cycle.
- Its use of data structures as the basis of the system design makes it easier for data processing function to progress within the company from using of database strategies.
- Provides a framework for integrating and interfacing products from different models.
- It facilitates a standard approach to systems development processes.

- It is a modern approach to problem analyzing and designing computer systems for businesses
- It involves the use of tools and techniques, integrated into the design face by means of a structured framework of stages and steps.
- SSA centers on building 'paper' models (graphical form rather than in text) for both the existing and required system. Alternatively, models built are used to communicate with user, proposed builders of the system, designer, and implementers coming after.

1.2.2 Review of Disadvantages (SSA)

- As structured methodologies they tend to concentrate solely on the use of tools and skills use in modeling the existing and proposed systems.
- They do not often comprise full system analysis training features.
- Not a complete method for system development. This is because they often lack the following:

  Interview Techniques;

  Cost-Benefit Analysis;

  Project Management and Procurement.

1.3 PROTOTYPING

Definition

According to Crinnion, Prototyping is defined as :

"Building a physical working model of the proposed system, and using it to identify weaknesses in our understanding of the real requirements ."

(Crinnion, 93c).

Referencing the author, he defines prototyping as:

"The construction of a draft model of a potential system for user's verification and understanding of the real requirements."

(Akinbode Inf./Systems, 1998).

1.3.1 Types of prototyping Techniques

- **Rapid prototyping (Throwaway Prototypes).**
- **Evolutionary prototyping.**

Introduction

Rapid prototyping involves creating a working model of various parts of the system at the primary stage after a relatively short investigation. It uses an informal method with speed as its essence, as model becomes the starting point from which users can re-examine their expectations, clarify and finally throw away the prototype (Crinnion, 93c).

Evolutionary prototyping

Introduction

Evolutionary prototype is initiated after a more careful and rigorous investigation and methods used in building the prototype are more structured. Note model built forms the heart of the new system and further improvements will be built onto it not thrown away (Crinnion, op. cit.).

Nowadays modern systems development methodologies incorporates the use of prototypes. This has resulted from the arrival of Fourth Generation Environment (henceforth, 4GE) namely, software surroundings it. It is also referred to as an 'Analyst Workbench'.), allowing software covers and iteration process to be performed at a much quicker pace than conventional methodologies. Moreover, it facilitates putting together an early version of the system, to be tried out on the user before the final system is churned out again note the end -product is geared towards a much better user-friendly system Noticeably, the use of prototyping techniques within structured systems development features strongly in the following areas :

- Requirements Analysis.
- During the 'paper' model of Data Flow Diagram and entity model.
- Detailed Investigation.
- Analysis and design.
- Investigation, Analysis, Design and Construction.

These previously processes were more rigidly set out in the traditional system development life-cycle, whereby each stage must be manually completed before the next stage can be started and in most cases leads to an non user friendly system. This has been made less rigid by the arrival of 4 GE, notably the used of these techniques and tools reduces the criticality of the programming stages through ease of change and can be used by less specialist staff (Crinnion, 91). Moreover, prototyping cuts across the development cycle stage, as each prototype includes elements of four stages. More importantly, prototyping facilitates the iteration of processes when building parts of the system. It further allows checking, altering, rebuilding, and rechecking with potential system users thereby guaranteeing complete satisfaction of the final systems output. In addition, the use of prototyping techniques led to user's requirements becoming more advanced with increasing functionality and human iteration, this is because 4 GE lend themselves well particularly to the development of on-line system; such as in dialogue design facilities (Crinnion, op. cit.). Prototyping further supports the evolutionary approach to systems development in which modifications are considered a norm.

Furthermore, many 4 GE applications after development become standard procedures or components in future system, requiring only slight tailoring in order to fit the new systems requirement. Hence, prototyping facilitates a number of options in prototype form because users are much more able to visualize potentials of the proposed system, by means of a prototype rather than in the form of the paper model hitherto provided by SSA. This shows the weakness of SSA Finally, prototyping techniques are considered more of a user-oriented system development methodology(Crinnion, op. cit.), (Godden, pers. comm.).

1.4. Review of Systems Design Methodologies (General).

Introduction

System design methodologies are designed to assist in a smoother design, construction and implementation of any agreed system, namely, Scientific or Systems Paradigm (Checkland, 81). Previous design methodologies have tended to be rigorous and rigid; mostly because they tend to follow a set pattern of design(without real concerns for the end-user), albeit the system life-cycle can be regarded as time consuming and presenting certain disadvantages. A typical example of Post-design methodologies that will be discussed in this thesis is SSADM. This methodology posits a well-structured routine and is considered to be a pre-requisite for large Government system development and vast organizations (Ashworth et al., 90a).

In addition modern day system design methodologies aim to weed out obsolete processes and expedite the process of systems design and development without any vital sacrifices being made. Consequently, these methodologies tend to be suited to smaller-scaled systems designs and development.

Moreover, in contrast to previous systems design methodologies involve or attempt to involve the end-user of such system largely. Hence, facilitating a smoother implementation of the finished systems, and likewise, half the systems built through these methodologies, very often find the End Products accepted as required deliverables.

Finally, as a result of modern-day technology, newer system design methodologies have continued to evolve and mature, making system design feasibility studies and design patterns more sophisticated from new invention fostering greater future prospects, competitive edge, fame and fortune. Noticeably, this has led to a continuing shift from the past sole dominance of Systems Analyst in system design, to the present involvement of system-users within applications development and system design. This change in trend looks set to continue well into the future and it is this, that I will be reviewing from four methodologies namely NCC, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING and to what extent these methodologies impact on the aging population(AP).

CHAPTER 2

2. STRUCTURED SYSTEMS ANALYSIS AND DESIGN METHOD

Introduction

SSADM is a data driven methodology developed in the UK by consultants Learmonth and Burchett Management System (LBMS) and Central Computing Telecommunication Agency (CCTA) responsible for computer training and procurement for the UK Civil Service. The use of this system design methodology became mandatory in many civil service applications around 1983 (when it became more of cookbook-methodology) providing development staff with detailed rules and guidelines for working on Government projects. These rules are contained in a set of manuals (NCC, 1986), (CCTA, 90). See Appendix A for reference.

Alternatively, referencing Ashworth, SSADM occupies a dominant market position within Government and industry. It forms the basis for a Certificate of Proficiency to be used as the basic requirement for any system Consultants and Contractors wanting to work on Government projects (Ashworth et al., 90a). These Certificates are named the ISEB version 3 and ISEB version 4 (cf. with the capability maturity model (CMM) used in the States (USA) to allocate Government and Military Defense Projects to potential Contractors).

Moreover, the practice by the UK Government in awarding the development of software and system to Consultants with the pre-requisite Certificates 3 and 4 has continued to uphold SSADM as a main pre-requisite for developing government systems, to the detriment of accepting modern methodologies as rivals and moreso as reasons for the unpopularity of computer-based technology with the aging population. For example, referencing Weaver,

> "Structured Systems Analysis and Design method is the standard Information system development method for UK governments projects, and has become a de facto standard for the UK private sector. It also forms the core of numerous courses at HND, B.Sc. and M.Sc.. levels" (Weaver, 93).

Nonetheless, it should be noted that SSADM, for all its glory is regarded by many as off-putting. Reasons given mostly include, a time consuming systems design methodology, its strict and rigid design structure and lack of flexibility more importantly its rigid / stem technical structure often seen for its unpopularity with the older generation(Godden, pers. comm.). Presently, SSADM is seen as a cookbook type methodology. A prescriptive framework of steps and stages, essential for large developments, and providing a high degree of control over developers (Crinnion, 91). Therefore, very little flexibility is given to the Analyst for creativity and, to the potential system users in participating partially or fully in the design of the system. Moreover, strict emphasis is placed on the completion of one stage before embarking on the next (Godden, pers. comm.). Noticeably, this results in a bulky documentation of the stages and is time consuming.

Accordingly, SSADM falls under the Systems Paradigm Umbrella, that is, Living systems and human activities exhibiting openness, low separability and high independence, therefore they cannot be reduced from a science paradigm. Refer to chapter five for illustration and Summarized Table of Paradigms.

2.1 Life-Cycle And Approach

SSADM covers six stages of system development life cycle (see figure 2 below for illustration), namely:

- Strategy planning.
- Feasibility study.
- Analysis.
- Design.
- Implementation
- Maintenance.

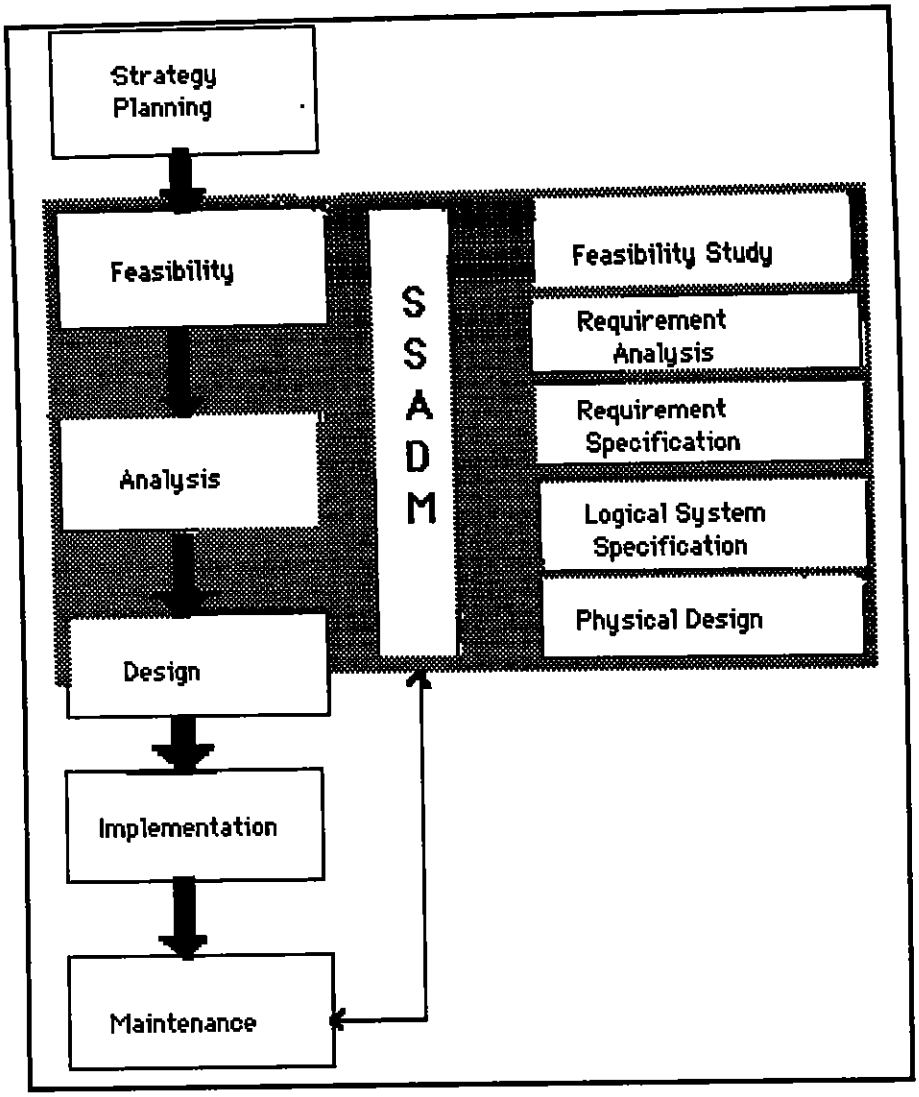


Figure 2 SSADM LIFE CYCLE (Weaver, 1993 P. 6)

The approach adopted by SSADM is a Top-down approach to systems design, that is a 'Data-Oriented' approach featuring a two world perspective namely the 'LOGICAL' and 'PHYSICAL' views of system components (Weaver, 93). The physical components are those existing within the real world (or will exist in the future) such as the constraints imposed by organizational, Political or Technical factors. It tend to overlook the end user largely. The logical components on the other hand, represent a picture of what underlies the physical components of a potential system, such as, giving a picture of what the physical components will look like in an ideal world free from real world constraints.

Both the logical and the physical components feature a four-way view of systems design namely :

- Functionality or processing - The way in which data is passed around the system and the processes or activity that transforms it, namely, it sets out the functions provided for users by the system.

- Data oriented-Based on the idea that information systems (IS) stores and acts upon organizational data from an in-depth study of the nature and structure of the data. Noticeably the data structures are far more constant (cf. to processing or functions with frequent change. The data view forms the backbone of SSADM Structured methodology-referred too as 'DATA-DRIVEN').
- Effects of time and real world 'events' on the data held within the system.

SSADM methodology consists of four main components namely:

- The structure or framework of an SSADM project.
- A set of structured analysis and design techniques.
- The products of each techniques

2.2 Reason For Success

So far the methodology has achieved considerable success due to being a government standard and because it forms the basis for providing detailed guidelines for building Government and Civil Service system. Moreover, in fairness to SSADM it addresses the question of maintenance in details such as, providing guidelines for operational systems requiring enhancement, a cookbook approach and sets of documentation procedures (Ashworth et al., 90b). Furthermore, SSADM's success as a methodology has further accrued from it, being a comprehensive methodology (covering most aspects of systems building) suitable for designing medium and large systems (Eva, 94). This can be seen as reasons for the longevity of SSADM, and moreso the revamp of a micro version of SSADM due to be launched at a latter date (Crinnion, pers. comm.).

2.3 Stages Within SSADM

SSADM starts with an initial statement of requirements and terms of reference and produce, as its final output of the following listed below:

- Program specification,
- User Clerical Procedures,
- Operating Schedule,
- File design or Database Schema,
- Plan for testing /Quality Assurance.

SSADM has six phases, classified into two areas, namely, four phases of systems analysis and four of systems design. See figure 2.1 below for illustration:

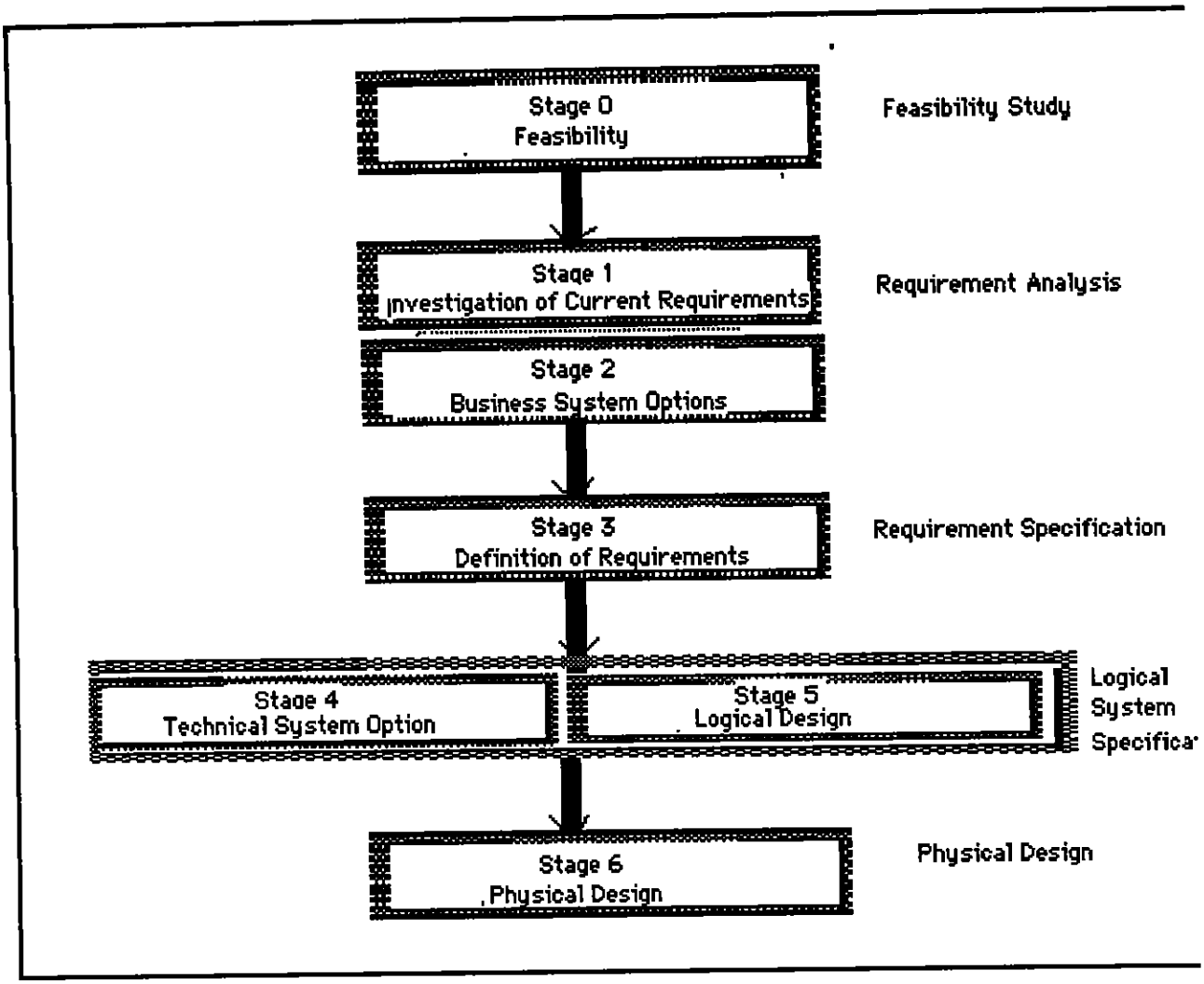


Figure 2.1 The Stags of SSADM

(Weaver, 1993 P. 9)

Most significantly, the separating of the systems analysis activities from system design activities within the SSADM methodology makes it easier to judge the proportion of time spent on analysis and design (Downs et al., 88). Furthermore, these activities provide detailed guidelines for tackling four areas such as, the analysis of the current system involving the investigation of the current operational system (be it computer-based or manual), whereby any problems amongst user are identified and eradicated. Noticeably, the traditional techniques of interviewing, questionnaires, and sampling are often carefully noted. The second area centers on the required specification of the system, here the logical view of an ideal current system is extended to include the new requirement of the main user so that a logical view of the ideal required system can be found with relative ease.

The third area covers the Users selection of service level, including technical option carried out from a feasibility study. This more often than not features various options for systems implementation presented by the analyst to the users, and covers the following:

Detailed Data Design

This defines in detail the data and data relationship, ensuring that the model supports the process, e.g., TNF. Moreover, the process also looks at the data requirements supplied on the screen format, report layout and input form selected by users in the previous phases to produce TNF relation (frequently referred to as document driven data analysis). Additionally, it is executed in a bottom-up approach because the details on the document are used as the basis of the data model via normalization.

Detailed Procedure Design

A prototype version may be developed in a trial design for the system including file or database design, etc. Prototype may be a 'paper prototype' for assessment by teams or users.

Physical Design Control

This phase is concerned with the production of a plan for building and testing the system, program specification, and operation. These aspects are analyzed on paper and refined to maximize performance before being developed on computers. In addition, documentation includes the following:

-Test Plan.

- Operation Guide.

- Implementation Plan and User Guide.

Furthermore, the six phases and sub-phases have a well-documented form, making it easy to teach this methodology to potential User and systems designers (Downs et al, 88),(Eva, 94). SSADM also defines the output expected from the stage, gives time and resources management guidelines, uses DFDs to provide pictures of how data moves around the IS. It also shows how it moves between the system and is used in the external world in early stages in order to understand the current system and specify the required system (Downs et al, op cit.). Likewise, within the SSADM methodology the external entities are represented by rounded symbol and processed by boxes that are considered easy to understand. The logical processes are named in the lowest level DFD and can be represented on decision trees or tables (Downs et al, op cit.).

In SSADM the technique of constructing entity life cycle provides extra dimension and historical views. It helps to show the effects of time on the system by means of the DFDs and entity models. Alternatively, the static view of the system can also be represented.

Likewise, these techniques (entities), assist in analyzing processes, for each major entity identified in the modeling phase. It also facilitates the use of diagram is produced showing all events which affects or updates the data. Furthermore, referencing Weaver, it is also recommended that quality assurance reviews based on structured 'Walkthrough' should the use during these processes (Weaver, 93).

In addition, though SSADM does not itself address the problem of project control or estimate costs directly, it through the incorporation of project management tools and a framework, provides help in these areas of systems development. Moreover, it is essential to remember that the successful implementation of this methodology relies on the skills of key personnel being available and analysts trained in conventional approaches will recognize many features of the SSADM methodology, particularly the emphasis on documentation standards, clear and detailed guidelines and thorough quality assurance. In fairness to SSADM, it tackles most of the flaws of the traditional methodologies. Therefore, it can be considered a reliable methodology. Nonetheless, we should not overlook its weaknesses, most analyst view the methodology as limiting especially since very little leeway is given to the creativity thereby stunting the analyst creativity, while leading to the production of a less than adequate End-Products very much considered to be unpopular with the AP. Finally, an added downfall of SSADM is that it takes a less business oriented view than most systems design methodologies, preferring to concentrate on Information system to be computerized. Therefore, the logical DFDs produced in SSADM are considered more 'Physical' than other methodologies (e.g. they only include parts of the system which are to be computerized).

2.4 Review of Advantages (SSADM)

- A comprehensive system development methodology.
- Avoids the unnecessary jumping of stage during system development.
- Compulsory requirements for Government projects.
- Widely reviewed and studies in College, Universities and Civil Service.
- It is a structured system development methodology.

2.5 Review of Disadvantages (SSADM)

- Time consuming methodology.
- Results in excessive documentation during system development.
- 3 GE system methodology, i.e., COBOL.
- Not considered User-friendly.
- No flexibility given to analyst for creativity, i.e., Cookbook approach.
- Can only be used with Throwaway Prototyping.

CHAPTER 3

3. SYSTEMSCRAFT

Introduction

SYSTEMSCRAFT is a systems design methodology developed by John Crinnion, School of Infomatics, City University London. The methodology centers on the use of four main processes namely:

- Business Analysis.
- Systems Design.
- Managing the project.

In contrast to the SSADM methodology, it lies on the Toolbox side of the continuum. A loose framework featuring great flexibility in choice of techniques, suitable for small system developments and takes advantage of developer's skill and creativity (Crinnion, 91). This facilitates the use of prototyping techniques (throwaway and evolutionary), techniques which when used can expedite the process of systems design and facilitates a smoother implementation of the finished system (Crinnion, 91).

As with SSADM, the SYSTEMSCRAFT methodology falls under the Systems Paradigm umbrella. Referencing Checkland he describes it as "Living systems and human activities exhibits openness, low separability and high independence, therefore cannot be reduced from a Science Paradigm" (Checkland, 81). The methodology kicks off with the use of a business analysis process, covering a detailed study of the business area requirements for the systems use and possible solutions to the problem jointly arrived at by the analyst and potential systems-user. Noticeably, important emphasis centers on the needs to produce a detailed analysis by means of ideas, techniques, and models providing easy grasps and understanding for potential system's users(user-friendly system).

3.1 The Methodology In The Marketplace

Introduction

As a system development methodology, the use of SYSTEMSCRAFT has continued to gain grounds within the commercial sectors, evidence of this, is seen within Olivetti, a large multi-national organization selling and monitoring the use of this system development methodology. Comments from prospective clients include the ability to tailor the methodology specifically too individual need, and in adapting the methodology to suit modern object-oriented 4GE (Godden, pers. comm.). See figure 3 below for illustration.

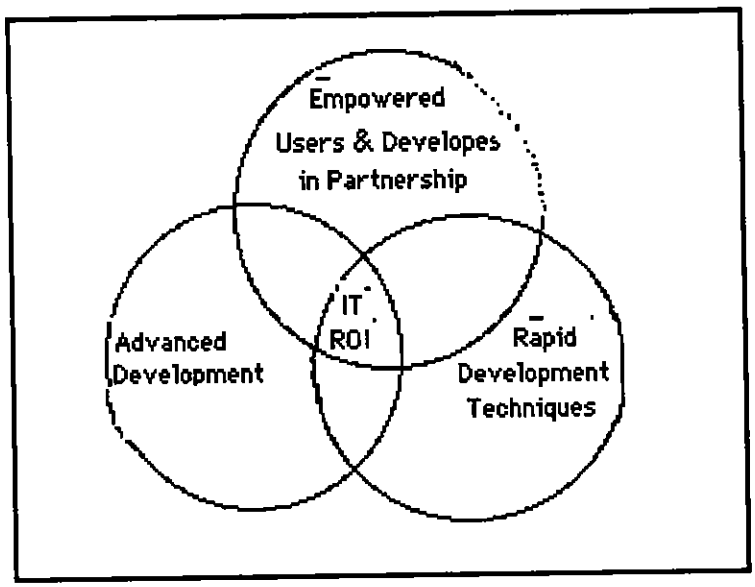


Figure 3 SYSTEMSCRAFT maximizes the Returns On Investment in IT

(Business Systems Express, Q1 94 P.1)

Most significantly, one aspect in which this methodology is clearly ahead, is its use of tools and techniques facilitating a faster pace of system development. These, include the use of Process Descriptions, Data Flow Dictionaries, Development Workshops and Structured Walkthroughs all combining to make SYSTEMSCRAFT a methodology considered to be more user friendly. Moreso, unlike traditional methodologies strict emphasis is placed on the end- user rather than the system. Evidently, success of the methodology is further seen in the extensive use of Walkthrough sessions first made use of in 1971 by Chuck Morris at IBM's developmental workshop, during an initial study phase and control analysis process (Silver and Wood, 89).

The strength of SYSTEMSCRAFT lies in two areas namely firs (A) the extent to which a systems life-cycle accurately represents a development project (B) its ability to be revised and cope with modern day technology. The flexibility of SYSTEMSCRAFT has been stressed throughout, for its use of tools and techniques illustrated as having several levels of complexity, hence analysts are required to exercise judgment in deciding individual levels needed for different cases. Particularly, concerning stages shown in the framework when the systems to be developed are small and relatively straightforward (see Appendix C2 for illustration).

3.1.2 Key Requirements of EDM

- The need to be adjusted to suit the type of organization or department in question.
- There almost certainly has to be slightly different versions of the methodology for each 4GE for which the organization is making use.
- It must be adapted to suit each of the systems development projects to which it is to be applied.

The advantage of EDM is that, it gives system user and owner the power to make business decisions regarding what the system should contain and its operations. Likewise, it gives the analyst and furthermore system designers flexibility in making decisions regarding the method of design to be used (Crinnion, 93b). Alternatively, the EDM approach advocates the development of a one-off construction, seeing virtues in the pursuit of maximum safety in designs, enforcing stages, and methods accepting increased overheads to minimize project risk. According to Crinnion, "The evolutionary approach encourages user involvement to a maximum in the design of the potential system. Moreover, it also encourages maximum use of analysis skills leading to a reduction of the overheads and resulting in an early possible delivery of the system." Additionally, the evolutionary approach adopted by the SYSTEMSCRAFT methodology aims to contribute in the reduction of project risk, associated with traditional systems design from integrating users into the entire processes of the system design and development, and allocating responsibilities to the users at the very early stage in the project (Crinnion, op. cit.).

Most significantly, SYSTEMSCRAFT as a design methodology examines in-depth analysis of the system's data usage via a data usage chart, the path analysis diagrams and the navigation models. These processes assist in the design of the physical database and computer programs (End Products). Furthermore, the design stage separates the overall system into two parts i.e., parts handled by means of a computer and parts to be tackled through human intervention. The latter is achieved from the use of Data Flow Diagrams allowing the design processes and analysis to occur simultaneously at an early stage of investigation. Additionally, the design process makes use of the input specification from requirements constructed during the analysis stage, this process is co-opted by efforts between the user and owner throughout the design stage from fact-finding interviews (workshop session), Walkthrough and Presentation.

Likewise, emphasis placed on the use of a prototype technique within the SYSTEMSCRAFT methodology provides opportunities at various stages including design and analysis. Another, clear advantage of SYSTEMSCRAFT as a methodology is through its use of graphics (pictures) for illustration of systems design. This facilitates an ease of understanding, that allows the user, owner and implementers of the system to follow the design process of the required system from start to finish.

3.1.3 Improvements

Traditionally, the 'Cookbook' methodologies, SSADM included, adopts the approach that every aspect of systems development should be formalized, with all steps and stages to be completed in a specific way namely, an engineering approach. This on reflection may be the last way to tackle systems design, especially when the End Products has to be used by a diverse sector of society. Note, the idea is frowned upon by the SYSTEMSCRAFT approach, which regards systems designs as a highly creative activity. It places less formal restrictions and limitations on design as this form of restriction on the analyst seriously impedes the notion of the process paradigm (Crinnion, pers. comm.), (Godden, pers. comm.). Moreover, SYSTEMSCRAFT can be regarded as an attempt to achieve the best of both worlds (methodologies) from incorporating the important evolutionary design concepts into what is basically a simple structured system analysis and design methodology. The methodology attempts to bring together the use of SSA and prototyping techniques under the umbrella of one systems development methodology, giving the added advantage of having increased options within a single approach.

3.2 Business Analysis (Part 1)

Introduction

SYSTEMSCRAFT kicks off by tackling the business analysis requirements first. It identifies the business function and the information flows by means of DFDs, analysis of business information through Data Model configuring and, the business information structure by means of a relational model. The completion of a final business analysis process then facilitates the integration of different views encountered during the systems analysis stages. Note this methodology makes use of extensive use of various tools and techniques, that are used during the above mentioned processes such as the following:

- Process Description (Structured English).
- Data Flow Dictionary.
- Development Workshop and Structured Walkthrough Sessions (business analysis).

Alternatively, BAS produces a 'Logical' analysis of required business system. The product of the analysis is known as the 'The Business Model' facilitating the provision of four aspects of system development namely;

- Flexibility from customizing each individual project, etc.
- Covering two major aspects of the system development stages namely the Business Analysis and System Designs stages.
- Systems Design comprises the rest.
- Implementation of system considered part of the project management process.

