The South African Institute of Computer Scientists
and
Information Technologists

Proceedings

of the

1996 National Research and Development Conference

Industry meets Academia

Interaction Conference Centre, University of Natal,
Durban.
26 & 27 September

Edited by
Vevek Ram
FOREWORD

This book is a collection of papers presented at the National Research and Development Conference of the Institute of Computer Scientists and Information Technologists, held on 26 & 27 September, at the Interaction Conference Centre, University of Natal, Durban. The Conference was organised by the Department of Computer Science and Information Systems of The University of Natal, Pietermaritzburg.

The papers contained herein range from serious technical research to work-in-progress reports of current research to industry and commercial practice and experience. It has been a difficult task maintaining an adequate and representative spread of interests and a high standard of scholarship at the same time. Nevertheless, the conference boasts a wide range of high quality papers. The program committee decided not only to accept papers that are publishable in their present form, but also papers which reflect this potential in order to encourage young researchers and to involve practitioners from commerce and industry.

The organisers would like to thank IBM South Africa for their generous sponsorship and all the members of the organising and program committees, and the referees for making the conference a success. The organisers are indebted to the Computer Society of South Africa (Natal Chapter) for promoting the conference among its members and also to the staff and management of the Interaction Conference Centre for their contribution to the success of the conference.

On behalf of the Organising Committee
Vevek Ram
Editor and Program Chair
Pietermaritzburg, September 1996
Organising Committee

Conference General Chairs
Mr Rob Dempster and Prof Peter Warren (UNP)

Organising Chair
Dr Don Petkov (UNP)

Secretariat
Mrs Jenny Wilson

Program Chair
Prof Vevek Ram (UNP)

Program Committee
Prof Peter Wentworth, Rhodes
Dr Milan Hajek, UDW
Prof Derek Smith, UCT
Prof Anthony Krzesinski, Stellenbosch
Dr Don Petkov, UNP
Mr Rob Dempster, UNP
Prof Peter Warren, UNP
# Table of Contents

Foreword i  
Organising Committee ii  
List of Contributors vi  

**Keynote Speaker**  

*The Role of Formalism in Engineering Interactive Systems*  
M D Harrison and D J Duke  

## Plenary  

*Industry-Academic-Government Cooperation to boost Technological Innovation and People Development in South Africa*  
Tjaart J Van Der Walt  

*Checklist support for ISO 9001 audits of Software Quality Management Systems*  
A J Walker  

*The IS Workers, they are a-changin'*  
Derek Smith  

## Research  

*Examination Timetabling*  
E Parkinson and P R Warren  

*Generating Compilers from Formal Semantics*  
H Venter  

*Efficient State-exploration*  
J. Geldenhuys  

*A Validation Model of the VMTP Transport Level Protocol*  
H.N. Roux and P J A. de Villiers  

## Intelligent Systems  

*Automated Network Management using Artificial Intelligence*  
M Watzenboeck  

*A framework for executing multiple computational intelligent programs using a computational network*  
H L Viktor and I Cloete  

*A Script-Based prototype for Dynamic Deadlock Avoidance*  
C N Blewett and G J Erwin  

*Parallelism: an effective Genetic Programming implementation on low-powered Mathematica workstations*  
H. Suleman and M. Hajek  

*Feature Extraction Preprocessors in Neural Networks for Image Recognition*  
D Moodley and V Ram  

---

iii
Real-Time Systems

The real-time control system model - an Holistic Approach to System Design
T Considine

Neural networks for process parameter identification and assisted controller tuning for control loops
M McLeod and VB Bajic

Reference Model for the Process Control Domain of Application
N Dhevcharran, A L Steenkamp and V Ram

Database Systems

The Pearl Algorithm as a method to extract information out of a database
J W Kruger

Theory meets Practice: Using Smith's Normalization in Complex Systems
A van der Merwe and W Labuschagne

A Comparison on Transaction Management Schemes in Multidatabase Systems
K Renaud and P Kotze

Education

Computer-based applications for engineering education
A C Hansen and P W L Lyne

Software Engineering Development Methodologies applied to Computer-Aided Instruction
R de Villiers and P Kotze

COBIE: A Cobol Integrated Environment
N Pillay

The Design and Usage of a new Southern African Information Systems Textbook
G J Erwin and C N Blewett

Teaching a first course in Compilers with a simple Compiler Construction Toolkit
G Ganchev

Teaching Turing Machines: Luxury or Necessity?
Y Velinov

Practice and Experience

Lessons learnt from using C++ and the Object Oriented Approach to Software Development
R Mazhindu-Shumba

Parallel hierarchical algorithm for identification of large-scale industrial systems
B Jankovic and VB Bajic
Information Technology and Organizational Issues

A cultural perspective on IT/End user relationships  
A C Leonard  

Information Security Management: The Second Generation  
R Von Solms  

Project Management in Practice  
M le Roux  

A Case-Study of Internet Publishing  
A Morris  

The Role of IT in Business Process Reengineering  
C Blewett, J Cansfield and L Gibson  

Abstracts  

On Total Systems Intervention as a Systemic Framework for the Organisation of the Model Base of a Decision Support Systems Generator  
D Petkov and O Petkova  

Modular Neural Networks Subroutines for Knowledge Extraction  
A Vahed and I Cloete  

Low-Cost Medical Records System: A Model  
O A Dami and T Seipone  

A Methodology for Integrating Legacy Systems with the Client/Server Environment  
M Redelinghuys and A L Steenkamp  

Information Systems Outsourcing and Organisational Structure  
M Hart and Kvavatzandis  

The relational organisation model  
B Laauwen  

The Practical Application of a New Class of Non-Linear Smoothers for Digital Image Processing  
E Cloete  

A Technology Reference Model for Client/Server Software Development  
R C Nienaber  

The Feasibility Problem in the Simplex Algorithm  
T G Scott, J M Hattingh and T Steyn  

Author Index  

Author Index  

V
List of Contributors

Vladimir B Bajic
Centre for Engineering Research,
Technikon Natal,
P O Box 953
Durban 4000

C N Blewett
Department of Accounting
University of Natal
King George V Avenue
Durban 4001

Justin Cansfield
Department of Accounting
University of Natal
King George V Avenue
Durban 4001

Tom Considine
Apron Services (Pty) Ltd
P O Johannesburg
International Airport
1600

Eric Cloete
School of Electrical Engineering
Cape Technikon
Box 652
Cape Town

I Cloete
Computer Science Department
University of Stellenbosch
Stellenbosch
7600

O A Daini
Department of Computer Science
University of Botswana
Gaborone
Botswana

Nirvani Devcharan
Umgeni Water
Box 9
Pietermaritzburg
3200

P J A de Villiers
Department of Computer Science
University of Stellenbosch
Stellenbosch
7700

Ruth de Villiers
Department of Computer Science and
Information Systems
UNISA
Box 392, Pretoria, 0001

