

Questioning the University's role in the SAP skills shortage: The case of UCT's IS Department

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AGENDA

SAP skills shortage

IS Skills Required

The IT Applications Course

Experience with teaching SAP

Justifying including SAP

Impact on student learning

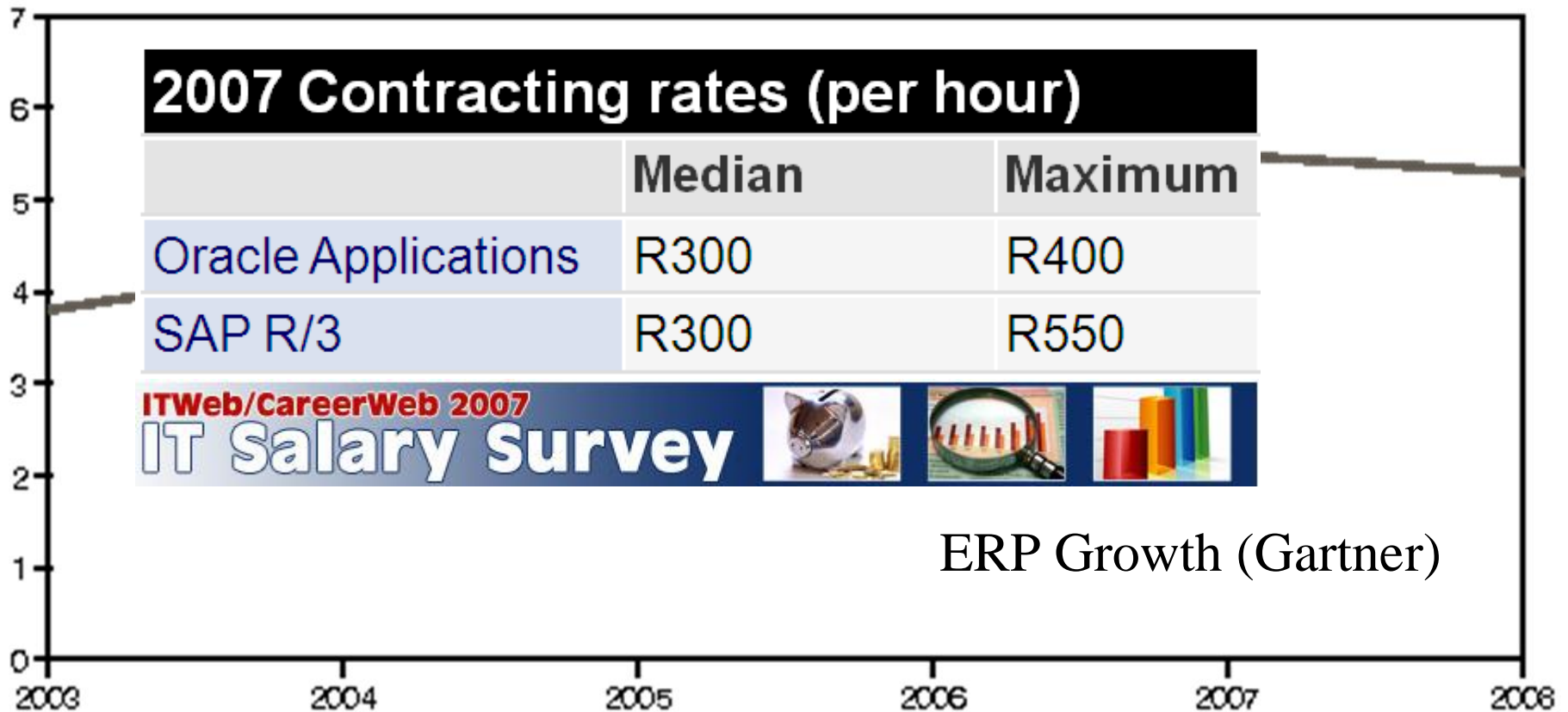
Student comments



ERP Skills shortage

There is a shortage of ERP skills; ERP market penetration is high; the market is still growing

Growth (Percent)



Information Systems?