Furthermore, unlike the SSADM approach, stages within the SYSTEMSCRAFT methodology are allowed and encouraged to run concurrently for the large part of the project. Hence, in contrast to SSADM the business analysis stage does not have to be completed before embarking on the designs. Most importantly, the SYSTEMSCRAFT methodology resolves problems hitherto faced by junior analysts, concerning the identification of the logical requirements behind the Physical reality of system as they exist and, forcing a hierarchical decomposition of the business functions within the designated study area, using BFD. Note SYSTEMSCRAFT places, strong emphasis on business functions rather than processes, making it difficult for analysts to lapse into recording how processes are carried out.

Referencing Crinnion, one possible advantage of the SYSTEMSCRAFT methodology is the provision of the BFD and DFD capable of cross-checking each other and iterating until a logical simple and aesthetically satisfying model of the functional requirement is established namely the data model and relational model (Crinnion, 93a). Finally, the data Model includes the entity-attribute-relationship arrived at via a Top-down approach, whilst the relational model is built from attribute identified in the earlier model and put through a process of normalization.

3.3 System Designs Stage (Part 2)

Introduction

The system design stage involves immediate existing options for the physical implementation of the system's requirement obtained from the system Data Flow Diagram via the Business DFD (Crinnion, 93b). The system DFD contains dotted lines showing the computer system boundaries and separating the computer's processing, clerical, administration, operational processes, by indicating the location of the data stores (See figure 3.3.1 for illustration).

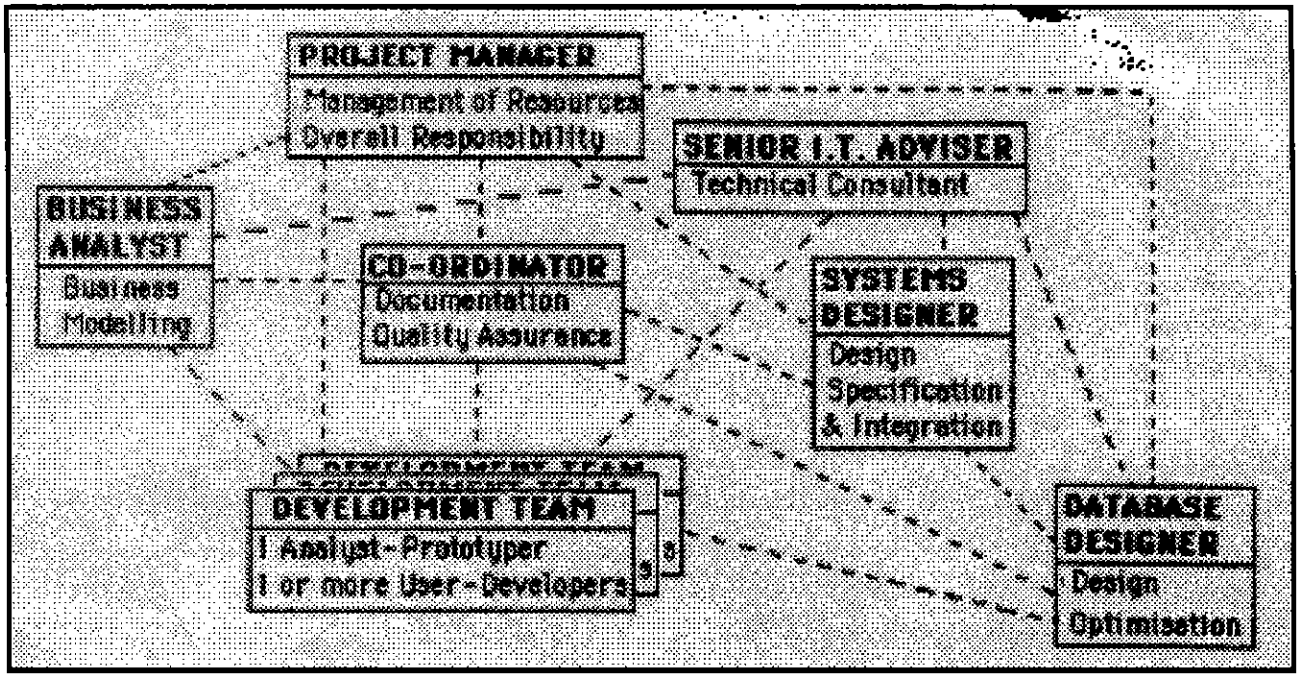


Figure 3.3.1 The Roles in a SYSTEMSCRAFT Project

(Crinnion, 1994 P. 18-2)

A further plus for SYSTEMSCRAFT relates to its provision of guidelines for identifying realistic candidate prototypes through the development of formalized prototypes of the system in stages. They culminate in an official 'Walkthrough' where the completed prototype is accepted as a signed off 'deliverable' within the project management system. Moreso, unlike the rigid structures of previous methodology, particularly alongside decisions concerning the groupings of various programs and modules into subsystem by means of a DFD ('computer DFD). SYSTEMSCRAFT allows Prototyping to be done, the outline of each prototype is further supported by a process description of all the DFD processes and the data definitions of the entity type mentioned, within the prototype boundary.

Hence, analysts are provided with details of each interview conducted with the user and supplemented with additional interview results before building a final prototype. Therefore, through the process of iteration analysts are given flexibility during the prototyping phase to modify and add extra levels of functions if the need arises. This includes the phasing of projects which can have effects on the decision as to the order in which different parts of the business function diagram can be exported into DFD and carried through quickly into the design and prototyping stage. Moreover, it has been pointed out that prototyping and the use of 4GEs have already proved-themselves as effective in the development of inexpensive user-friendly system (Godden, pers. comm.).

Moreso, an added bonus for using system is the way it provides for the inception of SYSTEMSCRAFT methodology as a tool for systems development. Four things are normally taken into account:

- The overall systems development strategy of the organization.
- The process of taking the method on board.
- The kind of tailoring needed to make the method best suited to the organization.

These views are taken into account (via an initial study) during the analysis modeling of the business entity, and in the ELH used for generating complex systems while, separating activities and events. SYSTEMSCRAFT as a tool facilitates the controlling of the processes via 'Control Analysis' method, aiding analysts and designers to impose controls on risk, while estimating their significance's, and devising preventive measures to counteract them. In addition, Tools, Techniques, and Models provided are used as a source of control, which aids in plotting a 'logical' access path for navigating through the database.

3.3.1 The Systems Design Stage (Part 2 Continued)

One of the key factors during system design concerns the ability to identify system's key requirements during design. SYSTEMSCRAFT as a methodology caters for this using the system DFD, splitting the Logical processes of the Business DFD into Physical processes operable by the computer and potential system users. Dotted lines are made use of within the methodology to signify demarcation processes, (computer processes from manual) these often appear in documents, forms, reports and HCI screens of the system. A clear advantage of this approach, is the flexibility given to an experienced analyst and designer in exercising skilled judgments when identifying ways computers aid in the process of building the DFDs (Crinnion, 93b). Moreover, actions performed from design assist in confirming the physical requirements when prototyping is used, and once the computer option part of the system has been agreed on, systems design facilitates the identification of areas best suited to the prototyping approach.

A good prototype is also achievable, even when the HCI is complex, involves the use of on-line dialogues, batch-oriented system, and on-line oriented system, and in default cases where the proposed system faces a database response-time problem. This approach facilitates the use of detailed forms of analysis (See to appendix C3 and C4 for examples of the business and systems DFDs). The numbering approach employed emphasizes the inter-dependence of the processes on the two models, by suggesting that the split processes are one level down in the hierarchy from the process being split.

SYSTEMSCRAFT further facilitates end-user design via the use of 4GEs and high level query languages during the processing of systems development. These are used to indicate candidate or candidates prototypes, via surrounding its entire components by means of a thick jagged lines and allowing designs by different design teams to be coordinated. The methodology also gives flexibility to the development teams in exercising discretion as to the choices of identifiers used, during system development. For instance, whenever large systems are constructed, the design teams are given the flexibility in choosing identifications to each separate prototype, noticeably the identifiers assist the PM (team) during the process of estimating and recording of the prototypes. Therefore, it makes it easier to identify prototypes by various teams and facilitate a better working environment both for designers, owners and user, furthermore, referencing Milton Jenkins, a leading authority on prototyping he say "ideally there should be a one-to-one relationship between user and builder" (Jenkins, Anon).

Presently, structured programming design is a method of identifying the best sequence for instructions to be obeyed within programs. Therefore, this implies that programming should be procedural. Noticeably, the SYSTEMSCRAFT approach suggests that when extra levels of functionality are to be included in a prototype, the new prototypes should be built and modified by the development team (Crinnion, 93b). Hence, when SYSTEMSCRAFT is to be used for developing large and complex project, attempts are to be made to elicit additional design functionality's through the use of modeling techniques. This assists in the probing process (into a series of clearly identifiable stages). The control analysis techniques suggested for the methodology are based on the use of the DFD, from navigating round the various DFD models and identifying the origin of any control and/ or weakness (Crinnion, op. cit.).

Note, the only documentation within the SYSTEMSCRAFT methodology (its deliverable) thought to be necessary are:

- Business requirement specification.
- System Designs specification.
- User manual.
- Operating instruction.

Presently, there is deliberately no method of modeling computer-user dialogue within the SYSTEMSCRAFT methodology. Presumably to enforce a simplicity of the approach or a set of common-sense standards on the production of such dialogues. Moreso, since SYSTEMSCRAFT is seen an evolutionary systems development methodology, it is designed to allow analysts to take maximum advantages of 4GEs whilst at the same time retaining the major benefits provided by a structured system analysis and design approach. Moreover, it is designed to provide a full set of modeling tools for the analysis and design of business computer system (Crinnion, 93b). Referencing the author "This, is one of the greatest dangers seen in taking an evolutionary approach to systems development (in comparisons to the traditional approach). This is because, it may result in a loss of control (Akinbode Inf./Systems, 1998).

Alternatively, SYSTEMSCRAFT facilitates the use of business function analysis to identify separate functional components. This enables a staggered development of the analysis model and allowing components to be proposed into the design stage, while others are still under analysis. Therefore, it is possible to produce and use the first prototype of a small part of the system, often within four days of starting the analysis of the system (Crinnion, 93b). With the use of a EDM there isn't a need for this complete transfer, of the prototypes since users take an active part in the process of analysis and design(with Analysts), so that the repository of detailed knowledge about existing systems remains in the user's mind, and the users' documentation can be referred to when conclusive details are needed. Alternatively, these documents can be summoned at will, hence only those pieces of information that are relevant need be put forward for examination.

Noticeably, this encourages a partnership of shared responsibilities between user and analyst, each bringing some specialist knowledge and expertise to the development of the system (Crinnion, 93b), (Godden, pers. comm.). Evidently, this is an added advantage of the methodology (SYSTEMSCRAFT is clearly ahead of most of its rivals), (Akinbode Inf./Systems, 1998).

Alternatively, evolutionary systems development (henceforth ESD) has become the norm, within systems development (workshops which facilitates the involvement of the end-user). The use of ESD encourages a much more formalized role for the system-users (i.e. system-users are often involved in the process of testing and reporting back to the Analyst). Moreover, higher standards (contributions) can be imposed /required on users, since they are partly responsible for planning, estimating, costing, and monitoring the outcome of the final system, in much the same way as any other project member. Therefore, the final system is more often accepted whole-heartedly (Crinnion, 91), (Godden, pers. comm.).

3.4 Project Management

Introduction

The third part of the methodology focuses on project management delving into aspects such as project management, adaptation of the methodology for organization, project infra-structure, planning, estimating and costing, monitoring of developments, managing the implementation (Post-implementation review) and finally, implication of problems and solution for development. Noticeably, this part of the SYSTEMSCRAFT methodology comprises a framework, tools, and techniques best described as a synthesis of established practice (Crinnion, 93c).

Note some of the key elements are shown below:

- SYSTEMSCRAFT is a full development methodology, that is, analysis and design, etc.
- It is an evolutionary development approach, and hence Post traditional stages of analysis, design, construction and implementation are allowed and encouraged to overlap.
- This approach is heavily business-oriented, as it examined business (organization) computer system and information system as a whole.

The methodology approach is geared towards user-driven where users are required, to be involved and to control the overall project (i.e., to taking a more active role during development activities. Note Project Management (PM) within the SYSTEMSCRAFT is seen as an integral part of the development process (Crinnion, op. cit.). Likewise, Post-Modern system development methodologies are known to be very restrictive with the use of evolutionary elements present within SYSTEMSCRAFT, noticeably this limits there potentials as one approach to systems design (to a large degree), (Akinbode Inf./Systems, 1998).

Note, SYSTEMSCRAFT also allows flexibility, its main development phases can overlap considerably, during the four stages within Project Management namely:

- Initial Study.
- Planning and Scheduling of the project.
- Development of the project.
- Implementation of the system.

Other aspects examined by SYSTEMSCRAFT is the interface between the project steering group and project team is discussed within project management, highlighting sequence of interactions tailor-able to suit the best developments for particular projects by extending the basic framework and incorporating techniques from the toolbox approach to address specific aspects of analysis and design (Crinnion, 93c).

Moreso, the nature of the developmental processes within the SYSTEMSCRAFT methodology allows for changes in user requirements to be considered at any time throughout the full development cycle, especially during project management. It should be noted that within project management session, it is expected that relatively small parts of the system are developed and released as live prototypes before the full project has been computed from installment, with the use of project management teams. Initial study of the main functional components for the required system can be identified while proposals are put forward describing how and when computers can be used to support functions i.e., each release of 'Sub-Systems' (Crinnion, op. cit.). Furthermore, a detailed Project Plan (Hard Plan) is used within SYSTEMSCRAFT taking into account the actual resources to be used, namely breaking many soft plan components down to lower levels with each featuring copies of Hard Plan (e.g. DFD model, prototypes, versions, etc.) and is collectively viewed as the project deliverables.

Notably, these include the areas listed below:

- Initial Study report.
- Development Plan(HP).
- Systems specification.
- Implementation report .

3.4.1 Project Management (Part 2 Continued)

The management of the projects within SYSTEMSCRAFT is made an integral part of every aspects of the development, hence ensuring a controlled approach can be taken. It is not necessary to employ a separate project management since project management is a main part of the methodology per se. Note PM within SYSTEMSCRAFT does include the estimation and costing of project at the initial study, it covers aspects such as:

- Business Analysis.
- Systems design (excluding prototype and database design).
- Prototypes.
- Database Design.
- Project management Overhead.

Again, costs such as the estimation of hardware and consumables are beyond the scope of the SYSTEMSCRAFT methodology and every shortcut taken during the development of a system carries with it a certain amount of risk. The art of tailoring is one of balancing these risks against the benefits of applying resources only to the area where they are clearly seen to be needed.

SYSTEMSCRAFT as a methodology is designed to provide the necessary flexibility to handle all standard types of application designs/ development, therefore it can be tailored to provide the same benefit as a large scale structured methodology or even cut back to provide guidelines for information Centre projects. Additionally, the flexibility of customizing this methodology to suit individual needs (circumstances) also reduces and minimizes resource wasting. Note this facilitates optimization of systems developed using traditional methodologies and those systems developed using the SSA approach receive a boost from the SYSTEMSCRAFT methodology (thoroughness and safety), especially from the provision by the methodology of a formal list of steps and stages covering standard system development project (Refer to diagram below for illustration).

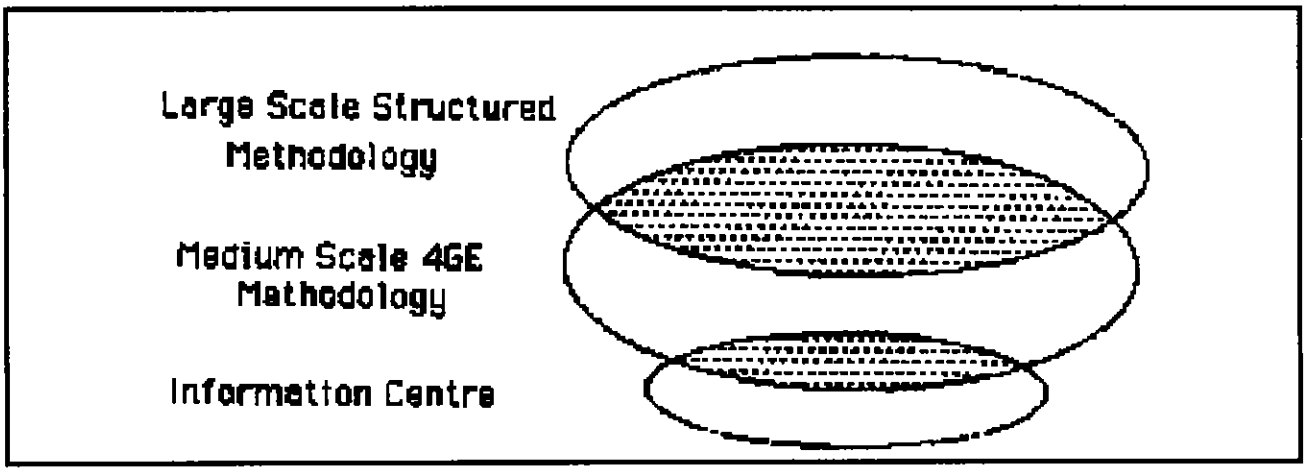


Figure 3.4.1 The Scope of The Different Development Environments.

(Crinnion, 1994 P. 19-3)

3.4.2 User Participation Within Project Management

From evaluation of the methodology's its greatest plus, stems from the effective antidote to systems development given to users i.e., responsibility of managing the project and resources used during development. By placing stronger emphasis on empowering, the development team and defining roles and tasks to be carried out by both user and members of the development teams. SYSTEMSCRAFT dishes out the responsibility between members, (team) allowing them to contribute freely to the decision within a Timebox. Referencing Crinnion, he defines Timeboxing as:

> " A **Timebox** is a fixed period of time during which a stage or component of the system must be completed. Changes to the system requirement can take place during the development only provided that they can be completed within the **Timebox** if not, they must be included in a later release." (Crinnion, 91).

Note any details concerning work breakdown within the prototype development process is permitted by the methodology. The methodology does this through the use of a 'workbench', this facilitates the provision of a formalized stage during the development of the prototype, hence leading to the creation of a test plan via standard document layouts and in the use of test coordinators, to oversee all stage of testing throughout the project. Moreover, since the evolutionary development aspects of SYSTEMSCRAFT is very robust, the use of change-control system is also facilitated, so that it now becomes the norm (not the exception), the flexibility given within SYSTEMSCRAFT means that the Timebox limits are not strictly adhered to. In its favor , SYSTEMSCRAFT imposes a much shorter Timebox, i.e., four to four weeks and makes use of Structured Walkthrough as a formal 'sign-off' mechanism for all project counterparts, both models and prototypes.

Thus, the methodology is seen to provide a 'Toolbox' approach to systems design(supporting techniques) with guidelines to be used during the initial study, enabling analysts to tailor the methodology specifically to the project in hand. Most significantly, it should be noted that SYSTEMSCRAFT has been designed to be hardware and software independent, though it is designed to be able to take advantage of modern CASE and WORKBENCH facilities and effectively addresses the majority of the key dangers within modern prototyping approaches.

Summarising the SYSTEMSCRAFT, methodology analysis shows that its approach to systems development is designed to suit a wider range of 4GE languages. It also caters for an assortment of organizational preferences (specifically, the idea of tailoring existing systems to fit new) with a view to making use of BPR, re-examining business processes (traditional system development process, as expressed in the 'WATERFALL' system, development cycle) from scratch i.e., First principles attempting to identify ways in which the process can be improved. Alternatively, by accommodating the use of systems tools, the methodology exhibits strong business orientation for systems DFDs, especially where users and computer components are separated. This provides opportunities for detailed design and modeling of the non-computer side of the business process (Crinnion, 93c), (Godden, pers. comm.).

3.5 Review of Advantages (SYSTEMSCRAFT)

- Methodology tailor-able to individual use.
- Suitable to 3 GE and 4 GE environment.
- Plenty of flexibility given to Analyst to exercise creativity and the methodology is considered flexible.
- A structured methodology based on the idea of evolutionary development methodology.
- A User-friendly methodology facilitating an increased role for the system user.
- Incorporates the use of tools and techniques for expediting the process of system development.

3.6 Review of Disadvantages (SYSTEMSCRAFT)

- Concurrent development of prototypes could be a potential risk.
- Not considered a totally comprehensive methodology.

CHAPTER 4

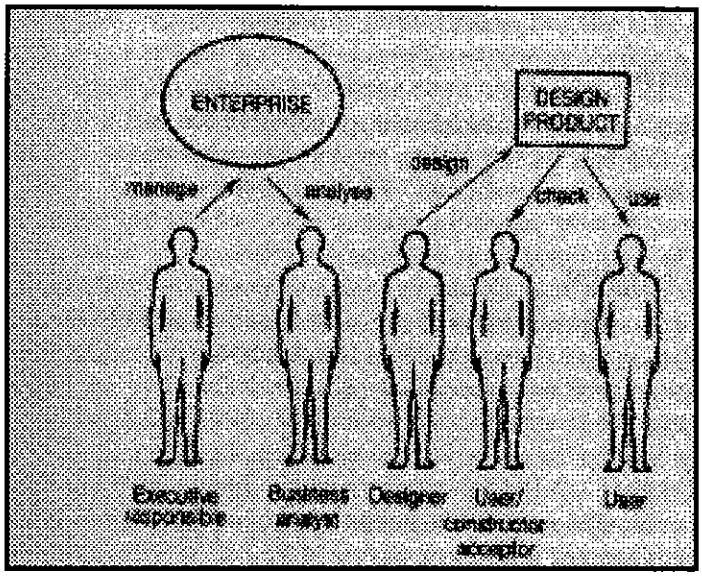
4. INFORMATION ENGINEERING

Introduction

INFORMATION ENGINEERING (henceforth IE) is a term first used by Clive Finkelstein and James Martin in a book entitled Information Engineering (Martin and Finkelstein, 81) to describe data modeling methodology. IE falls within the science paradigm, that is, learning systems characterized by the process of reduction, repeatability, and refutation. The methodology posits a comprehensive approach covering all aspects of systems life cycle. This claim is supported by a statement from author James Martin as follows, " The automation of the IE process' is the biggest single revolution in the history of computing" (Martin, 91) and referencing Olle, he defines and regards IE as:

> "An approach which covers the four stages of this framework. It stresses the development of integrated systems, combines data and process oriented features at each stage and uses business objectives based information system planning. The approach, packages and integrates a large number of techniques and proposes flexible deployment of techniques in different development scenarios." (Olle, 94).

Accordingly the above quote shows the extent of IE's impact within present day systems development. IE is an evolving methodology, developing in light of improving technology and experience of use via Analyst and systems designers. Areas examined by IE includes the automation of tools, techniques, the use of 4GEs for systems development and most crucial of all, the involvement of system-users.
See figure 4 over-leaf for illustration:



.Figure 4 Some Human Roles In Information Systems Design

(Olle, 1991 P. 7)

Noticeably, IE is viewed from two similar perspectives. Referencing Crinnion, it is seen as "A loose framework featuring great flexibility in choice of techniques, suitable for small system developments taking advantage of developer's skill and creativity" (Crinnion, 91). Moreso, IE is viewed as a framework supported by a variety of techniques for developing good quality information systems in an efficient way (Olle, 91). The framework is noted to be relatively static, while outlining fundamental guidelines (system specifications) required for the development of good information system. Accordingly, IE techniques are presently regarded as the most suitable way of achieving the fundamental aspects of a good system. Aspects covered by the framework, includes project management, tools and techniques reflecting the IEs philosophy of practicality and applicability. IE, Object Oriented approach to systems design is considered to be more than just a set of ideas, i.e., it has proven practical approach to systems development of being applicable to a wider range of industrial and work environments (e.g. British Gas Corporation have made use of this methodology).

Furthermore, IE posits a number of key concepts namely:

- The beliefs that data is the heart of an information system and data types are considerably more static than processes or procedures acting upon data.
- Any methodology successfully identifying the underlying nature and structure of an Organization data, exhibits a stable basis from which to build information systems.
- A detailed consideration of processes, balancing of the data model is a necessity, that is, the basis of the information system is data.

- The most appropriate way of communicating within a methodology is by diagram. Since the concepts of diagramming are very appealing to end-users.
- End-user management enables the system user to understand, participate, and construct for themselves relevant diagrams.
- Ensuring requirements are truly understood and achieved.

See figure 4.1 for illustration.

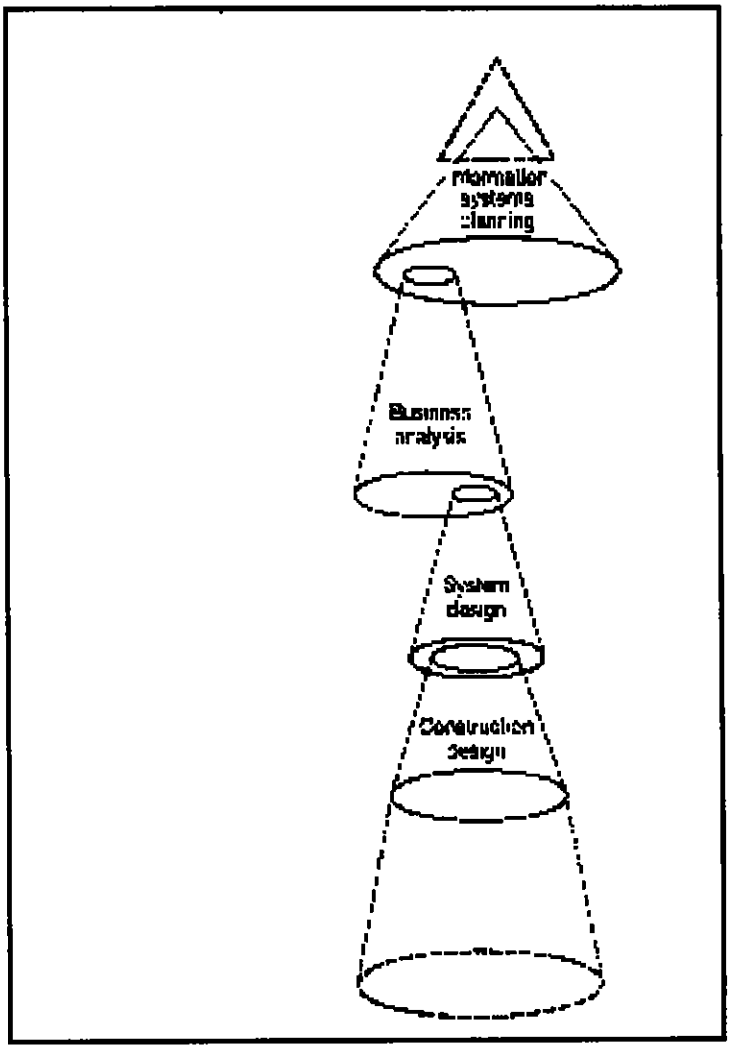


Figure 4.1 Stages Considered in Information Systems Methodology Framework

(Olle, 1991 P. 14)

Note, IE posits a Top-down approach, with detailed overview of the steps derived as the methodology unfolds. Noticeably, progress of the system is controlled by measuring whether the objectives have been achieved from stages, rather than how much details have been generated.

The IE approach is divided into four levels, further into seven sub-stages and objectives namely:

- Planning: The objective here is to construct an information architecture and a strategy supporting the objectives of the organization.
- Analysis: The objective here is to understand the business area and determine the system requirements.
- Design: The objective here is to establish the behavior of the system in a way that the user wants and that is achievable via the technology.
- Construction: The objective here is to build the system as required by the four previous levels.

4.2 Sub-Stages

Business Planning

The business plan centers on the development of the Corporate plans and objectives, it is recognized as the fundamental starting point for the methodology from meeting the strategic requirements of the Corporate plan and information system of potential organization (Martin 91). Additionally, it covers aspects of the organization's goals and strategy that is, outlining the major business functions, objectives and identifying the organizational structure of the business.

Information Strategy Planning

This covers an overview analysis of the organization's business objectives, major business functions and informational needs termed 'Information architecture' forming the basis for subsequent development of the system and ensuring consistencies coherence between a variety of different systems within an Organization. The information strategy planning also covers the joint activities of user management and information system staff.

Business Area Analysis

The BAA covers the entity and function analysis, the interaction analysis, current system analysis and, confirmation and planning for systems design. Noticeably, the output from the Business Area Analysis forms the business area description containing the organization business function.

Business System Designs

BSD covers the preliminary data structure design, system structure and procedure design, confirmation, and planning for technical designs. It facilitates the production of business system specification detailing every aspect of the business processes.

Technical Design

Here the emphasis is to computerize aspects of the business system so that the final construction and operation of the system can be costed and tasked in a specific sequence namely, Data, Software, Transition, Operation, Verification and system test design, and lastly the implementation planning.

Construction

The construction aspect focuses on systems generation and systems verification transition, i.e., a controlled-changeover from existing organization system procedure, to a new characterized by preparation and installation of new software. Then the final acceptance and the system variant developments stages. Noticeably the transitional stage is only regarded as completed when the system operates for a period at defined tolerance, standards and passes its Post-implementation stages review.

Production

The production aspect covers the continued successful operation of the system over the period of its life. This includes ensuring that service is maintained and addressing the various stages in the business requirements.

Evaluation

This deals with evaluating systems, performing a measurement of benefit and making a comparison with the design objectives of the intended system.

Time

Covers the timing aspects from monitoring the systems performance, tuning software and reorganizing the database, carrying out maintenance to correct the bugs and modify system as and when required.

The framework in INFORMATION ENGINEERING presents a panoramic view of task sequence needed to be performed to achieve the required system (Olle, 91). Noticeably, the present technique, or orientation view emphasizes the importance in the role of system automation and developmental processes as ultimate goals of IE. A framework sometimes construed as the encyclopaedia, positing sophisticated data and dictionary function are designed in support of information types, consisting of a variety of details reflecting the different levels of systems required in the methodology. The stores, object types and their associated properties are seen to be necessary in an encyclopaedia (Olle, op. cit.). The maintenance function enabling the creation and maintenance of objects and properties are using graphics tools. Presently there exists two sets of automated CASE tools supporting the IE methodology, these are:

- The Information Engineering Facility (IEF) produced by JMA
- The Information Engineering Workbench (IEW) produced by KnowledgeWare and Arthur Young.