G J Erwin
Business Information Systems
University of Durban-Westville
Private Bag X54001
Durban 4000

G Ganchev
Computer Science Department
University of Botswana
P Bag 0022
Gaberone, Botswana

J Geldenhuys
Department of Computer Science
University of Stellenbosch
Stellenbosch
7700

Louise Gibson
BIS, Dept Accounting & Finance
University of Durban
Pvt Bag X10
Dalbridge 4014

Mike Hart
Department of Information Systems
University of Cape Town
Rondebosch
7700

M. Hajek
Department of Computer Science
University of Durban-Westville
Pvt Bag X54001
Durban 4000

A C Hansen
Dept of Agricultural Engineering
University of Natal
Private Bag X01
Scottsville 3209

J M Hattingh
Department of Computer Science
Potchefstroom University for CHE
Potchefstroom 2520
Boris Jankovic
Centre for Engineering Research
Technikon Natal
P O Box 953,
Durban 4000

Paula Kotze
Department of Computer Science and
Information Systems
UNISA
Box 392
Pretoria, 0001

J W Kruger
Vista University
Soweto Campus
Box 359
Westhoven 2124

A C Leonard
Dept of Informatics
University of Pretoria
Pretoria
2000

Ben Laauwen
Laauwen and Associates
P O Box 13773
Sinoville
0129

Mari Le Roux
Information technology, development: project
leader
Telkom IT 1015
Box 2753
Pretoria 0001

P W L Lyne
Dept of Agricultural Engineering
University of Natal
Private Bag X01
Scottsville 3209

Rose Mazhindu-Shumba
Computer Science Department
University of Zimbabwe
Box MP167
Harare, Zimbabwe

Meredith McLeod
Centre for Engineering Research,
Technikon Natal,
P O Box 953
Durban 4000

D Moodley
Computer Management Systems
Box 451
Umhlanga Rocks
4320

Andrew Morris
P O Box 34200
Rhodes Gift
7707

R C Nienaber
Technikon Pretoria
Dept of Information Technology
Private Bag X680
Pretoria 0001

E Parkinson
Department of Computer Science
University of Port Elizabeth
Box 1600
Port Elizabeth 6000

Don Petkov
Department of Computer Science and
Information Systems
University of Natal
PBag x01
Scottsville 3209

Olga Petkov
Technikon Natal
Box 11078
Dorpspruit 3206
Pietermaritzburg

N Pillay
Technikon Natal
Box 11078
Dorpspruit 3206
Pietermaritzburg
V Ram
Department of Computer Science and Information Systems
University of Natal
PBag x01
Scottsville 3209

H. Suleman
Department of Computer Science
University of Durban-Westville
Pvt Bag X54001
Durban 4000

Melinda Redelinghuys
Department of Computer Science and Information Systems
UNISA
Box 392
Pretoria, 0001

A Vahed
Department of Computer Science
University of Western Cape
Private Bag X17
Bellville 7530

Karen Renaud
Computer Science and Information Systems
UNISA
Box 392
Pretoria, 0001

A Van der Merwe
Computer science and Information Systems
UNISA
P O Box 392
Pretoria, 0001

H N Roux
Department of Computer Science
University of Stellenbosch
Stellenbosch
7700

Tjaart J Van Der Walt
Foundation for Research and Development
Box 2600
Pretoria, 0001

T G Scott
Department of Computer Science
Potchefstroom University for CHE
Potchefstroom
2520

K Vavatzandis
Department of Information Systems
University of Cape Town
Rondebosch
7700

T Seipone
Department of Computer Science
University of Botswana
Gaborone
Botswana

Y Velinov
Dept Computer Science
University of Natal
Private Bag X01
Scottsville 3209

Derek Smith
Department of Information Systems
University of Cape Town
Rondebosch
7700

H Venter
Department of Computer Science
University of Port Elizabeth
Box 1600
Port Elizabeth 6000

Anette L Steenkamp
Department of Computer Science and Information Systems
UNISA
Box 392
Pretoria, 0001

H L Viktor
Computer Science Department
University of Stellenbosch
Stellenbosch
7600

T Steyn
Department of Computer Science
Potchefstroom University for CHE
Potchefstroom 2520

R Von Solms
Department of Information Technology
Port Elizabeth Technikon
Private Bag X6011
Port Elizabeth 6000
THE DESIGN AND USAGE OF A NEW SOUTHERN AFRICAN INFORMATION SYSTEMS TEXTBOOK.

G.J. Erwin¹
and
C.N. Blewett²

¹ Business Information Systems, Faculty of Commerce and Administration, Department of Accountancy, University of Durban-Westville, Private Bag X54001, Durban, 4000. Phone: (W) (031) 820-2435 Fax: (W) (031) 820-2429 e-mail: erwin@is.udw.ac.za

² Business Information Systems, Faculty of Economics and Management, Department of Accounting and Finance, King George V Ave., Durban, 4001. Phone: (W) (031) 260-2161 Fax: (031) 260-3292 e-mail: blewett@bis.udw.ac.za

Abstract

Changes in South African society have brought about changes in the back

ground of student audiences and these have stimulated a review of the areas of governance, syllabus, curriculum, teaching methods and research in educational institutions. In this paper we describe our revised approach to teaching of (Business) Information Systems/ Computer Studies / Business Computing, and the first-year textbook which we created to support this new approach. We discuss the "product-driven" and "problem-driven" arrangements of current textbooks and report on a survey of Business Information Systems students using the new textbook at the University of Durban-Westville. We discuss problems with foreign textbooks and current teaching methods and describe the structure and content of an Information Systems course designed locally. We conclude with recommendations on teaching methods, textbook design and support material which are appropriate to the new South Africa.

Keywords: textbook design, education, Information Systems

Computing review categories: K.3.2

Introduction and Background

"There are ever-fewer white students and the trickle of Africans has become a flood. Universities (et al, added by authors) must adapt to the needs of a new and very different clientele." (Moulder, 1994).

The student audiences at, for example, University and Technikon, in South Africa are rapidly changing. Moulder discusses how the change in student audiences requires us to:

1. alter the "composition of student, academic and ..... administrative bodies", the governance structures of our institutions.
2. change the syllabus by moving away from "geriatric, n hemisphere cultures".
3. change the curriculum, "the whole way in which teaching and learning are organised".
4. change the "criteria (for) research".

In other words, Moulder is summarising the areas of attention for the transformation of our educational efforts.

