Supporting Students via 5th Generation Distance Education Technologies

Professor J C Taylor

Deputy Vice Chancellor (Global Learning Services)

& Chief Information Officer

University of Southern Queensland

Australia

Learning and Teaching In Context

- **Global Context**

- **Theoretical Context**

- **Institutional Context**

- **Pedagogical Context**

- **Consumer Context**

Joseph Schumpeter (1934) predicted that every 50 years or so, technological revolutions would cause

"gales of creative destruction"

in which old industries would be swept away and replaced by new ones.

The Networked World:
Internet Access Population (millions)

- USA · · · · · · · · · · · 207.16
- China · · · · · · · · · · 123.00
- Japan · · · · · · · · · · 86.30
- Germany · · · · · · · · 50.62
- UK · · · · · · · · · · · · 37.60
- South Korea · · · · · · 33.90
- Canada · · · · · · · · · 21.90
- Australia · · · · · · · · 14.66
- Netherlands · · · · · · 10.81
- Sweden · · · · · · · · · 6.80
- New Zealand · · · · · · 3.20

Total global population estimated at 1.086 billion

Economic Driver for Change

'The death of distance as a determinant of the cost of communications will probably be the single most important economic force shaping society in the first half of the 21st century'.

Cairncross (1997)

Significant Forces Driving Change in Higher Education

- Impact of information and communication technologies

- Globalisation of culture and commerce

- Exponential growth of new knowledge and new disciplines

- Exponential growth in the need for professional development/lifelong learning in all disciplines

Source: Duderstadt (2001)

The Knowledge Explosion

Over 90% of the relevant literature in many technical fields, such as biotechnology, astronomy, computers and software, and environmental sciences, has been produced since 1985.

Traditional programmatic approaches to education simply cannot keep up………..

J B Quinn (2001)

The Knowledge Society

There are increasing signs that our current paradigms for higher education, the nature of our academic programs, the organization of our colleges and universities, and the way that we finance, conduct and distribute the services of higher education may not be able to adapt to the demands of our time.

J J Duderstadt (2001)

Future Projections

- **A recent IBM report forecasts a threefold (US$4.5 trillion) jump in global education expenditure during the next 13 years.**

- **The World Bank expects the number of higher education students will more than double from 70 million to 160 million by 2025.**

(Source: Richard Gluyas, New Nabs e-School Deal http://finance.news.com.au, 22 April 2000).

Leadership Challenge

The fact that the present traditional approaches based on conventional classroom-based teaching and learning will not be capable of meeting the escalating demand for higher education and continuing professional development in the knowledge society presents a real leadership challenge to the higher education sector.

Cost-Effective Access

In both developed and developing countries, the Internet will provide the only viable cost-effective conduit through which corporations and educational institutions will be able to provide access to ongoing opportunities for the continuing professional development of working individuals.

Leadership Challenge

"Technology is the key variable making possible, and imperative, the reinvention of the corporation"

Stace & Dunphy (2001)

Fast, Flexible and Fluid

The transition from the Industrial to the Information Age was encapsulated by Dolence and Norris (1995), who argued that to survive organisations would need to change from rigid, formula driven entities to organisations that were "fast, flexible and fluid".

Leadership Challenge

The leaders of education and training institutions are badly equipped and supported to implement changes needed for successful introduction and mainstreaming of meaningful eLearning and the use of ICT

Policy Paper of the European ODL Liaison Committee, November 2004.

Five Generations of Distance Education Technology

- **The Correspondence Model**

- **The Multimedia Model**

- **The Telelearning Model**

- **The Flexible Learning Model**

- **The Intelligent Flexible Learning Model**

First Generation (Asynchronous)

MODELS OF DISTANCE EDUCATION AND ASSOCIATED DELIVERY TECHNOLOGIES	CHARACTERISTICS OF DELIVERY TECHNOLOGIES					INSTITUTIONAL VARIABLE COSTS APPROACHING ZERO
	FLEXIBILITY			HIGHLY REFINED MATERIALS	ADVANCED INTERACTIVE DELIVERY	
	Time	Place	Pace			
THE CORRESPONDENCE MODEL • **Print**	Yes	Yes	Yes	Yes	No	No

Second Generation (Asynchronous)

MODELS OF DISTANCE EDUCATION AND ASSOCIATED DELIVERY TECHNOLOGIES	CHARACTERISTICS OF DELIVERY TECHNOLOGIES					INSTITUTIONAL VARIABLE COSTS APPROACHING ZERO
	FLEXIBILITY			HIGHLY REFINED MATERIALS	ADVANCED INTERACTIVE DELIVERY	
	Time	Place	Pace			
THE MULTIMEDIA MODEL						
• Print	Yes	Yes	Yes	Yes	No	No
• Audiotape	Yes	Yes	Yes	Yes	No	No
• Videotape	Yes	Yes	Yes	Yes	No	No
• Computer-based learning (eg CML/CAL)	Yes	Yes	Yes	Yes	Yes	No
• Interactive video	Yes	Yes	Yes	Yes	Yes	No

Variable costs tend to increase or decrease directly (often linearly) with fluctuations in the volume of activity.

In traditional distance education delivery, the distribution of packages of self-instructional materials (printed study guides, audiotapes, videotapes, etc) is a variable cost, which varies in direct proportion to the number of students enrolled.

Third Generation (Synchronous)

MODELS OF DISTANCE EDUCATION AND ASSOCIATED DELIVERY TECHNOLOGIES	CHARACTERISTICS OF DELIVERY TECHNOLOGIES					INSTITUTIONAL VARIABLE COSTS APPROACHING ZERO
	FLEXIBILITY			HIGHLY REFINED MATERIALS	ADVANCED INTERACTIVE DELIVERY	
	Time	Place	Pace			
THE TELELEARNING MODEL						
• Audio-teleconferencing	No	No	No	No	Yes	No
• Audiographic communication	No	No	No	Yes	Yes	No
• Videoconferencing	No	No	No	?	Yes	No
• Access Grid	No	No	No	?	Yes	No
• Broadcast TV/Radio and Audio-teleconferencing	No	No	No	Yes	Yes	No
• Webcasting (live)	No	No	No	Yes	No	Yes

Existing Predominant Mindsets

- **Tyranny of Distance**

- **Tyranny of Proximity**

- **Tyranny of Futility**

Computer Mediated Communication (CMC)