4.3 Information Engineering Workbench (IEW)

Introduction

INFORMATION ENGINEERING WORKBENCH, abbreviated to IEW is a workbench supporting the IE methodology, The use of IEW facilitates the automation of system specifically with a view of providing analysts with the tools for planning, analysis and design and development of computer systems. Note tools used in the IE workbenches aids greater productivity and improvement of systems planning, analysis and designs. Other tools such as, Entity modeling, Diagramming and their relationships, and the use of Data Flow Diagrams supporting the complete t life-cycle of the IE system development methodology allows for the production of user-friendly end product(refer to appendix D1 for IEW symbols).

The INFORMATION ENGINEERING Workbench covers four workstations namely:

- Planning Workstation.
- Analysis Workstation.
- Design Workstation.

4.3.1 Planning Workstation

The planning workstation (henceforth PW) facilitates capturing system requirements and business goals for a high-level overview of the required system, its functions, data and information needed can be developed (KnowledgeWare, 89a). Moreso, tasks such as the development of system models via organizational strategic plans and activities identifying the information need for supporting the objectives of the system are possible. Planning aspect covers the establishment of a framework for information system development throughout enterprises thus setting priorities for developments based on strategic business planning and workstation facilitates determining the users needs from deciding the information system requirements and planning for them (KnowledgeWare, op. cit.).

The workbench likewise accommodates the design of a user friendly system with its provision of an Encyclopaedia and a data dictionary containing all the relevant information captured via the planning workstation. It stores and maintains all objects, such as the entity types and relationships, attribute types, processes and function, etc. Therefore, as an Encyclopaedia it performs the task of logically checking and safeguarding against the unnecessary duplication of data, via ensuring any data created is refined and stored only once. Therefore, it provides workstations with access to generic data (KnowledgeWare, op. cit.). The choice provided by the Encyclopaedia aids the workings of the Analysis Workstation, by way of refining data using the entity diagrams and process decomposition (KnowledgeWare, 89b).

Once refined it is further accessible by the Design Workstation for describing the implementation aspects of a systems physical level (KnowledgeWare, 89c). Tools also features in the process of planning, analysis and the designing of systems via IE including the following:

- Decomposition Diagrammer.
- Entity Diagrammer.
- Matrix Diagrammer.

4.3.2 Decomposition Diagrammer.

The decomposition diagram in IE is comparable to the Business Function Diagrammer (BFD) featured in the SYSTEMSCRAFT methodology above from showing the hierarchical decomposition of functions in a BFD from a high level to the lower level. The higher level processes are further decomposed into more successive levels as the system evolves system. While decomposition diagrams show objects decomposed from higher to lower level objects and objects managing others.

4.3.3 Entity Diagrammer.

The Entity Diagrammer aids in the process of extracting entities i.e., people, places and things about which one needs to maintain information. It facilitates a means of describing data requirements for system, it consist of two types of windows in the Analysis and Planning of a Workstation, namely the Entity Diagram and the Entity type descriptions. Note, the Entity Diagram showing entity types and the relationships between them is considered the most important of the two tools used. It further represents the data model of an entire system within which information is kept.

4.4 Analysis Workstation.

The Analysis Workstation provides excellent support for Analysts and Systems designers during the systems Analysis process. In addition, the outcome of a speedy analysis process expedites the design stage and results in the final system (deliverables) being delivered on time, and within budget (KnowledgeWare, 89b).

4.5 Design Workstation.

The Design Workstation facilitates the completion of the final system. It aids Analysts, Designers and System-Users' in designing the potential system, thereby achieving the required outcome (deliverables) within time and budget (KnowledgeWare, 89c).

4.6 Review of Advantages (IE)

- A modern day system development methodology.
- Focuses on the organization business strategy, adapting the system to suit it.
- A structured methodology.
- Methodology is flexible compared to SSADM. However, not on same footing with SYSTEMSCRAFT.
- Facilitates the use of prototyping tools and techniques.

4.7 Review of Disadvantages (IE)

- Jumps stages during systems development .
- Not considered a comprehensive methodology.
- Concentrates rather Slavishly on the Organization business area.
- Cuts out stages during systems development, which could result in risk.

CHAPTER 5

5.1 CONCEPTUAL MODEL

Introduction.

The notion of a conceptual model embodies a form of representation of the real-world(presumably the AP end-user). This idea is expressed clearly by the Avison and Fitzgerald in their paper ('a taxonomy of current approaches to system analysis'), (Avison and Fitzgerald, 92). The important concept is referred to as **SUBJECTIVE REPRESENTATION OF REALITY.** Simply, the way people view things from subjective perspective. Using the same tabular taxonomy as in the comparison of the paradigms, I will attempt to summarize the conceptual models of SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING methodologies to show how closely the methodology supports the development of system and end-user, while placing emphasis on the ease of understanding..

SCIENCE PARADIGM

Definition:

Learning system characterized by reduction, repeatability and refutation (Checkland, 81).

SYSTEM PARADIGM

Definition:

Living systems and human activities exhibits openness, low separability and high independence, therefore cannot be reduced from a science paradigm (Checkland, 81).

5.2 Objectives.

Each of these approaches embodies certain objectives, that can be classified accordingly. The SSADM approach has a primary objective of providing an accurate organizational analysis for problem solving and systems through the analysis of data. SYSTEMSCRAFT and INFORMATION ENGINEERING have as the objectives the greater participation of the systems end-user (user friendly). Note it is suggested that with added modification these two systems methodology will go along way to providing system capable of meeting the requirements of use, i.e., user-friendly system that can be used to bridge the gap between generation. Again, alleviating if not eradicating the AP's fear of computer-based technology.

5.3 Summary Table.

SSADM	SYSTEMSCRAFT	INF. ENGINEERING
Developed By LBMS and CCTA.	Developed By John Crinnion.	Developed By James Martins.
Based on holistic approach, such systems loose their meanings and ability to be explained if reduced, because they are more than the addition of their individual components.	Based on holistic approach, such systems loose their meanings and ability to be explained if reduced, because they are more than the addition of their individual components.	Based on parts, which when aggregated, displays emergent properties, etc.
Systems Paradigm	**Systems Paradigm**	**Science Paradigm**
Supports the paradigm . The system specification is broken down into their component subsystem, and managed separately.	Supports paradigm by focusing on tailoring the methodology to suit individual objectives.	Supports the paradigm via providing a framework suitable to 4GE environments(i.e. rapid prototyping and computer techniques).
Places large emphasis on excessive documentation of stages involved in the design of the system.	Places large emphasis on Business Analysis, Systems Design, and Project Management.	Places large emphasis on the business area of perspective organizations.
APPROACH	**APPROACH**	**APPROACH**
Data oriented.	Tools and Technique oriented.	Tools and Technique oriented.
Data analysis approach supports paradigm because the real world is reduced to the study of data, i.e., entities, attributes and relationships between are identified.	Based on the use of Business Function Diagrams(BFDs) and System Function Diagram(SFDs).	Based on process analysis of the business areas.
Sole Analyst Approach	**Participative Approach**	**Participative Approach**
focuses on the analyst designing the system without the prolonged participation of the system user.	Supports paradigm by placing emphasis on the interaction of social and technical subsystems (i.e. a user participative design philosophy).	Supports paradigm by placing emphasis on the interaction of social and technical subsystems (i.e. a user participative design philosophy).

Figure 5 Summary of Methodologies.

(Akinbode, Inf./Systems, 1998).

5.3 Summary Table Part 2).

CONCEPTUAL MODEL	CONCEPTUAL MODEL	CONCEPTUAL MODEL
Involves a complete breaking down of the system's activities into stages, with each needing to be completed in order to progress to the next.	The model is based on breaking down functions and optimizing.	Focuses on an Organization's business area and tailoring the potential system to suit their goals.
Data analysis: Based on data analysis via entities, attributes, and relationships.	Data analysis: Based on data analysis via entities, attributes and relationships termed BFD and SFD.	Business area analysis: Based on the idea that the client's business area forms the key to developing a potentially suitably system.
Based on functions, but observed from the viewpoint of the data rather than the viewpoint of any person or organization.	Model is based primarily on the users and their needs(i.e. finding a fit between the user and their work environment).	Model is based primarily on the users and their needs(i.e. finding a fit between the user and their work environment).

Figure 5.1 Summary of Methodologies.

(Akinbode Inf./Systems, 1998).

CHAPTER 6

6. PRACTICAL ASPECT

Introduction.

The practical aspect focuses on the use made of these methodologies namely, in the commercial sectors and Academia. Moreso, included are reports from the interviews held with experts on these methodologies (software and system design methodologies).

- **Commercial Reliability and Use.**
- **Chances of Faults Occurring.**
- **Government Standard (SSADM) Similar To The Process Capability Maturity Level, i.e., Pre-requisite.**
- **Reasons For.**
- **Ease of Use.**
- **How Much Use of Micro (SSADM) Variant.**
- **INFORMATION ENGINEERING Use.**
- **SYSTEMSCRAFT.**

INTERVIEW QUESTIONS

6.1 Sample Questions.

- **Based on the methodologies known to you which one would you recommend as the best approach to system design?.**
- **Based on your experience of these methodologies (SSADM, SYSTEMSCRAFT an INFORMATION ENGINEERING) which of the methodology would you say is better concerning time constraints**
- **Which one would you say is less risky in regards to system design?**
- **SSADM version 4.2 features some of the techniques present in modern methodologies, Such as SYSTEMSCRAFT (designed by John Crinnion City University) and INFORMATION ENGINEERING (James Martins) would you say it has bridge the gaps, e.g., the criticisms levied against big-brother SSADM.**
- **What would you say are the similarities and differences between these methodologies? Especially, SYSTEMSCRAFT and Information Engineering.**
- **Where within the Continuum, i.e., the Cookbook-Toolbox Continuum, will you place these methodologies, NCC, SSADM, SYSTEMSCRAFT, and INFORMATION ENGINEERING.**
- **Science and Systems paradigms give different views of systems design and development methodologies. Where would you place these methodologies?**

6.2 Interview A

Interviewer: Peter Akinbode.

Interviewee: Peter Mellor, Centre For Software Reliability, City University

Date: 17/3/98

Time: 4.15 PM

I asked about the practicality of using either of the four systems design methodologies namely, SSADM, SYSTEMSCRAFT, and INFORMATION ENGINEERING for the design of safety critical systems. Mr. Mellor commented that presently these methodologies are more inclined to be used in academia rather than the commercial world (Mellor, pers. comm.). I specifically mentioned that SSADM was considered a pre-requisite used by the UK Government departments to award contract. This stands in parallel with the process maturity model equally used by the US Defense Department in awarding contract to American software and systems designers. Accordingly, Mr. Mellor commented that, he personally would not recommend SSADM to be used as a pre-requisite, reasons shown below:

- SSADM is rather bureaucratic.
- The methodology is best suited to the civil service rather than the commercial sector.
- SSADM is more of a white elephant.

Accordingly, Mr. Mellor went on to say that SAO an equivalent of CAD is used in the safety critical areas such as the Aeronautic industry for building safety critical software and system (Mellor, pers. comm.). These design methodologies he continued features a graphical interface used during design specification for control signal input in Airplanes and is much safer. One sure user of the methodology he said is Boeing (Airbus), (Mellor, pers. comm.).

One of the arguments leveled against SSADM concerns its suitability for the development of large systems. Hence, it has led to the downward turn in the use of the methodology. I mentioned, that a revised version of SSADM, i.e., Micro-SSADM suitable for the analysis and design of small-scaled system will be available soon (CCTA, per. comm.). How do you view this version as a replacement to SSADM? Referencing Mellor, "if this version contains those features capable of tackling the criticism levied against SSADM, then in future I would be tempted to give the methodology a try" (Mellor, pers. comm.).

6.3 Interview B

Interviewer: Peter Akinbode.
Interviewee: Derrick Godden Olivetti
Date: 18/3/98
Time: 1.30 PM

I asked about the practicality of using SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING for designing safety critical systems. Referencing Mr. Derrick Godden(Olivetti Ltd.). He commented that SYSTEMSCRAFT as a system design methodology is highly rated at Olivetti. He personally feels that amongst the four methodologies SYSTEMSCRAFT stands out ahead reasons given included its suitability for both 3 and 4 generation environments, the flexible and the informal approach offered. Moreso, it is a time saving methodology best suited to the development of smaller systems, likewise accommodating larger systems. He went on to say, the use of tools and technique within the methodology facilitates and allow flexibility for Analyst to show creativity, therefore the use of the Products is on the increase (Godden, pers. comm.).

When asked about the risk of using SYSTEMSCRAFT, in comparison to SSADM he went on to say that this can be easily minimized using SYSTEMSCRAFT. Arguably, he continued SYSTEMSCRAFT as a methodology, is much more flexible than SSADM and INFORMATION ENGINEERING and NCC put together and as any other methodology it has weakness in terms of risk, etc. Nonetheless, in comparison to SSADM, risks associated with SYSTEMSCRAFT are compensated for using tools/techniques, flexibility and speed associated with its use in areas such as speed, flexibility and the use of tools and techniques. Mr. Godden also mentioned other weaknesses associated with SSADM methodology, that are rated far more riskier for the design/development of system. The suitability of SSADM applies only to 3GE environment and large system development. he goes on to say it is a rather a long-winded form of system development methodology lacking flexibility (previous stages have to be completed before the next stage can started) its use of excessive documentation is off putting. Moreso the SSADM methodology is sold more as a bible, lacking the ability to individual and less accommodating to the use of tools and techniques, i.e., prototyping. Mr. Godden proclaimed , he was aware of a new version -SSADM(Micro-SSADM), and "arguably it could be seen as a replacement in times to come" (Godden, pers. comm.).

Nonetheless, Mr. Godden concluded by saying that INFORMATION ENGINEERING as a methodology is preferable to SSADM but lacks flexibility in comparison with SYSTEMSCRAFT. Therefore, if given a choice from the four methodologies, the latter very easily wins hands down (Godden, pers. comm.).

6.4 Interview C

Interviewer: Peter Akinbode

Interviewee: John Crinnion, Business Computing, City University.

Date: 21/3/98

Time: 10.30 AM

I asked about the practicality of using SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING for systems design and development. Accordingly, Mr. Crinnion replied that each methodology posits their advantages and disadvantages (Crinnion, pers. comm.).

Firstly SSADM the methodology I explained, has the added advantage of being considered a Government Standard forming one of the major pre-requisite required by the Civil Service from Contractors bidding for projects within the United Kingdom. Moreso, it is highly placed within the realms of Systems Development methodologies and parallel with CMM a striking similarity with the CMM methodology used in the United States for awarding contracts by the Defense Department. Mr. Crinnion replied that "although there are similarities between the two, SSADM is slightly different in that the procurement approach used in the UK is not necessarily the same, i.e., SSADM is more of a design standard rather than a procurement procedure, hence, it is used more as a system design methodology rather than for procurement purposes. The latter he continued falls under a slightly different criterion, that is, designs of systems rather than procurement"(Crinnion, pers. comm.). However, Mr. Crinnion concluded that I am right in pointing out the similarities. Since, SSADM can be used inadvertently by certain branches of government.

I made emphasis on the rigid structures of SSADM, such as, the completion of each stage before allowing analysts to embark on subsequent stages. According to Crinnion, SSADM does involve the use of excessive documentation and lacks flexibility. He goes on to say SSADM is mainly suitable for the development of larger systems, and 3GE designs (i.e. COBOL, etc.). Most importantly, he agreed that it is time consuming sometimes delivering systems late and resulting in the systems becoming obsolete at the time of use. Again, Mr. Crinnion agreed, saying that, SSADM suffers from the moving target problem an unlike SYSTEMSCRAFT cannot be tailored to suit individual approach.

This is because as a methodology it does not cover the construction and implementation stages of systems designs and development and because of this, it is frowned upon in the commercial sector for reasons such as lateness, not understanding requirements and its lack of flexibility for minimizing the risk of misunderstanding (Crinnion, pers. comm.).

Mr. Crinnion gave a positive, concerning the use of SYSTEMSCRAFT for system development methodology within the commercial sector, he emphasized that SYSTEMSCRAFT lies mid-way between the Cookbook-Toolbox Continuum, Therefore, it is considered to be a commercially viable methodology. Note John Crinnion's view had earlier been supported in a statement made by Mr. Godden (Olivetti UK limited)during a previous interview namely,

> " It is a very flexible methodology, giving Analysts a lot of leeway compared to SSADM that is sold rather like a bible. SYSTEMSCRAFT is very commercially viable." (Godden, pers. comm.).

He went on to say that as a methodology positing the evolutionary approach, it is a more suitable form of system development methodology applicable to the dynamic approach of modern systems development. He pointed out that it is geared towards the concept of reuse, through its involvement of larger components. Moreso, as an evolutionary methodology, SYSTEMSCRAFT within the structured systems Analysis categories designed mainly for a 4GE environment accommodating the use of prototyping techniques for flexibility (i.e. the ability to tailor the methodology to suit individual systems). Crinnion stressed that it is a far better methodology in comparison to traditional systems design methodology encapsulating the use of evolutionary techniques. further facilitating the re-use of components and models from existing systems. The important focus of SYSTEMSCRAFT is its use of prototyping. Note this is considered to be a constructive technique mainly present in modern SSA methodologies (INFORMATION ENGINEERING and SYSTEMSCRAFT included). The use of these techniques allows system users to avail themselves and participate in the design of potential systems (cf. traditional methodologies), reason includes its user friendliness. Also in its favor is its suitability for the development of smaller systems, i.e., those used in the systems paradigm (Mumford, 83a, b) and (Checkland, 81).

Mr Crinnion in fairness to the SSADM methodology, did agree that similarities existed between SYSTEMSCRAFT and SSADM, i.e., both methodologies come under the umbrella of systems paradigm and structured methodologies for the use of entity modeling, data Flow Diagram, ELHs. Note, methodologies like SSADM, SYSTEMSCRAFT does not address systems reuse directly, but covers the logical re-use of modules. However, an added advantage in using SYSTEMSCRAFT includes the use of RAD philosophy, i.e., Rapid Application Development, a strategy expediting the development of systems processes.

When asked about his view on the INFORMATION ENGINEERING methodology Mr. Crinnion commented that IE as systems design methodology falls under the umbrella of the science paradigm (Checkland, 81). The methodology advances more benefits (cf. to SSADM), addressing the business process directly, and by giving analysts necessary leeway for flexibility in system designs similar to the SYSTEMSCRAFT methodology (Crinnion, pers. comm.).

He went on to say IE encapsulates the evolutionary approach as a SSA methodology, its also embodies the flexibility and use of the prototyping techniques (i.e. constructive techniques). These characteristics make it highly rated within the commercial sector for systems development (Crinnion, op. cit.).

In fairness to SSADM, Mr. Crinnion concluded that IE as the other modern systems design methodologies (SSADM, SYSTEMSCRAFT) does not address the idea of systems reuse directly (cf. with object-oriented methodology).

6.5 Summary of Interviews (Part 1).

From conducting these interviews I came to a conclusion that of the four methodologies reviewed so far (i.e. NCC, SSADM SYSTEMSCRAFT and INFORMATION ENGINEERING), it appears to be SYSTEMSCRAFT in the lead at the moment. Moreso, as the methodology incorporates extensively prototyping techniques (facilitating a thorough participation by Systems-Users). Note, this feature is highly tailor-able to 3 and 4GE and most significantly contributes to a faster pace of systems development. Nonetheless, INFORMATION ENGINEERING and SSADM like any other methodologies exhibit advantages concerning systems design and development (i.e. Most of which have been discussed during the review). Moreover, in comparison to SSADM, more often than not evidence shows that users prefer the latter (SYSTEMSCRAFT).

Finally, It should be noted that some methodologies stand out clearly as leaders in their fields (i.e. systems design and development), i.e., achieving a highly regarded End-Products and in the case of use afforded to end-user as a result of the methodology being chosen for End-Products designs. Nonetheless, the outcome of any systems (End Products) boils down to an Analyst's creativity from flexibility given concerning systems design. Likewise, constraints placed on the Systems design, be it management or otherwise, influences the outcome of the End Products.

CHAPTER 7

7. PRACTICAL ASPECT (2).

Introduction

The practical aspect (2) focuses on the use made of computers (Software and Hardware) by the AP namely, in the commercial sectors and Academia. It approaches the task in two ways, firstly by the use of questionnaires and secondly by a randomly held interviews on the AP. Moreso, included are observation and evaluation summary from the questionnaire and interviews held on the impact of computers on the aging population.

The questionnaire covers reasons the unpopularity of computer based technology among the AP. It likewise covers the types of Software applications, the ease of use (User Interfaces), and Hardware computer components.

7.1. SAMPLE QUESTIONNAIRE

QUESTIONNAIRE

NAME:
D- O- B: **AGE:**
OCCUPATION:
ADDRESS:

TELEPHONE NO:

TYPES OF SOFTWARE USED:

(A)
(B)
(C)
(D)
(E)

TYPES OF HARDWARE USED:

(A)
(B)
(C)
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

NOTA BENE.

THE QUESTIONNAIRE IS USED TO SHOW CORRELATION AND CHANGING TRENDS WITHIN A PARTICULAR SECTOR OF SOCIETY. IT FOCUSES ON SHOWING GENERAL LEVELS OF EXPOSURE TO COMPUTER BASED TECHNOLOGY AMONG THE AGING POPULATION. POSSIBLE SOLUTIONS WILL BE INVESTIGATED/ USED TO MODIFY THE PROCESS OF KNOWLEDGE ELICITATION, SYSTEM METHODOLOGIES, SOFTWARE AND HARDWARE DESIGNS. THE OBJECTIVE IS TO SPEAR HEAD A TREND AIMED AT BRIDGING THE GAPS, WHILE SLOWING, IF NOT ELIMINATING IT COMPLETELY.

7.1.2 SAMPLE QUESTIONNAIRE RESPONSE

NOTA BENE

Included in appendix G are copies of 18 randomly selected questionnaire response surveys. Note, samples questionnaires has attempted to evaluate reasons for the decline in the use of computers based technology among the AP. While showing the need for an immediate response to the changing trends.

7.2. Sample Interview Questions (Part 2)

- **What sort of exposure to computers have you had?**
- **Would you say you have a fear of computers?**
- **Do you get confused with jargon used to describe computer components?**
- **Do you know the difference between hardware and software?**
- **Have you used any software applications in the last 2 years?**
- **What do you understand by the term Internet?**
- **Do you enjoy using computers?**
- **What do you feel are the benefits of computers**
- **Do you feel we will be dependent on computers in the next millenium**
- **Would you like to increase your knowledge of computers? If so how would you do this?**
- **Have you any children?**
- **What sort of exposure have they had of computers?**
- **Do You Consider Your Child (ren) Whizkids?**
- **Do you think Short Computer courses should be encouraged and subsidized for the AP?**
- **Do you think the use of Computers is an issue for the Younger generation or both .**
- **Are you aware that all household appliances may eventually become computerized in the near future?**

7.3 Interview A

Interviewer: Peter Akinbode.

Interviewee: Mr. D. Johnson.

Occupation: Lorry Driver. Birth Date: 22 May 1938. Aged: 60 Years.

Date: 25/3/98

Time: 1.00 PM

I asked about his exposure to computers, Mr. Johnson replied that computers in general are of minimal interest to him, simply because he does not have to use them for work purposes. I asked him whether he had a fear of computers he replied that he had not really thought about it. However, he is slightly concerned at the rate of computer component changes and that this is a cause of concern to him, as an older generation. He is aware of the distinction between Hardware and Software mainly because his children have computers of their own. To the question, have you used any software application in the last 2 years? Mr. Johnson responded with a positive yes; confirming that it had been mainly for typing letters. He went on to say he is familiar with the concept of the Internet as well. Again by virtue of his children and confessed to having used the Internet to download shareware applications (game etc).

Accordingly, Mr. Johnson then went on to say that computers are really not for him. Hence, to the question do you enjoy computers; he would have to say no. He agreed that the use of computers generates benefits but that majority of the benefits are for the future generation, to him this is where the concerns of dependency of lies.

He feel, it is an issue for the younger generation solely because the AP are more interested in making money to cater for their families. I asked if he would like to increase his knowledge of computers because of the changing trends within society. In reply, he stressed that now he has adequate knowledge to serve his immediate needs and will only seek to upgrade his skill if the need arises. Furthermore, he feels that his children can be regarded as computer boffins and that they are the main reason why he himself got involved in the use of computers. To the question , do you think about updating your skills. Mr. Johnson replied, if he feels the need to brush up his computer skills, then reassured he will not hesitate approaching his children for tutoring (he considers them knowledgeable in this field). Referencing Johnson, he said, "if computers suddenly become critical in the near future, he would make sure that he attains the necessary skills to make the best use of the technology in future. He said that he is tempted to start learning, however as of now his major concern is not the development of his skills (Johnson, pers. comm.).

Nonetheless, Mr. Johnson concluded by saying that the use of computers to him is of less importance as the only reason for purchasing one is to give his children a head start in life. Especially, as he is thinking ahead and weighing out the likely impact computers will have in the future (Johnson, pers. comm.).

7.4. Interview B

Interviewer: Peter Akinbode.

Interviewee: Mrs. T Saunders.

Occupation: Housewife. Birth Date: 18 August 1957. Aged: 41 Years.

Date: 25/3/98

Time: 2.00 PM

I asked about her exposure to computers, Mrs. Saunders replied that she has no interest in computers as she is a housewife. I asked her whether she had a fear of computers, she replied that she supposes it is more a case of failure than anything else. After further discussion, she agreed that some of her concerns boil down to the rate at which new computer components change. She agreed it is a concern for the AP as a whole. Mrs. Saunders is aware of the distinction between **Hardware** and **Software** mainly because she has children (Emily and Christopher) both of whom have computers of their own and constantly requires Software applications. To the question, have you used any software application in the last 2 years? She replied with an emphatic NO. She went on to say that the concept of the Internet is definitely clear, since that is all she seems to hear from her son day in day out.. Mrs. Saunders did agree to having used the Internet, but only with the help from her son.

Accordingly, She stressed that computers are really not for her. Hence, to the question do you enjoy computers; she would definitely have to say no, but agreed that the use of computers can generate benefits. Nonetheless, the majority of benefit will be for the future generation and agreed the question of a dependency on computers in the near future is a daunting prospect for her. She feel it is an issue for both generations , especially the AP. I asked if she would like to increase her knowledge of computers because of the changing trends within society. In reply, she stressed that this is something she has been considering for sometime and may perhaps take up a short course in the near future to upgrade her skills. Likewise, she does feel her children are knowledgeable about computers possibly computer 'whiz kids' and again agreed that they are the main reasons why she is contemplating a short study course in the use of computers for the future.

Nonetheless, Mrs. Saunders concluded by saying that it is definitely a cause of concern for the AP and for the younger generation. This is why is has opted to purchase computers for her children and feels that this will give them a head start in life. Especially, as household appliances are fast becoming computerized and furthermore, she has weighed out the likely influence that computers will have in the future (Saunders, pers. comm.).

7.5. Interview C

Interviewer: Peter Akinbode.

Interviewee: Mrs. J. Appleton

Occupation: Riding Instructor. Birth Date: 7 July 1941. Aged: 57 Years.

Date: 25/3/98

Time: 4.00 PM

I asked about her exposure to computers, Mrs. Appleton replied that she has an average interest in computers mainly for account keeping purposes (note she runs a riding school). I asked her whether she had a fear of computers she replied perhaps of newer inventions and agreed it is more a case of making a fool of herself than anything else. She stressed that it boils down to the rate at which new computer components change. Mrs. Appleton agreed it is a cause for concern, especially for the AP as a whole. Again, Mrs. Appleton is aware of the distinction between **Hardware** and **Software** mainly because she has children and does get involve in doing the books (Appleton, pers. comm.).

To the question, have you used any software application in the last 2 years? She replied yes and mentioned the Access and Excel Software applications. She is familiar with the concept of the Internet especially as it is the in thing, and it is a means of her and her staff inclusive to keep abreast of equestrian developments around the globe.

Accordingly, Mrs. Appleton stressed that computers are important, Hence, to the question do you enjoy computers; she would definitely have to say yes, and agreed that the use of computers does generate benefits. Nonetheless, the majority of the benefit will be for the future generation and agreed that the question of a dependency on computers in the near future is a daunting prospect for her as well as her children. She felt it is an issue for both generations, especially the AP. I asked if she would like to increase her knowledge of computers because of the changing trends within society. In reply, she stressed that taking more interest in the use of her office computers will help her to continue to learn. But she may not rule out hiring a private tutor should she need too Likewise, she does feel her children are knowledgeable about computer possibly computers 'whiz kids' and that they are attending computer course at college and preparing themselves for the computer age (Appleton, pers. comm.).

Finally, she concluded by saying that it is a cause for concern, certainly for the AP. However, the younger generation need to gear themselves for a complete change in trends. She feels that her children are getting a better education by taking computer courses at college. Likewise, she is aware that household appliances are fast becoming computerized . Therefore, there is a needs to advance oneself, ,whilst weighing out the likely impacts that computers will have in the future.

7. 6. Interview D

Interviewer: Peter Akinbode.

Interviewee: Mr. S. Foster

Occupation: Garage Owner. Birth Date: 29 Jan 1936. Aged: 62 Years.

Date: 26/3/98

Time: 1.00 PM

I asked about her exposure to computers, Mr. Foster replied that he has interest in computers as he uses computers both at home and at his garage. I asked him whether he had a fear of computers, he replied that that is an interesting point and retorted not really, however it is only because he uses them often. I careful prompted Mr. Foster by asking if periodic changes in computer components bother him. He agreed, by saying sometimes, especially money wise (i.e., it entails having to upgrade ones exiting computers). He went on to say that it is a cause for concern among the AP especially, as they see themselves left behind in the likelihood of job hunting. Mr. Foster is aware of the distinction between **Hardware** and **Software** mainly because he uses computer for business and at home. To the question, have you used any software application in the last 2 years? He replied with an emphatic Yes and went on to say that the Internet is also a big part of his daily routine, which he uses to stay in touch with reality and for business purposes.