This paper describes work we have done to address the syllabus issue, with our new textbook (Erwin and Blewett, 1996), and the curriculum issue, by reshaping the presentation of Information Systems to be problem-driven , items 2 and 3 above. We begin by describing the design of current Information Systems textbooks, and the problems which students face using foreign textbooks. We then present the features of our new Information Systems textbook which address those problems, discuss the problem-driven approach to teaching and learning, compared with the product-driven approach, and, after reporting on a survey of Information Systems students using our new textbook, draw some conclusions about the success of the textbook and the problem-driven approach. These issues also apply in business, and at primary/secondary schools, but, this paper does not address those areas, except in passing.
Many new students will be and are educationally disadvantaged, under-prepared and unprepared. These students come from very different backgrounds to previous entrants to our tertiary institutions. The growing penetration of sectors of our society by Information Technology (IT) means that students will encounter courses in subjects such as Business Information Systems (BIS) and Computer Studies. Many of these students are studying in a foreign language (Moulder, 1994). Teaching methods and materials are under review by many educational institutions.

Some Notes on Current Textbooks and Student Learning

Currently prescribed textbooks for Information Systems/Computer Studies courses at Universities, Technikons, Technical Colleges and other educational institutions often bear little specific relevance to South African society. They are illustrated with foreign-based examples, lack reinforcement of the material suited to educationally disadvantaged readers, and have inappropriate "chunking" and sequencing of material. Such textbooks can create learning problems for many students. Our teaching experience shows that current American/British textbooks assume certain experiences and institutions in society, leaving our students confused between fundamental material and the mechanisms of a particular society's structure. Furthermore, American/British textbooks present material in a sequence which is much more for the author's and course leader's convenience, than for the student's. Textbooks are often designed for the approval of other academics, rather than to improve the learning process of students. Academics/course instructors are already familiar with the material in a textbook. Their main concern when assessing a textbook is often the organisation of the material therein, rather than the impact of the material on the learning student. This approach does not recognise the difficulties students have with material on first meeting it.

The success of a student's learning process depends, inter alia, on the method of initial exposure to the material and progress through it without jolts or obstacles. Subsequently, after first-level comfort is achieved, there will be an (overlapping) formal learning stage in which a student returns to the material, for example, for examination purposes. There is a two-stage process, with much overlapping of stages, as new topics are encountered. Every topic has an initial stage, followed by a more formal stage. The initial learning stage significantly influences the outcome of the more formal learning stage. Existing textbooks have been arranged largely to suit the more formal type of student learning which occurs when preparing for exams/tests, not the initial learning that occurs when a student first encounters a topic.

Production of a New Textbook

We believe serious learning problems emanate from the use of inappropriate textbooks, (and other media, methods and material) and that these problems will grow substantially, unless addressed. As in any situation, there are three major options available (Erwin and Blewett, 1996): namely, do-nothing, improve existing methods, or adopt new methods. In the early 1990s, we observed the mounting difficulties our students were having with IS material and teaching methods, and we decided we could not do-nothing. We could attempt to improve our existing methods and material, by piecemeal attention to many different areas, or we could go “back to the drawing board” and address the problems we were facing by building new materials and methods. Therefore, after some months of planning and discussion with colleagues and others, we wrote and published a new type of first-year Business Computing/Information Systems textbook (Erwin and Blewett, 1996) to reduce learning problems associated with foreign textbooks. We incorporated our new textbook into an Information Systems course using problem-driven methods. In these two ways we hoped to introduce material better suited to our student audience, and offer better teaching support as our new student audience emerges. In (Moulder, 1994)'s phrase, we are “Riding the Wave”, not being swamped by it.

Target Audience

We aim our textbook at 1st. Year University, Technikon, Technical College students of Business Information Systems (BIS), Information Systems (IS), Computer Studies, Information Technology, Computer Management, Business Computer Science, Business Data Processing (BDP), Commercial Computer Science, Management Information Systems, and so on. The book also caters for business people, with little or no computer experience, who wish to improve their computer literacy and want to understand the process of computerisation in a business.
Objectives of a Textbook

A (first-year) textbook can be constructed for one or more of a variety of objectives. These objectives include:

* to cover the field
* to be up-to-date with latest research findings
* to expose principles
* to provide drill and practice
* to encourage interest in the subject
* to cover a specific set of topics, often as a basis for professional work
* to introduce core topics in a comfortable style
* to provide a variety of (edited) sources for student growth

and so on.

We believe that, at first year (and novice) level, the appropriate objective of an IS textbook is a mixture of "expose principles", "encourage interest in the subject", "cover a set of topics, ... as a basis for professional work" and "introduce core topics in a comfortable style".

Let's look at some of the problems we recognised with existing available textbooks and teaching methods, and the approach we took to address those problems.

Summary of Existing Problems

Here is a summary of major problems we encountered with existing textbooks. We discuss these problems and our "solutions" in the sections that follow.

Existing Business Computing / Information Systems textbooks are:

* foreign: aimed at "literate", non-South African, audience
* product-driven: describe how? Often to the exclusion of why and when?
* glossy: distracting and unreal photo galleries; sophisticated applications
* superficial: not useful for the practice of business; stop at first level, even for core topics
* boring/dense: not read and learnt; use passive voice; assume good literacy; back-end Appendices.
* comprehensive: distracting wide coverage of most-recent software/hardware versions
* up-to-date: un-necessarily so, to "prove" usefulness to a literate audience as an up-to-date text
* targeted: at the instructor (his preferred chunks of knowledge), not the student

Existing textbooks have:

* good coverage of required material
* emphasis on PCs without ignoring other types of computers
* well-organised exercises and summary material

However, in our South African situation, existing textbooks suffer from:

* inappropriate context
* inappropriate examples
* lack of reinforcement
* inappropriate "chunking" and sequencing of material
* inappropriate use of language
* poor placement of Appendices
* an unrealistic element.

We now consider each of those problems in turn, with the use of examples, and, after each discussion, immediately discuss our approach to each problem.
Problem: Inappropriate Context

Existing textbooks describe the society and events of a first world society, rather than our mixed first/third world society. For example, an (American) textbook on Computer Security starts off by claiming "You seldom hear of bank robberies these days!" (Pfleeger, 1989, p. 1). American society has largely moved to the use of credit cards and other forms of cashless transactions. This reduces the availability of cash as a target for robbers. In South Africa, bank and building society robberies are so common that we hardly notice them anymore!

Almost all American textbooks refer to USA laws, such as The Freedom of Information Act: a law giving citizens the right to have access to data about them gathered by federal agencies; Fair Credit Reporting Act; Federal Privacy Act and so on. For example, "The major piece of legislation on privacy is the Privacy Act of 1974 (PA74), enacted by President Gerald Ford." (Stair, 1992, p. 632). (Stair, 1992) is an American textbook, so, our relatively young, local, novice reader can make little sense of this sentence in South Africa, where the 'President' is currently Nelson Mandela. This example from Stair confusingly refers our students to a foreign history and foreign legislation at an early stage in the learning of Information Systems "Principles". South African students using Stair will learn about the issues of privacy in the confusing context of unfamiliar and (largely) irrelevant Government institutions and regulations. Material of this type is important in order to expose legal aspects of the issues of privacy and security, but the context in which such textbooks do this makes the topic very difficult for novice students. See (O'Leary and Williams, 1985, p. 543) for a similar example. Our textbook, on the other hand, as one example, refers to South African issues, such as "The government may introduce new laws which require strict control of the business, such as the calculation and claiming of Value Added Tax (VAT)." (Erwin and Blewett, 1996, p. 21).