Information Systems focuses on the business organisation (People, business processes, information and technology)

Undergraduate degrees with IS (aligned to the ACM World Standard):

- Bachelor of Commerce (IS) – 3 years
- Bachelor of Business Science (Management with IS) – 4 years
- Bachelor of Science (IT – Business Computing) – 3 years

B.Com (IS) non-IS Courses

YEAR 1

Financial Accounting
Business Accounting
Evidence-based Management
Microeconomics
Macroeconomics
Statistics 1001

YEAR 2

Business Law I
Issues Around Business
Control of Financial
Information Systems
Statistics 1000
1 approved half course

YEAR 3

People Management
Professional Communication
Marketing
1 approved half courses



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Careers for IS graduates: An indication of need

<u>* 2007 Total monthly package, before tax.</u>	Permanent Contractors	
	Median	Median
Primary area of expertise		
ERP	30,833	41,667
Project management	30,000	38,333
Business process management (BPM) / workflow	26,083	18,000
Business analysis	25,000	37,167
Software development / programming	21,521	29,167
Database development and management	21,000	25,000
Lecturer	19,167	10,833
Web development	16,792	24,083



ITWeb/CareerWeb 2007
IT Salary Survey



Wednesday, February 14, 2007 11:07 AM/EST

Gartner's 2007 CIO Priorities

Top 10 Business Priorities

1. Business process improvement
2. Controlling enterprise-wide operating costs
3. Attract, retain and grow customer relationships
4. Improve effectiveness of enterprise work force
5. Revenue growth
6. Improving competitiveness
7. Using intelligence in products and services
8. Deploy new business capabilities to meet strategic goal
9. Enter new markets, new products or new services
10. Faster innovation

Top 10 Technology Priorities

1. Business Intelligence applications
2. Enterprise applications (ERP, CRM and others)
3. Legacy application modernization
4. Networking, voice and data communications
5. Servers and storage technologies (virtualization)
6. Security technologies
7. Service-oriented architectures
8. Technical infrastructure management
9. Document management
10. Collaboration technologies



Says Mark McDonald, Gartner EXP's head of research and group vice president:

CIOs cannot rely on traditional actions--such as improving operational efficiency, reducing IT costs and automation that lead to commoditization--to meet executive expectations. Success in 2007 requires making the enterprise different to attract and retain customers.

What IS Skills are Required?

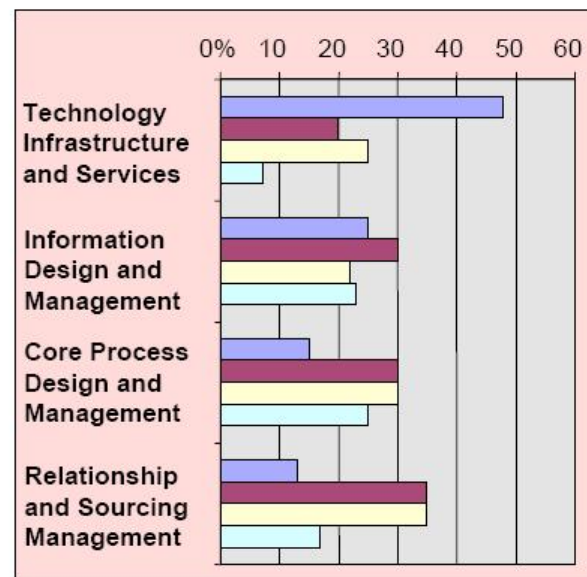
The IS industry has shifted from employing programmers to employing more **business analysts** (Green, 1989; Gallivan, Truex & Kvasny, 2004).

As IS jobs **move from systems development to systems integration**, they have become more diversified and generic (Noll & Wilkins 2002).

Interpersonal skills, business analysis skills, understanding of business operations and carrying out enterprise-wide tasks are the most critical skills that now characterise an IS professional (Gallivan, et al., 2004; Noll & Wilkins, 2002).

Organizations should appoint **Process Information Officers** in IS to support process owners (Kyte 2005).

Reposition the IT organization as the **enterprise process management resource** (Mahoney 2005).