Accordingly, he stressed that computers are the way for the future. Hence, to the question do you enjoy computers; he would have to say yes and agreed that the use of computers generates immense benefits. Nonetheless, the majority of benefit will be for the future generation and agreed the question of a dependency on computers in the near future is very much a welcomed prospect for him as well as his friends. Mr. Foster feels it is an issue for both generations moreso the AP. I asked if he would like to increase his knowledge of computers, particularly in light of the changing trends within society. In reply, he stressed that he feels he is up there with the Jones's, but it is something for the AP to consider (i.e., taking up short courses in the near future to upgrade their skills)or else we really will be left on the shelf (Foster, pers. comm.). Mr. Foster does feel that his children are knowledgeable about computer particularly his eldest Michael (a computer consultant for Price water House), and possibly a computer 'whiz kid'.

Finally, Mr. Foster concluded by saying that it is definitely a cause of concern for the AP likewise the younger generation. This is why is he feels that the use of short courses for the AP should be encouraged as well as being subsidized bearing in mind the cost of training at place of study. He further concluded by saying he is aware. That household appliances are fast becoming computerized and likewise, of the likely influence that computers will have in the future (Foster, pers. comm.).

7.7. Interview E

Interviewer: Peter Akinbode.

Interviewee: Mr. M. O' Riley

Occupation: Sales Representative. Birth Date: 19 March 1940. Aged: 56 Years.

Date: 26/3/98

Time: 2.00 PM

I asked about his exposure to computers, Mr. O'Riley replied that he has interest in computers as he uses computers both at home and at work to do his commission forms. I asked him whether he had a fear of computers, he replied that he does not have a fear, and that he is comfortable using them(only simply). I asked Mr. O'Riley does the periodic change in computer components bother him. He answered that he is use to the idea of constant change, particularly since as a sales Representative adaptability is a necessity. He went on to say that as an elderly citizen, it is a cause for concern especially among the AP. He stressed that no one wants to be left behind in the likelihood of job hunting or as a social trend. Mr. O'Riley is aware of the distinction between **Hardware** and **Software** mainly because he uses computers for commission and at home for pleasure. To the question, have you used any software application in the last 2 years? He replied with an Yes and went on to say that the Internet is also a big part of his daily routine, particularly, because it is something he and his son have in common (O'Riley, Pers, Comm.).

Mr. O'Riley likewise agreed that, that computers are the way for the future. Hence, to the question do you enjoy computers; he would have to say yes, and yes again. He agreed that the use of computers certainly produces immense benefits. Nonetheless, he see the majority of benefit going to the younger generation and to the question of a dependency on computers in the near future to him, it is very much a welcomed prospect.
I asked if he would like to increase his knowledge of computers, particularly in light of the changing trends within society. In reply, he stressed that now he has adequate knowledge to serve his immediate needs and will only seek to upgrade his skill if the need arises. Furthermore, he feels that his son can be regarded as computer 'whizkid' and he himself got involved in the use of computers by virtue of his son. Referencing Mr. O'Riley, he said and quote, "if we as the older generation are to keep abreast of technology we need to start now. Before it suddenly becomes critical." , he went on to say that he himself will make sure that he attains the necessary skills to make the best use of the technology for future (O'Riley, pers. comm.), i.e., taking up short courses in the near future to upgrade his skills)or else we really will be left on the shelf (Foster, pers. comm.). He certainly agrees that his child is knowledgeable about computers maybe a 'whiz kid'. However, he stressed that he will continue to encourage him.

Finally, Mr. O'Riley concluded by saying that, yes it is a cause of concern for the AP and also for the younger generation. He agreed that the idea of short courses for the AP should be encouraged as well as being subsidized. Mr. O'Riley is aware that all household appliances will eventually become computerized (note he is into electronics himself, judging by the way his household is furnished). likewise, of the likely impact that computers will have in the future.

7.8. Interview F

Interviewer: Peter Akinbode.

Interviewee: Mrs. D. Williams

Occupation: Receptionist Birth Date: 23 December 1939. Aged: 59 Years.

Date: 26/3/98

Time: 3.30 PM

I asked about her exposure to computers, Mrs. Williams replied that she has very good grounding in the use of computers especially as she uses it for call logging and call switching to various departments, she also confesses to having a computer at home for family use. I asked her whether she had a fear of computers, to which she replied not at all. However, the periodic change of computer components does give her cause for concern..

Mrs. Williams is aware of the distinction between **Hardware** and **Software** mainly because she and her children make extensive use of computer technology, inclusive the use of books (Williams, pers. comm.). In reply to the question, have you used any software application in the last 2 years? She replied yes both at work and at home. Again, she is familiar with the concept of the Internet, but stressed that she does not use it often.

Accordingly, Mrs. Williams stressed that computers are important, Hence, to the question do you enjoy computers; she would have to say yes, that using computers definitely generate benefits. Furthermore, the majority of benefits are for the younger generation. She also agreed that the question of a dependency on computers in the near future is a welcomed prospect for her as well as her children. She agrees that it is an issues for both generations, but moreso the AP. I asked if she would like to increase her knowledge of computers because of the changing trends within society. In reply, she stressed that presently, she considers herself capable of coping with anything that computers throw at her. However, the idea of taking short courses is very much at the back of her mind. Mrs. Williams does feel her children are knowledgeable about computers and that one of them show a greater interest in computer based technology (Williams, pers. comm.).

Finally, she concluded by saying that it is a cause for concern, certainly for the AP. The younger generation need to gear themselves for a complete change in trends, but that this also applies to the AP. Mrs. Williams, she is aware that household appliances are fast becoming computerized and strongly suggest that there is a need to bridge the declining use of computers among her generation, especially concerning the likely impact that computers will have in the future (Williams, pers. Comm.).

7.9. Summary of Interviews (Part 2).

From conducting these interviews I came to a conclusion that of the use of computers based technology among the AP is on the decline. A random sampling has shown the need to increase the awareness of computer in society as a whole. It appears to be that there is a willingness among the AP to learn. However, circumstance presently dictates. Therefore in order to encourage an extensive use of computer based technology user friendly applications have to be introduced to be used at one's leisure, likewise the involvement of the end user, be it by prototyping techniques (i.e., techniques facilitating a thorough participation by Systems-Users) will need to be introduced. Note, this feature is highly significantly as it contributes to a faster pace of systems development that will ultimately lead to an acceptance of the End Product. Nonetheless, like any other invention advantages concerning the use of computers cannot be over looked Moreover, it appears to be the case that this is an unavoidable future development that will take place regardless.

Finally, It should be noted that from the questionnaires and interviews held. There appears to be a major concern by the aging population about the use of computer based technology for the future. It stand out clearly that if measure are not taken to curb these fear at an early phase possible catastrophe will eventually occur (possibly poverty and a complete decline of the End Products). Nonetheless, the outcome of any boils down to the amount of leeway given to Analyst's creativity resulting in a more user-friendly systems design. Likewise, we ought to appreciate that any constraints placed on the Analyst creativity will eventually result in a decline of the methodology use to create the End-Product and lead to unpopularity of Hardware and Software among the AP and society as a whole.

7.10. EVALUATION OF THE IMPACT OF COMPUTING ON THE AGING POPULATION

Introduction

Two types of paradigms currently exist the paradigms form the basis for systems and software development namely the **Science** and **System's** paradigm. The importance of these paradigms cannot be over looked partly because they represent methodologies used during the hardware/ software development. Presently, current developmental process isolates the end user and contributes towards a decline in the use of the End Products. Most importantly, if this trend is allowed to continue, it will spiral a decline in use of the hardware infrastructures as a whole., and moreso, its impact will be felt largely by the aging population AP. Moreso, it might seem less of a concern presently. However, if this trend continues to persist - tried and tested knowledge will also be lost with devastating effects. Particularly, if the older generation continue to have a fear of computing - we will be force to send knowledge engineers from house to house in order to extract and record valuable information for use at a latter stage.

Detail analysis of the system design methodology currently point towards alternatives which could become time consuming and a costly exercise. The reason being that, implications show alarming concerns (i.e., how best to go about extracting and recording knowledge which can then be use for the future use) bearing in mind that the aging population AP ,over the years(working lives) have acquired valuable experience beneficial to the younger generation. A thought that readily springs to mind, concerns the idea of exposing the aging population AP to user-friendly packages, which will then be used to extract tried and tested knowledge for the future, such as for censor, polls etc. Other angles to consider involve determining the cause of the problem i.e. where does the fault currently lie on the methodologies scale and can a radical overhaul of the methodology allow the end-user to be involved in the process of the development even moreso to a greater extent than they currently are.
The need to critically discuss this issue cannot be over-emphasized as in the long run we stand to loose significantly if positive action is not taken.

The **Scientific Paradigm,** encourages the designing of systems using automation as its focal point, (by this I mean - system designers have less of a leeway to maneuver during the process of system development). The paradigm is known to advocates a rigid form of system's design. The paradigm is a typical example of the cookbook methodology. As mentioned the approach encourages a rigid form of system development noticeably a robotic approach: The drawbacks with this approach concerns the lack of consideration given to living systems/organisms. For instance, living systems exhibit real actions and repetition of things tend to lead to monotonous boredom (although allows one to become skilled at a particular task), possibly encouraging us to continue developing outdated systems and aiding towards a decline in the use of the End-Products.

(The Impact of Computing On The Aging Population).

Presently, the rate at which technology changes necessitate the need for updated systems, i.e., hardware and software, user-friendly systems. Consequences of this not happening suggest that the fear of computing by the aging population AP will continue to permeate (the myth that computers are difficult to understand and bearing in mind that the reason for development of systems, i.e., hardware/software is to alleviate the workload of the common man). Evidence suggests that if care is not taken eventually the AP will loose interest, and the hope of them ever getting to grips with computer based technology fade, let alone eradicate their fears.

In the likelihood of this happening, in my opinion systems produce will continue to fall short of the required standard i.e. we will not be able to produce systems that the AP can find user-friendly. Enough in any case, to allow us to extract valuable knowledge (from the AP) gained over a substantial period of their working lives. This heralds the need to give thought to the youth of today, presumably because the younger generation are considered to be whiz kids, i.e., well versed in the use of computer based technology, therefore in order to capture their attention. We need to develop a medium of communication between generations.

Experience suggests, that if we can bridge the decline in the use of technology by the AP as a whole, them we ought to be taking positive steps in order to accomplish this goal knowing that this medium will be used to communicate with the younger generation (i.e. internet) and not feel unwelcome with the new technology, bearing mind that although we are currently focusing on the used of technology by (AP). Our fears likewise concern ways by which families are be able to bond closely through sharing the same technology/medium (i.e. computer based technology) and by being computer literate since every household will in the near future be computerized with equipment for the better of mankind. Nowadays the rate at which technology is moving pre-supposes that every household appliance will eventually posses computer chip (if they do not already). Noticeably, the effect could prove disastrous for the (AP), i.e., parents could find themselves isolated from their children from lack of communication due to a fear of computing. Note this could produce a spiraling effect within the family unit, the community, and the nation as a whole. Since there will be a steady boycott of these appliance partly because it a total fool of themselves and in turn the youth (children) will miss out of future based technology cf. the situation between developed and developing countries presently. Therefore, the need to thoroughly examine the present impact of computer based technology on the aging population AP cannot be over-looked. Majority of the aging population AP will at some point in the near-future come across computer and computer-based technology during their normal course of life. The likelihood of this situation getting worse is imminent unless prompt reaction is taken.

The idea is to explore computer organizations from the perspective of the hardware and software related issues. Other aspects to consider include the home and organization these need to be examined with four main objectives in mind: to provide an introduction to a working knowledge of assembly language, and to impact an elementary comprehension of different yet cohesive abstractions of computational systems.

Each chapter of this thesis builds upon previous chapters in its discussion of topics such as architecture (system's methodologies), the building blocks of computers, circuit components, program structure and many more (Andrews, 87). The thesis provides a comprehensive and authoritative analysis of the burgeoning discipline's pros and cons concerning human-computer interaction for the (AP), it further focuses on those from industry who wish to know more about the subject. Assuming, they know very little at the present. The thesis tackles the problem, by providing a panoramic view of the diverse research interest that are gradually emerging. The aims is to explain the underlying causes of the cognitive, social and organizational problems typically met with when computer systems are introduced to various sectors of the population. It proposes the idea that future systems, i.e. hardware and software need to be both clear and concise, whilst avoiding the oversimplification of important issues and ideas. (Booth, 93) The thesis presents the critical tools to analyze computers and shows the practicing engineer how technology changes over time offering the empirical constants needed for systems design. There is a need to educate Systems Analysts and Designers about the need for user-friendly and End Products (Hennessy and Paterson, 90). Simply, because it addresses the implications of bad systems designs i.e., the design of less than interactive computer systems, because future computer systems each require particular consideration to find its relevant computer support. This thesis also analyses the tasks of writing databases, business process re-engineering and problem solving from a cognitive point of view bearing in mind that human cognitive characteristics (actions) impose further particular requirements on the design of the user interface. Finally, it evaluates the possible effects of the AP working with computers and computer based technology and concepts on our thinking habits and everyday lives. From these different perspectives, the AP should be able to build a better understanding of the role of cognitive processes for the design of more efficient and satisfactory human/computer interaction (computer based technology). Researchers and practitioners in the field of human factors, cognitive ergonomics, artificial intelligence, and computer systems design should find these analyses useful.

Presently majority of the Systems, application and books on computers are highly technical, often geared into one particular application or products. The needs of beginners and the AP needs to come first, their concerns need to be met by a practical step-by-step guide, showing how to get computer to help you at work or at home. The thesis discusses why computers may be needed. It shows the extend to which computers features in our lives, be it processing letters, documents, managing accounts, handling customers, business presentation and desktop publishing. In short, it show computer-based technology has become an integral part of our lives, i.e., the impact of computing on the AP.

7.10.1 EVALUATION SUMMARY

This research focused on the fears of computer usage and the reasons behind them. For instance was the fear of computing and computers related to a fear of Mathematics or was it more deeply rooted. I.e., related to the sciences in general (Physics, Chemistry and Biology).

Moreso, does the fear of computing and computers stem from its classification under the science subject headings, and that it ultimately leads to a B.Sc., M.Sc., and possibly, a D.Sc. award title degree. Perhaps, their fear of the premises that computing and computers based technology relates to the study of robots. Therefore conjuring an image of a brainy man's subject, could it be put down to terminology (i.e. jargons such as chips, scuzzy, backstroke/return and alt/ctrl etc.), used to describe computing and computer components confusing to mere mortals e.g. Perhaps we ought to be thinking of expose every children pre and post schooling age to the use of computers and continuing to bridge gaps, by making computer subjects a compulsory core subject (i.e. alongside mathematics and the use of English Language). Or perhaps, we can go a step further by taking future aptitude test on computers, maybe this sort of exposure to computing and computers help to eradicate a fear of Computers. While, enlightening their objectives concerning their usage. Especially, as evidence collated from the research showed that the dislike of computing and computers technology concerns the challenges time constraints, trust, and rewards associated with using computers, (i.e. employment opportunities).

Alternatively, does the problem stem from people humanizing computers(i.e. thinking computers contain humans - a homunculus - a little man) and can this problem be eradicated by emphasizing the limits of computer based technology(i.e. through our emphasizes on the **Functionalist** or **Physicalist** approach) and by pointing out similarities between Typewriters and Computers. The reason being that a substantial majority of the aging population AP would have at one time or another in the past made use of typewriters. Finally, as the demand for home computers have rocketed in the last decade. This begs the question of future research into what ratio of computer usage exist between countries.

After random sampling evidence showed that the difficulties face by the aging population AP concerning the use of computers technology stems from a fear of failure and possibly wasting their time/class. A possible solution could be an increase in teach yourself exercises and Computer training video's and CD's like those presently on sale. Note these can be used safely in the home at ones leisure. Written-text may also pose problems, bearing in mind reading skills and abilities.

A thought that readily springs to mind, to alleviate the potential problems may be special recognition software (e.g. speaking Gold, Language translators for universal translation /compatibility. note However, modern-time manuals may seem user-friendly but often spook qualified/skill computer technicians. Most skills the aging population AP have acquired stem from training. Therefore, any form of exposure should be through practical (i.e. hands on training). Furthermore, from the analysis of the questionnaire evidence show a deeper fear of computing within the aging population AP particularly since future generation good are bound to. Hence, a complete/radical overhaul of our system's methodology still needs to be examined. After random sampling evidence showed that the difficulties the aging population AP have concerning the use of computers technology stems from a fear of failure/ making a mockery of themselves time/class.

A possible solution could be an increase in teach yourself exercises and Computer based training videos and CD's like those presently on sale. Note these can be used safely in tat home during ones leisure. other comparisons between types of training materials i.e., text-based training material without step-by-step procedural guide needs to be highlighted. Note the worst types (i.e. personally, are procedural instructions without separate lines and are jargon intensive. Written-text may also pose problems, bearing in mind reading skills and abilities. A thought that readily springs to mind, in order to alleviate the potential problems, speech can be used may be special recognition software (e.g. speaking Gold, Language translators for universal translation /compatibility. However, modern-time manuals may seem user-friendly but often spook qualified and skill computer technicians Most skills the Aging population AP have acquired stem from training. Hence, one possible solution would be through practical. To examine implications of computing or rather lack of computing skills on the aging population AP (Included in appendix A are copies of the Thesis proposal). It appears to be that the fear of computing within the aging population AP still exists. Hence, a complete and radical overhaul of our system's methodology still needs to be examined.

Quest for knowledge and academic thirst(i.e. a need to prolong/delve into knowledge that would have been a trivial matter. on the one hand, this in itself is not adverse. However, evidence shows a correlation between the ratio of a country's gdp per head and in the ratio of wealth between class/race, working /scholar ration leading to a shortage of jobs and a decline in the technical know-how and an unproductive socialist idealism.
The aging population AP (40 and over) have behind them vast amount of wisdom, technical and scientific knowledge acquired over a number of decade. Note this knowledge and skills can be put to use however with a change in trend (i.e. ways of extracting/recording knowledge/skills. Moreover, this reflects a growing trend in mature students (possibly seeking to acquire computer-based knowledge possibly with the aim of increasing their future employment prospects. Moreover, the change in trends within the field of computing and technology transcends employment but have somewhat found ways of breaking the barriers of communication with the younger generation (i.e. whiz kid present and future.

Likewise, a growing trend in the use of expert system has further contributed to a fear of being left behind (i.e. not in the incrowd). This poses major concerns for the older generations as ignorance breeds fears. The reason being that some of the changes in the last decade have been phenomenal (have been swift and alarming e.g. changes in computer component within a four years, increases in the number of computer programming languages/skill currently on the markets, likewise in the number of operating systems and the computerizing of household commodities on the market. Evaluation shows that the majority of changes have at one time or another caught experienced staff, students, and even the average person remains mystified. Therefore, what chances have the AP got of getting to grip with the remarkable changes within the computing environment as a whole (especially without substantial help for the computing world).

Finally, the vast increase in computer component available will for the next decade or so continue to change whilst baffling the average man. Therefore, there is an unsurpassed need to bridge the gaps concerning computer-based technology within the AP. First hand exposure to computing based technology and user-friendly hardware and software will not totally eradicate the potential problem, but this will go a long way towards bridging the gap and preparing the older generation for the imminent changes that are bound to happen at some point whilst not leaving them vulnerable. The very heart of this thesis through random sampling of the aging population shows a drastic change in trend, especially percentages wise. Furthermore, make no mistake that this trend will eventually level out as analysis show the trend continuing and perhaps more importantly, if care is not taken. There is every possibility of it leading to a decline in the use of computer based technology on the one hand and to drop in the level of computer awareness as a whole. moreso in times of recession there will undoubtedly be an increase in the number of people going on to further study in order to acquire computer skills so competition may be keener. Moreover, other integral work will feel the crunch.

Included in appendix A are copies of the Thesis proposal.

APPENDIX A: TERMS OF REFERENCE

APPENDIX A1: ***Ph.D. INFORMATION SYSTEMS AND TECHNOLOGY 1998***

THESIS PROPOSAL

To review four systems design methodology, namely NCC, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING and to evaluate the impact of computing among the aging population.

OBJECTIVES:

- To examine the methodologies used in systems design past and present via an introductory chapter titled Review of System Designs General'.
- To review four system design methodologies namely, NCC, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING.
- To compare and contrast their similarities and differences, i.e., science or systems paradigm.
- To evaluate their impact within present systems design particularly among the aging population AP.
- To review the use of these methodologies within an industries, i.e., Olivetti.

DELIVERABLES: Evaluation reports on:

(i) The impact of these methodologies on systems design;
(ii) Similarities and difference between these methodologies;
(iii) Advantages and disadvantage of these methodologies;
(iv) The preference of a particular industry;
(vi) Evaluate the impact among the AP.

METHODS:

- Selecting and agreeing on a number of systems design methodologies, i.e., NCC, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING, to be reviewed.
- General discussion of the systems methodologies (traditional and structured).
- Review of NCC, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING.
- Tabulated summarized sequence with heading i.e., science, and system paradigms, including definitions, approaches, their conceptual models.
- Strengths and Weaknesses
- Examination of the systems design methodology employed by a specified industry.
- Finally, focuses on the awareness of computer based technology among the AP.

.....

Author: Akinbode O. K. Peter.

.....

Supervisor: Dr. Karen, A. Sawyer.

APPENDIX A2: Useful Addresses

Customer Services Manager
CCTA Information Systems Engineering Group
Gildengate House
Upper Green Lane
Norwich NR3 1DW
Tel: (0603) 660181
Fax: (0603) 694817

Derek Godden
Senior Consultant
Software Services Division
International Support Centre
Olivetti House
P.O. Box 89
86-88 Upper Richmond Road
London SW15 2UR
Tel: (0181) 780 - 8580
Fax: (0181) 780 - 8157
Or
Nick Gill
ASIS (Application and Systems Integration Services) Division
Olivetti UK Limited
86-88 Upper Richmond Road
London SW15 2UR
Tel: (0181) 780 – 8235
Fax: (0181) 780 - 8157

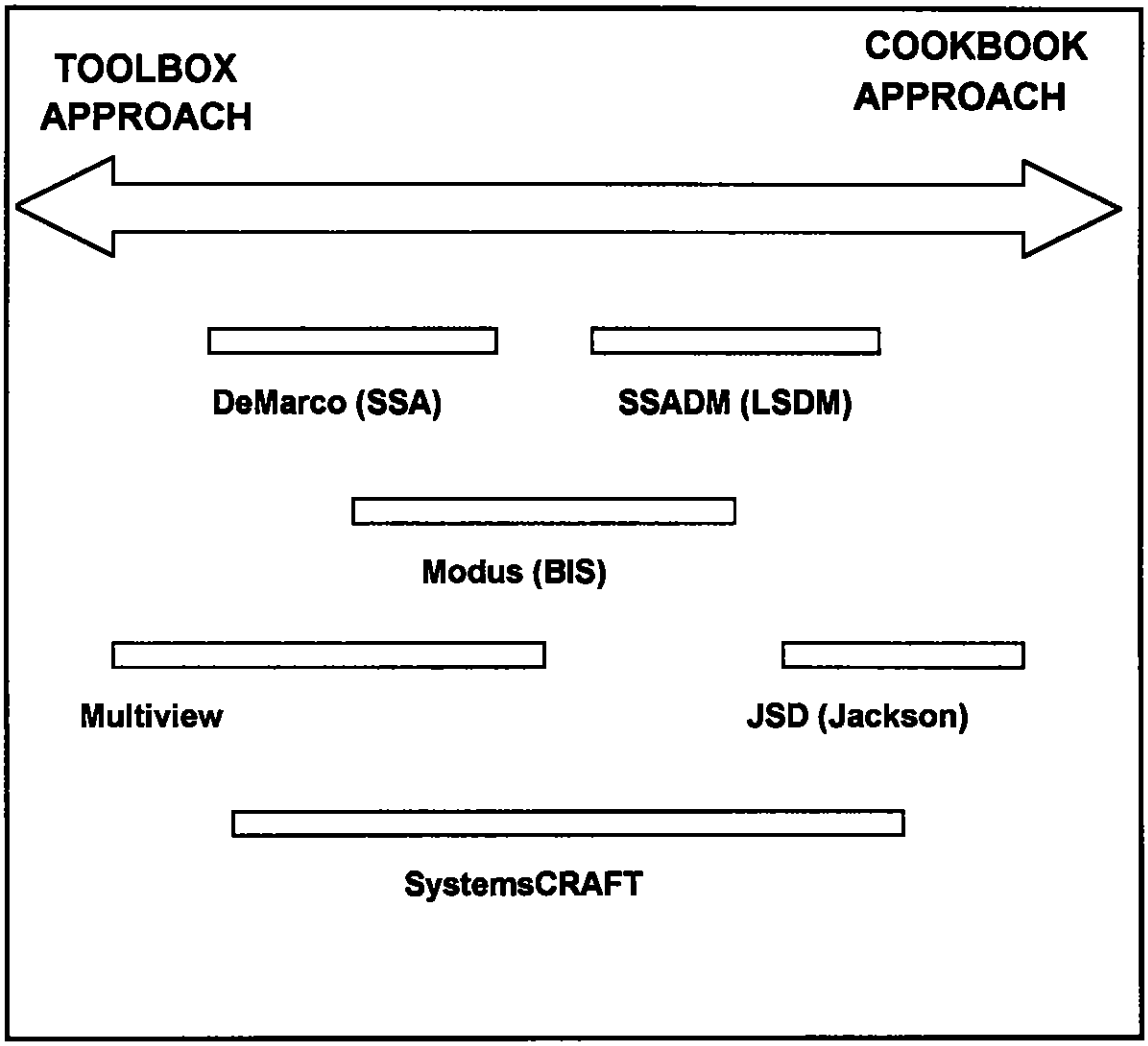
Administration Office
SSADM Users Group
11 Burlings Lane
Knockholt
Kent TN14 7PB
Tel: (0959) 534337
Fax: (0959) 534184

APPENDIX A2 CONTINUES: Useful Addresses

Emma Aldridge
Age Resource (Concern)
1268 London Road
SW16 4ER
Tel: (0181) 765 7610

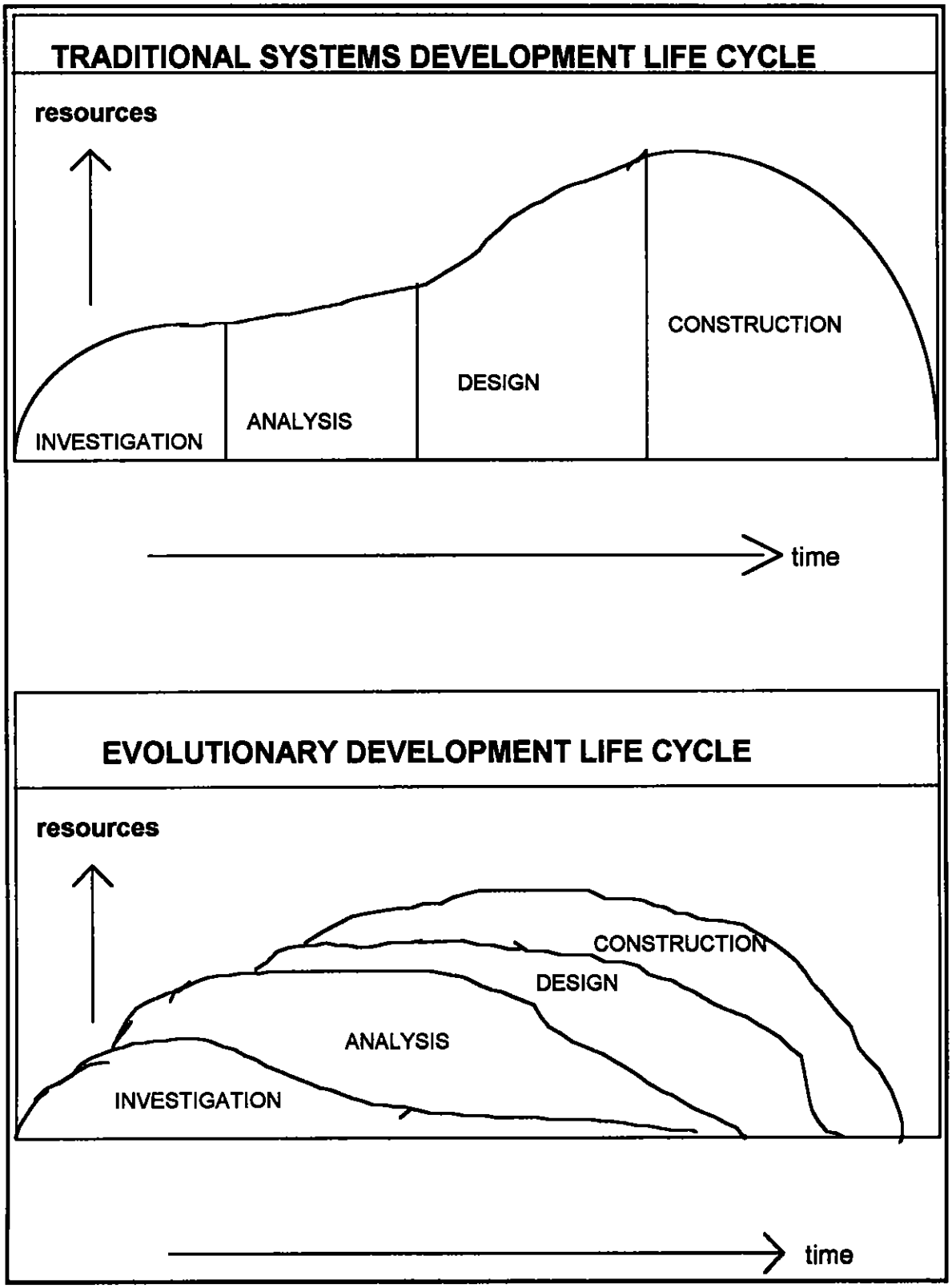
Mike Alaycock
Third Age Challenge Ltd.
115 Commercial Road
Swindon
SN1 5PL
Tel: (0345) 573 527
Fax (01793) 533 390

APPENDIX A3: The Toolbox- Cookbook Continuum.