Another example of inappropriate context (for South African students) is "... a new type of robot developed at the MIT Mobile Robotics Laboratory in Cambridge, Massachusetts." (Stair, 1992, p. 354). There are many blockages for our students here, including the "MIT", the "Cambridge", and the "Massachusetts". A similar inappropriate (for South African students) example occurs in (Stair, 1992, p. 217), namely, "Researchers at AT & T Bell Labs ...". Our textbook, on the other hand, uses an example such as "For example, ... rainfall figures in Cape Town help to plan the construction of a new dam." (Erwin and Blewett, 1996, p. 212).

Existing textbooks also assume wide availability and accessibility of computer equipment. For example, one textbook offers a "Teaching Tip: Take off the enclosure on a microcomputer processor to expose the circuit boards. Point out the motherboard, memory, add-on boards, disk drives, and so on." (Long and Long, 1990, p. 60). This is not only unrealistic with Information Systems class sizes of hundreds, but is normally forbidden by institutions, and is impossible for distance teaching.

In general, the level of computer literacy, availability and personal, computer comfort in South Africa seems far lower than in the USA and UK. The content and style of a textbook needs to recognise the characteristics of its target readership, usage and society.

Inappropriate Examples

Our experience at teaching in University, Technikon, Damelin Management and Computer Schools, industry and commerce, and other institutions has shown us problems when students learn with inappropriate textbooks and examples. In textbooks, such as (Capron, 1990), the beautifully printed picture galleries, glossy print and USA examples immediately present credibility problems for our students. The examples in books such as Capron, become a distant, almost dream-like fantasy collection when read by many of our students. Capron-type examples simply convince many students of the unmanageable sophistication and complexity of computerised applications, reducing their own confidence in being successful with computers. A confident, identifiable start to learning is needed. Further texts and/or study can subsequently introduce complexity and breadth.

Another example of an inappropriate example appears in (O'Brien, 1988, p. 21). The illustration (photo) for an optical scanning "wand" is of a mysterious product called "Dr Pepper". Only people who have travelled to the USA (or been very observant while watching American TV situation comedies) will know that "Dr Pepper" is a soft drink, and not a medicine or a brand of Mexican food.

A similar example appears in (Stair, 1992, p. 152), namely, "... which leads to the manager's SSN (098-40-1370) in the Department table." Many of our students have no idea what "SSN" is, so this example is much more a blockage to learning than an aid. An equivalent example in our textbook is "Another way to think of a byte is to consider eight soccer referees." (Erwin and Blewett, 1996, p. 256).
Problem: Lack of Reinforcement

A common student complaint is that the course instructor delivers the course material too quickly. Other complaints include little reinforcement (reminders) of the material and examples are usually big business, first world orientated. Many textbooks are tightly edited to remove any repetition. Such removal of repetition causes difficulty for students who do not read the book sequentially. In our experience, no student reads a book sequentially. In fact, even courses are not usually presented in the same sequence as the textbook. We recognise this “non-sequential” attribute of our courses and repeat important material in several places. For example, we show the components of a transfer (Source, Destination, Channel and Protocol) in different parts of the book (Erwin and Blewett, 1996, p. 238, 268, 579, 588, 607). Each repetition is in a different situation and encourages students to see the application of fundamental material in different areas, by reinforcing the presence of a major principle or framework.

We saw that students often forgot the meaning of abbreviations. So, throughout the book, we explode abbreviations into their full wording. This means that a student will no longer confuse the Bank for International Settlements (BIS) with Business Information Systems (BIS). We also use acronyms liberally to assist memorisation of key points. For example, a student remembers the seven Critical Computerisation Questions (CCQs) (to assess whether a computerisation investigation should proceed) by using the acronym CRITICAL.

A textbook should reinforce other course material as well as internally reinforce the book itself. Ideally, the student also has his/her textbook material reinforced by events and institutions in his/her society outside the class, as well as within the educational institution. In existing textbooks, this aspect is very well handled for American (and other first world) students by reference to well-known institutions and practices in their society. Such books provide no reinforcement support of that type for our students in Africa. Our textbook refers to local institutions, such as Eskom and Telkom. In addition, our textbook provides “Interactions”. Many Interactions require the student to visit different parts of society, such as a bank, soccer club, pharmacy, supermarket and so on. These visits include a questionnaire which helps the student to observe the meaning of words from the textbook in the real world.

Problem: Inappropriate "chunking" and Sequencing of Material

"Chunking" is the choice of which material goes into various chapters, episodes and sections. For example, Capron (1990) chunks a chapter on "Database Management Systems". This Chapter first describes what Database Management Systems are, followed by uses for a Database Management System. This sequence of exposure of the material is product-driven. A product-driven approach describes the content of a product; what it is, and how it works. Although product-driven sequence can be useful at a later, more formal learning stage for students, it does not properly assist them through the initial, formative learning stage. Our textbook recognises and caters for both stages of learning.

Our textbook has a problem-driven approach. A problem-driven approach describes a situation which, as it develops, requires the use of a technology, product, method or design which appropriately services the problem situation. The problem, once recognised, identified and measured, drives the use of the product for solving the problem. A problem-driven approach is also a requirements-driven approach. In our textbook, we introduce problems a business faces, such as stock control and payment of suppliers, then, may draw an analogy between existing manual methods and a computerised approach. Database Management Systems are shown to be an appropriate technology (product) for a certain class of problems, rather than a product to be described per se. The problem-driven approach is then supported by Structured Material to assist with learning core topics and the required detail for examinations and tests. Our textbook provides the proper chunking and sequencing of material to assist the student when learning concepts, and structured material for later use, such as in examinations. This approach addresses a common question from students, namely, "I know what it is and how to use it, but why or when do I use it?". Later, we discuss how the problem-driven approach drives the design of an Information Systems course, not just the textbook material.
Consider another example of the product-driven chunking compared with the problem-driven chunking (Stair, 1992) includes "Chapter 3: Hardware: Input, Processing and Output Devices". This Chapter covers as a "chunk", the topics of Computer System Components, CPU, Primary and Secondary Storage, such as Tapes and Disks, Classifying Computers, and Input and Output Devices. Chapter 18 of Stair includes a section on "backup procedures" associated with "Information and Technology Management". This chunking and sequence of presentation is the product-driven approach, because it describes components and not applications within a business. Our problem-driven approach, covering the same material as Chapter 3 of (Stair, 1992), begins with a Story in "Episode C2: Computer Disaster Planning." This Story continues the events in the computerisation of a supermarket, owned and managed by Mr Makhathini, in Africa. As a result of a disaster which destroys Mr Makhathini's computer, the issue of backup procedures, and copies of data and software arises. Discussion of methods of backup follows, and then a description of magnetic tape principles occurs in the context of a problem to be solved. Now, in this Story, and because of the business problem, for the student, the calculation of the capacity of a magnetic tape becomes important and relevant, not just an exercise in arithmetic. Our textbook has no single section which describes hardware and computer components. The relevant descriptions occur in contexts in which such component descriptions are relevant and needed. A student learns about components and products at the time the information is needed. Descriptions also occur at several different levels of detail. There is a first level description, for assimilating the overall concept. Then, there is a more detailed description in a separate sub-section. This style recognises that a student needs to be comfortable at an overall level first, then, as problems arise the more detailed description is more comfortable and meaningful.