- Emphasized Knowledge**
- Technical knowledge**
How does this technology work?
 - Business-specific knowledge**
What makes this company tick?
 - Core process knowledge**
What processes make this area unique?
 - Industry knowledge**
What characterizes this sector?

The UCT IS Courses

Service Courses

- Information Systems 1 (~1100 students)
- IT in Business (~700 students)

Courses for IS Majors

- Commercial Programming
- Systems Development A & B
- Databases; IT Architecture
- Systems Development Project
- eCommerce; IT Applications

The UCT IT Applications Course:

- Third year one semester course to IS majors
- ERP and business process teaching
- Software: SAP R/3 IDES system (since 2003), ARIS (since 2006)



Students aim to...

- Grasp the interaction between IT applications and business, both technically, and organisationally
- Be aware of practices, trends and risks associated with large ICT application evaluation, acquisition, implementation and usage
- Understand core business processes across sales, materials management, accounting and human resources and how business IT applications can support and integrate them
- Understand how organisations introduce business process improvements and be aware of the role business IT applications play in changing business process
- Understand the role of IS professionals in business process design and management and implementing and supporting purchased business applications

Organisation section

Lifecycle section

ERP sections & SAP workshops

BP Change

Throughout

Students aim to...

Have practical hands-on SAP R/3 experience and understand how changes are managed, customising is performed, transactions are processed, integration occurs and how reports are created

Have systems thinking skills, business process modelling skills and ARIS process modelling experience

Be able to apply their skills and knowledge to real business cases

Be able to produce professional business reports

Be able to work on team projects and perform self- and peer-assessment

5 2h SAP workshops & an assignment

Systems thinking, BP lectures and workshops

Class exercises, case workshops, test, exam

Assignment 1 & 2

Class exercises, Assignment 2


SAP R/3 Teaching Concerns & Experiences

Danger of turning into an SAP training course. Effort needed to be made to ensure that students did not perceive their SAP workshops as **“point and click” training sessions.**

Trying to devise tasks that draw students through **the SAP R/3 maze** and direct them to the core business process material.

Adopting **a case study approach** throughout the workshops. In the Accounting workshop, students have to refer to their earlier transactions, enabling them to trace the effects of transaction changes through the various modules.

When 200 students try to customise the same table at the same time! Had to limit customising to the Project

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A SAP Project consolidates workshop learning and gives freedom to **experiment with customising, SAP Query and Report Painter**



But we needed to justify teaching ERP..

How and why ERP skills are incorporated into the IS curriculum has not been thoroughly addressed by educators (Davis & Comeau, 2004)

“Educational benefits of instructional uses of ERP systems are established on the basis of *anecdotal statements* from faculty and students rather than on empirical and objectively measured data, secured by educational research” (Noguera & Watson, 2004)

We needed to know:

- What does the International IS Curriculum say?
- Has graduates' perceived understanding of the course outcomes increased as the level of ERP exposure increased across the different cohorts?
- Are intended course outcomes relevant to recent graduates?



The International IS Curriculum (Computing Curricula, 2005)?

IS Graduate Performance Capability	Recommended Value
Define information system requirements	5
Select database products	5
Configure database products	5
Implement information systems	4

Course Concepts	Recommended Topic weight
Organisational change management	2-2
Systems Theory	2-2
Functional business areas	4-5
Evaluating business performance	4-5
Analysis of business requirements	5-5