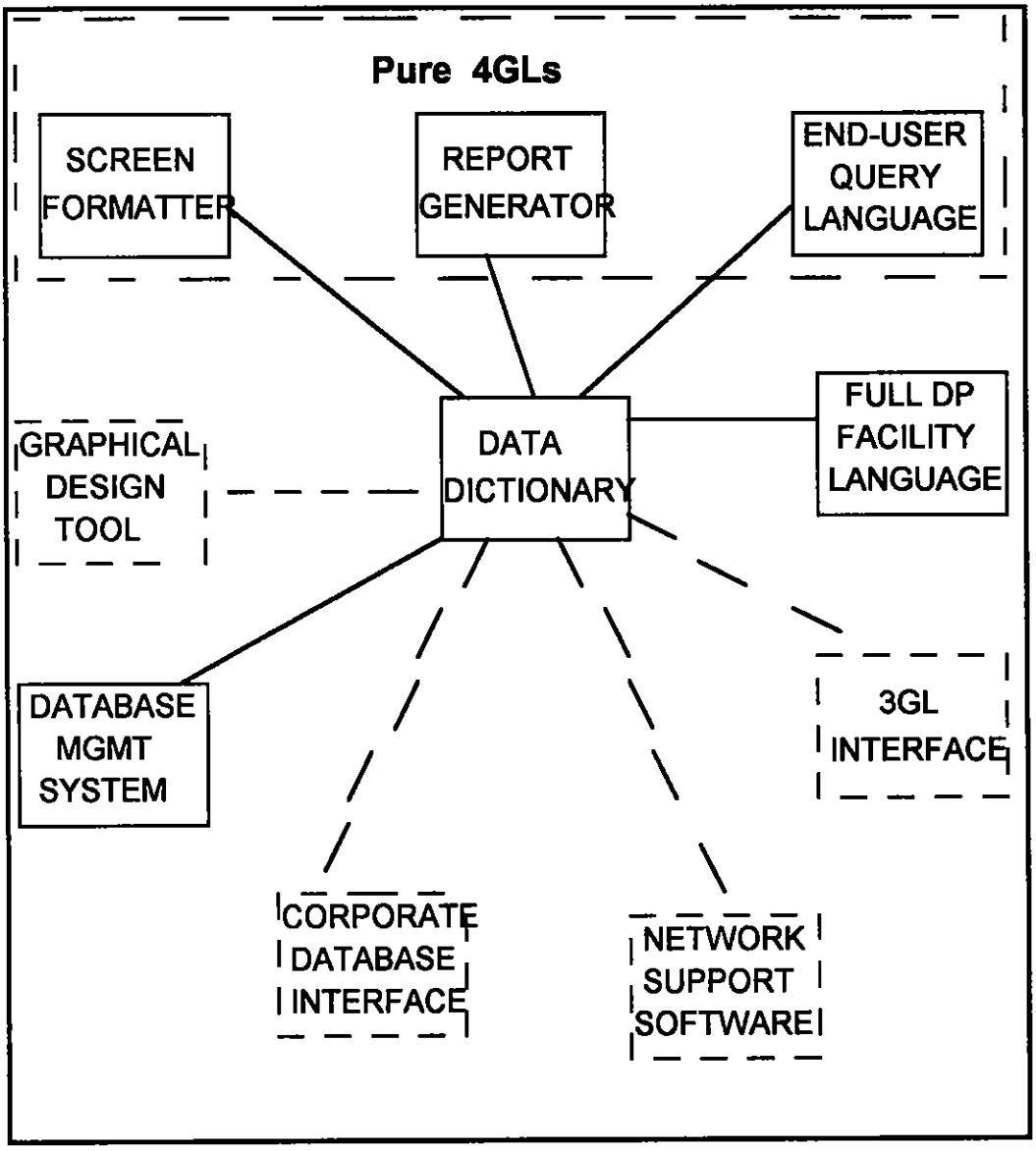
(Crinnion, SYSTEMSCRAFT Manuals P.1-3)

APPENDIX A4: Structured Systems Analysis and Prototyping Comparison of Life Cycle.



(Crinnion, SYSTEMSCRAFT Manuals P.1-17)

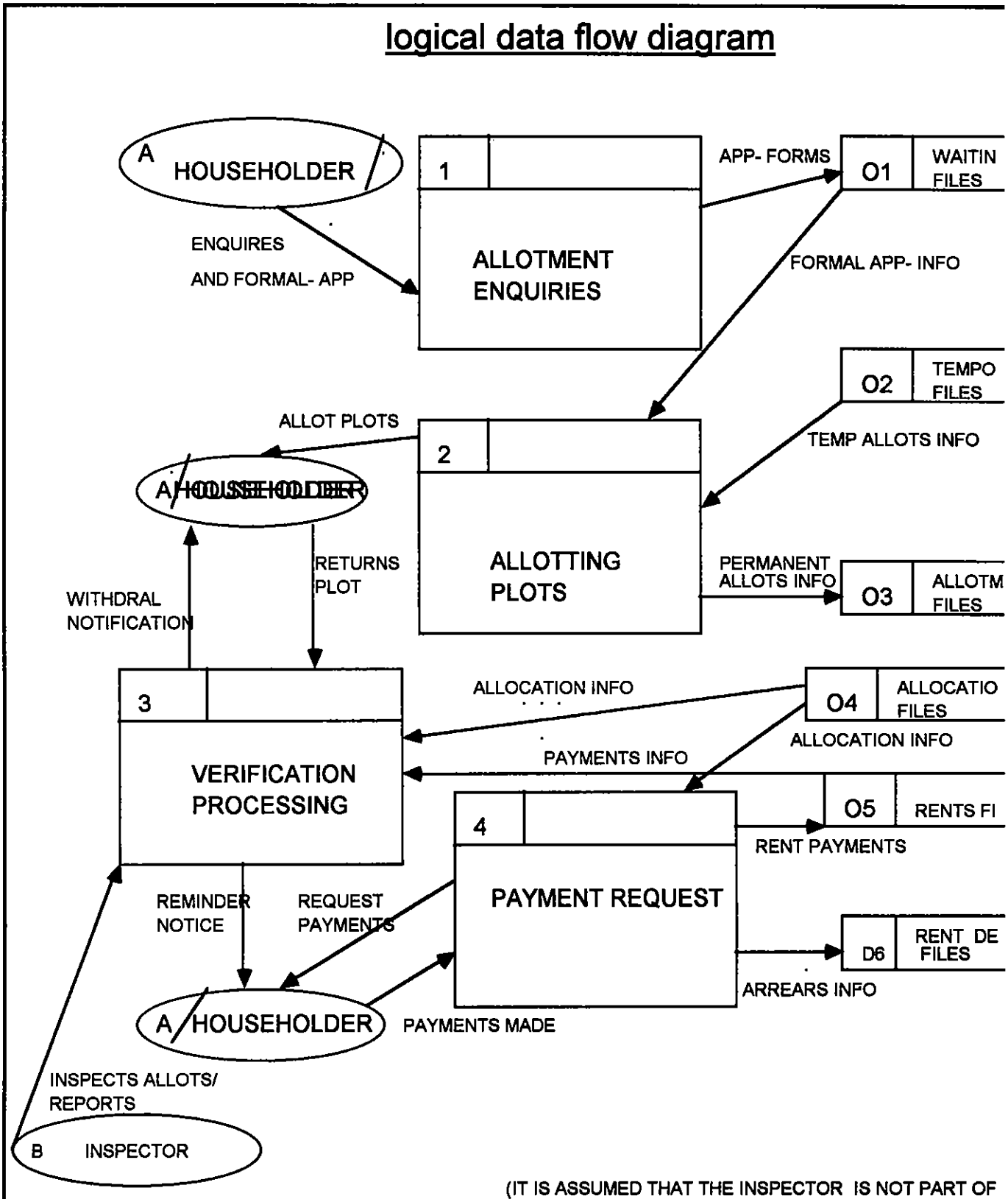
APPENDIX A5: The Components of A 4GL Environment.



(Crinnion, SYSTEMSCRAFT Manuals P.1-13)

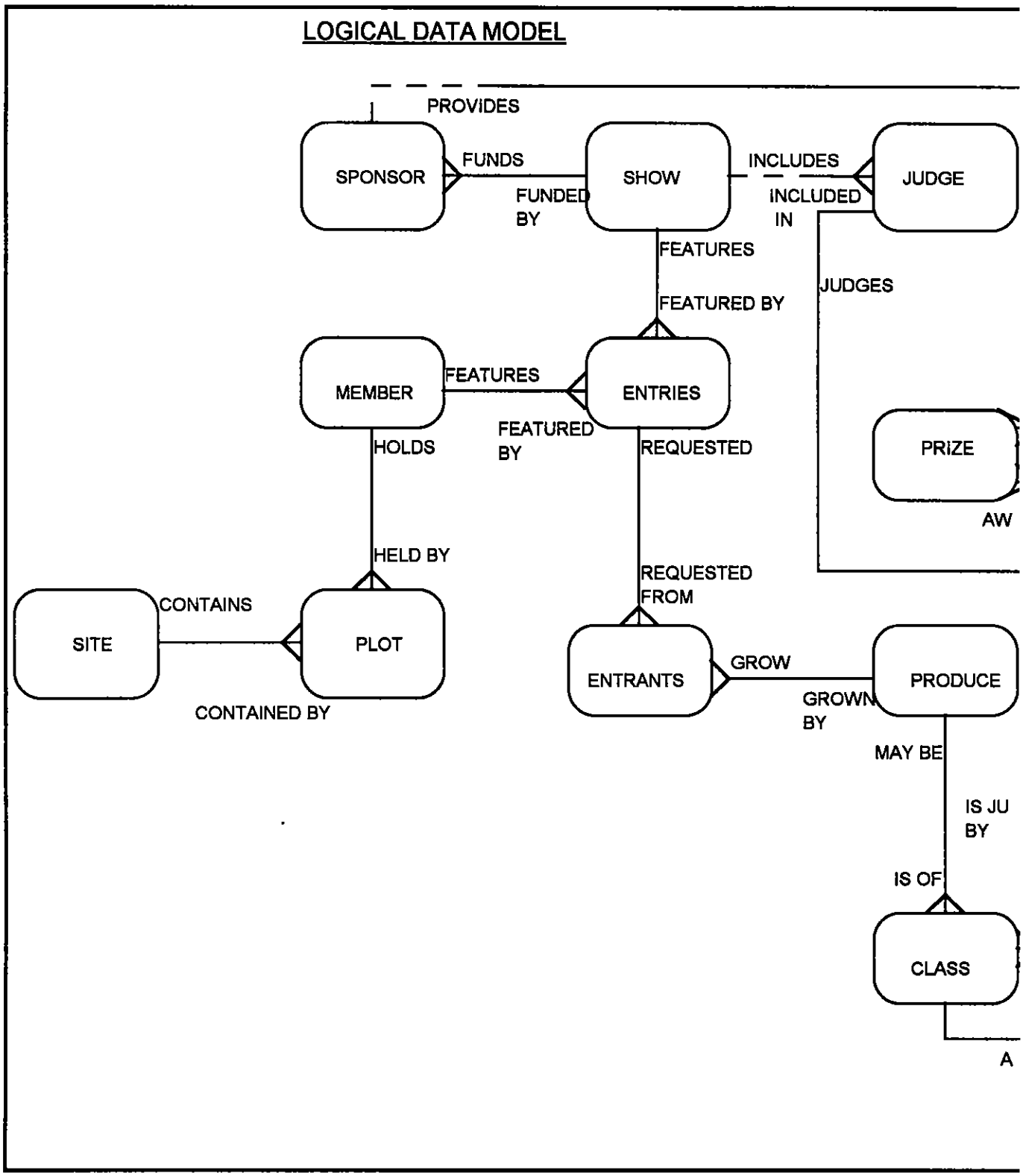
APPENDIX B: SSADM

APPENDIX B1: Example of SSADM's Logical Data Flow Diagram.



(Akinbode, Ph.D. Inf. Sys/Technology 1998)

APPENDIX B2: SSADM's Logical (Entity Model).



(Akinbode, Ph.D. Inf. Sys/Technology 1998)

APPENDIX B3: An Example of Entity Listings And Their Attributes.

ENTITY LIST

SHOW
Show Date, Location, Time
MEMBER
Member No, Member Name
SITE
Site No, Location

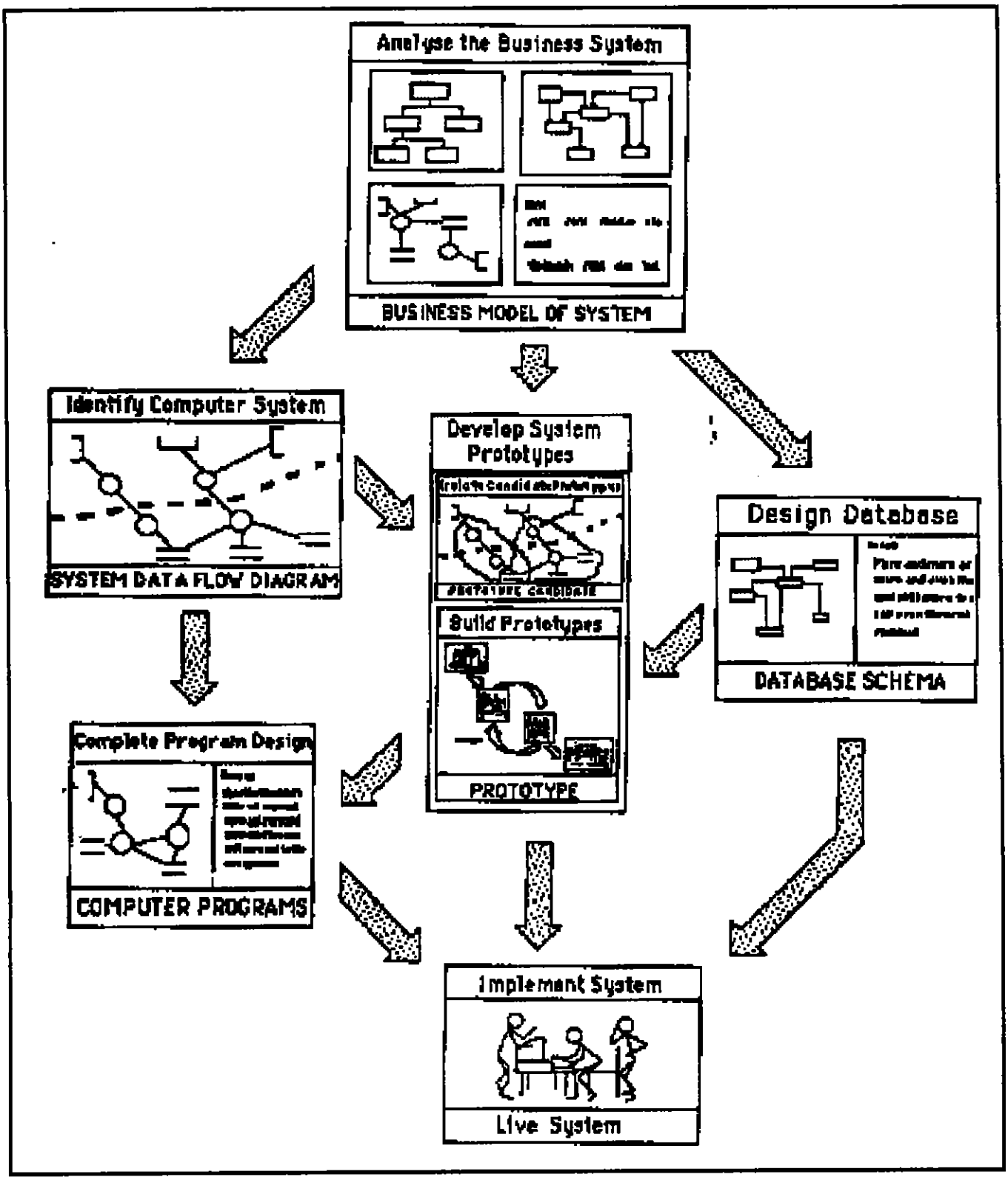
PLOT
Plot No, Location *Site No * Member No
PRIZE
Value Prize No, *Sponsor ID ,*Class ID
SPONSOR
Sponsor Type, Sponsor ID,, Sponsor Name ,*Show Date
PRODUCE
Produce No, *Produce Class
ENTRIES
Entrant No, *Show Date, Member No

ENTRANTS
Entrant No Produce No
CLASS
Class ID, Type, *Produce ID, *Judge ID
JUDGE
Judge ID, Name, Address, Qualification, *Show Date

(Akinbode, Ph.D. Inf. Sys/Technology 1998)

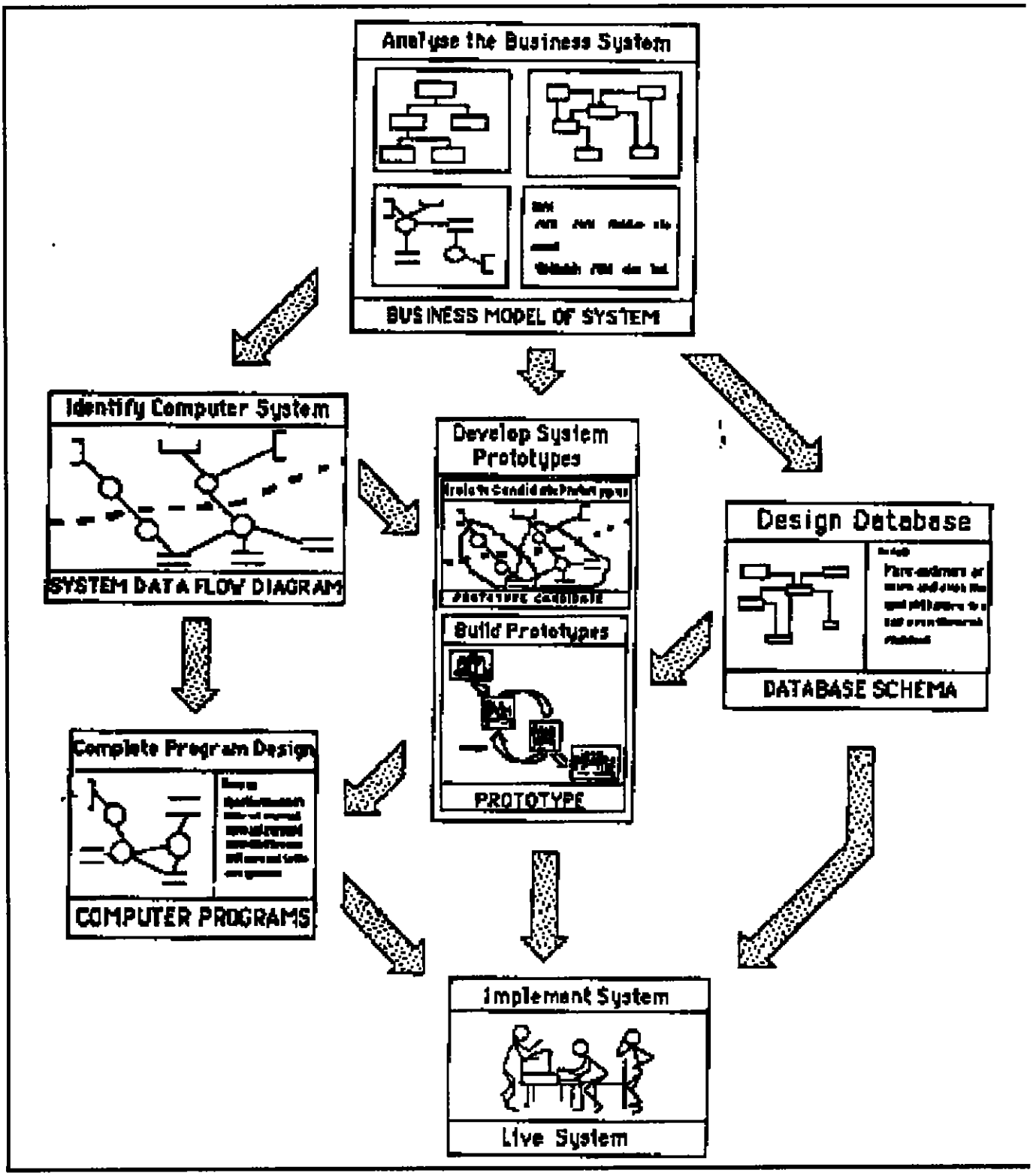
APPENDIX C: SYSTEMSCRAFT

APPENDIX C1: The SYSTEMSCRAFT Methodology Basic Overview.



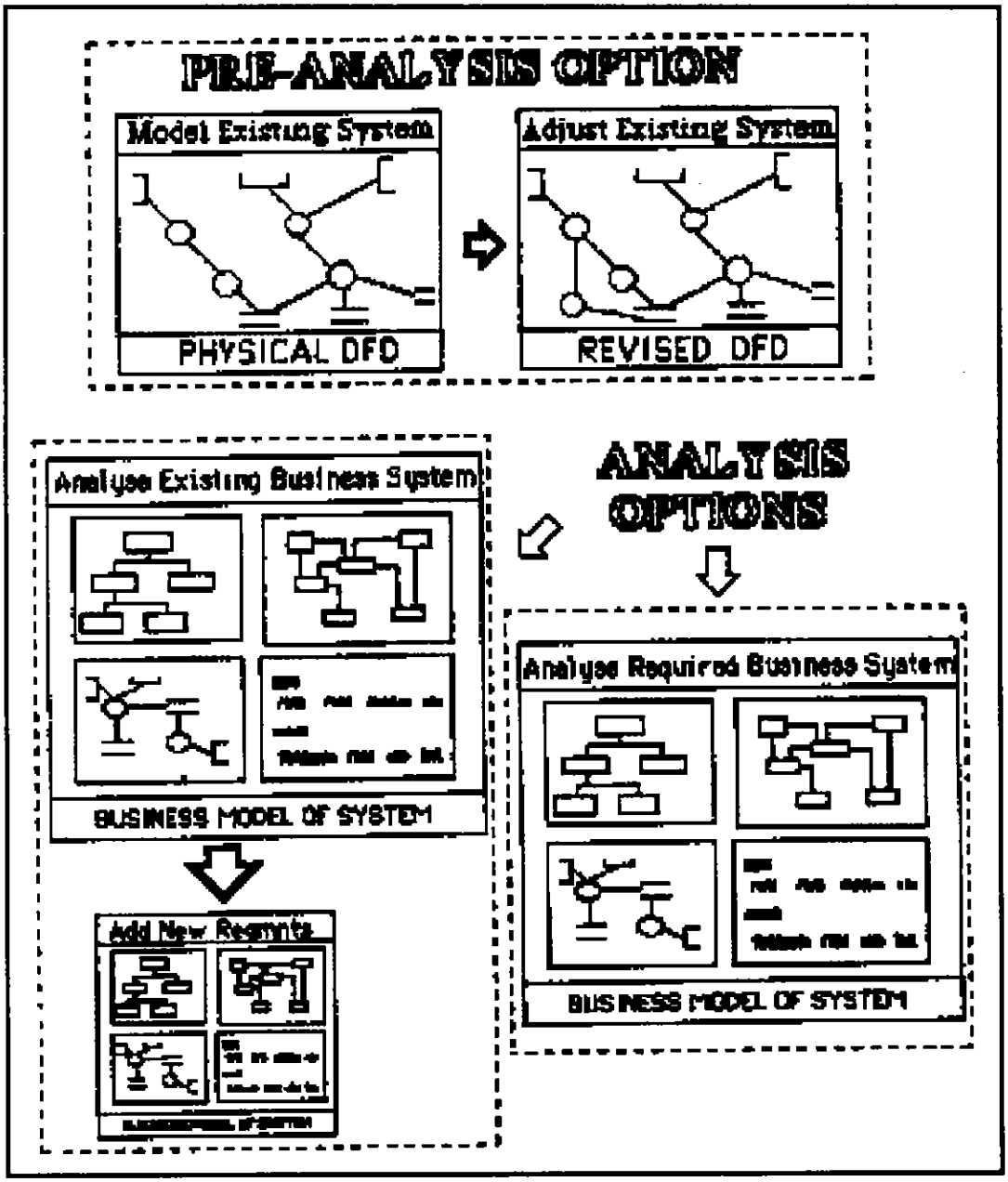
(Crinnion, SYSTEMSCRAFT Manuals P.1-20)

APPENDIX C2: Standard Form of The SYSTEMSCRAFT Methodology For Smaller Development.



(Crinnion, SYSTEMSCRAFT Manuals P.15-14)

APPENDIX C3: Business Analysis Tailoring Options.



(Crinnion, SYSTEMSCRAFT Manuals P.19-8)

APPENDIX C4: Example of Structured Walkthrough Form.

Work Unit PS V1	STRUCTURED WALKTHROUGH	Date 5-9-93

Work Unit Description

Version 1 of Order Processing prototype

Agenda

1 Examination of Build Plan

2. Demonstration of Prototype

3 Examination of Test Plan

4 Examination of Change-control List

5 Resources Used

Decision

- [x] Accept Product
- [ ] Revise (No further Walkthrough)
- [ ] Revise & refer to later Walkthrough

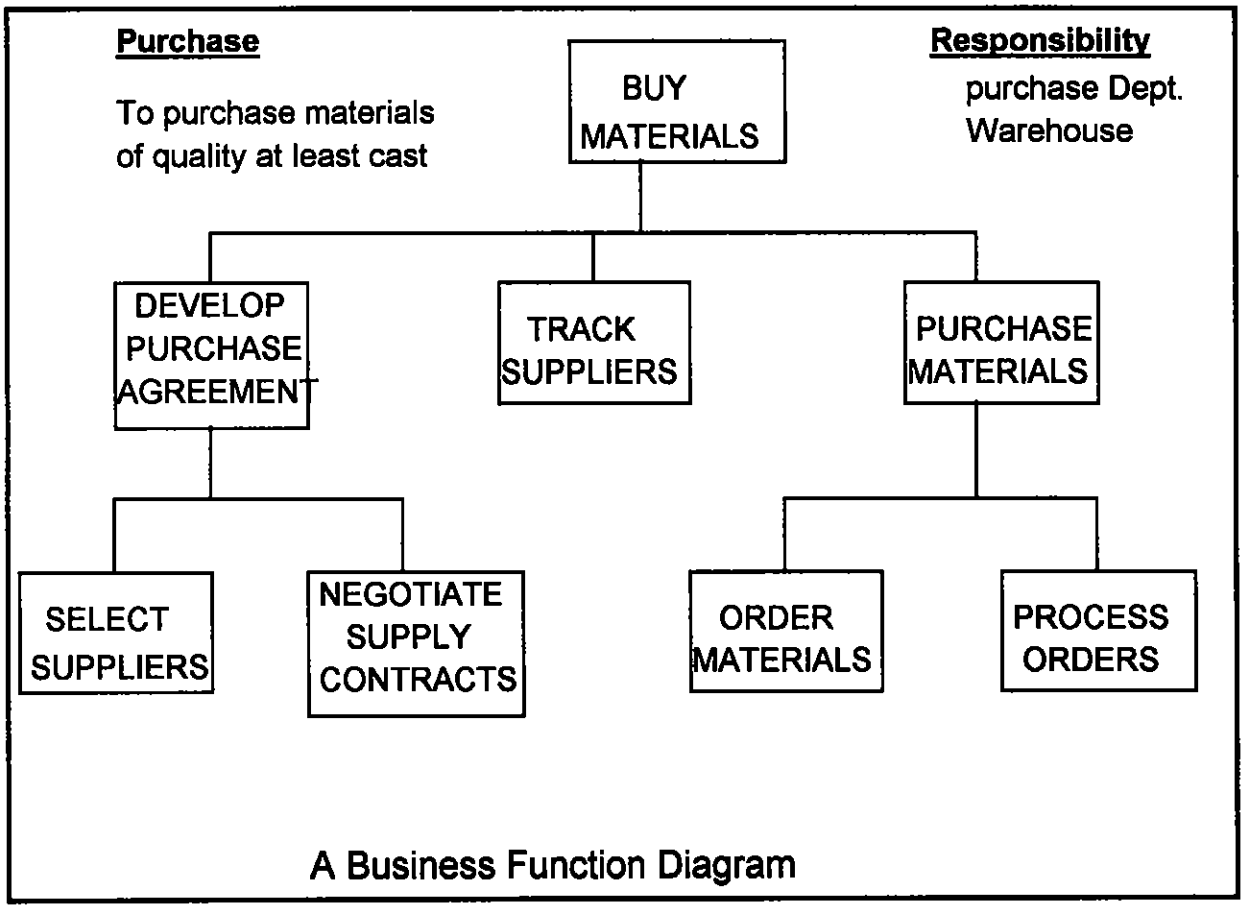
Reviewers

J Smith T Jones R Murphy

S Stuart M Davies

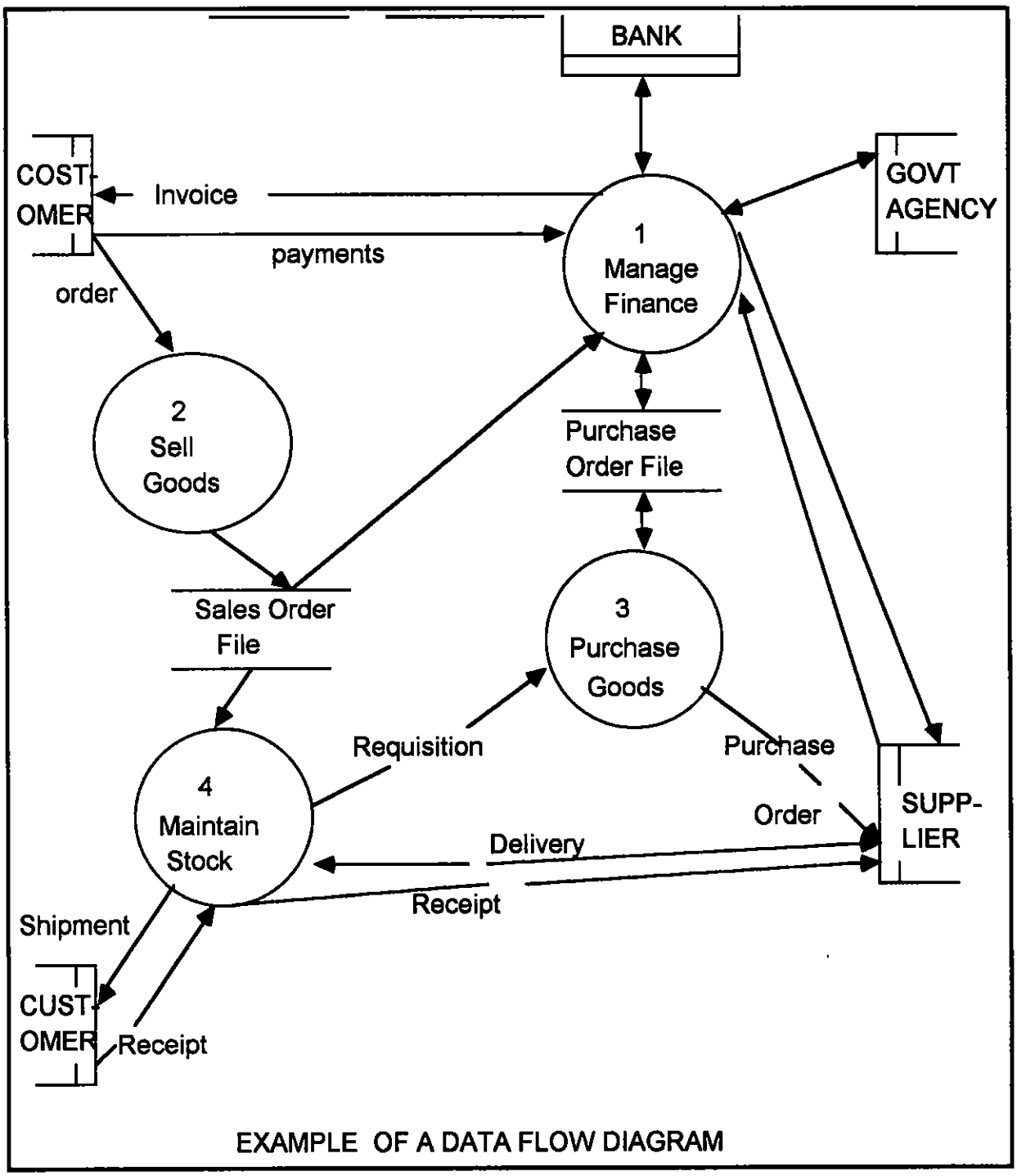
(Crinnion, SYSTEMSCRAFT Manuals P.21-10)

APPENDIX C5: A Business Function Diagram.