- **There is an important qualitative difference between a traditional on-campus tutorial and asynchronous written communication online.**
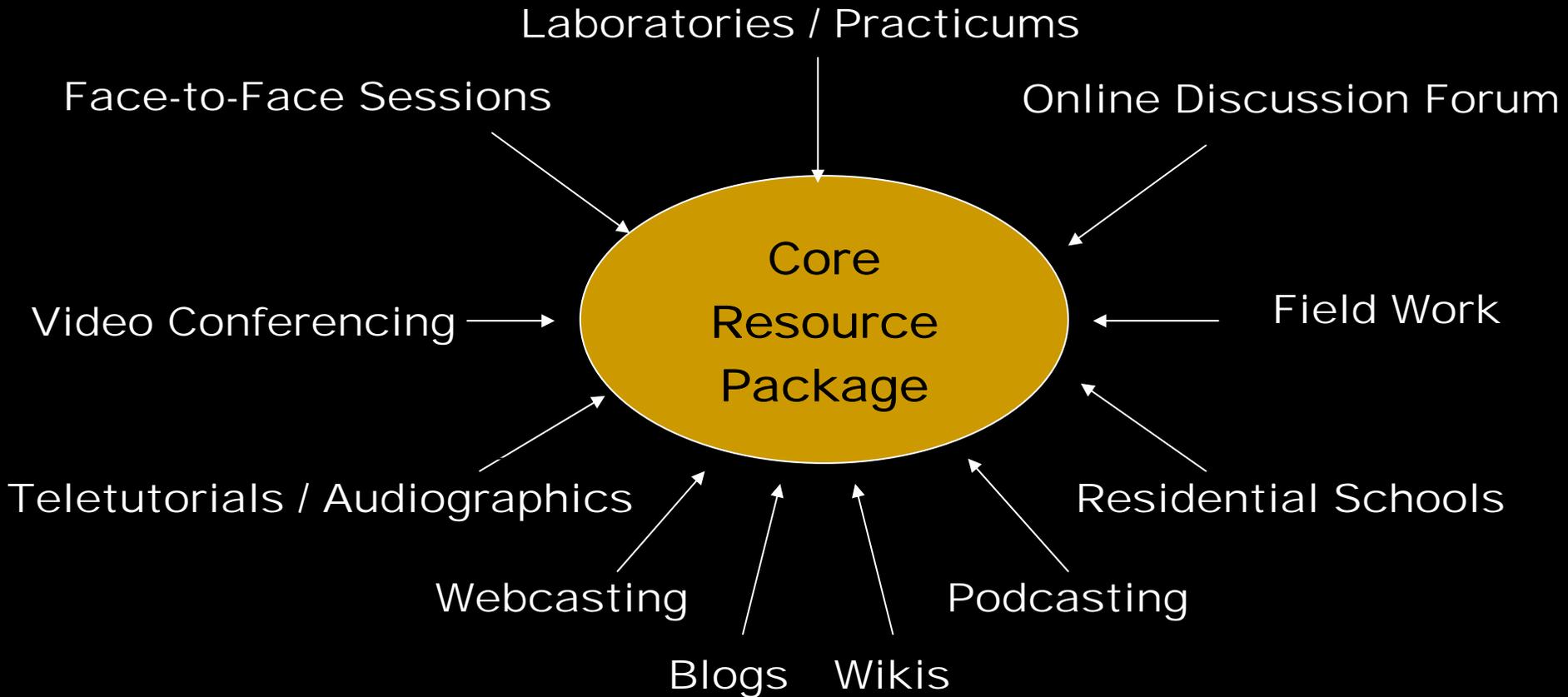
Important Qualitative Difference

- **Compared to the spontaneous and less structured nature of oral discourse, asynchronous discussion online engenders a disciplined and rigorous form of thinking based on the reflective and explicit nature of the written word.**

Fourth Generation (Asynchronous)

MODELS OF DISTANCE EDUCATION AND ASSOCIATED DELIVERY TECHNOLOGIES	CHARACTERISTICS OF DELIVERY TECHNOLOGIES					INSTITUTIONAL VARIABLE COSTS APPROACHING ZERO
	FLEXIBILITY			HIGHLY REFINED MATERIALS	ADVANCED INTERACTIVE DELIVERY	
	Time	Place	Pace			
THE FLEXIBLE LEARNING MODEL						
• Interactive multimedia (IMM)	Yes	Yes	Yes	Yes	Yes	Yes
• Internet-based access to WWW learning resources	Yes	Yes	Yes	Yes	Yes	Yes
• Computer mediated communication (CMC)	Yes	Yes	Yes	Yes	Yes	No
• Audio on demand	Yes	Yes	Yes	Yes	No	Yes
• Video on demand	Yes	Yes	Yes	Yes	No	Yes

Fifth Generation (Asynchronous)

MODELS OF DISTANCE EDUCATION AND ASSOCIATED DELIVERY TECHNOLOGIES	CHARACTERISTICS OF DELIVERY TECHNOLOGIES					INSTITUTIONAL VARIABLE COSTS APPROACHING ZERO
	FLEXIBILITY			HIGHLY REFINED MATERIALS	ADVANCED INTERACTIVE DELIVERY	
	Time	Place	Pace			
THE INTELLIGENT FLEXIBLE LEARNING MODEL • **Interactive multimedia**	Yes	Yes	Yes	Yes	Yes	Yes
• **Internet-based access to WWW learning resources**	Yes	Yes	Yes	Yes	Yes	Yes
• **CMC using automated response systems**	Yes	Yes	Yes	Yes	Yes	Yes
• **Campus portal access to institutional processes & LMS activities**	Yes	Yes	Yes	Yes	Yes	Yes

Transmodal Delivery Options

- Laboratories / Practicums
- Online Discussion Forum
- Face-to-Face Sessions
- Field Work
- Video Conferencing
- **Core Resource Package**
- Teletutorials / Audiographics
- Residential Schools
- Webcasting
- Blogs
- Wikis
- Podcasting

Giving Students WWWW

USQ Delivery Channels

Individual Off Campus Channel

Individual

Standard DE	Primarily Online
49%	**3%**

On Campus Channel

On Campus

Wide Bay	Toowoomba	Springfield
2%	**20%**	**1%**

Distributed Learning Centre Channel

Distributed Learning Centres

Off Shore	On Shore
19%	5%

Enrolled Students USQ 2006

- **All students**   **23,886**
- **On-campus**   **5,670**
- **Off-campus (Australia)**   **11,314**
- **Off-campus (Overseas)**   **6,902**

Note: Students studying solely online   838

USQ's International Students 2006

- **China**   **1,308**
- **Malaysia**   **996**
- **India**   **780**
- **Singapore**   **744**
- **Hong Kong**   **378**
- **Fiji**   **278**
- **Taiwan**   **202**
- **United Arab Emirates**   **189**
- **South Africa**   **181**
- **Canada**   **157**
- **Bangladesh**   **128**
- **Germany**   **81**

Total, incl. students from 82 other countries   6,902

Activity Based Costing: Results by Delivery Mode

The contribution from teaching from each of the modes is shown below. The size of the Bubble represents the number of enrolments. Modes below the x-axis are providing a negative contribution.