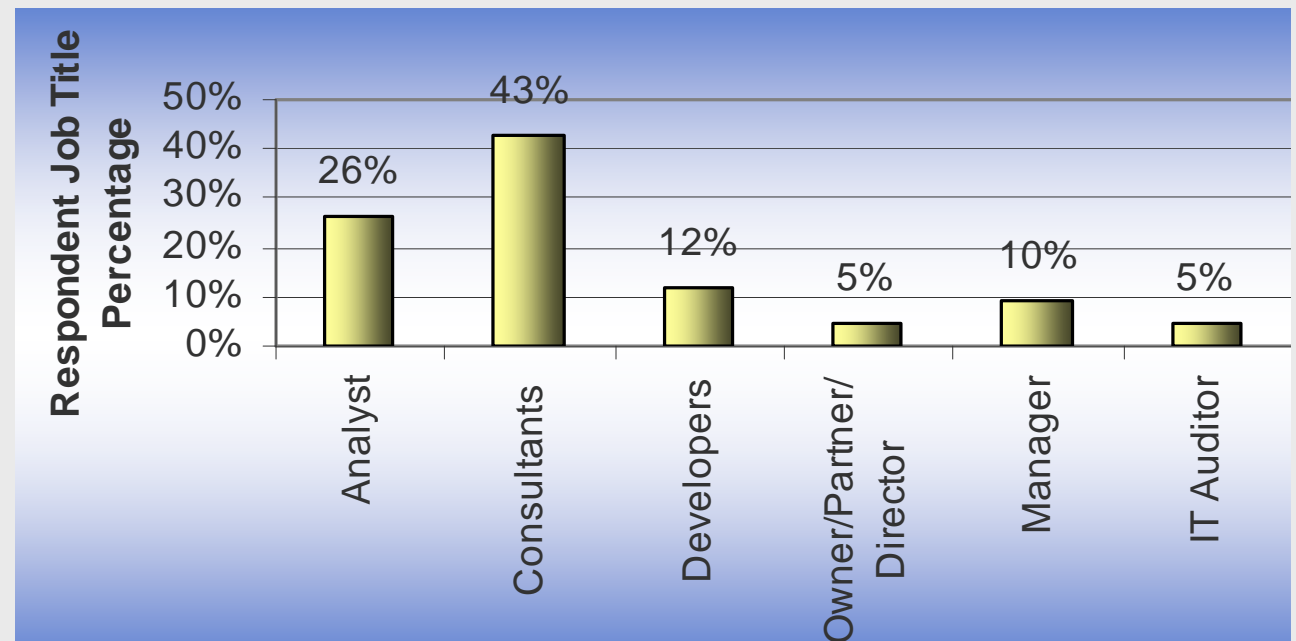
While Hawking et al., (2001) argued for ERP teaching against this broad curriculum model, purchased business applications, and business processes are not listed as course concepts or included as graduate capabilities



Researching graduate perceptions of our course

More ERP exposure was added to the course over a three year period:

- Cohort 1 (2002), received traditional instructional method – lectures plus readings/exercises and non ERP based workshops;
- Cohort 2 (2003), received hands-on instructional method– lectures and live SAP based workshops/practicals; and
- Cohort 3 (2004), received hands-on instructional method– lectures plus live SAP based workshops/practicals and an SAP project



Support for ERP Exposure

ERP Concepts : Students need to gain hand-on experience with the software in order to understand and master the concepts inherent in ERP systems (Scott, 1999; Watson & Schneider, 1999; Hawking & McCarthy, 2000; Grandzol, 2004; Noguera & Watson, 2004; Peslak, 2005)

Business Processes : Students are able to understand how business processes work within and across functional areas of an organization and it leads to a deeper understanding of the links of technology with those business processes (Boykin & Martz, 2004; Grandzol, 2004; Guthrie & Guthrie, 2000; Bradford et al., 2003)