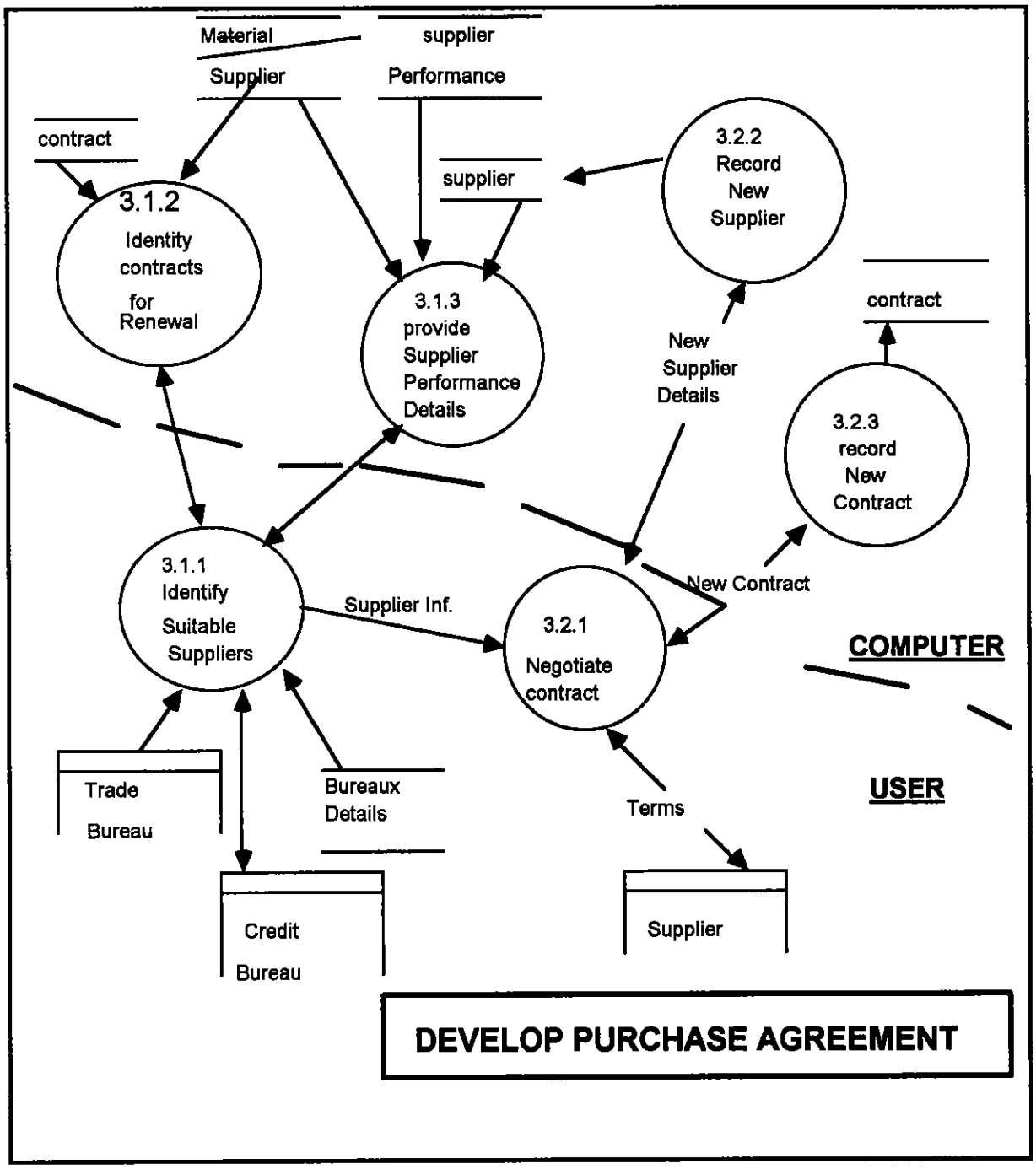
(Crinnion, SYSTEMSCRAFT Manuals P.2-1)

APPENDIX C6: An Example of A Data Flow Diagram.



(Crinnion, SYSTEMSCRAFT Manuals P.3-2)

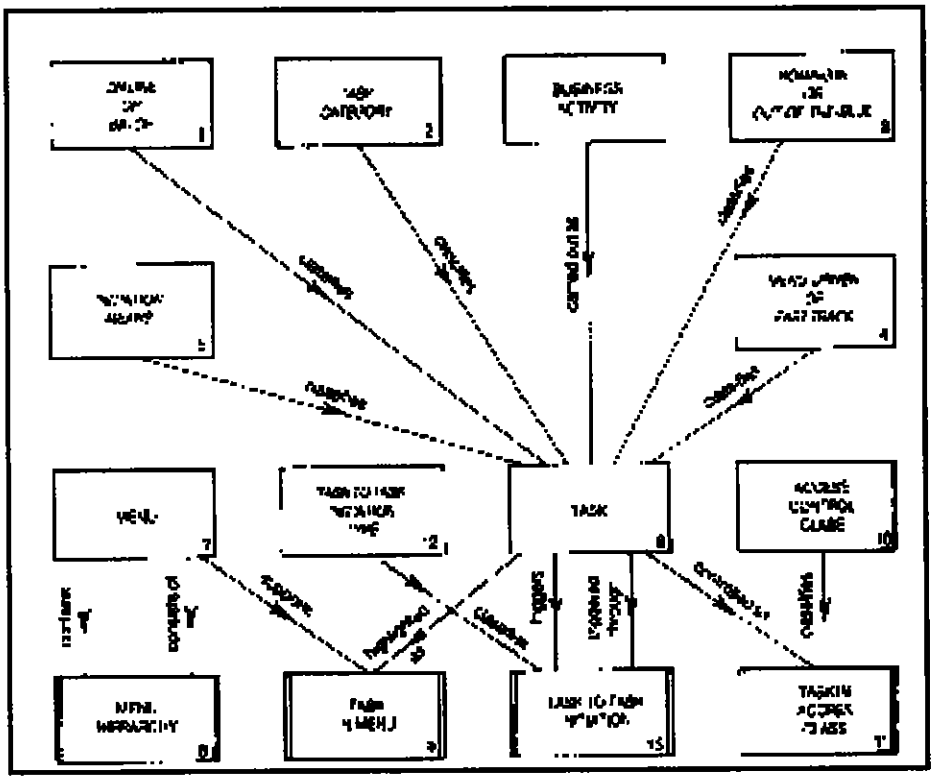
APPENDIX C7: An Example of A Systems Data Flow Diagram.



(Crinnion, SYSTEMSCRAFT Manuals P.7-10)

APPENDIX D: INFORMATION ENGINEERING

APPENDIX D1: Systems Design Stage-Process Perspective And Cross-References.



(Olle, Information Systems Methodologies P.146)

APPENDIX F: EVALUATION

APPENDIX F1: EVALUATION

Most of the material for this thesis has been a mixture research, reviews, questionnaires, and interviews form persons of all walks of life. Much have been achieved by carrying out this thesis including an evaluation of :

- How planning and analysis of the user requirement can be maintained using NCC, SSADM, SYSTEMSCRAFT and INFORMATION ENGINEERING.
- Provision of graphical representation of system requirement in the form of data flow diagrams and entity models;
- How these tools can support Structured Methodologies.

Furthermore, it should be noted that the use of tools and techniques play a major role in increasing systems development productivity, via being used well. Likewise another contributor that increases systems productivity and the use of a methodology is training, If the analyst is trained extensively on the methodology, they will then become profecient enough to produce accurate system requirements, at a lower cost. Moreso, they will be able to develop diverse systems (all types and sizes) also at a much faster pace.

Finally, I believed that from the review done, most of my objectives have been met.

APPENDIX G

QUESTIONNAIRE RESPONSE SAMPLES OVERLEAF

QUESTIONAIRES

NAME: SUE GRAVETT.
D- O- B: 25/6/49 **AGE:** 48
OCCUPATION: SECRETARY/WARD CLERK
ADDRESS: ROOKS FARM COTTAGE
COTTAGE LANE
WESTFIELD.
TELEPHONE NO: 870584

TYPES OF SOFTWARE USED:

(A) MICROSOFT - WINDOWS 95 - AVERAGE
(B)
(C)
(D)
(E)

TYPES OF HARDWARE USED:

(A) DON'T KNOW.
(B)
(C)
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

I find the use of computers far more superior than previous office equipment and essential to the efficient functioning in commerce today. The disadvantage is not having access to training for the rapid updating of programmes + facilities.

QUESTIONAIRES

NAME: CHRIS ROBINSON
D- O- B: 6·6·49 AGE: 48
OCCUPATION: CARETAKER
ADDRESS: 23 GITHA ROAD
HASTINGS
TN35 5JU.

TELEPHONE NO:

01424 465873

TYPES OF SOFTWARE USED:

(A)
(B)
(C) NONE
(D)
(E)

TYPES OF HARDWARE USED:

(A)
(B)
(C) NONE
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

NOT interested.

QUESTIONAIRES

NAME: JANE POTTER
D- O- B: 30. 11. 47 **AGE:** 50
OCCUPATION: ADMIN ASST.
ADDRESS: 34 THE JAYS
RIDGEWOOD
UCKFIELD
EAST SUSSEX TN22 5YG.

TELEPHONE NO:
01825 768724

TYPES OF SOFTWARE USED:

(A) COREL DRAW (1)
(B) BACK UP DISCS UNSURE.
(C)
(D)
(E)

TYPES OF HARDWARE USED:

(A) WORD 4.5 (2)
(B) WORD 7 (1)
(C) ACCESS (2)
(D) EXCEL (2)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

I PERSONALLY HAVE NO "IN DEPTH" KNOWLEDGE OF COMPUTERS ONLY WHAT I HAVE LEART MYSELF THROUG DIFFERENT JOBS. BUT IT SEEMS COMPUTERS ARE TAKING OVER IN ALL WORK PLACES. I CAN USE THEM BUT DONT UNDERSTAND THEM !!

QUESTIONAIRES

NAME: MRS B HAGGER
D- O- B: **AGE:** over 50
OCCUPATION: Retired Office Worker
ADDRESS: 127 Eversley Road Bexhill TN40 1HA

TELEPHONE NO:

TYPES OF SOFTWARE USED:

(A)
(B)
(C) None
(D)
(E)

TYPES OF HARDWARE USED:

(A)
(B)
(C) None
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

I'm sure they are a wonderful invention, I gather from my grandaughter that the training would have impossible without, she has a BA and training further to be a dietitian.

QUESTIONAIRES

NAME: McINTYRE

D- O- B: 01-05-38 **AGE:** 57

OCCUPATION: RETIRED

ADDRESS: THE [illegible] HOUSE [illegible]

TELEPHONE NO:

01424 813377

TYPES OF SOFTWARE USED:

(A) WORD PERFECT
(B)
(C)
(D)
(E)

TYPES OF HARDWARE USED:

(A) BROWN A.P.S.
(B)
(C)
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT WHEN NEW 10 YEARS AGO NOW OUT OF DATE
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

I cannot give a fair comment owing to limited ~~[illegible]~~ knowledge of computers. However if I had a PC with windows programmes etc I would be more enlightened and therefore be in

QUESTIONAIRES

NAME: THOMAS DANIEL EVANS
D- O- B: 22-12-33 **AGE:** 64
OCCUPATION: CASH REGISTER ENGINEER.
ADDRESS: 15, WESTFIELD LANE
ST LEONARDS-ON-SEA
EAST SUSSEX TN37 7NE.

TELEPHONE NO: 01424 751112

TYPES OF SOFTWARE USED:

(A)
(B)
(C) NONE
(D)
(E)

TYPES OF HARDWARE USED:

(A)
(B)
(C) NONE
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

VERY LITTLE KNOWLEDGE OF COMPUTERS AT THIS TIME BUT IN NEAR FUTURE I WILL BE PURCHASING ONE AS AN AID FOR PROGRAMING CASH REGISTERS

QUESTIONAIRES

NAME: J LEAR
D- O- B: 9.1.38 **AGE:** 60
OCCUPATION: SPACE MECHANIC
ADDRESS: 21 HOWARD CRES
PEMBURY
TUN/WELLS

TELEPHONE NO: 01892 82 4265

TYPES OF SOFTWARE USED:

(A) NONE
(B)
(C)
(D)
(E)

TYPES OF HARDWARE USED:

(A) NONE.
(B)
(C)
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

NOT APPLICABLE

QUESTIONNAIRE

NAME: MRS C. CARR
D- O- B: **AGE:** 64
OCCUPATION: CLEANER
ADDRESS: 68 DRAYTON BRIDGE Rd
HANWELL
London W7 1EP

TELEPHONE NO:

TYPES OF SOFTWARE USED: NOT KNOWN (TERM)

(A)
(B)
(C)
(D)
(E)

TYPES OF HARDWARE USED: NOT KNOWN (TERM)

(A)
(B)
(C)
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY. ?

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

I HAVE NO IDEA ALL AS I DO NOT WISH TO USE THEM

QUESTIONNAIRE

NAME: JOHN JOSEPH
D- O- B: 03-06-52 **AGE:** 42
OCCUPATION: ENGINEER.
ADDRESS: 229A MOUNT PLEASANT RD. N17 6HD

TELEPHONE NO: 0181 885 6492

TYPES OF SOFTWARE USED:

(A)
(B)
(C)
(D)
(E) NONE

TYPES OF HARDWARE USED:

(A)
(B)
(C)
(D)
(E) NONE

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

QUESTIONAIRES

NAME: MARION ELLICOTT (MRS)
D- O- B: **AGE:** OVER 50
OCCUPATION: RETIRED SECRETARY
ADDRESS: 5 BRASSEY COURT.
BEXHILL. SUSSEX

TELEPHONE NO:

—

TYPES OF SOFTWARE USED:

(A)
(B)
(C) NONE
(D)
(E)

TYPES OF HARDWARE USED:

(A)
(B)
(C) NONE
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE NONE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

WONDERFUL INTENTION PROVIDING THEY ARE NOT ABUSED. IF I WERE YOUNGER I WOULD CERTAINLY BE INTERESTED IN LEARNING

QUESTIONAIRES

NAME: JEANNE WICKENS
D- O- B: 12 - 8 - 42 **AGE:** 53
OCCUPATION: MEDICAL CLERK
ADDRESS: 10 ST HELENS CT HASTINGS . EAST SX

TELEPHONE NO: 01424 427920

TYPES OF SOFTWARE USED:

(A) MICROSOFT WINDOWS
(B) IN HOUSE SYSTEM (PAS)
(C)
(D)
(E)

TYPES OF HARDWARE USED:

(A) ELONEX
(B) OLIVETTI
(C)
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY. DON'T KNOW

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

THEY ARE GOOD FOR GAMES BUT I HATE TO USE THEM AT WORK .

QUESTIONAIRES

NAME: C. DORSETT
D- O- B: 27.11.55 **AGE:** 42
OCCUPATION: TEACHER
ADDRESS: 57, EAST ST.,
TOLLESBURY
ESSEX.

TELEPHONE NO: CM9 8EE
01621.868.462

TYPES OF SOFTWARE USED:

(A) EDUCATION PROGRAMMES
(B)
(C)
(D)
(E)

TYPES OF HARDWARE USED:

(A)
(B)
(C)
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

I know very little about computers. A small number of children I classes I teach are reasonably proficient due to working with parents (Normally fathers) at home. In the class room the computer is used 95% of the time for word processing. It seems that individuals

QUESTIONAIRES

NAME: MRS MARGARET McINTYRE
D- O- B: 14-09-1941 **AGE:** 56
OCCUPATION: HOUSEWIFE
ADDRESS:
THE DOWER HOUSE
CHURCH HILL
PETT
HASTINGS E SUSSEX.

TELEPHONE NO: 01424 813577.

TYPES OF SOFTWARE USED:

(A)
(B) NONE
(C)
(D)
(E)

TYPES OF HARDWARE USED:

(A)
(B)
(C) NONE
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

I would have liked to have used a computer. But feel I am a little old to learn no

QUESTIONAIRES

NAME: MRS VALERIE TARRY
D- O- B: **AGE:** OVER 40
OCCUPATION: RETIRED SEC.
ADDRESS: HERBRAND WALK
COODEN BEACH
E. SUSSEX

TELEPHONE NO:

TYPES OF SOFTWARE USED:

(A)
(B)
(C)
(D)
(E)

NONE

TYPES OF HARDWARE USED:

(A)
(B)
(C)
(D)
(E)

NONE

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.
ON THE WHOLE A GREAT BENEFIT TO THE POPULATION

QUESTIONAIRES

NAME: JOYCE EVANS
D- O- B: 27.6.41 **AGE:** 56
OCCUPATION: ADMIN ASSISTANT
ADDRESS: 15 WESTFIELD LANE
ST LEONARDS
TN 37 7NE

TELEPHONE NO: 01424/751112

TYPES OF SOFTWARE USED:

(A) WORDPERFECT 6.1 AVERAGE
(B) WORD 6 AVERAGE
(C) SAGE - JUST STARTED POOR
(D)
(E)

TYPES OF HARDWARE USED:

(A) APPLE MACINTOSH ADEQUATE
(B) OMNIS 7 DATABASE "
(C) PC AVERAGE
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE

I HAVE ONLY LEARNT TO USE COMPUTERS IN THE LAST 2 YEARS BEING OF "THE OLD SCHOOL" SAID AND THOUGHT THEY WOULDN'T SUIT MY GENERATION HOWEVER AFTER BEING FORCED INTO IT THROUGH A CHANGE OF EMPLOYMENT I AM NOW OF THE OPINION THEY ARE [illegible] YOUR AGE SINCE THEY OFFER SO MUCH

QUESTIONAIRES

NAME: WENDY WOOD
D- O- B: 10 - 10 - 46 **AGE:** 51
OCCUPATION: ADMINISTRATOR
ADDRESS: 3 OLD HOUSE GARDENS
HASTINGS
EAST SUSSEX

TELEPHONE NO: 01424 443970

TYPES OF SOFTWARE USED:

3 **(A)** MICROSOFT OFFICE - IN
2 **(B)** SIERRA PRINT ARTIST
2 **(C)** QUICKEN
5 **(D)** SAGE
(E)

TYPES OF HARDWARE USED:

3 **(A)** APPLE - MAC
2 **(B)** PC OMEGA PENTIUM 100
(C)
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

I think that soon computers will be part of every home's equipment (like TVs & Fridges). Certainly they are essential items for the younger generation.

QUESTIONAIRES

NAME: SHEILA HALL
D- O- B: [redacted] **AGE:** 59
OCCUPATION: H/W
ADDRESS: 1 ESSENDEN ROAD
ST. LEONARDS-ON-SEA
EAST SUSSEX
TELEPHONE NO:

01424 - 422628

TYPES OF SOFTWARE USED:

(A)
(B)
(C) D/K
(D)
(E)

TYPES OF HARDWARE USED:

(A)
(B)
(C) D/K
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

THE LITTLE USE I HAVE HAD, I ENJOYED IT, ESPECIALLY BEING ABLE TO PRINT OUT COPIES. BEING TREASURER OF A BADMINTON CLUB IT WAS HELPFUL FOR THE ACCOUNTS. I WOULD HAVE LIKED TO HAVE LEARNT MORE.

QUESTIONAIRES

NAME: J Quaye
D- O- B: **AGE:** 60
OCCUPATION: Retired
ADDRESS: Eaglestone Rd Hastings

TELEPHONE NO:

TYPES OF SOFTWARE USED:

(A) None
(B)
(C)
(D)
(E)

TYPES OF HARDWARE USED:

(A)
(B) None
(C)
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

My only concern is that any information about me or my family on any computer is correct.

QUESTIONAIRES

NAME: DOROTHY EDEN
D- O- B: 27-11-98 AGE: 42
OCCUPATION: TEACHER
ADDRESS: 16 WILTON COURT
CAVELL ST. LONDON

TELEPHONE NO: /

TYPES OF SOFTWARE USED:

(A) CD ROMS for children
(B)
(C)
(D)
(E)

TYPES OF HARDWARE USED:

(A) CD ROM MACHINES (2)
(B)
(C)
(D)
(E)

PLEASE ASSIGN A GRADE NEXT TO THE LIST ABOVE USING FOLLOWING CRITERIA AND GRADING IT ACCORDINGLY.

(1) EXCELLENT
(2) AVERAGE
(3) ADEQUATE
(4) POOR
(5) KNOWLEDGE OF

PLEASE GIVE YOUR VIEWS AND/OR COMMENTS CONCERNING THE USE OF COMPUTERS/COMPUTING AMONG THE POPULATION.

- No particular views.

APPENDIX H: NEWSPAPER EXCERPTS

NOTA BENE

Included in appendix H are **Excerpts** of **Newspaper** articles featuring the impact of computer based technology on the bothe generation. The articles are randomly selected and attempts to show reasons for the decline in the use of computers among society. Note, the appears to be an undoubted need to educate the society at large concerning computer based technology for the future.

Turn to Techno-File, page 88, for full product details

lounge wizards

David Murphy selects the ultimate in home entertainment technology for the living room

Things have never looked so good for the couch potato. It is now possible to enjoy cinema-quality pictures, studio-quality sound, surf the Net and win a prize in a game show, all from the comfort of your old armchair. The fish don't even need feeding.

If money is no object, the very latest flat-screen TV is a must. The Fujitsu gas-plasma television (5) has a 42in screen yet is only 5in thick, which means it can sit in your lounge and still leave space for the family. It can even be hung on the wall like a painting. And programmes themselves are about to become interactive. Two Way TV (6) is currently broadcasting in the Midlands prior to national launch in the autumn. It offers viewers the chance to interact with television soaps and quiz shows. A built-in modem sends viewers' answers down the phone lines with the chance to win cash prizes. The potential is also there to use the system for market research surveys or, who knows, even one day voting in a general election.

If there's nothing on that you want to interact with, try the SCT Monterey Classic Multi-Satellite receiver (8), which is not restricted to pointing at one satellite, such as Astra, home of the BSkyB channels, but can scour the heavens for programming from almost 50 satellites. And why not use your television to surf the Web? The NetStation (7) network computer connects your TV to the Internet and is controlled by a TV-style remote. When Sky's digital satellite service launches in 1998, it will carry British Interactive Broadcasting (BIB), a joint venture between BSkyB, BT, Midland Bank and Matsushita that will allow subscribers to surf the Net, have access to e-mail and more. For the kids, activate the Sony PlayStation (9), which is still the bee's knees when it comes to playing games on your TV screen. But the future will see on-line, multi-player gaming over the Internet.

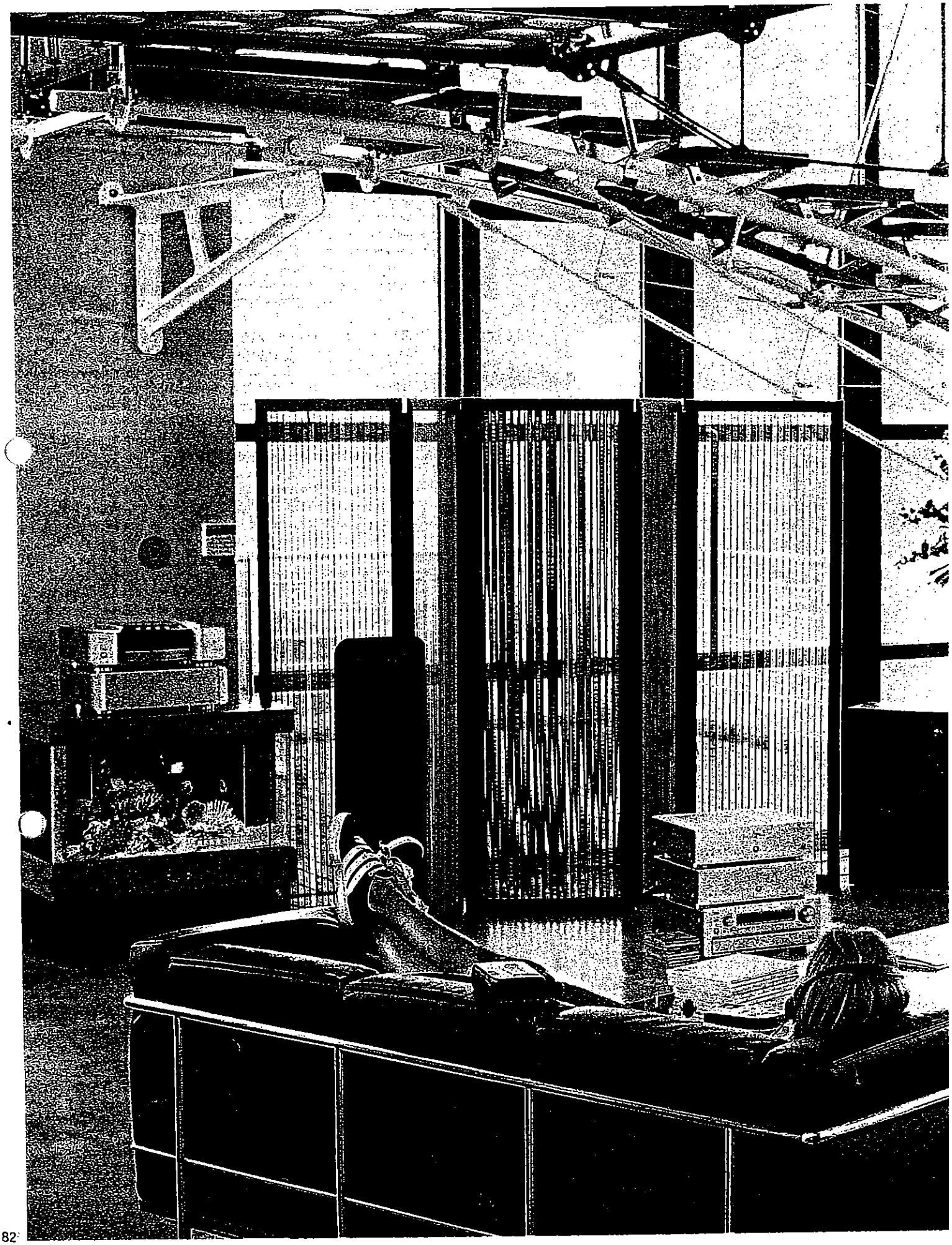
Of course, movies on a huge television screen would be a waste without re-creating the rest of the cinematic experience. The Denon Dolby Digital home cinema pre- and power amplifiers (2c, 2d, 2e) are the most awesome incarnation of the cinema-sound experience in the living room to date. Partnered with the JBL Synthesis 2 speaker system (4) — two subwoofers and front stereo speakers, a centre speaker to handle dialogue and two rear speakers for surround effects — you'll never want to visit your local Odeon again. And if you still can't enjoy pure sound because of the constant drone of the family arguing over what to watch next, try the latest Sennheiser noise-reduction headphones (13). They have a microphone on the outside of each earpiece that monitors ambient noise. Anything that it picks up is reversed in phase and fed into each earpiece to cancel it out.

If there's still nothing worth watching on the television, try the video. DVDs (Digital Video Disc) is the next-generation video system. DVDs look like compact discs but have a capacity of 4.7 gigabytes, and so can store seven times as much data. The extra capacity allows stunning picture and sound quality from your DVD player, such as this one from Toshiba (10). The launch of DVDs in Europe has been hampered by Hollywood's fears about piracy, and a domestic recordable machine has still to be launched. You can, of course, fall back on the traditional video recorder to tape your favourite soap. The Sony Digital Video VCR (11), for example, uses the DV (Digital Video) format to deliver near-broadcast-quality pictures.

For musical entertainment, most families of the future will still have a CD player and perhaps a MiniDisc recorder. Top of the CD range is the Denon transport and digital-to-analogue converter (2). In simple terms it means a CD player in two boxes, one for the CD playback mechanism, one to process the sound. The end result is the same as an all-in-one player – it just sounds a lot better. MiniDisc recorders, such as the the Sony MDS-JA3ES (12), are the modern-day equivalent of the cassette deck, offering high sound quality and convenient editing facilities.