Contribution Margin = 15%

Legend:
- ● Educational Partners - Off Shore
- ● Educational Partners - On Shore
- ● Off Campus - On-Line
- ● Off Campus - Standard
- ● On Campus - Toowoomba
- ● On Campus - Wide Bay

Y-axis: **Contribution ($M)** — 12, 8, 4, 0, -4, -8
X-axis: **Revenue ($M)** — (20), 0, 20, 40, 60

Key:
● 2,000 Enrolments
● 20,000 Enrolments

USQ
AUSTRALIA

The PC-ePhone

Managing the Variable Costs of Student Administrative Support

Ask a question/ send an email

NO

Incoming "new" admin question from student

Search / Match

USQ*Assist*: Self-service Knowledge Base

Previous Questions
Previous Answers

USQ staff member – "New Answer"

YES

"Immediate" admin feedback to student

Trigger

Web Self-Service Knowledge Base

- **2002: 48,983 student visits**

- **2003: 209,926 student visits**

- **2004: 299,900 student visits**

- **2005: 441,459 student visits**

Managing the Variable Costs of Customer Contacts

Face-to-face contact	**US $8.00**
Phone contact (average)	**US $4.00 - $6.00**
Email	**US $0.50 - $2.50**
Web Self-Service	**US $0.24**

Source: Gartner Group Inc.

USQAssist

- During 2005, USQAssist processed 441,459 student visits at an approx. cost of $105,950, compared to an estimated equivalent phone enquiry cost of approx. $2.2 million.

USQAssist
Self-Service Knowledge Base

Student support staff also save 25% of their time through the use of the knowledge-base for the automatic generation of suggested answers to email, phone and face-to-face enquiries

e-University

USQ
AUSTRALIA

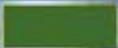USQ Corporate Information Systems

Legend: e-Content/Data Repositories

e-University

USQ
AUSTRALIA

USQ Content Management Systems

USQ Corporate Information Systems
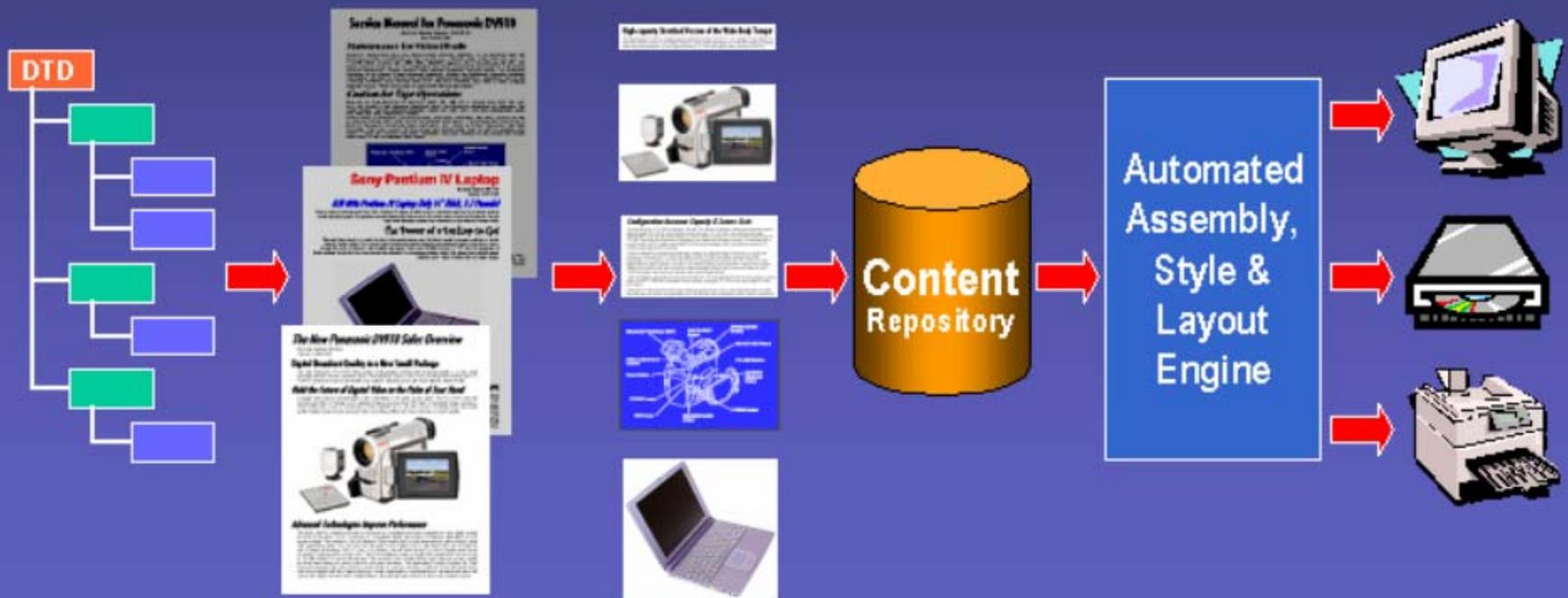
Legend: *e*-Content/Data Repositories