Our chunking arrangement and sequencing mean that students do not regard concepts as strictly compartmentalised. Concepts are introduced in an inappropriate problem situation and often reappear in later Episodes. For example, the topics covered in (Stair, 1992, Chapter 3: Hardware: Input, Processing and Output Devices) need approx. 30 pages. (Erwin and Blewett, 1996) covers the same material as (Stair, 1992, Chapter 3) in over 100 pages, namely, Storage Devices, pp. 105-112; Principles of Disk Operation, pp. 211-228; Data Representation and the Machine Cycle, pp. 245-298; Input Devices, pp. 355-364; Output Devices, pp. 473-484, and Magnetic Tape Principles, pp. 563-574. The Stair chunking suits the purpose of arranging like-items together. The Erwin and Blewett chunking arranges material as a flowing, natural story, then, as problems and situations arise which need computer approaches, the textbook describes and explains the material to apply that technology. This chunking means that the introduction of hardware is part of problem solutions. For example, students learn about Output Devices in the context of Office Automation and Word Processing. They learn about Magnetic Tape Principles in the context of disaster and backup issues.

There is so much material available in the IS field that a student can become confused about his/her position within the material. To reduce this problem, we introduced a uniform framework for every Episode in the textbook. No other textbook known to us in this field presents each Chapter in a separate framework, or arrangement. Each Chapter's material is arranged in its own special way. Course instructors have no difficulty adjusting to different styles of presentation in each Chapter. Novice students struggle with such a scheme. Every Episode in our textbook has the following format / framework:

**Story -> Transition -> Structured Material -> Infobyte**

Every **Story** unfolds in the STAIR framework, namely:

- **Stimulus**: events or circumstances which lead to discussion of a business problem
- **Trouble**: exploration and identification of business problem(s) as a result of the Stimulus
- **Approach**: discussion of various approaches for resolving the identified business problem(s)
- **Implementation**: actions to install the chosen Approach

The **Transition** after each Story is a summary of the Business Computing principles and events in the Story, and an anticipation of the formal treatment of material to follow in the Structured Material.

The **Structured Material** follows the Transition. **Structured Material** is in the KAIR format, namely:

- **Knowledge**: facts and techniques
- **Awareness**: importance, role, potential and widespread usage
- **Interaction**: practical exercises, direct touch, visits to the real-world
- **Reality**: business implementation issues.
The KAIF elements make up the four parts of Computer Literacy and Competency.

To further provide the student/reader with a ‘road map’ through the material in the book, the Knowledge part of KAIF in Structured Material is split into COURSE elements, namely:

<table>
<thead>
<tr>
<th>Complaint:</th>
<th>opportunities and/or difficulties which lead to a business investigating a specific topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview:</td>
<td>the mainstream content of the topic</td>
</tr>
<tr>
<td>Usage:</td>
<td>how to use this technology</td>
</tr>
<tr>
<td>Resources:</td>
<td>resources associated with the use of this technology</td>
</tr>
<tr>
<td>Strategy:</td>
<td>options and approaches</td>
</tr>
<tr>
<td>Examples:</td>
<td>illustrations of the use of this technology in various levels of business</td>
</tr>
</tbody>
</table>

After each Structured Material section is an Infobyte. An Infobyte provides background, and further detail on Business Computing topics. We aim Infobytes at students requiring more than a first-level understanding of a Business Computing topic. Typically, this will be an Information Systems major student, an Information Systems support person and, of course, an Information Systems developer. For example, Infobyte I3 appears at the end of Episode A3 and covers Data Representation in a Computer and the Machine Cycle.

The uniform framework in every Episode means that a student can learn about various topics in a standard way, and begin to see the common aspects of topics such as Database and Spreadsheets. To further assist the student, we also devised a framework for learning about the usage of various packages, components, and so on. This is the SKRAP framework, namely:

- **Setup:** actions to establish the initial use of a package, data and data definitions for an application
- **Keep:** actions to preserve/save/keep work/data/software established in the application
- **Retrieve:** actions to retrieve/find/call back for use, the data/definitions in an application
- **Alter:** actions to alter/amend/change data and definitions in the application
- **Print:** actions to list/inspect/print/display/query data and definitions in the application

This SKRAP framework considerably assists students when approaching a new software package or application. The SKRAP actions have to be supplied by every package/application. No application can exist without providing the SKRAP actions. The student can now search a way to perform each SKRAP action, and, when (s)he has conquered SKRAP, (s)he will be able to move on to more complex variations of those basic actions. Initial comfortable usage comes from pursuing SKRAP.

The book has three major Levels arranged in Sections A, B and C.

**Level A** contains Fundamentals: computers, hardware, software, internal computer principles, business requirements, computer selection, and so on. Some detailed Fundamental material appears elsewhere. For example, Magnetic Tape Principles appear in Infobyte I8 at the end of Episode C2 in Level C.

**Level B** covers major Applications areas; Database, Spreadsheet (DSS) and Office Automation.

**Level C** covers Implications of using computerised Information Systems, such as backup, disaster recovery planning, networks, Information Systems Development (ISD), package software, and so on.

In conjunction with Infobytes, a course instructor or a novice reader can choose a selection of material to suit various depths and lengths of courses of study. The repetition of some material at different Levels and within Levels assists such a customised choice.

**Problem: Inappropriate Use of Language**

Every subject has its own jargon and specific terminology. Any course in the subject includes the acquisition of this terminology. However, when a textbook uses difficult, hard-to-read language a student has understanding problems. Many textbooks use passive voice to expose material. Passive voice is an attribute of “verbs in sentences in which the grammatical subject is the recipient of the action described by the verb” (Hanks, 1988, p. 833), as in ‘Total revenue from soccer tickets is calculated by the computer application’. Active voice is an attribute of “verbs used to indicate that the subject of a sentence is performing the action or causing the event or process” (Hanks, 1988, p. 11), as in ‘The computer application calculates total revenue from soccer tickets’. Our textbook almost exclusively uses active voice, because active voice presents concepts in a more ‘natural’ way and contributes to the easy-to-read, soft language, attribute of a textbook. This style can sometimes appear to make the content elementary, because the wording is so simple. However, our treatment of material is usually deeper than American and British textbooks.
Material in existing textbooks is often dense and boring with long passages of unrelieved text. Many students find that a textbook presents material in a particular way, and then moves on to the next topic. Our experience is that many students understand material better when we present it to them in several different ways. That seems to be one of the main objectives of lectures. However, in our textbook, we introduced a unique concept, known as the Wise Guru. This 'person' is a device to break the text into smaller sections by looking back on material and describing its contents in a different writing style, different font, and with different words. The Wise Guru also points out important material and common topics for examination questions to students.