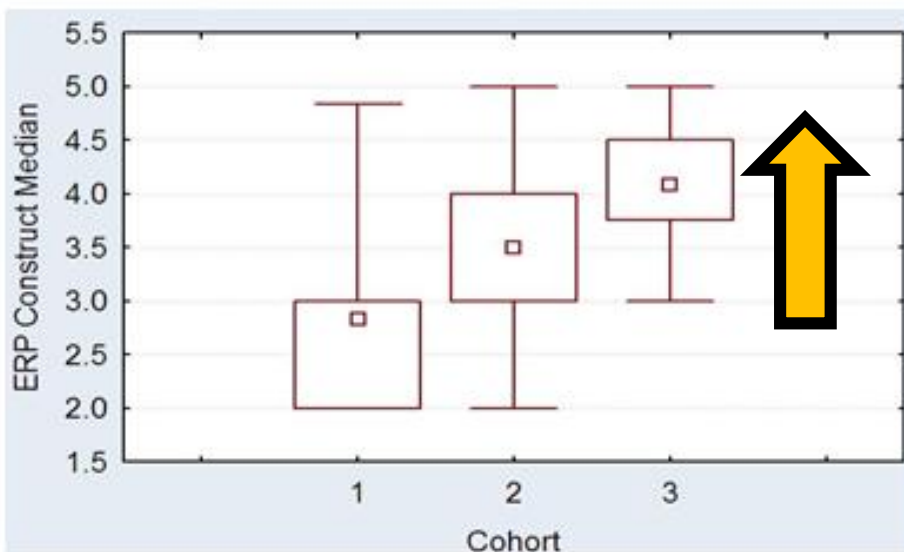


Figure 5.1: ERP Box and Whisker

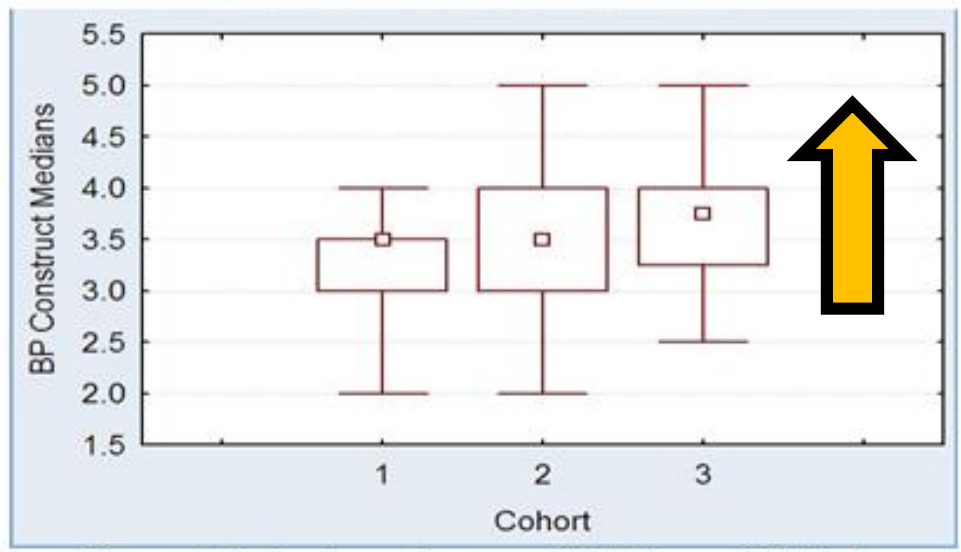


Figure 5.2: Business Process (BP) Box and Whisker

Support for ERP Exposure, cont'd.

Systems Thinking : ERP systems provide a holistic view of the business enterprise and hence epitomise the spirit of systems thinking (Watson & Schneider, 1999).

Business Process Change : ERP systems embed the notion of “best practices”, students gain knowledge of a more controlled method of technology enabled reengineering. They can identify that a change to a business process in one area of the organization has a rippled effect through the entire organization (Joseph & George, 2002; Grandzol, 2004).