USQ AUSTRALIA

Document Structure & DTD are Designed
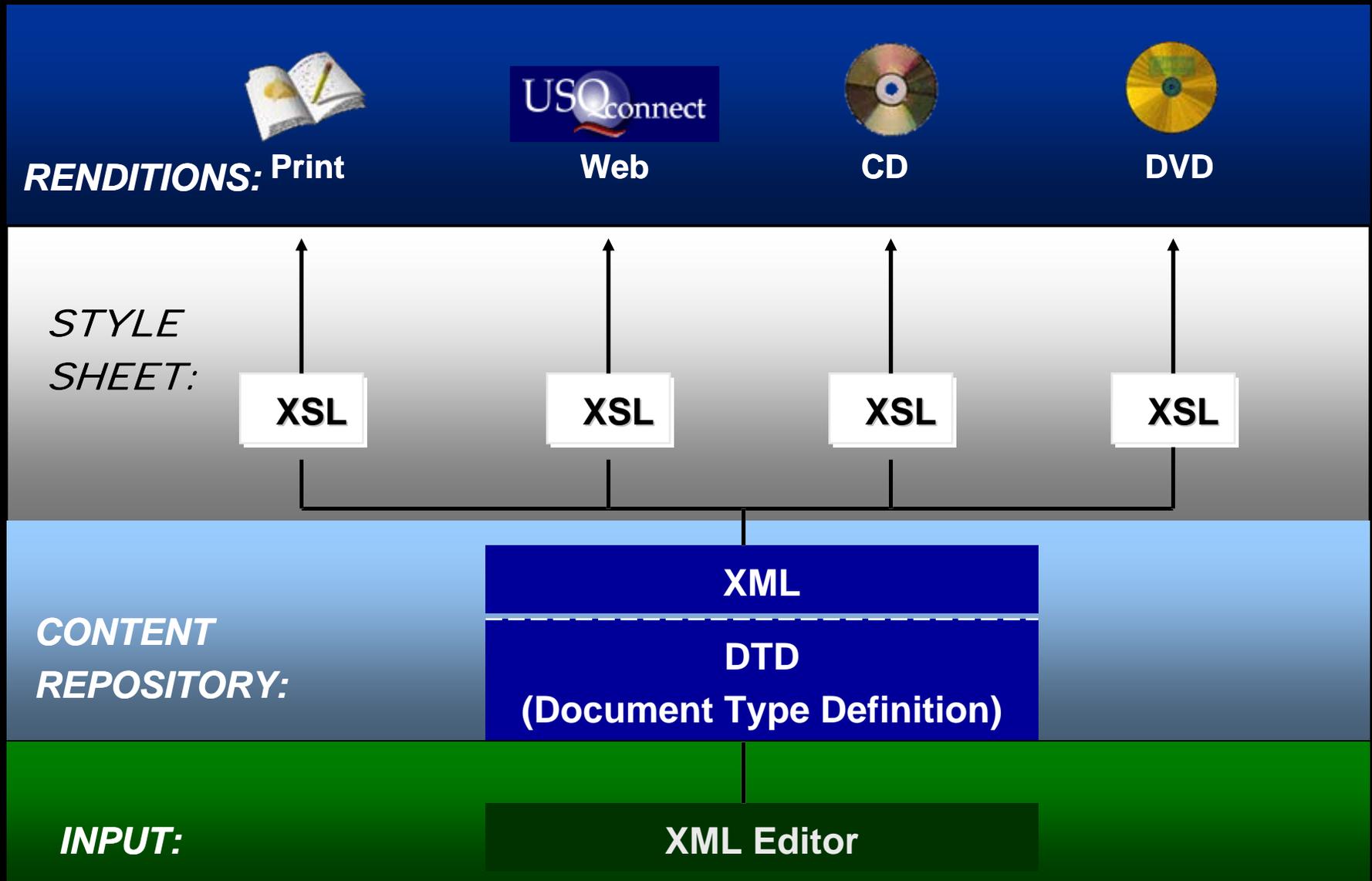
Authors Create Structured Source Documents...

...Which Are Broken Into Reusable XML-based Content

XML Content Is Indexed & Stored

XML Content Is Reused for New Applications

DTD

Content Repository

Automated Assembly, Style & Layout Engine

XML (eXtensible Markup Language)

RENDITIONS: Print   Web   CD   DVD

STYLE SHEET: XSL   XSL   XSL   XSL

CONTENT REPOSITORY:

> **XML**
>
> **DTD**
> **(Document Type Definition)**

INPUT: **XML Editor**

ICE (Integrated Content Environment)

RENDITIONS: Print Web CD DVD

ICE:

Uses XML

OpenOffice.org: rendering services

Free Software: ICE application

CONTENT REPOSITORY:

User's "working copy"

Version Controlled Central Repository

INPUT:

Word processsor

(Microsoft Word or OpenOffice.org)
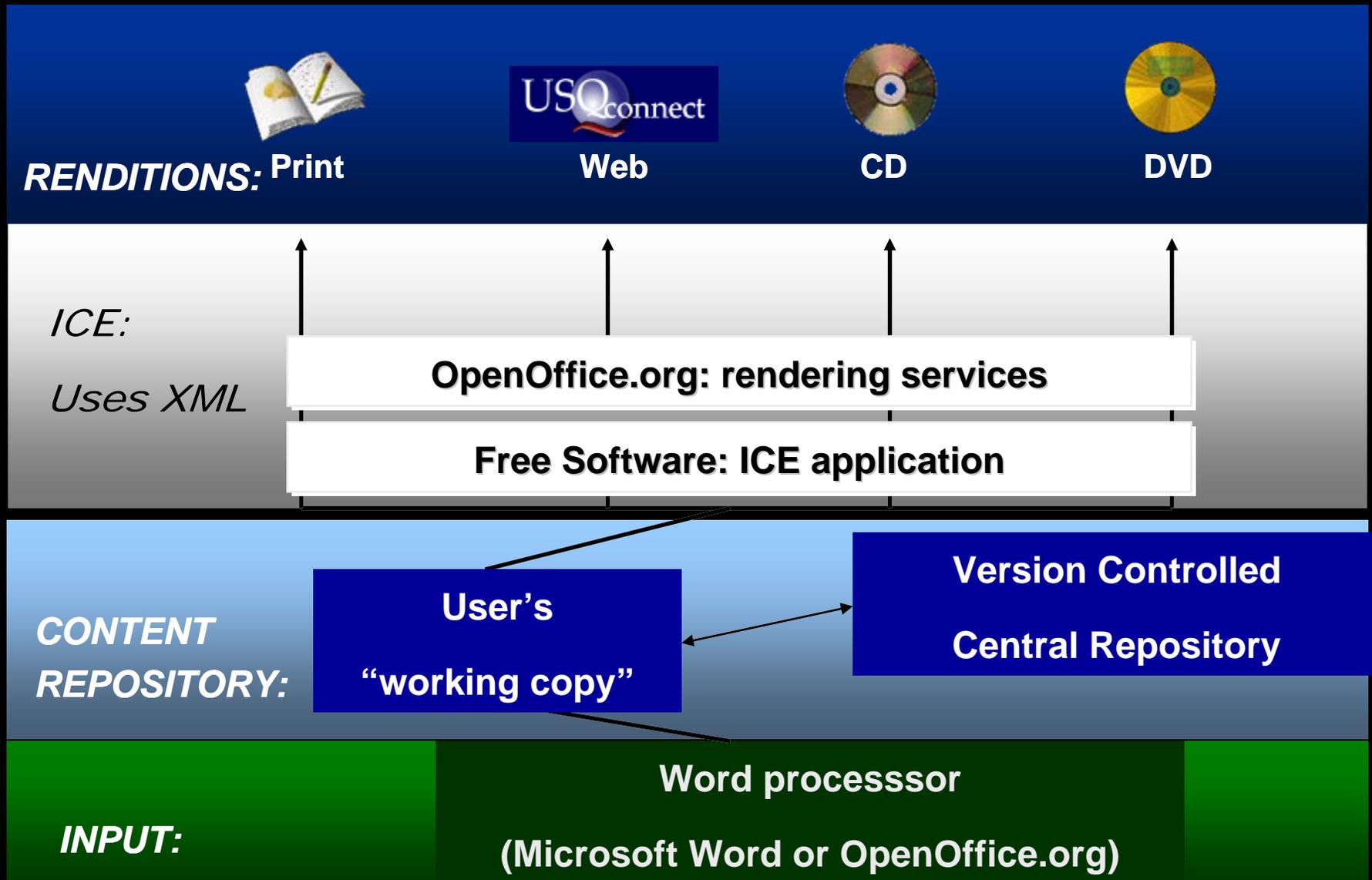
Managing the Fixed Costs of Publication

Cross-Media Rendering of Content

University Handbook

International Undergraduate Guide

Undergraduate Guide to Programs

WEB (html or PDF)