All this music technology would be linked into your Linn KNEKT multi-room control system, which will select music from your central hi-fi system for listening anywhere in the house. A good match, perhaps, for the Intellihome home automation control system (1), which can control room temperature and lighting and, using a touch-tone phone, remotely switch electrical appliances on or off from the other side of the world.

And finally, what better way to unwind from all this high-tech gadgetry than simply to sit and stare at the fish? NEC's virtual aquarium (3) is in fact a television with a built-in laser disc player. The discs display lifelike images of fish in water to create the illusion of an aquarium without any of the work involved. No cleaning, no feeding, no smells. Anyone for virtual kids?■



it.ma
FOR ALL THAT'S NEW IN INFORMATION TECH

The race is on to make you click and shop

THE WORLD'S biggest bookstore is set to open a branch in Britain this year, a move that underlines the growing importance of Internet retailing.

Amazon claims a stock of 2.5 million books, although none is kept on its premises in Seattle. Its low prices, speedy service and huge 'virtual' stock have made it one of the most successful sites on the Internet.

Having attracted thousands of European subscribers, the firm is conducting research before making its final decision on opening a branch in Britain. If it opens a warehouse in this country, it will cut shipping times dramatically.

Although Amazon's Web site, at www.amazon.com, is not always the cheapest source of books on the Internet, it is probably the best designed shopping site on the Web.

Regular customers have access to 'one click shopping', where a button appears beside each book on screen — one click and you have paid for it and arranged shipment. There are also personally tailored guides to new books, together with author profiles and the chance to browse a book's text before buying.

by ANDREW BROWN

Amazon's growth has produced several rivals including Bookpages, based in Britain.

Although amazon.com still runs at a loss, its turnover and threat to High Street retailers has been seized on as an example of how Internet shopping is set to explode.

The World Trade Organisation predicts there will be 300 million users of the Internet by the turn of the century, doing more than £200 billion's worth of business.

Some Internet shopping is purely electronic. You can already buy software and clip art straight down the phone line, and will be able to buy music as soon as the record companies can work out how to encode it to prevent unauthorised copying.

Many of the largest computer companies in the world have taken to selling over the Internet. Dell, Apple, and Gateway 2000 all have sites where you can order exactly the computer you want and have it delivered to your door.

Several British firms also sell computer parts over the Web for delivery the next day, which is simpler and usually quicker than buying over the phone.

High Street retailers in the UK are currently poised to seize the Net's possibilities. Interflora and Victoria Wine already operate successful sites.

British supermarkets hope the Internet will give them the kind of personal knowledge of their customers' habits which only small, upmarket shops have in the real world.

Tesco has launched a shop by Internet service in selected areas of London and Leeds, where you fill out a shopping list on screen and everything is delivered to your home within 24 hours for a £5 fee. Other supermarket chains are looking into this also.

But the Internet is also proving a boon to smaller companies, who have found the Web enables them to promote their wares around the world for next to nothing.

Penny Duns and her husband Colin realised the dream of many British couples when they moved to the France eight years ago, where they run a vineyard at Cahors, near Toulouse, selling their wines across the Internet.

Buyers logging on to their Web site can read a catalogue of wines on offer before printing out, or faxing, an order form. The wines can be delivered to Britain.

Penny said they were surprised to find that the real success on the Internet was selling the vines, not wines. The Duns offer people the chance to rent a row of vines for £200 a year, which allows 'tenants' to get the wine from those grapes at cost price in bottles with personalised labels.

Read this page on the Internet
http://dailymail.co.uk

Q IF I switched to Internet Service Provider with a lower user-to-modem ratio, would it be any faster? *Jenny Taylor.*

NOT necessarily, but you would be less likely to come up against an engaged tone when you try to dial in. ISPs have only a limited number of modems. If they're all occupied, you won't access the Net at any speed.

Q I JUST bought a second-hand multimedia PC but it doesn't have Sound Recorder or CD player. Where can I get these? *John Quinn.*

INSERT your Windows 95 CD, go to Add/Remove Programs in the Control Panel, highlight Multimedia under the Windows Setup and click on Details. Check boxes next to Sound Recorder, Media Player, Volume Control and CD Player, then click OK.

■ *IF you have a computer query, contact Angus Kennedy at angus@dailymail.co.uk*

IT: it's as easy as ABC

The only intimidating thing about IT, or Information Technology, is the phrase itself.

Because it sounds like jargon, most of us think we don't understand IT, when in fact we use it every day.

If you've ever used a touchtone phone – even just to store a number – you've used IT.

The same applies if you've ever used a bank cash dispenser, stood by a barcode scanner at a supermarket checkout or used Teletext on TV. They are all aspects of IT.

Information Technology has filled our lives with information and entertainment, bringing us – among other things – mobile phones, pagers, advanced phone services, fax, electronic mail and the Internet. At shopping centres, railway stations and airports, electronic kiosks are starting to appear where you can walk up to a screen and just touch the screen for the information you need and have it printed out.

And the same approach that enables us to use communications tools like mobile phones and pagers, – the following of a straightforward set of instructions – applies to using computers.

But if you don't have a computer at home or work in a job that involves computers, you may not have had the chance to try out this and other related technologies like e-mail and the Internet.

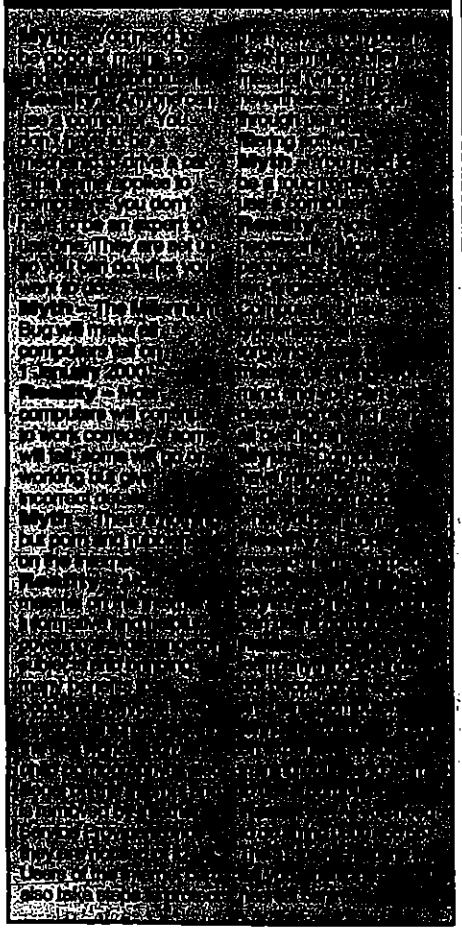
If you've missed out so far, then this is where 'IT for All' comes in. It is a government initiative to help people, regardless of age or education, to find out about and try new technologies like the Internet and e-mail

'IT for All' has developed a fast-growing network of drop-in centres – more than 1,500 at the last count – where beginners can have the opportunity to try out a computer, and, if they want, receive some basic training at low cost or none at all.

To find out more, call the Freefone number at the foot of the page or fill in the coupon.

You'll be glad you did.

MYTHS AND REALITIES



Julie joins the IT revolution

UNTIL she started to do voice-overs for radio commercials to promote 'IT for All', actress and presenter Julie Peasgood (above) was a self-confessed techno-phobe.

At 41, she reckoned that she belonged to the generation that had just missed learning about computers at school.

Julie, who recently spiced up soap opera in *Emmerdale* as sexy VAT inspector Jo Steadman and is a team captain on the BBC's daytime *Give Us A Clue*, was really negative about computers.

'I was intimidated by all the jargon,' she says.

'I'd got to the point where you think you won't get the hang of it and why bother, because you've survived so far without it?'

Then Julie, who next month stands in for Judy Finnegan alongside Richard Madeley on TV's *This Morning*, found herself doing voice-overs from a script explaining how ordinary people had benefited from 'IT for All'.

'They really impressed me,' she says.

Fired by their example, and the fact that her 74-year-old mother had just bought a computer, Julie decided to investigate her local 'IT for All' centre to learn about computers.

The course, at her local library in Richmond, Southwest London, surprised her.

'It was so easy – I didn't even need an appointment. I sat down in front of the screen and it just guided me through everything. It was amazingly easy.

In next to no time Julie was using the computer to write letters.

'I'm the chair of my daughter's school's PTA and there are lots of letters to write. I'm one of those people who start a letter and if it doesn't sound quite right screw it up and start all over again. On a computer it's so much easier – and even though I'm a painfully slow typist, it's still much quicker than using pen and paper.

'I still have to pinch myself when I realise I'm keen to learn about things like spreadsheets. It doesn't feel quite me.

'I'm so glad I went on that course. It does your self-esteem a lot of good. Technology is moving so fast and you run the danger of feeling excluded – when you don't have to be.'

Jargon busters

- **Browser:** Software that retrieves and displays information from online services
- **CD-ROM:** Compact disc format that can store vast amounts of words and pictures as well as sounds and video. Initials stand for Compact Disk-Read Only Memory.
- **Digital:** The primary language of computers where everything is converted into numeric values, that are coded in zeros and ones.
- **Download:** the process of moving information from one computer to another.
- **e-mail (electronic mail):** allows messages to be posted from computer to computer.
- **Hardware:** The physical parts of the computer and accessories such as printers.
- **Information Society:** A nation that benefits fully from information and communication technologies.
- **Information technology/ IT:** General term that describes technologies that collect, store, process and communicate information.
- **Interactive:** Information displayed by a computer or TV that you can control or influence to answer a question, obtain information or solve a problem.
- **Internet:** The worldwide network of interconnected computer systems.
- **Multimedia:** Systems that bring together the interactive use of text, audio, still images, video and graphics.
- **Modem:** Device that enables computers to talk to each other over phone lines. Stands for MOdulator/DEModulator.
- **Online:** connected to another computer via a phone modem.
- **Software:** Programmed instructions that tell the computer hardware what to do.

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FOR ALL THAT'S NEW IN INFORMATION TECHNOLOGY

Family album for the world to see

by JONATHAN MARGOLIS

Woodcocks on the Web: Sandra with children (from left) Anna, 15, Tom, 17, and Tasmin, 11

THOUSANDS of British families are setting up Web sites, posting an Internet album of their lives, relationships and interests for anyone in the world to examine.

Demon, a leading British-based Internet company, says about 20,000 families have taken advantage of its free Web pages offer. Other Internet providers say they have been surprised by the enthusiasm with which British computer users have embraced the idea.

Marc Demarest, the computer-age guru, believes such sites are far more than a temporary phenomenon. He says: 'It's a way of making yourself known in the wider world unlike anything there's ever been.'

Demarest believes that within a few years it could become as normal for families to keep up a Web site as it is now to be on the telephone. 'People love having the world's largest encyclopaedia at their fingertips, and this gives the chance to add to it, too.'

Among those with a family site are the Woodcocks from Southampton. It started when Tom, 43, a hospital consultant in intensive care, set up a Web site last year to pass on techniques and tips to doctors.

The idea of turning it into a general Woodcock family album grew later. Now it includes everything from the work of Tom's unit — on topics such as hepatic failure and brain death — to his teenage son's computer game reviews, and a very funny spoof newspaper. There are also helpful tips on travel with toddlers, a subject of which the Woodcocks clearly have great experience.

'Potentially, I think family Web sites are a marvellous thing,' says Tom. 'And they're going to become very commonplace, because making a site is incredibly easy, and it doesn't really cost anything if you already have an Internet connection.'

His site has attracted a small network of 'penpals' the world over. 'It's opened up a new community,' says Tom. 'It means we don't just live in a street; the world is our electronic street, and anyone in the world can knock on our door for a chat, take a look at our family photos or drop in a Christmas card.'

Such sites can also have unexpected results. Since November 1996, when Russell Whitworth, a management consultant from Inverkeithing, Scotland, posted up his family details, more than 1,800 people have logged on to read about subjects as diverse as his children's activities and the rock group King Crimson.

Among those logging on to the Whitworth pages was Russell's old Scoutmaster, now in South Africa, who stumbled on the site as he surfed the Internet.

American-based AOL, one of the biggest International Internet providers, gives customers space for up to five Web pages — plenty of room for parents and children to have their own sites. Combined with programmes such as Adobe Pagemill, the once complex business of making a Web site has become almost as simple as writing with a word-processing programme. AOL says its on-line Personal Publisher makes constructing a page, complete with pictures and soundclips, a 20-minute job.

WEB sites are written in a code called HTML (Hypertext Markup Language), but you don't need to be an expert. Web page creation tools insert all the instructions automatically behind the scenes.

To put your page out on the Web, you need a computer to which it is permanently linked. Normally, your provider will allow you space on its server, and allocate you an address.

Where will this curious family Web sites revolution end? According to James Gardiner of Demon Internet, in an intriguing place.

The Internet hasn't been around long, but some people with personal Web sites have already died.

'The newest thing I've heard about,' says Gardiner, 'are companies who, for a one-off fee, will place the Web pages of a dead person on a server for eternity, in a virtual graveyard. So instead of your pages dying, people can come to see who you were and what you did in your lifetime.'

From the family Web site to the interactive family tomb in a virtual graveyard. Is there anything left to surprise us?

Read these pages on the Internet
http://dailymail.co.uk

ASK ANGUS

EACH week Angus Kennedy, our agony uncle, answers some of those baffling questions that arise as you tap at your keyboard. You will find the answers archived on our Internet site.

Q SINCE I've installed Internet Explorer 4.01, my computer often refuses to 'shutdown completely. I have to switch it off at the on-off switch. When I reboot, Scandisk starts automatically and warns that the system wasn't properly shut down. How can I fix this? *Mal Stephens*

SEVERAL things could be crashing your computer but the most likely is Internet Explorer's Windows Desktop Update component. It's worth removing anyway as it slows your system down.

Open Control Panel, double-click the Add/Remove Programs icon, select Microsoft Internet Explorer 4.0 Web browser, click Add/Remove and then click 'Remove the Windows Desktop Update component but keep Internet Explorer 4.0'.

If that doesn't work, try completely uninstalling Internet Explorer. If that works, then either reinstall Internet Explorer, this time without the Desktop Update component, or switch to Netscape Communicator. If none of this helps, refer to the Microsoft Knowledge base at: http://support.microsoft.com/support/kb/ARTICLES/Q145/9/26.asp

Q I RECENTLY double-clicked on a file that Windows didn't recognise and accidentally associated it with a program. Now every file with that extension is associated with this program. Can I get it back to how it was? *Chris Dowlen*

RIGHT-CLICK on My Computer and choose Explore. From Explorer's menu select View/Folder Options, click the File Types tab and locate the file type in question. Then either 'Remove it' to delete the association or 'Edit' it to associate it with another program. In the latter case, it's probably easier to remove it and install/reinstall the preferred program.

Q THE files in my Windows 95 Temp, Temporary Internet and History folders take up over 50 Mbs. Can I safely delete them and if so, how? *Sam McDonagh*

FIRST close all programs. Locate the Windows 95 Temp folder. Any files over a week old can be safely deleted. Temporary Internet and History files can be deleted from under the General tab in Internet Options from the View menu in Internet Explorer. Reduce the size of these files if you're worried about disk space.

Send your queries to Angus Kennedy, it.mail, Daily Mail, 2 Derry Street, London W8 5TT, or e-mail him at angus@dailymail.co.uk

Ladies who log on

by JAN HOWELLS

LARGE groups, feeling out of our depth, and dropping behind through skipping classes are the main reasons we drop out of courses — computing included.

The obvious answer is individual tuition, but personal trainers can be prohibitively expensive. The London Ladies Club, however, believes it has come up with the answer.

The 500-member club, which offers a meeting place, advice and lectures for women, has hired a computing tutor who will visit members in their home or in the office. Courses are customised to individual needs and set for a time which suits the client, and not, as is so often the case, the tutor.

'We tried initially to run computer courses, but we found it impossible to get a group of four to six people together who were of the same standard,' explained Penny Williamson, the club's founder member and its full-time outside events co-ordinator.

'There are also so many different types of software, so this seems the obvious solution.'

After talking to some contacts in the City of London, Penny finally settled on Rod Scrimgeour, a technology consultant and IT teacher at Westminster

Screen savers: Rod Scrimgeour and Penny Williamson

University. He charges £35 per hour, a typical rate for a personal trainer.

'It is another service for our members and it has been very popular — although that may be because Rod turns up to class in black leathers on a huge motorbike,' says Williamson.

As well as tutoring in packages such as Microsoft Office Suite and Microsoft Works, Scrimgeour installs Internet software and shows members how to surf the Net and use e-mail.

Increasingly, he has also been installing protection software to stop children finding unsuitable material on the Internet.

'It is extremely varied. Some want to advance in their skills for business reasons, others simply want to e-mail friends abroad,' says Scrimgeour.

As with any subject it is difficult to predict how fast someone will learn, but Scrimgeour is confident that anyone, even a complete beginner, can be familiar with a word processor after three hours of tuition.

'Some of the ladies were fully-trained typists in an earlier life, so they have a big advantage,' says Scrimgeour. 'Others have never changed a plug, let alone touched a keyboard, so they require rather more patience.'

He recommends that tuition lasts no more than two hours per session. 'You just can't take in more than that realistically,' he says.

If members do not already have a computer, Scrimgeour takes along a notebook computer. And if the trainee gets hooked, Scrimgeour will give advice on what computer to buy and how to link up to the Internet.

'I'm not committed to any one manufacturer or the final transaction, so I can give my honest opinion on what kind of package I think would suit their needs,' he says. He also provides technical support to members who retain his services.

If you aren't based in London, training agencies and secretarial colleges often run courses for individuals. Usually bookable on a daily basis they cost around £150. Local newspapers carry adverts for one-to-one training at up to £50 an hour.


Gripping: Blade Runner

Riven emerges triumphant from the Myst

RIVEN (Red Orb Entertainment) PC CD-ROM (£44.99)

IN THE EARLY Nineties a game called Myst was launched, featuring simple and intuitive gameplay combined with an outstanding quality of graphics. It became the biggest-selling PC game.

Now its sequel, Riven, is out and the graphics are even better. Riven is what the creators had intended Myst to be first time around, but they lacked the resources to do it then.

To achieve their aims, they turned to the technology used to create the dinosaurs in Jurassic Park. Starting where Myst left off, your role is to rescue the beloved spouse of Atrus, lost somewhere in the islands of Riven.

The island is unique, from the stupendous scenery to the mad professor-style inventions dotted around the place.

The puzzles have been well put together, and you need a keen, logical mind to get anywhere. This is a work of amazingly creative imagination. ★★★★☆

BLADE RUNNER (Virgin Interactive) PC CD-ROM (£44.99)

BASED on the cult movie, Blade Runner is a game that has special written all over it from the beginning.

Developed by Westwood Studios, this captures the ambience of the movie perfectly.

You play a character called Ray McCoy, in the Replicant Detection Division of the Los Angeles police. You investigate what seems to be a routine crime, and each location turns up clues. Four CDs will keep you absorbed for months. ★★★★★

DAVID GIBBON

ASK ANGUS

EACH week Angus Kennedy, our agony uncle, answers some of those baffling questions that arise as you tap at your keyboard. You will find the answers archived on our Internet site.

Q I RECENTLY changed my screen resolution from 640x480 to 800x600 and then back again. Since then, I've had problems with my Start menu. The icons are too big and I have to scroll up and down to see all the programs. How can I change it back? *Malcolm Chambers.*

RIGHT-CLICK on the Taskbar at the bottom of your screen and choose Properties. Then go to Taskbar options and check the box to 'Show small icons in Start menu'. If you still have too many items in the menu, right-click on the Start button, choose Explore and nest the shortcuts into the new subfolders.

Q I OFTEN lose my Internet connection halfway through a download or while using NetMeeting. It's very distressing. What can I do? *Morvyn Finch.*

YOU can expect to get dropped offline occasionally, but if it happens regularly, you should check each link in the chain between you and your provider. Start by reporting it to your provider.

A common, but often overlooked, culprit is telephone Call Waiting. If that's enabled, and you're called while online, those little beeps will knock out your connection. If that's not it, try a different access provider, phone line, and modem.

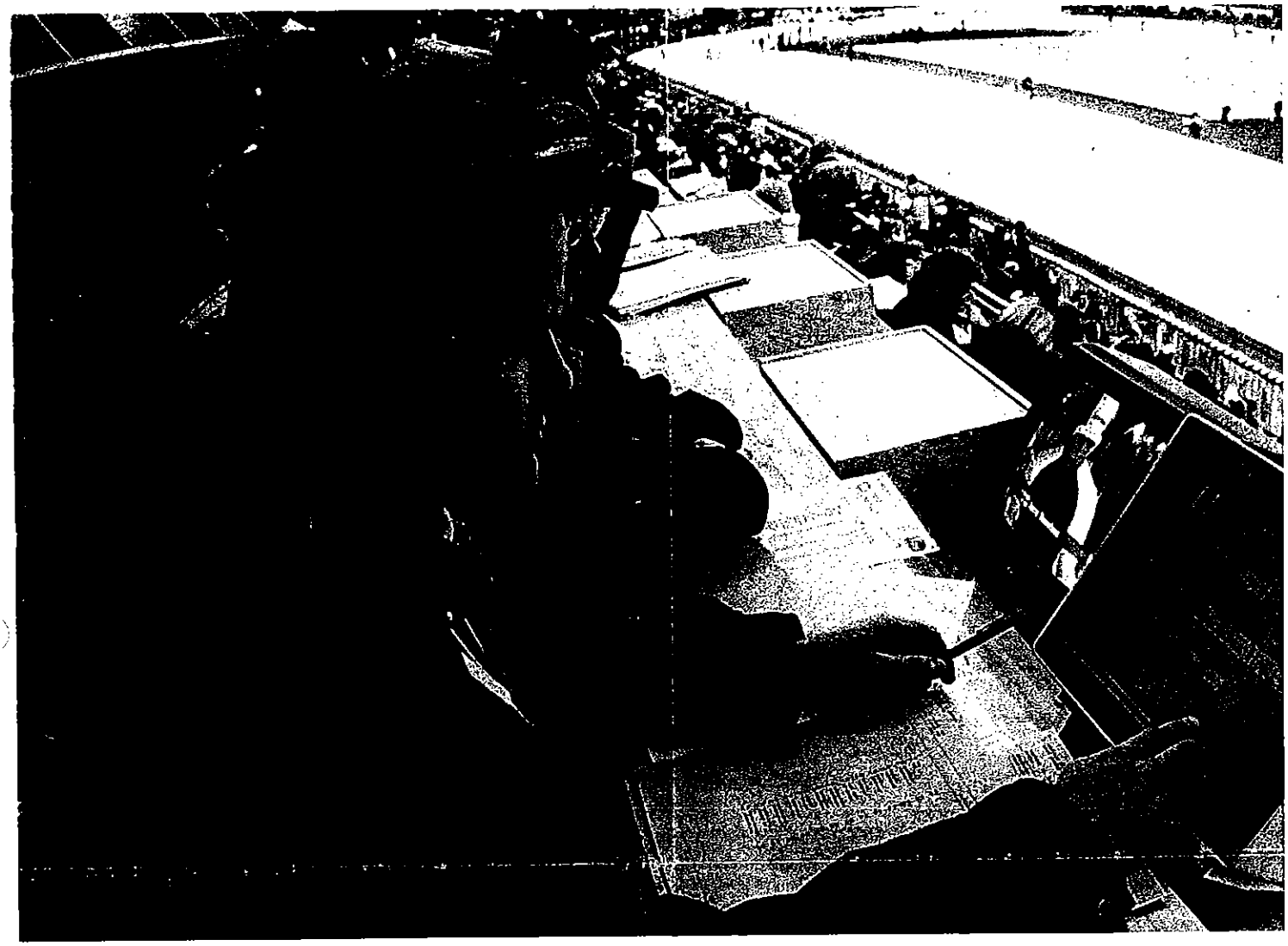
As a defence, ensure your FTP program supports 'resume downloads'. Then if you drop out, you can go back and pick up where you left off. The latest versions of Netscape and Internet Explorer both resume broken downloads, but if you're a keen file-hound throw Gozilla on top: http://www.gozilla.com

Q SINCE installing Internet Explorer 4.0, the additional option 'Log Off John' has been added to my start menu, just above the 'Shut Down' option. How can I remove it? *John Steel.*

THERE is a way, but you'll have to track down the Win98 version of TweakUI. It's free, but not online yet. However, it is on the Win98 beta CD, in the \Betaonly\tweakui directory. If you can get a copy, then install it, click on the new TweakUI icon in the Control Panel, select the IE4.0 tab, uncheck the box 'Allow Logoff' and reboot your computer.

PS IN REPLY to several readers following up an earlier reply, if you've installed that Windows95 password patch, but it failed to get rid of the log-in nag screen, try this: http://ourworld.compuserve.com/homepages/J_Helmig/tweakui.htm

Send your queries to Angus Kennedy, Mail IT, Daily Mail, 2 Derry Street, London W8 5TT, or e-mail him at. angus@dailymail.co.uk



Invisible electronics are the key

Light beams on the ice surface will trigger equipment capable of timing speed skaters to one hundredth of a second. Commentator information systems will disseminate worldwide the results of events within one second. ***Alan Cane*** *reports*

Performances have improved remarkably but the basics of skiing and skating have changed little since the Winter Olympics were last held in Norway. The technology underpinning the management of the Games has undergone a revolution, however.

The timing, data processing and security systems which will be used in Lillehammer would have seemed miraculous to competitors and spectators in Oslo, 42 years ago.

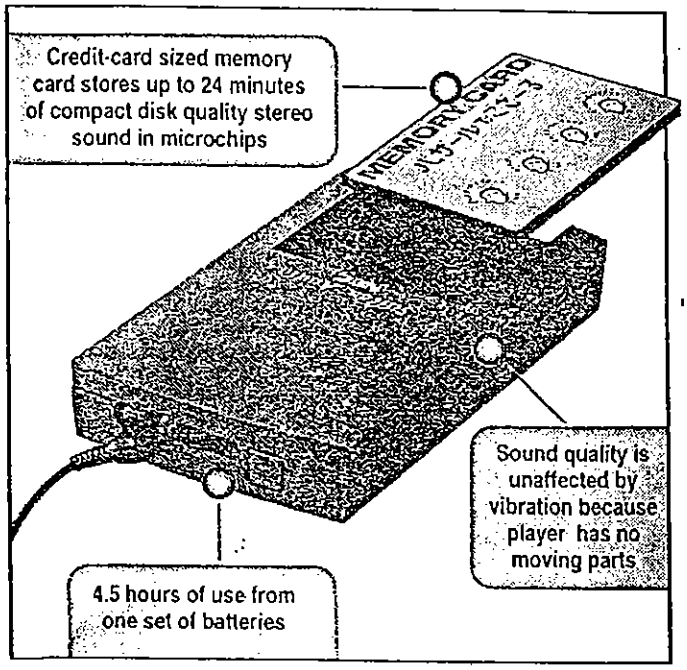
Even by today's standards, they are something special. Light beams on the ice surface will trigger electronic equipment capable of timing speed skaters to one hundredth of a second – one thousandth of a second on the luge. The results of events will be disseminated worldwide within one second of the finish.

Complete and detailed maps of each site and every location, down to individual chairs and tables, are available from a computer database at the touch of a button. Police resources will be monitored by satellite and controlled by a computer system developed by Andersen Consulting.

Technological innovation extends to the physical environment of the Games. Advanced construction techniques have been used to create structures of remarkable grace and strength. The laminated wood beams which support the vaulted roof of the 22,000 sq m. Olympic Hall at Hamar, to be used for speed skating, are an unprecedented 96m in length. A special low-

Evening Standard City Prices
2nd December 1994
Page 7

Now music comes on a credit card



FIRST there were records, then tapes, then CD's. Now the Japanese have unveiled their latest cunning musical invention — the Silicon Audio card.

NEC has just announced that it has developed a Walkman-like pocket stereo that uses memory cards instead of tapes to store music.

The interchangeable silicon cards, the size of fat credit cards, contain rows of tiny computer memory chips.

Each card can hold up to 24 minutes of high-quality music, the company says.

It would mean you could simply walk into a music shop, stick you card into a slot and load the latest hits on to it.

Just one card will set you back £1,500 so only the rich and really trendy will be able to afford them for Christmas. But predictably prices are expected to fall and in 10 years they could cost as little as £75.

by MICHAEL SWAIN

The rest of the player will cost only just over £30 to make and eventually could be the same size as the card.

The players are lighter than conventional cassettes and don't have any moving parts to wear out or skip. And unlike tapes, the chips allow instant random access to different music tracks.

The cards also could be used to store still pictures and moving images.

NEC is considering a version that could also function as a debit card, with each music purchase subtracted automatically from the total credit on the card.

Electronics Weekly
7th December 1994
Page 6

NEC heralds the age of music on silicon

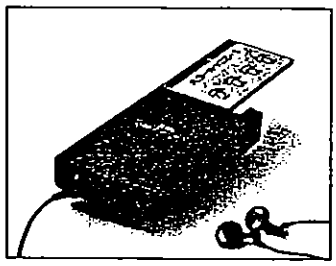
Karl Schneider

Japanese electronics giant NEC has developed a portable music player/recorder that produces CD-quality sound from data stored on an IC flash memory card.

Called Silicon Audio, the solid state player has no moving parts, unlike conventional portable players which use discs or tape to store the music. NEC hopes the technology will eventually result in a direct competitor to the latest Walkman-type systems such as Sony's mini disc and Philips' digital compact cassette.

The prototype player unveiled by NEC last week uses a 32Mbyte flash memory card, containing 16 x 16Mbit flash chips.

The player compresses a 20MHz, 770Kbit/s signal to one eigth its original size, ie 96kbit/s, using MPEG audio chips developed by NEC. So 1Mbyte of memory can store 5.5 minutes of music and the 32Mbyte memory card can hold 24 minutes of material.



Silicon sound...Music played from a flash memory card.

Silicon Audio will get its first public showing at a conference in Tokyo next week. NEC says it is looking at ways to bring the technology to market "as early as possible".