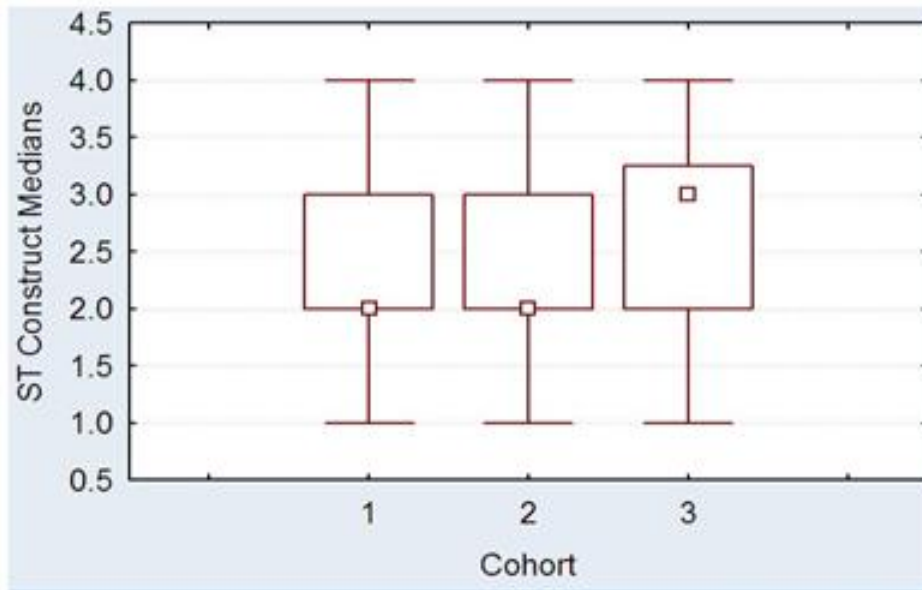


Figure 5.3: Systems Thinking (ST) Box and Whisker

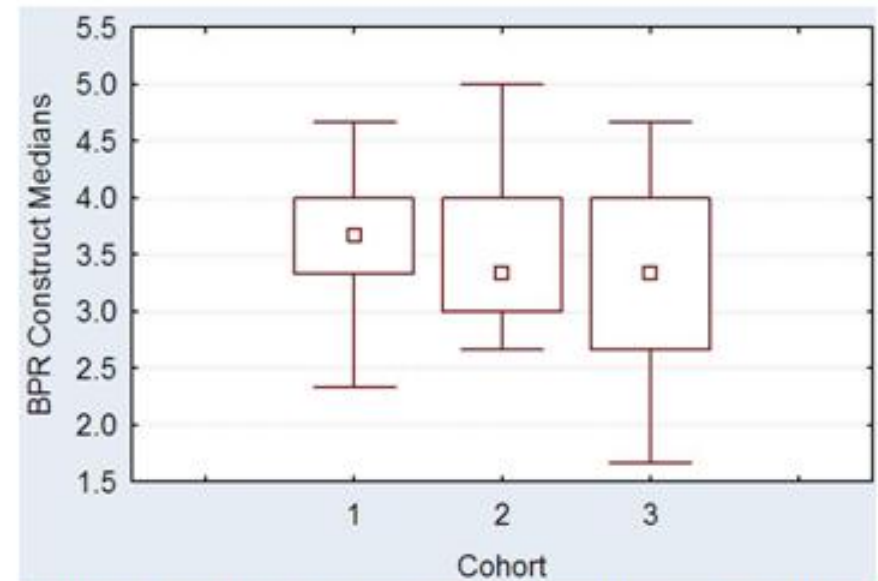


Figure 5.4: Business Process Change Box and Whisker

Course Changes

	2002	2003	2004
Course Format	38 lectures 4 workshops 42 group presentations 1 essay	34 lectures 8 workshops 2 essays	26 lectures 9 workshops 1 essay 1 SAP Project
ERP Concepts Purchased software	6 lectures and 4 group presentations on ERP concepts and products ERP Case study workshop	15 ERP Lectures, including lectures on Concepts, Technical features, reporting and lectures on select SAP R/3 business processes.	13 ERP Lectures, including lectures on Concepts, Technical features, reporting and lectures on select SAP R/3 business processes. 1 ½ ERP Case study workshops
ERP & alternative user interface exposure	NONE	4 SAP R/3 Workshops	4 SAP R/3 Workshops 1 SAP R/3 Project
Business Processes (BPs) and BP change	2 lectures on BPs ½ workshop on activity diagrams 1 group presentation on activity diagrams 4 lectures on BPR, change and change management 4 Group presentations on BPR BPR case study tutorial	1 lecture on BPs One process modelling workshop 3 lectures on BPR	1 lecture on BPs 1 ½ process modelling and redesign workshop 3 lectures on BPR
Systems thinking	1 lecture 1 Group presentation	½ lecture	½ lecture

BP change and systems thinking content reduced



Support for ERP Exposure, cont'd.