Structured Single Source Corporate Information Repository (XML)

International Postgraduate Guide

Postgraduate Guide to Programs

CD (html or PDF)

Other Publications

USQ Website

Faculty Brochures (x10)

PRINT
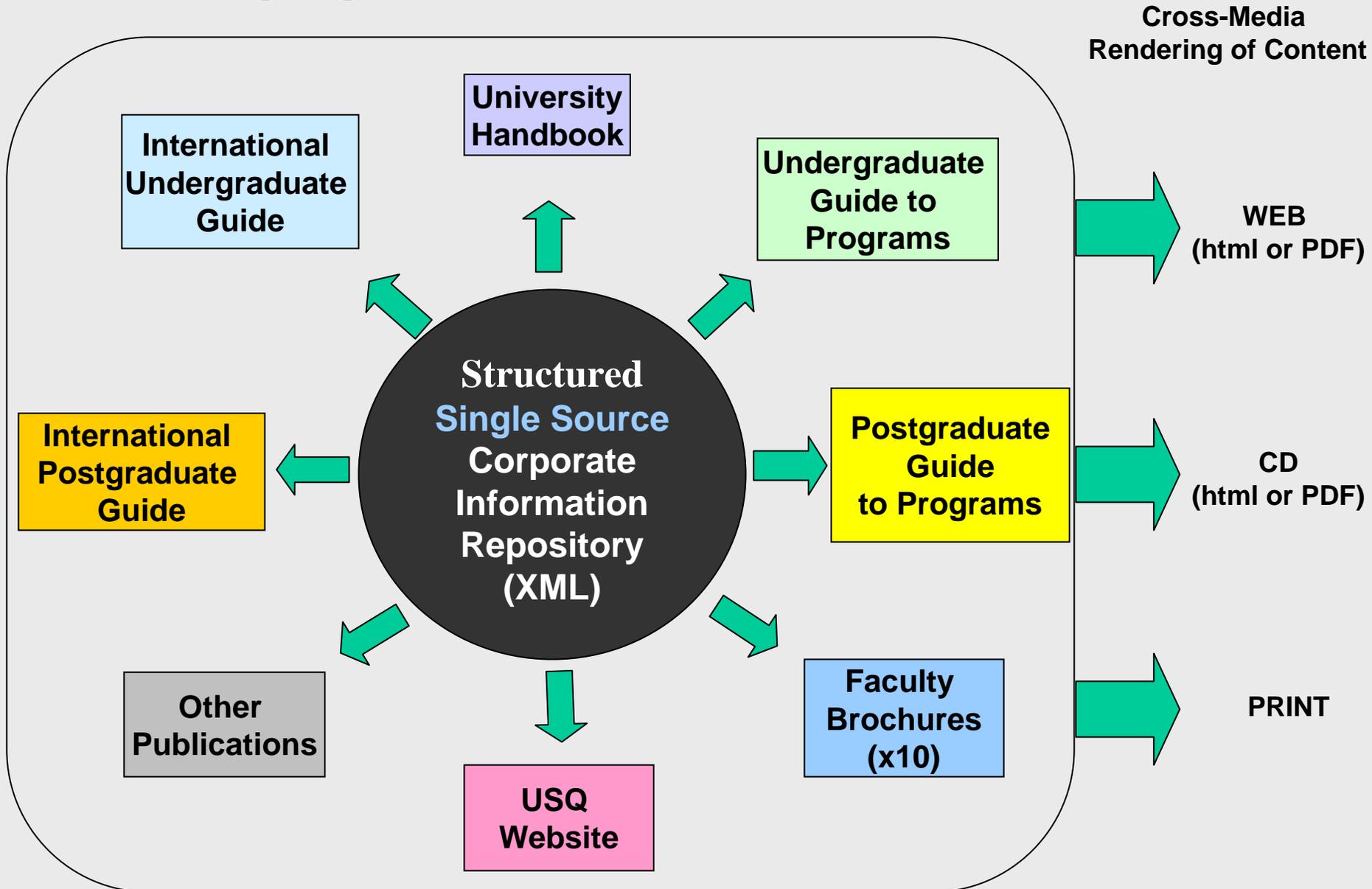
e-University

USQ
AUSTRALIA

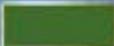| e-Library	e-Publishing	e-Learning
e-Enrolment	e-Administration	e-Commerce

USQ Content Management Systems

USQ Corporate Information Systems

Legend: █ e-Content/Data Repositories   █ e-Applications

"All of the theories used by educators come from an era where computers did not exist"

George Siemens

Global Summit 2006

Laurillard (2002)….." The academic world has called each new technological device – word processing, interactive video, hypertext, multimedia, the Web- into the service of the transmission model of learning."
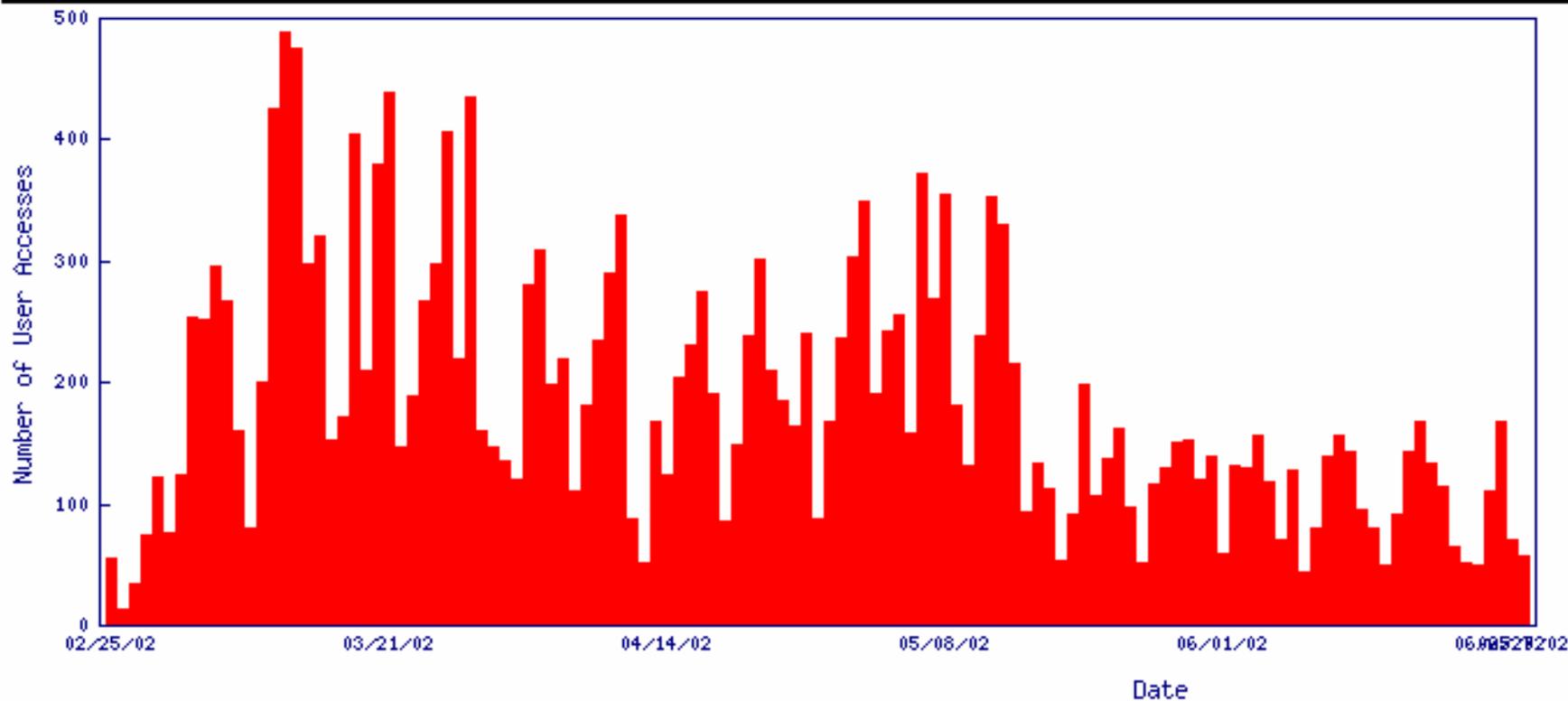
The Potential of e-Learning