Because we live and teach in Africa, we were concerned to produce an African-flavoured textbook which recognised both our strengths and weaknesses. We wanted to present the student with a 'comfortable, but correct' introduction to fundamental concepts. To do this we divided the book into Episodes, rather than Chapters, and wrote a series of Stories. Every Episode begins with a Story. We wrote the stories in conversational, novel-style English. Read as a whole throughout the book, the Stories cover the first year of computerisation for Mr Makhathini's supermarket business. The Story format, and language, enable us to lead the student into important issues in an interesting way. The Stories contain drama, action, discussion, human difficulties and humour. These Stories allow comfortable assimilation of concepts at initial learning stage and are excellent pre-reading for lectures, tutorials and discussion groups. Plans are underway to offer these Stories, and the Structured Material, as a series of video Episodes for presentation to classes, on educational TV, and so on. This medium can assist course instructors with presentation of material.

Problem: The Placement of Appendices

Information Systems textbooks often contain Appendices at the end of the book with detailed, off-the-mainstream topics. Our experience is that students often regard such Appendices as unimportant. In our textbook, we introduced the concept of an Infobyte. An Infobyte is a section at the end of each Episode which contains the next level of detail after the material in the main part of the Episode. For example, in Episode C2: Disaster Planning, Infobyte I8 contains two Nybbles. The first Nybble is about Backup Principles, and the second Nybble is about Magnetic Tape Principles. The Infobyte approach keeps detail out of the mainstream topics of the book, and places the detailed material adjacent to its (commonly-applied) area of application.

Problem: Unrealistic element

Much of the material presented in existing texts conveys the idea to students that computerisation is an almost magic process which can improve any given situation with little effort or mistake.

Existing textbooks describe smooth success for computer implementations following ideal sequences of activities. Real world experience is different, and our textbook recognises this. Our book discusses plans, options and issues, and recognises that, in reality, not all will go as planned. Important messages in the book are "It's not easy to computerise", and "Not everyone is keen about computerisation". But, it is manageable and achievable. The novice Mr Makhathini has some computerisation problems, such as staff resistance, and in discussion in our book, various approaches are covered. Mr Makhathini fails at some of his attempts, but the student learns from such setbacks.

We retain a realistic treatment of computers and computerisation throughout our entire book. Our characters raise real life issues, both as people going through the computerisation process, and from the Wise Guru. The Wise Guru is a character (outside Mr Makhathini's family and business) who talks directly to the student reader of our book. The Wise Guru helps the student reader, by offering advice, and comments on issues as Mr Makhathini makes decisions or mistakes. The Wise Guru advises about important issues such as examiners' approaches to topics. The Wise Guru has empathy for the student in the learning situation. Students reading our book will not feel that they are a third party reading dry facts presented to them by some well-learned authors. Rather, through the use of Mr Makhathini's relatives, staff and friends, and other aids such as the Wise Guru, the students reading our book should relate to the development and learning experiences of Mr Makhathini.

Content of our Textbook

There is no new information in our book. The level of our material is first level, novice level; assuming no previous contact with computers, or business. Our frameworks and approach are new in order to address the problems discussed above. The textbook contains a full syllabus to support a one year, or shorter, Information Systems course.
Implementation of problem-driven approach at University of Durban-Westville (UDW)

The textbook (Erwin and Blewett, 1996) is prescribed for Business Information Systems I (BIS1) in the Faculty of Commerce and Administration (Department of Accountancy) at the University of Durban-Westville (UDW) in 1996. Previously, (Stair, 1992) was prescribed, except in 1995 when no textbook was prescribed. Stair had become so inappropriate that a decision was taken to issue notes, rather than use Stair. Some of the material from our textbook was used in BIS1 in 1995 as test exposure. BIS1 is a second-year course for most students, since BIS at UDW is currently a two-year major. BIS1 is a year course, and is not yet modularised/semesterised. UDW expects to begin a three-year IS major in 1997. Almost all BIS1 students are registered for a B. Comm. or B. Acc. (towards becoming a Chartered Accountant) degree, with the rest being B.Sc. students. BIS1 (wholly or partially) will eventually form a service course for most UDW students.

Adopting a problem-driven textbook means that large parts of formerly product-driven material has to be adjusted. At UDW, BIS1 was reorganised in 1996 to match the problem-driven nature of the textbook with a problem-driven approach to the whole course. Using a product-driven textbook in a problem-driven course is awkward. And vice-versa. It is not a successful strategy to change the textbook to be problem-driven, and then continue to lecture and organise the rest of the course in a product-driven way.

Here are some of the aspects of BIS1/UDW course delivery which supported the problem-driven textbook:

1. Before lectures commenced students had to register on a workstation in the BIS Information Centre (IC) with their own personal details, and some other data re courses taken, and so on. This forced (most) students to view and use the IC. (BIS does not have a Lab! Labs are where chemicals mix to form explosions. BIS has an Information Centre, with the traditional workstations, printers, cables, magazines, and so on.) The students' personal data was then used, by the students, as a base for appending more data, and then as a means of discussing data, information, integrity of data, and so on. Students had access to overall class data as well as their own individual data. Students saw the problems of integrity, confidentiality, and so on, before they realised they had seen a database system or the software for database (dBASE IV), or had any lectures on database systems. Real-life problems showed them the issues. The lectures and textbook helped students to make sense of their experience. Students were encouraged to use the SKRAP framework described above.

2. All student work has to be submitted in a personal “bin” on the BIS LAN (Novell). No handwriting is accepted. As part of the problem-driven approach, BIS students must use the technology that they are being taught.

3. No tutorials were held, partly due to lack of staff. In lieu of tutorials, BIS students attend Personal Development Programs (PDPs) where the practical work and issues from lectures are discussed in groups of about 20, supervised by an academic. “Tutorial” is a poor term to describe the process of “comfort-generation” that we sought early in the course, so we sought a new term. The use of words to describe course items is critical to the formation of student perceptions about the course. PDPs were optional.

4. “Interaction”s from the textbook were used for practical work to send students out to the real-world.