Alternate user interfaces : This is directly translatable into the job market
Supporting Purchased Business Systems

- Due to the development focus in curricula, IS graduates seeing little role for themselves in supporting purchased business systems
- Exposure to an ERP and its customization tools would give students an improved understanding of their role in maintaining and customizing purchased systems

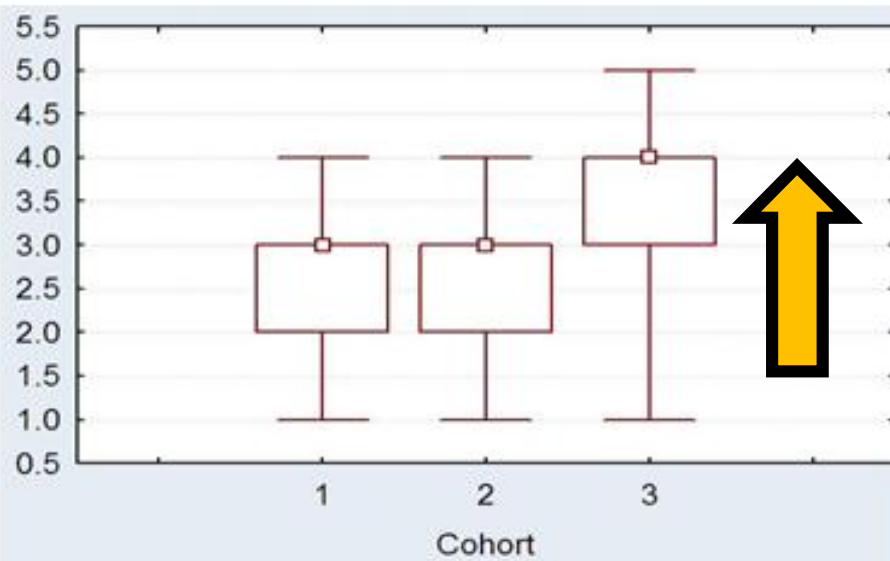


Figure 5.5: Alternative User Interface Box and Whisker

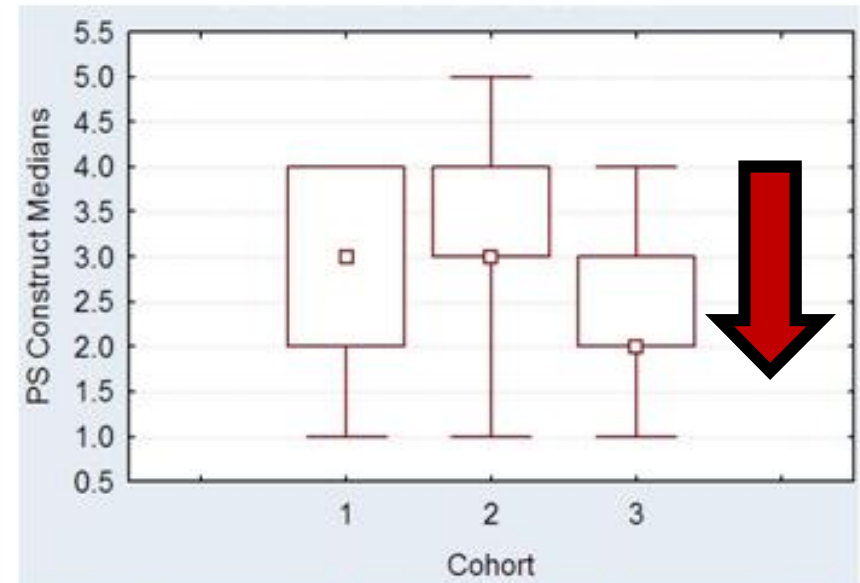


Figure 5.6: Purchased software (PS) Box and Whisker

Results	Course Concepts	Applicability to job
	Business Process	3.51
Alternative User Interfaces	3.42	↑
Enterprise Resource Planning	3.12	↑
Systems Thinking	2.94	
Purchased Software	2.81	↓
Business Process Change	2.78	

Not Applicable (1) to Strongly Applicable (5)

Supporting purchased business systems (Customisation, integration and maintenance)?

Most Positive Aspects Of The Course

Interesting (3), Up to date (2), Assignment Structure (1), SAP exposure (30), Systems thinking (1), ERP assignment (1) SAP workshops (3)

Most Negative Aspects Of The Course (With Suggestions For Improvement)

SAP: wanted more (3), too much theory, want more practicals (2), SAP workshops rushed & confused (3), SAP assignment: unclear (2), more SAP help (1)

Has increased access to SAP R/3 left students with increased appreciation of its complexity and size as well as an increased acceptance of their limited understanding?