- **From transmission to transaction**

- **From the independent learner to the inter-dependent learner**
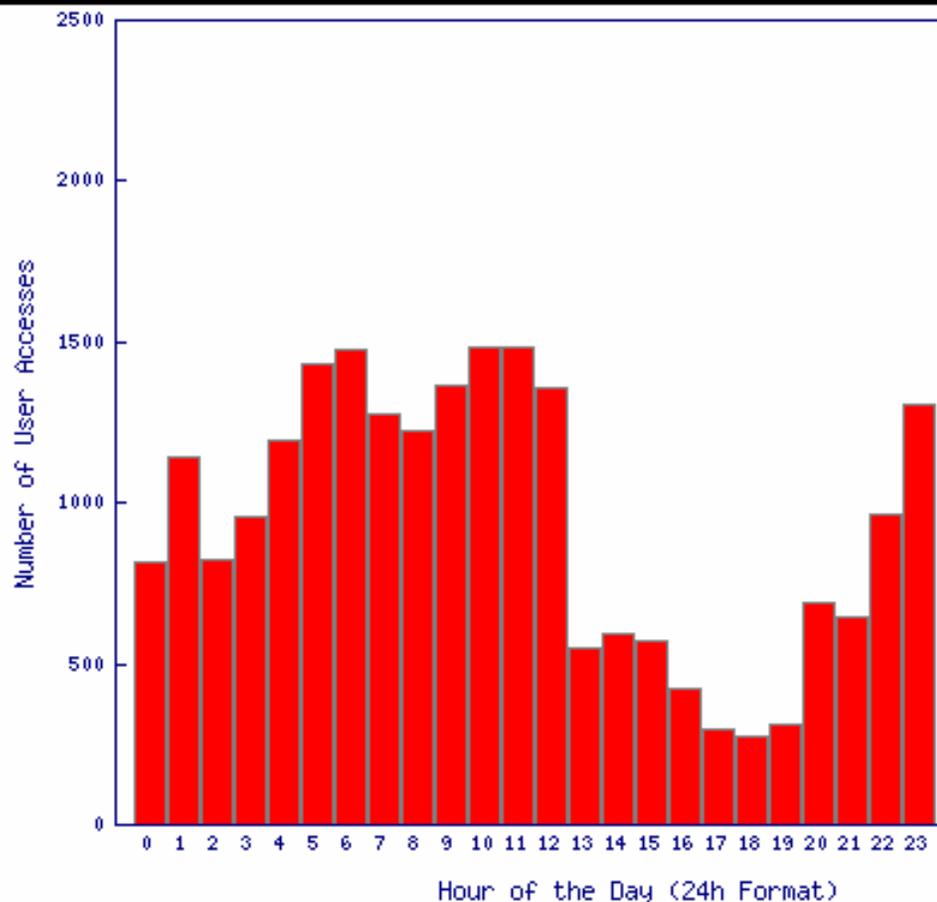
Number of Accesses over Time   ▲ Top

File   Edit   View   Favorites   Tools   Help

← Back ▾ → ▾ ⊗ 🗋 🏠 | 🔍 Search 📑 Favorites 🎞 History | 🖃 ▾ 🖨 🔲 📄

Address 🗐 https://www.usqonline.com.au/bin/common/access_statistics.pl   ▾ 🔗 Go | Links »

User Accesses by Hour of the Day   ▲ Top

Hour of The Day	Hits	Percent
0	819	3.61 %
1	1145	5.05 %
2	827	3.65 %
3	955	4.21 %
4	1195	5.27 %
5	1431	6.31 %
6	1475	6.51 %
7	1277	5.63 %
8	1226	5.41 %
9	1367	6.03 %
10	1482	6.54 %
11	1484	6.55 %
12	1356	5.98 %
13	546	2.40 %
14	593	2.61 %
15	569	2.51 %
16	425	1.87 %
17	300	1.32 %
18	274	1.20 %
19	309	1.36 %
20	687	3.03 %
21	642	2.83 %
22	965	4.25 %
23	1307	5.76 %
Total	22656	100 %