5. Students also had practical work in the BIS IC (Information Centre). To begin with this work used the students’ personal data from each individual in the class. Issues of confidentiality, accuracy, integrity, lies, errors in software/network, non-cooperation and so on, soon arose for discussion at PDPs and in lectures. Novice students find it difficult to relate to business organisation and control issues. Dealing with their own data, seeing the problems there, and moving on to more general approaches and concept-learning, was a comfortable starting approach. Our approach is to offer “Work Performance Improvement Courses”, rather than “Computer Courses”.

6. The style of test and examination questions altered. Students were coached in the meaning of “Describe” and “Discuss”, amid fierce resistance from many who wanted the BIS1 course to be run according to their perception of a “computer course”, namely, questions on keyboard activities. Tests and examinations do not examine keyboard activities. BIS1 test and examination questions tend to begin with a scenario, such as “You are the owner of a supermarket, and .... Outline the steps you would take to implement a stock control system, including the use of a computer. Justify your steps at every stage.” Or, “During your BIS1 course, you were asked to visit a bank, or a car manufacturer, or a building society, or .... and report back on their use of spreadsheets (or networks, or ....). Describe your visit, in the context of the spreadsheet.
usage you found, and discuss what you found using material from your BIS1 course. Extra marks are awarded for a systematic answer." Students do not like these types of questions, but, we believe that this aspect of the problem-driven approach is an excellent way to build up confidence and competence, and to prepare students for the workplace. IT issues are always related to, in fact, flow from, problems.

7. No multiple-choice tests or examination material are used. We believe such material is more a language and semantics exercise rather than a test of knowledge. Such material encourages piecemeal learning, and remembered phrases, at the cost of students' inability to describe or discuss an issue/problem.

8. All practical work and Interactions were DP requirements.

The problem-driven approach for the whole course has been partly diluted/distorted by the large number of disruptions to the academic programme at UDW in 1996. However, we feel that the problem-driven paradigm will be a much more successful one than the previous product-driven style.

Survey of BIS1 Students at University of Durban-Westville (UDW)

The survey was conducted during a scheduled BIS1 lecture period in a lecture hall on 18 June, 1996. Approx. 200 students are registered for BIS1, and 131 respondents completed the "Questionnaire" form (Appendix A). At the time of the survey, UDW had only just re-opened after a closure for almost 6 weeks due to unrest on campus. Lectures were still returning to normal rhythm at the time of the survey.

A special section of the Questionnaire form referred to the textbook. Other aspects of the course were also covered, but, only results from the textbook section are reported here. Not all respondents replied to all items on the questionnaire. Each respondent assigned a RATING to attributes of the textbook on a scale of 0 to 10, where:

0: TOTALLY UNSATISFACTORY
5: SATISFACTORY
10: EXCELLENT

Some respondents, apparently about 10, interpreted this RATING range to mean that they could only use exactly 0, 5 or 10. The remainder appeared to award ratings throughout the range 0 to 10. Several answer forms were excluded due to obviously invalid answers. For example, answer 1 = 10, answer 2 = 9, answer 3 = 8, .... down to -10 then start over at 10.

Table 1: "UDW Survey Results for the Textbook 18/6/96" below, shows the results of the textbook survey.
The first column in Table 1 shows the “Attribute” rated. For example, “Easy-to-read”. The second column shows the Total Number of Ratings (Respondents) for that attribute. The third column, headed “<5”, shows the percentage of Ratings less than 5. In other words, the % of respondents for this attribute who rated the attribute as “less than satisfactory”. The fourth column, headed “>=5”, shows the percentage of Ratings greater than or equal to 5. In other words, the % of respondents for this attribute who rated the attribute as “satisfactory or better”. The fifth column, headed “>=7”, shows the percentage of Ratings greater than or equal to 7. In other words, the % of respondents for this attribute who rated the attribute as “very good or better”. The sixth column, headed “>=9”, shows the percentage of Ratings greater than or equal to 9. In other words, the % of respondents for this attribute who rated the attribute as “almost excellent or excellent”.

Table 1: UDW Survey Results for the Textbook 18/6/96

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Total Number of Ratings (Respondents)</th>
<th>&lt;5 % “less than satisfactory”</th>
<th>&gt;=5 % “satisfactory or better”</th>
<th>&gt;=7 % “very good or better”</th>
<th>&gt;=9 % “almost excellent or excellent”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Useful</td>
<td>128</td>
<td>9</td>
<td>91</td>
<td>63</td>
<td>41</td>
</tr>
<tr>
<td>Informative</td>
<td>128</td>
<td>12</td>
<td>88</td>
<td>62</td>
<td>41</td>
</tr>
<tr>
<td>Interesting</td>
<td>128</td>
<td>17</td>
<td>83</td>
<td>60</td>
<td>36</td>
</tr>
<tr>
<td>Understandable</td>
<td>128</td>
<td>10</td>
<td>90</td>
<td>71</td>
<td>44</td>
</tr>
<tr>
<td>Wise Guru</td>
<td>128</td>
<td>14</td>
<td>86</td>
<td>65</td>
<td>37</td>
</tr>
<tr>
<td>Easy-to-read</td>
<td>128</td>
<td>8</td>
<td>92</td>
<td>74</td>
<td>47</td>
</tr>
<tr>
<td>Well-organised content</td>
<td>126</td>
<td>11</td>
<td>89</td>
<td>63</td>
<td>37</td>
</tr>
<tr>
<td>Ease of finding material</td>
<td>126</td>
<td>13</td>
<td>87</td>
<td>55</td>
<td>25</td>
</tr>
<tr>
<td>Content arranged for effective learning</td>
<td>126</td>
<td>10</td>
<td>90</td>
<td>60</td>
<td>29</td>
</tr>
<tr>
<td>The “Story” at the start of each Episode</td>
<td>128</td>
<td>20</td>
<td>80</td>
<td>61</td>
<td>38</td>
</tr>
<tr>
<td>The style of language used</td>
<td>126</td>
<td>11</td>
<td>89</td>
<td>67</td>
<td>44</td>
</tr>
<tr>
<td>Examples used in the textbook</td>
<td>126</td>
<td>8</td>
<td>92</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Level of Material (0 if elementary level, 10 if much too complex)</td>
<td>113</td>
<td>18</td>
<td>82</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>OVERALL RATING FOR THE TEXTBOOK</td>
<td>122</td>
<td>9</td>
<td>91</td>
<td>57</td>
<td>27</td>
</tr>
</tbody>
</table>

Except for the Attribute “Level of Material (0 if elementary level, 10 if much too complex)”, the higher the Rating (the closer to 10) the better the acceptance of and reaction to the textbook by the respondents.
Evaluation of Survey Results

Overall acceptance level for the textbook was very high. 91% of respondents for "OVERALL RATING FOR THE TEXTBOOK" rated it as "satisfactory or better", and 57% as "very good or better".

Below, in Fig. 1 is the graphical, frequency distribution of the OVERALL RATING FOR THE TEXTBOOK replies. The Y-Axis is the NUMBER OF RESPONDENTS. The X-Axis is the RATING given.