Student Learning: anecdotal comments

Evidence from the way questions were tackled in the exam papers and students' comments that they found the live ERP experience aided their understanding of business and business processes. This unsolicited comment below was emailed to the lecturers after the end of the course, post final exam.

- “I really enjoyed the R/3 part of the INF312S course, however, there is one thing that I am still struggling with: In the last workshop in exercise 3 we acted as a sales clerk, recorded a sale and the system then generated a document number which we had to write down. Then in the next part we took on the role of a warehouse supervisor and had to deliver the sales order, using the sales order number generated by the sales clerk. I would just like to know how the warehouse supervisor becomes aware that there is a sales order waiting upon delivery. I know that the whole point of an ERP is data share and so that data is immediately available to the warehouse supervisor, but my confusion comes in how the warehouse supervisor is kept informed. Does the system send an e-mail, is there a special interface that the supervisor works from and the data just pops up or is some other method followed?”

Previous students: impact on employment

Hi Lisa,

I'm doing well, thanks. Didn't have much of a holiday, 1 week after my last exam Maybe. I went for an interview in the middle of the year at XXXX. After the week they offered me the **position as SAP Functional Leader/Business Analyst**, I started on the 1st December 2005, a bit of a dive into the deep end but it's exciting. It's very dynamic as I can work myself far into the company either going the **Business Analyst route or ABAP programmer / Customizing route**.

I never thought I would ever use the knowledge I received from INF312S but here I am, applying that lecture room & Comlab knowledge to the business processes of the company. I must say that insert into my CV probably got me the interview, thanks!



Previous students: impact on employment

Hello Lisa

Not too sure if you remember me, but a couple of weeks ago I emailed you asking for information about SAP to help me prepare for my interview. Well, I'm pleased to inform you that on Monday, **XXX offered me the job**. I just wanted to say that your course on IT Applications was very useful because as part of the interview, we were given a case study, and the concepts that I learnt in that course were very helpful because they were looking for solutions that came hand-in-hand with their methodologies. Things like **'automating to increase efficiency'; 'identifying the core business processes first' etc were concepts that I applied that scored me some real points.**

During my interview, he asked me what exactly I knew about SAP (since I had written that I had 5 weeks' exposure), and **he seemed very impressed that I knew about ASAP and all their functional modules** etc.

Well, to cut a long story short..Thank you once again for you help and assistance, and I think the course makes a considerable difference to anyone interested in working in the ERP field.



Previous students: impact on employment

Hi Lisa, I just wanted to let you know that I am currently on an SAP implementation.

My project role from now (we are coming into Realisation) is I am going to be **configuring SAP**. Before this I was a **functional analyst** and that included doing a gap analysis on the SAP system as opposed to the XXXX bank requirements and developing WRICEF's to fill the Gaps. We are going live in October so the timelines are a bit hectic....but nothing new to an UCT IS Honours graduate.....just the same pressure on a big stage for me



Parting comment – The Global Crisis in IT Education

“We are short of men and women with IT skills. All recent studies and surveys confirm what we already know about scarce skills - management, engineering, and IT are key areas of shortage” (Speaking notes, Minister of Education, Naledi Pandor MP, at the South Africa-Ireland education conference, Dublin, 15 November 2006)

Universities worldwide have experienced a massive drop in IS/CS student enrollments

- "disturbing trend of the declining number of computer science undergraduate majors and graduate enrollment between 2000 and 2005" (Melymuka, 2006).
- We will be facing IT graduate shortages in RSA soon!
- UCT's Third year IS student numbers: 2003 (204); 2005 (155); 2007 (63)....

“With 1.5 million new IT jobs projected by 2007 by the U.S. Department of Labor and a steep decline in graduates with computing degrees, a labor shortage is inevitable. The business sector needs to step and be part of the solution.” Buell Duncan, general manager of the IBM Academic Initiative (Tucci, 2005).



*What do you believe is
the University's role in
addressing the SAP
skills shortage?*

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