User Accesses by Day of the Week   ▲ Top

Day of The Week	Hits	Percent
Sunday	2680	11.8 %
Monday	4090	18.0 %
Tuesday	4076	17.9 %
Wednesday	4066	17.9 %
Thursday	3279	14.4 %
Friday	2504	11.0 %
Saturday	1961	8.65 %
Total	22656	100 %
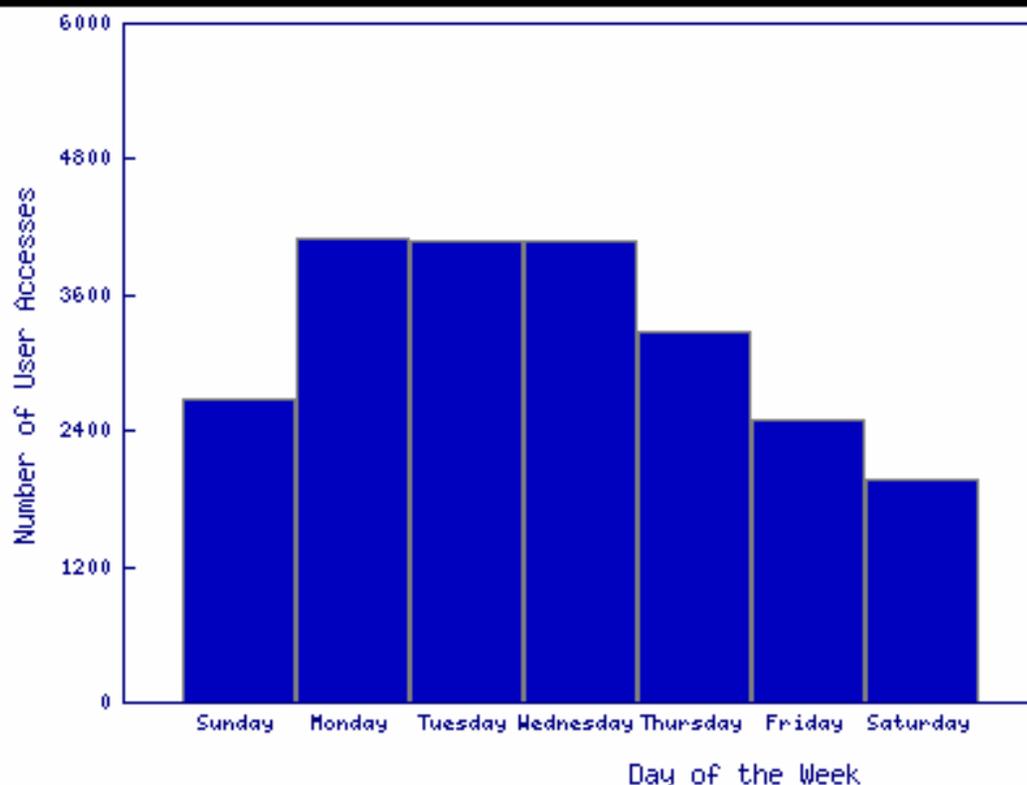
Total Number of Accesses per Area ▲ Top

Area Name	Hits	Percent
Content Areas	5357	23.6 %
Communication Areas	12808	56.5 %
Group Areas	1551	6.84 %
Student Areas	2940	12.9 %
Total	22656	100 %

Communication Areas

Communication Areas

Content Areas

Student Areas

Group Areas

Group Areas

Student Areas
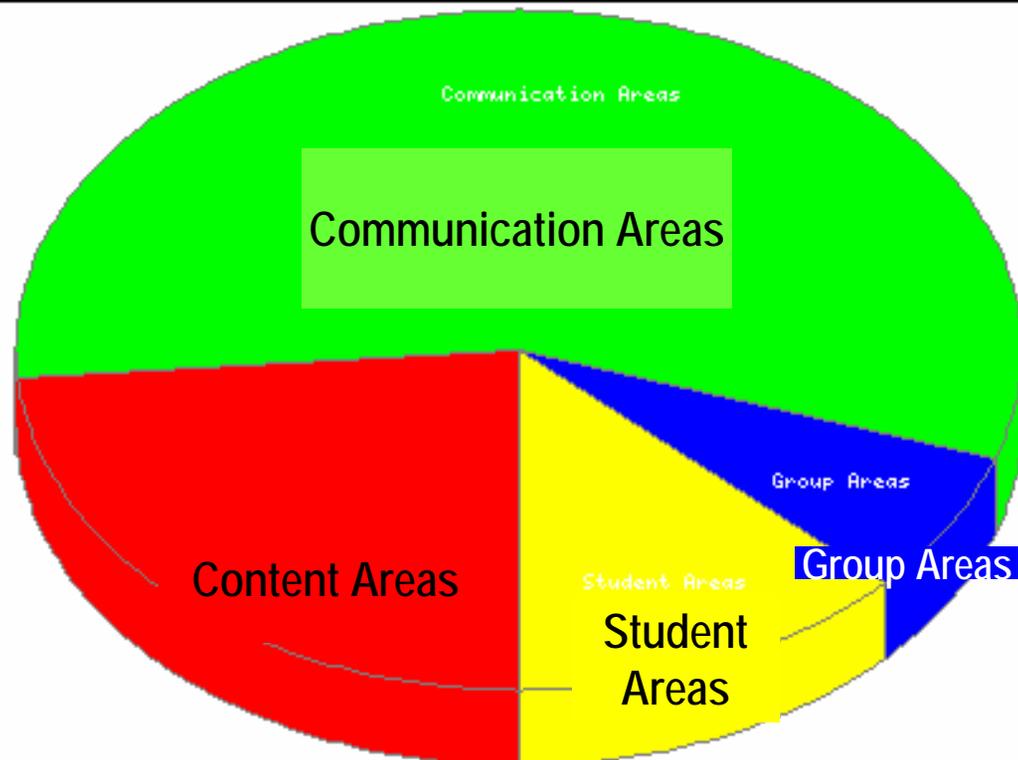
Relevant Instructional Design Theories

- **Social Learning Theory** *(Bandura, 1977)*
- ZPD: Zone of Proximal **Development** *(Vygotsky, 1978; 1981)*
- **Situated Cognition** *(Lave & Wenger, 1991)*
- **Reflective Practitioner** *(Schon, 1987)*
- **Communities of Practice** *(Brown, Collins & Duguid, 1989)*

Brown & Duguid (2000) emphasised the importance of regarding learning as a social act:

"Practice is an effective teacher, and community of practice an ideal learning environment."

Lave & Wenger (1991) emphasised the importance of the social context in which the learner is immersed, and learning as legitimate peripheral participation in a community of practice.

In the online context, legitimate peripheral participation has become associated with the term

"Lurker".

"One of the "silent majority" in an electronic forum; one who posts occasionally or not at all but is known to read the group's postings regularly."

(The Jargon dictionary, 2002)

Is peripheral participation really legitimate?

Are all lurkers illegitimate?

Student Participation Profiles

- **Proactive** **Workers**

- **Peripheral** **Lurkers**

- **Parsimonious** **Shirkers**

The Workers

Participant No.	Discussion Board	Post Message	Study Material	Total Action hits	Grade
6	196	20	11	787	A
7	523	49	40	1200	B
10	83	30	30	299	B
12	96	35	36	404	C
13	126	21	30	410	B
14	325	179	47	992	A
16	93	24	87	476	A
18	102	28	49	349	B
21	136	30	39	492	B
22	321	20	34	951	A
35	184	26	44	652	B
38	267	23	30	817	HD
42	105	31	22	521	B
43	141	19	47	554	A
	2698	535	546	8904	

14 participants: 33% of cohort

The Lurkers

Participant No.	Discussion Board	Post Message	Study Material	Total Action hits	Grade
1	153	14	28	759	A
3	80	13	28	401	A
9	81	9	16	324	A
11	191	17	26	532	B
15	182	12	33	648	B
17	218	17	78	1019	A
19	185	16	45	407	A
20	113	8	47	720	B
24	180	8	32	729	C
26	57	16	16	265	A
28	39	7	16	169	C
29	83	15	29	406	HD
32	131	14	26	552	B
33	250	9	49	581	B
36	142	13	34	700	A
37	33	8	23	235	B
41	81	17	33	376	B
	2199	213	559	8823	