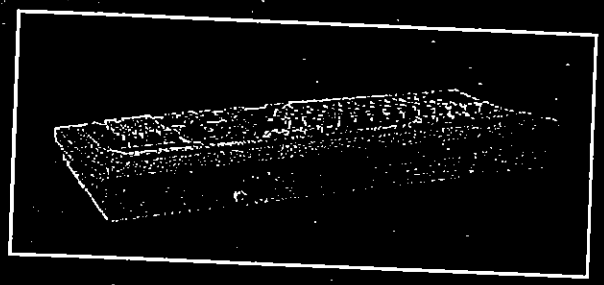
However, the cost of 16 x 16Mbit flash chips alone (around £2,000) means the device is not likely to appear as a consumer electronics product for some time. Another drawback is that the player can only run for 4.5 hours on its four nickel cadmium batteries.

We've taken computer design out of the Stone-Age

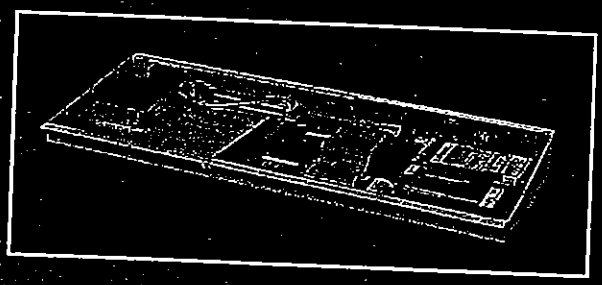
AMD 586 AVAILABLE NOW!

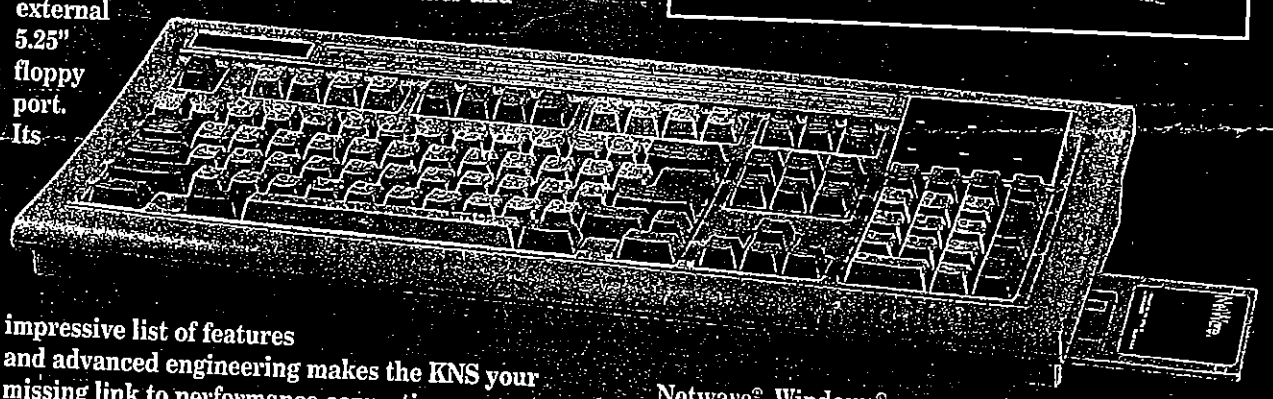
KNS, the world's first *TRUE* keyboard computer

Primitive design chooses to house a tiny microprocessor inside a bulky case. With desk space being a rare commodity these days, why put up with such stone-age packaging? Cut the clutter with the Keyboard Network Station (KNS) from Advanced Interlink Corporation.



We're changing the shape of computing by packing technologically advanced components inside a keyboard! This logical evolution of the PC doesn't sacrifice performance for size. The KNS is a compact powerhouse that houses a 80486DX microprocessor*, up to 32 megabytes of RAM, super VGA adapter, 2.5" hard drive, built in 3.5" floppy drive, optional on-board Ethernet, two serial ports, one parallel port, standard 16 bit expansion slot, optional barcode reader and external 5.25" floppy port. Its impressive list of features and advanced engineering makes the KNS your missing link to performance computing.





On-board Ethernet connectors with a choice of thin coax or twisted-pair cables and a data transfer rate of 10Mbps makes the KNS a smart addition to any new or existing network. The KNS is fully tested and compatible with Novell Netware®, Windows® and DOS® environments.

To find out more about the KNS (Keyboard Network Station), give us a call and let us show you how we have taken computer design out of the stone-age.

*Cyrix, AMD and Intel processors supported

yes It runs with NetWare

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travel file

NEWS YOU CAN USE FROM BA AND BEYOND

VIRTUAL SKIING

This woman is taking a skiing lesson yet she won't encounter a single flake of snow. She "skis" down a hillside of computer graphics displayed in her helmet, while metal plates under her feet move to mimic the sensation of travelling down the piste. If it all sounds a bit bland to you the computer has thought of that too. The skier's mental state is constantly monitored by blood flow through a finger. If the skier relaxes and her pulse slows down the computer instantly compensates and makes the virtual slope a bit tougher. The only difference is no broken bones!

Kirsty Chubb, NEC (UK) Ltd.,
West World Gate,
London W5 1DT.
Tel: 081 991 9697

Business Life March 1993

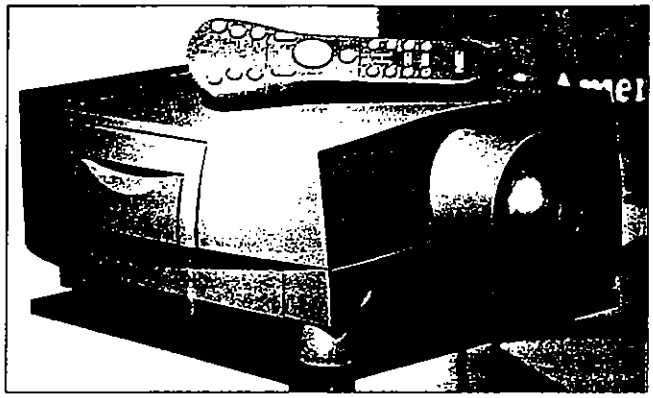
THE RACIN

MEDIA MANIA

WHO'S AFRAID OF THE EUROPEAN

THE KANGAROO CONNECTION

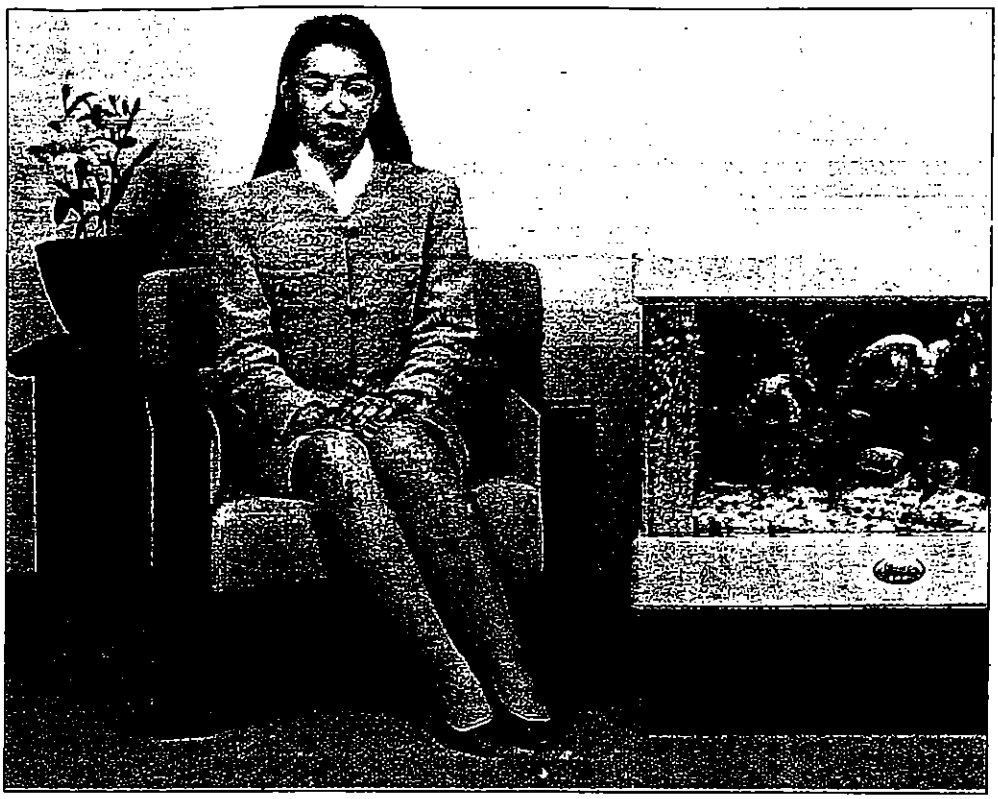
THREE MORE PROJECTORS



In response to demand for true 800 x 600 SVGA projection equipment, Maverick has added the NEC MT800 (illustrated), Proxima Desktop 5600 and Sharp XG-3795E projectors to its multimedia presentation products. All three enable users to take full advantage of software such as Windows 95 which is designed to run on true SVGA resolution.

The MT800 and DP5600, priced at £7,995 and £6,995 respectively, are featured for the high end user. Both are light in weight, the DP5600 featuring a motorised zoom lens and the MT800 seamless switching between video, audio, PC or MAC inputs. The XG-3795E at £4,995 represents good value and features a built in amplifier and stereo speakers.

Maverick **Enter no 214**



Designed to soothe: Japanese virtual tanks even have "pseudo-realistic" bubbles and noise

The virtual fish that will never bite back

A JAPANESE company has come up with the ultimate must-have accessory for the multimedia age — a virtual aquarium.

It arrives complete with fishes of your choice courtesy of a laser disc. This means the tank's inhabitants never need feeding, their water changing, nor their temperature precisely monitored.

Known as the Fish Club, it uses laser-disc technology in a free-standing cabinet that looks exactly like a real aquarium. Around 200 have already been sold in Japan by manufacturer NEC, and according to the company's British marketing marketing manager, Simeon Joseph, there is strong interest here.

According to Joseph, the tanks already sold are being used in reception areas, advertising agencies, hospitals and doctors' waiting rooms, where their soothing and therapeutic natures are well known.

The tank is a combination of a 32in high-definition TV screen, display technology and a laser disc player. To make the tank seem even more authentic, there are two layers of clear plastic at the front which act as a slight lens. Sandwiched inside is a layer of water through which a pump blows air bubbles and generates noise to add "pseudo-realism".

If you can't find a yellowfin horse mackerel or a long-nosed butterflyfish at your local pet shop, then have no fear. You can find them on the 22 laser disc titles currently on sale. They include *Goldfish 1*, *Goldfish 2*, *Carp*, three versions of tropical fish, creatures of the sea and other rarities.

NEC expects that when they go on sale here later this year, they will be sold for around £12,000. Joseph hopes that they will also be hired through specialist leasing companies just in case you change your mind — or want a virtual lake scene, instead.

For further information, call Simeon Joseph at NEC on 0181-993 8111.

NICHOLAS BOOTH

Times Interface 19-3-97

TIMES

17 SEP 1993

PCs to acquire arresting looks

Computer magazines are full of articles about the insides of personal computers, and how various combinations of unintelligible acronyms can make one machine faster, cheaper and generally more desirable than another.

Design is an issue that rarely raises its head in the technical press, yet for most other electrical commodities how a product looks is just as important as what it actually does.

Over the years PC users have been conditioned to believe that the amount of memory, the size of the hard disc and the speed of the processor are the key criteria by which a desktop computer should be judged.

Perhaps this is just as well because, when examined with a candid eye, most office PCs are too big, too noisy, too greedy with electricity, and, in aesthetic terms, plain plug-ugly.

They are also, for the average office user, all very much the same, which may be one reason why the question of design is finally beginning to become a live issue.

PC manufacturers are at last desperately searching for a way in which to make their products stand out from the battalions of lookalikes that are crowding retail shelves. NEC, the Japanese manufacturer which has been running blueprints for the PC of the future through an internal think tank, has come up with several prototypes.

These go well beyond today's conventions, however, and are designed to be not just portable but wearable. NEC's

> The 'spoon' terminal comes on wheels and can be whatever its user wants

futurologists predict that the report writer of the future will wear a "lapbody", an advanced notebook that hangs from shoulder straps like a purse and can rest in front of the chest when in use.

Other variations include the "porto office", in which the electronic components, including a fax, video camera and touch pad, are contained in a tube supporting a keyboard and a display, and the "spoon PC", a round terminal on wheels which can be used from any side, turning itself into a keyboard, touch pad or pen pad according to what the user requires.

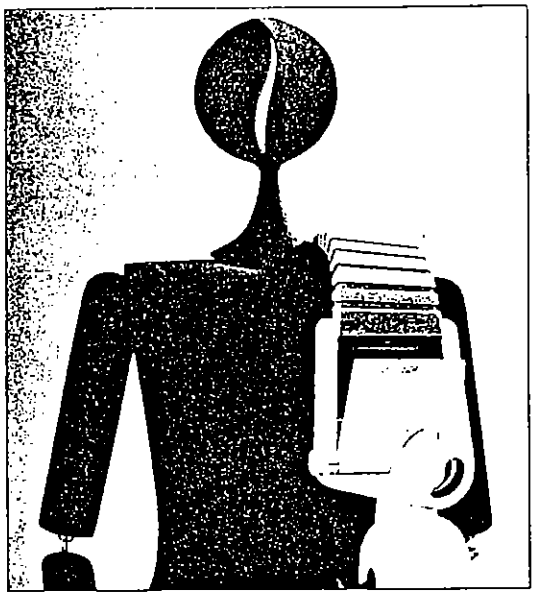
NEC is keen to emphasise that its glimpse into the future is pure speculation, not an announcement of products about to appear. But the company believes that design is an area for future development, and has incorporated some of the elements of its future PCs, including swivelling screens and high quality colour flat displays, into its fast-selling range of Ultralite notebooks.

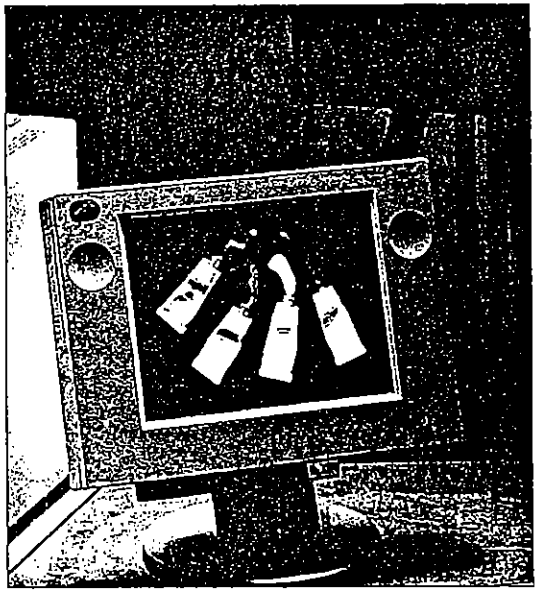
In the next century, says Hideji Takemasa, NEC's design centre superviser, the PC store may look more like a designer boutique and less like the industrial warehouse of today.

Toshiba, another Japanese manufacturer, now makes nothing but notebooks and believes that, with new developments they will increasingly supersede the standard office desktop PC.

IBM, which has often been criticised in the past for being slow to lead the PC market it originally developed, has been the first to lay down a serious challenge to conventional desktop design.

Its new PS2/E machine is the most innovative desktop machine in years, a fully fledged, powerful modern 486 computer, but with a modular, stylish image that would look equally at home as part of an upmarket hi-fi system.





NEC is working on prototype "lapbodies" (left), while IBM's PS2/E is a serious challenge to usual desktop design

IBM's key criteria for the new product may well be a blueprint for the PC of the future, the machines that will follow today's big, noisy, power-hungry beasts.

The template for many of the features of the desktop of tomorrow is the notebook of today. The top model of the PS2/E range uses the same flat-screen colour display found on IBM's Thinkpad notebook, but mounted on a Z-shaped bracket.

You can hang the screen on the wall or move it around the office with one hand. Like all high-quality colour screens, the cost is high, accounting for more than half of the £5,500 price.

Analysts predict a continuing fall in flat-screen prices over the next few years as production techniques improve. IBM considers that by the turn of the century most office desktops will be using flat screens.

The PS2/E has a small notebook-style keyboard, with full-size keys and a built-in "mouse" that looks like the rubber from a school pencil. To keep down the base unit size, the system uses the latest alternatives to old-fashioned expansions slots, PCMCIA slots that can accept a wide range of cards, from hard discs to modems, in two credit card-sized holes in the side of the machine.

PCMCIA is a developing standard, fast taking hold of the notebook world and now spreading to desktops. It promises huge advances over conventional expansion slots.

Cards can be inserted and withdrawn easily, without turning off the machine, so a user can take his or her entire workload on the road on a single credit card-sized hard disc.

But compactness also has its price. PCMCIA devices are more costly than conventional devices. Psion Dacom is one of the leading manufacturers in the market its V32 bis device has just been reduced to £499. IBM says it expects interest in the PS2/E, one of the most expensive PCs available, to be limited to chief executives who want something stylish on their desks, and business roles which require a piece of front-desk equipment that is less ungainly than the common cathode ray tube monitor, such as hotel reception areas or travel agencies.

The lessons the company learns from its stylish venture into PCs with cachet will then be used to design next year's flush of new machines.

ALLISON PEARSON

Making babies too clever by two-and-a-half

A WORLD summit on children's television sounds like a pretty daft idea. Sure enough, no sooner have the delegates turned up in London with their Muppet pyjamas, their Thomas the Tank Engine lunch boxes and their 101 Dalmatians condoms (we don't want any little accidents, do we?) than they start picking on four poor British kids; Dipsy, Laa-Laa, Tinky Winky and Po.

The po faced — tragically not "Po"-faced — delegates concluded that the Teletubbies are bad for youngsters because they are not educational enough. "Children are invited into an alien-looking world with some alien-looking creatures talking in baby language. What is there for small children to aspire to grow up to?," demanded one outraged "expert".

The expert, as is the way with experts, was asking the wrong question. What we should really be wondering is, why do we think children as young as two and three (the Tubbies' natural constituency) need to watch educational programmes? Why should a being which can't yet use the toilet by itself be "aspiring" to anything more demanding than a lesson in puddle-dancing from Tinky Winky?

If you think the TV experts' priorities seem crazy, they are sadly just a reflection of a wider madness that is infecting the world of child rearing. Last week, I spent an afternoon with a group of mothers who were anxiously comparing notes on the scholastic prospects of their offspring. All the students concerned were the same age as my daughter, two-and-a-bit.

But she's just a baby, I protested, fighting the panic rising in my throat as I realised that I was the only person in the room who had failed to put their child down for a Nobel-standard nursery. Even worse, I was not up to speed on the schools that Evie should aim to get into when she was four. At that age, packed with skills and knowledge from her uber-kindergarten, she would have to undergo an interview, a battery of tests and, for all I knew, perform selected extracts from the works of Shakespeare.

One mother told me that parents applying for a very popular local school had sent their children to a psychologist who had taught them answers to questions they were likely to be set at interview. A three-year-old had even been coached in the "imaginative" picture she should sketch to impress the headteacher. All this sounded unbelievably creepy — a sort of join-the-tots programme, in which parents really believe they can draw up a template for their child's life.

The London pre-school scene is now so competitive it makes Formula One look like morris dancing. Although it is not possible to assess intelligence before the age of six or seven, nurseries are coming under incredible pressure to concentrate on academic subjects at the expense of play. A Montessori teacher I know recently resigned from her job after a mother had walked into her class, spotted a small boy lying quietly on the floor and demanded, "Why isn't that child doing something?" According to the Montessori teacher, hysterical parents, with an eagle eye on the next round of tests, are insisting that pupils be stretched all the time. "But little children aren't like that," she says. "They get tired and need to rest sometimes, they want to stretch out and listen to a story, sometimes they just want to be cuddled."

And, now I come to think of it, whatever happened to that traditional childhood activity: mucking about? It is all the rage these days to talk about downtime for stressed adults, but it seems that there is to be no let-up for the children of the ambitious.

Yesterday morning I watched my daughter as the theme music struck up for the evil and unimproving Teletubbies. "Over the hills and far away," came the familiar opening words and — as always — she ignited with delight.

Soon we had joined the vibrant but infinitely gentle creatures in their rolling green playground place where you don't have to be confident until you feel quite ready, a place where you can dance and eat more toast than is sensible and where every foolish mistake is rewarded with a Big Hug.

A place where childhood is still for children.

A ROM of my own: still no E-mail confirming a place at the nursery

Louise: cursed by serenity

DID you see Louise Woodward on TV? I did and it was mesmerising in the way that other people's traffic accidents are mesmerising. You want to look away but, appalled, you go on looking anyway. Sitting on a kitchen counter and sipping coffee, the one-time au pair chatted about what life was like for her as she awaited her appeal hearing. She made it sound as though the whole business was

Computer studies fail to make the grade

This year's A-level results suggest that teenagers are avoiding information technology. **David Guest** reports

Within the flight from science revealed by this year's A-level results was a statistic of particular interest for the computer industry. Only 1.3 per cent of students took an A-level in computing.

Of these, a lower than average proportion managed a grade C or better — 39 per cent in computing, against 46.5 per cent in all other subjects.

In an industry where the skills shortage has been a perennial problem, these look like discouraging figures. But they do not necessarily imply that IT professionals will soon be an endangered species. First, the numbers are a slight increase on last year — 9,696 computing A-levels as opposed to 9,168 — and there is one other good reason for personnel managers to regard the figures with equanimity.

"I am absolutely sure that the number of students taking computing at A-level has little relevance to the number taking up undergraduate courses," Rob Roseveare, the manager of career training with the National Computing Centre (NCC), says. "Nor does A-level or undergraduate study bear much relation to the number of people going into the industry."

Mr Roseveare points out that, in the traditional programmer or analyst route into an information technology career, the subject of the degree is rarely vital. "The bulk of students going into computing will start the discipline afresh from a variety of academic backgrounds," he says, adding: "They will not be disadvantaged."

On the contrary, some believe that the type of computing taught in Britain's schools bears so little relation to the work of an IT professional in industry that it might have to be unlearnt. Mr Roseveare says that this is overstating the case, but one corporate training officer commented: "There is still far too much 'making a computer out of coat-hangers' going on in schools."

The proportion of graduates taking jobs in IT with computer science backgrounds is estimated at less than 40 per cent.

If there is a problem in the education statistics for the computer industry, it may rather be in the difficulty with which A-level students take the next step. There are question marks against the content of courses and the ability of students to find the right degree course for themselves.

"The would-be undergraduate does not find it easy to identify the course he or she wants: those with a computing A-level might have a better idea of what questions to ask," Mr Roseveare says.

But it is with the content of degree courses that Mr Roseveare really takes issue. Admitting that the NCC's training orientation towards vocational qualifications makes him biased, he says: "I think the universities have got to get their house in order if they are to serve the computing industry." In particular, he says, the business side of IT in industry is not always reflected in computer science degree courses.

NEC's Algoblock could provide building blocks for the computer industry

The NCC's five-year prediction is that the number of jobs in computer operations and data entry — at what has generally been seen as the end of the career spectrum where lower qualifications are demanded — is going to fall away markedly, while the demand for programmers will remain stable.

But the number of analysts and programmers will rise sharply, and this is the traditional path for graduates into IT. The spread of the personal computer has also opened a new route — PC user-support — which need not depend on formal qualifications at all.

The programmer's job has changed considerably over the past ten years, with new techniques coming into vogue and a wealth of software "tools" available for the programmer's assistance. But that does not mean it has become less skilled, says Mr Roseveare — the requirement for good training and work experience persists. "If you put a power tool into the hands of a carpenter, he will surely make the best use of it if he knows how to use a chisel."

There will also continue to be openings for determinedly technical "propeller heads", despite all the talk about the business context of IT. Particularly on the supply side of the software industry and in such areas as telecommunications and open systems, the skills shortage remains one of both volume and quality.

The funding status of computing courses has not changed, and students wanting to take up computer studies courses should not find anything like the difficulty that faces those inclined to the arts. Meanwhile, the hunt goes on for something more subtle than withdrawal of funding from alternatives to persuade more young students into c puter studies.

Elsewhere, target stud are getting younger all time. NEC, the Japanese c puter and communicati company, has just showe programming system in I ain that is aimed at yo children and aims to teach rudiments of programm without a keyboard.

Algoblock, as it is cal consists of a set of plas blocks that can be joine represent the sequence of c mands in a program results are displayed o monitor. So far, NEC produced eight exercises perform with the blocks each can be made progressi ly more challenging.

"It brings the program from behind the screen," company argues. If so, it two great advantages o present methods: the childr can see the program, and th is no keyboard-huggi Algoblock has been field-t ed by 12-year olds in Jap and NEC may eventually lease it for six-year-olds a upwards, but it is unlikely be made available until n year.

Plug in, turn on ...

Plug and play simplicity has now met multimedia technology, observes Steljes, making for a realistic sale by any switched-on dealer.

here is a very clear message coming through from the presentation sector ight now. It is that pfront technology is ow more accessible han ever, and that good prices and argins are likely to open up the sector considerably to the on-specialist dealer.

FOR THE office equipment market, the great thing is that everything has been moving towards becoming a straightforward plug and play peripheral, with no engineer required. Most of our machines have an automatic synching function, so they'll recognise the signal from any laptop they're being used with, and automatically tune themselves in. There's no great skill base required."

One company in particular has started to make a lot of noise in the office equipment recently. Steljes was a first-time exhibitor at Statindex this year, and has started publicising itself very heavily within the trade press. Its arguments have been based around the new-found accessibility of multimedia presentation products to this trade, and the attraction comes from the now easy-to-understand technology, and highly impressive margins that these products offer, says Steljes.

There's a very simple way to maintain a perspective on it all, suggests marketing manager Mark Bird; just consider projectors as a straightforward PC peripheral, that can be marketed and sold as easily as a printer or a fax, because this is the level that presentation technology has arrived at.

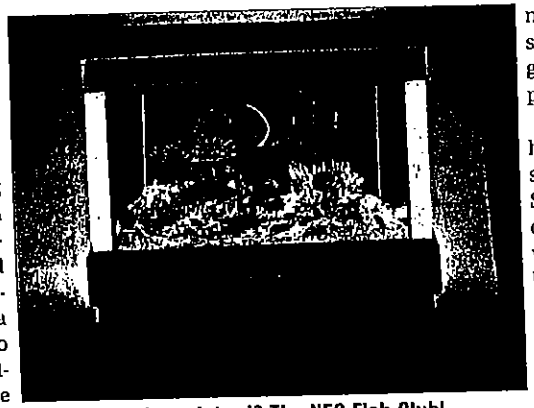
Steljes is a great enthusiast of dealers, and has devised a three-tier arrangement for its network of resellers – these fall into the categories of premier, authorised and trade accounts.

"Within that arrangement, we also go through three channels," explains Mark Bird. "The main one for us has always been the professional AV dealer. Then there's the PC channel, and everyone predicted that this would be the channel that would end up driving our industry. Well, it hasn't happened yet! The most promising for us is the office equipment industry, which appears very interesting to us right now.

"Twelve months ago there would have been a very big need for specialist knowledge from any office equipment dealer selling these products. But the manufacturers have recognised that, to get the market they want, they need to make their products extremely easy to use and understand.

People assume it's the IT manager that would be specifying this type of thing. In most cases, we find it's not – it's the office buyer, and office equipment dealers already have direct access to him!

"I came from the petroleum industry myself, and I'm amazed at how simple this technology is. And there are some damn good margins built in – at least 15 points!"



Real or virtual? The NEC Fish Club!

The Steljes company history is a well-told story. Founder Nigel Steljes was a former dustman and van driver, who accidentally stumbled across LCD panel technology when it was still in its underground infancy, and immediately saw potential in it as a universally-marketable presentation product. A lot of preliminary effort in trying to get things off the ground resulted in him securing the sole UK distribution rights for the In Focus range of LCD-based products from the States, for which the Steljes company has been best known over here.

Now, the company's status is rather unusual; it acts as a semi-wholesaler, taking presentation solutions from many different makers. Among the star products currently getting a lot of emphasis are Panasonic's meeting room system, Philips' videoconferencing options, and Fujitsu's Plasmavision 42, described as the UK's first and largest plasma flat screen unit. The machine's plug and play direct view screen technology has already caught the imagination of BBC1's *Business Breakfast* and BBC2's *Newsnight*, which have both featured it recently. Steljes also has a flexible relationship with NEC, enabling it to sell from the maker's portfolio on an as-needed basis.

(A fascinating item from this range that Steljes guarantees to raise open-mouthed fascination wherever it's shown, is NEC's virtual aquarium. This is a box with graphic representations of tropical fish, said to be so realistic that people have been known to pass beside one for a whole day without realising that they're not walking past real fish! Around 200 have already been sold in Japan for their therapeutic and novelty effects, and the option is now available in the UK through Steljes – for around £11,000 a set!)

"It's very much become just another computer peripheral."

But it is the In Focus products for which the company will already be best known.

"In Focus developed the first desktop projector that took the technology away from these panels. This was the Litepro 580, which is probably the most dynamic product ever on the UK market."

Something receiving particular promotional attention now, meanwhile, is the Litebox 600 unit, being put out under the company's own brand identity. This is described as a large-screen, multifunctional retro projection cabinet, designed specifically for presentations or displays in boardrooms, training centres, seminar rooms and reception areas.

Its focal point is its adaptability, considers Steljes; it is compatible with a wide range of current LCD projectors, and will give clear vision in anything from a very bright to a very dark environment. The system features a 60-inch wide-angle screen, and can be put to use as a television, a data monitor or a video monitor, and can accommodate a VCR, a PC and speakers, to act as an all-in-one multimedia box.

Something considered to be unique is the unit's telescopic design, which allows the top section to be retracted without the need of mains power, and raised at the touch of a button. It carries an ex-vat price of £5,995.

For a dealer involving himself with Steljes anew, what can he expect by way of back-up and trade support?

"We have a full-time sales support team available by phone during business hours, backed up by six regional account managers, then a service department of four, a marketing department of three, and all backed up by the finance infrastructure.

"Because of the value of the products we deal with, there is a reluctance to buy them off the page. End-users are always going to want a demo at some point. Our most successful resellers are the ones not just selling the box, but adding value and creating a market there."

Enquiry no: 557

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