![Graph of Overall Rating](image)

**Fig. 1: OVERALL RATING**

The specific new features of the book also obtained high ratings. The surveyed new features were "Wise Guru", "Easy-to-read", "The 'Story' at the start of each Episode", "The style of language used" and "Examples used in the textbook". Below, in Figs. 2 to 6, are the graphical, frequency distributions of the RATINGS for these new features. The Y-Axis, in each case, is the NUMBER OF RESPONDENTS. The X-Axis is the RATING given.

![Graph of Wise Guru](image)

**Fig. 2: Wise Guru**

![Graph of Easy-to-read](image)

**Fig. 3: Easy-to-read**
A textbook is one medium, amongst many, which can contribute to course success/failure. Examination results, and students' level of understanding and knowledge, can be other indicators of course improvement compared with previous material and methods. For the authors, the results are pleasing, although preliminary. There was no indication of significant rejection of any feature of the textbook, or the textbook as a whole. Several other aspects of the course received poor RATINGs, showing that respondents did not seem to rate all questionnaire items highly regardless of the item.

Conclusions

The problem-driven approach appears to be a satisfactory approach for a first-year Information Systems course, as well as suited for education of business people.

The provision of a full instructors' support pack by the end of 1996 (as scheduled), and possibly video Episodes, could further assist course results. The Overhead Projector slides should be available under Microsoft Powerpoint Version 7.0 (currently), via Internet for prescribers. Course instructors can then select individual slides for printing on Transparencies, or retain the electronic slides for display within a classroom with a notebook/laptop computer. The course instructor can customise the overhead slide material, and other, to suit a local course.

A textbook is not the only medium of teaching in a course. Tutorials, lectures, PDPs, assignments, practicals, and so on, all make a contribution. But for many students, the textbook sets the tone and level of the course, and becomes a safe source of useful knowledge.
Course instructors need to revisit course objectives, course methods and course perspective to determine an appropriate conceptual model for teaching. Driven by changing student population, changing employer requirements and changing society, there is a need to reevaluate existing paradigms. Courses should be designed in the best possible way, and then, the best possible textbook, and other material, used to support the course. We believe that the problem-driven conceptual model is the appropriate one for the South African future in Information Systems education (Moulder, 1994) says we have to "ride the wave" that is rolling over South African society, and education in particular. Otherwise, we will drown!

Notes

Comments, criticism, suggestions, experiences on any aspect of the textbook, courses, students, and so on, are welcome. E-mail addresses for the authors appear at the start of this paper and on the Title Page of our textbook. The authors invite other institutions and colleagues to share e-mail correspondence, with survey results, course methods, textbook assessment, and student matters. Even the Wise Guru has an e-mail address. The front pages of the textbook contain further detail about the design of the textbook.

Acknowledgements

Juta & Co. Ltd. of Cape Town put together a great group of individuals, making up a great team of publishers. Thanks for your expert assistance and happy production days!

References


University of Durban-Westville  
Faculty of Commerce and Administration  
Questionnaire re Business Information Systems 1 (BIS1)  
To a BIS1 student in 1996:  

Hi! Here is an opportunity for you to comment on the BIS1 course and its components. Please answer the following questions as fully and honestly as you can so that UDW can assess the quality of your BIS education. You do not need to supply your name. You must be a registered BIS1 student in 1996. Return your completed Questionnaire to Professor Erwin.

Assign a RATING for each component as:
0: TOTALLY UNSATISFACTORY
5: SATISFACTORY
10: EXCELLENT.

OVERALL BIS1 COURSE

Overall RATING for BIS1 course: ___

Usefulness to you
Interesting
Organised (0 means very badly organised)
Difficult (0 means very difficult)
Relevant to job/work future
Practical Computer Assignments (PCAs)
Hard to understand (0 means very hard to understand)

What would you like to see different in BIS1?
What is missing from the BIS1 course?
What did you like MOST about the BIS1 course?
What did you DISLIKE about the BIS1 course?

BIS STAFF

Overall rating for Mr Webb:
Overall rating for Ms Oldman (PDPs):
Overall rating for Rajiv Lutchman (IC):
Overall rating for Prof. Erwin:
Overall rating for BIS Staff attitudes:

INFORMATION CENTRE (IC)

Availability of computer(s)
Help from demonstrator(s)
Hours of opening
Access to information about IC usage
Overall rating for the IC:

Appendix A: BIS1/UDW Questionnaire. 18 June 1996.

Page 1 of 2
### Lectures

<table>
<thead>
<tr>
<th>Rating</th>
<th>Useful</th>
<th>Interesting</th>
<th>Start and end on time</th>
<th>Suitable venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>-------</td>
<td>--------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>----------------</td>
</tr>
</tbody>
</table>

**Overall rating for Lectures:**

---

### Textbook: "Business Computing: An African Perspective by Erwin and Blewett."

<table>
<thead>
<tr>
<th>Rating</th>
<th>Useful</th>
<th>Informative</th>
<th>Interesting</th>
<th>Understandable</th>
<th>Wise Guru</th>
<th>Easy-to-read</th>
<th>Well-organised content</th>
<th>Ease of finding material</th>
<th>Content arranged for effective learning</th>
<th>The &quot;Story&quot; at the start of each Episode</th>
<th>The style of language used</th>
<th>Examples used in the textbook</th>
<th>Level of Material</th>
<th>What is a CCQ?</th>
<th>What is KAIR?</th>
<th>What is COURSE?</th>
<th>What is STAIR?</th>
<th>What is MOLEST?</th>
<th>What did you like about the textbook?</th>
<th>What did you dislike about the textbook?</th>
<th>Overall rating for the textbook:</th>
</tr>
</thead>
<tbody>
<tr>
<td>-------</td>
<td>--------</td>
<td>-------------</td>
<td>-------------</td>
<td>----------------</td>
<td>-----------</td>
<td>--------------</td>
<td>-------------------------</td>
<td>---------------------------</td>
<td>--------------------------------</td>
<td>---------------------------------</td>
<td>-----------------</td>
<td>---------------------------</td>
<td>-----------------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
<td>--------------------------------</td>
<td>-------------------------------</td>
<td>------------------</td>
</tr>
</tbody>
</table>

---

### Personal Development Programs (PDPs)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Useful</th>
<th>Interesting</th>
<th>Start and end on time</th>
<th>Suitable venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>-------</td>
<td>--------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>----------------</td>
</tr>
</tbody>
</table>

**Overall rating for PDPs:**

---

### Other Comments on any aspect of BIS1: (write on back of this page)

**Are you taking BIS1 towards becoming a CA?**

**If you answered NO, why are you taking BIS1?**

---

**END OF QUESTIONNAIRE. Thank you for your cooperation. Date completed:**

*Professor Geoff Erwin: Head: Business Information Systems.*

---

Appendix A: BIS1/UDW Questionnaire. 18 June 1996.