17 participants: 39% of cohort

The Shirkers

Participant No.	Discussion Board	Post Message	Study Material	Total Action hits	Grade
2	31	6	13	203	B
4	16	3	45	153	F
5	81	6	33	411	B
8	10	4	3	25	IDM
23	20	3	4	52	IDM
25	30	3	48	268	IDM
30	23	1	26	91	IDM
31	86	4	25	293	IDM
34	40	4	27	343	B
29	42	6	60	383	B
40	36	5	81	310	IDM
44	12	3	26	111	IDM
	427	48	391	2643	

12 participants: 28% of cohort

Overview of Participation and Performance

Student Sub-Groups	Average Number: Discussion Board Hits	Average Number: Messages Posted	Average: GPA
The Workers	193	38	5.43
The Lurkers	129	13	5.41
The Shirkers	36	4	4.30

Outcome

The academic performance of the lurkers was on average not much less than that of the workers, thereby supporting the notion of learning as legitimate peripheral participation

The Future

The success of the lurkers augurs well for the use of e-learning facilitated by intelligent databases and the flexibility inherent in interacting with virtual cohorts of students.

Managing the Variable Costs of Student Administrative Support

Ask a question/ send an email

NO

Incoming "new" admin question from student

← **Search / Match** →

USQ*Assist*: Self-service Knowledge Base

Previous Questions
Previous Answers

USQ staff member – "New Answer"

YES

"Immediate" admin feedback to student

Trigger

Managing the Variable Costs of Academic Support

Metadata Schema Model

Incoming "new" academic question from student

Search / Match

NO

Duty Tutor

Reusable Learning Objects Database

Previous Questions <meta tags>

Previous Answers <meta tags>

New Answer

YES

Trigger

"Immediate" academic feedback to student
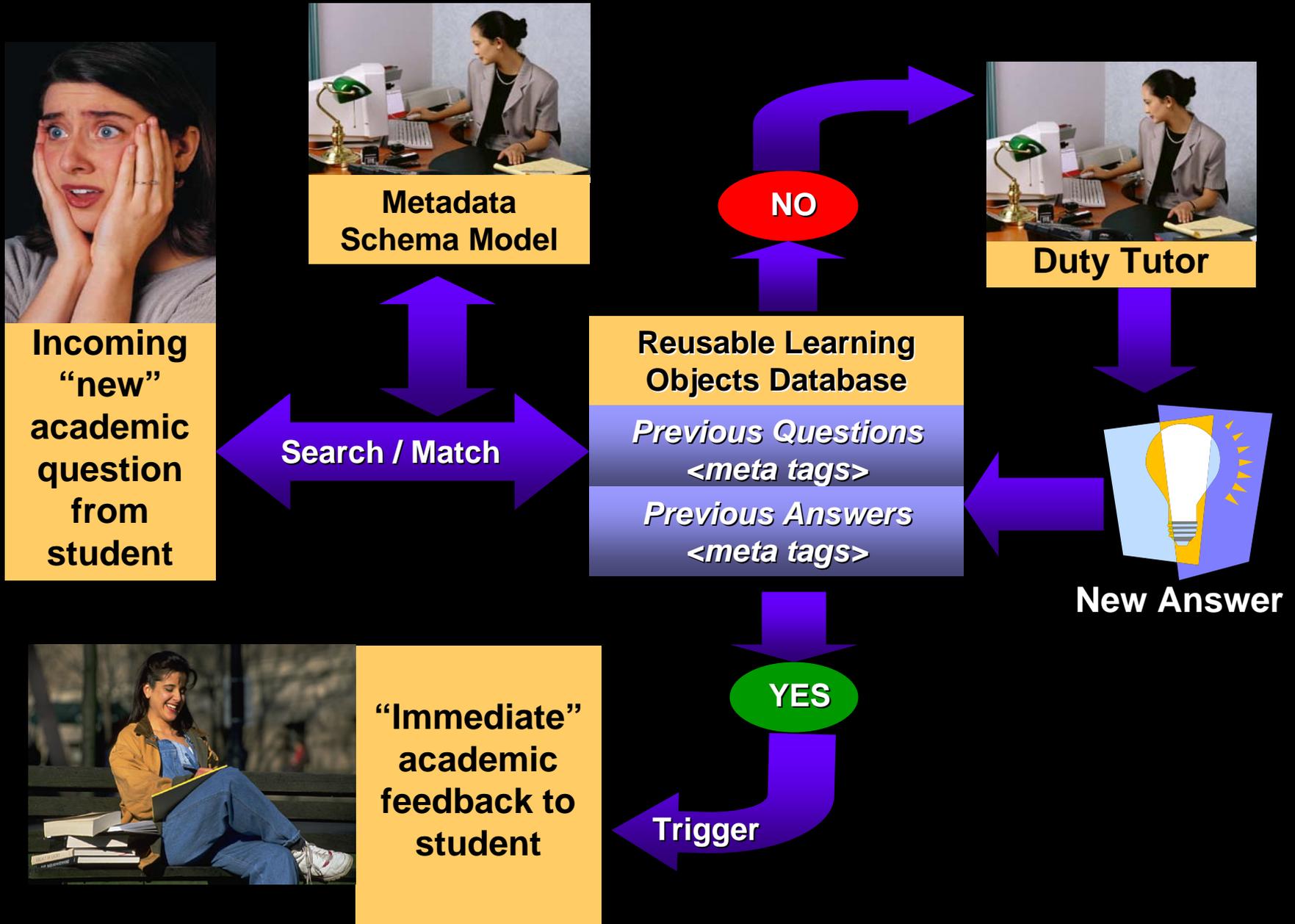
Managing the Variable Costs of Academic Support

Incoming "new" academic question from student
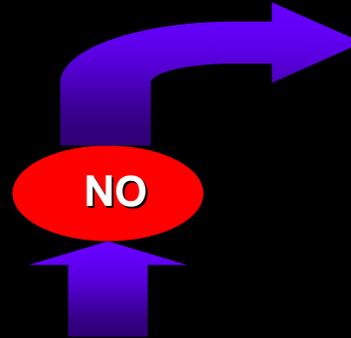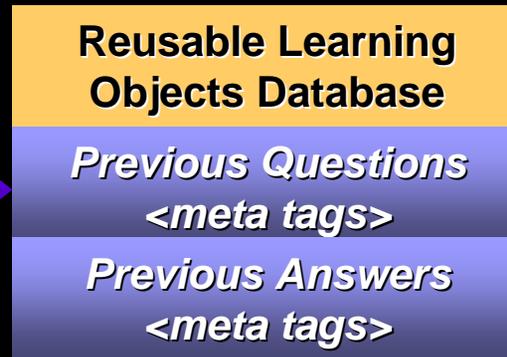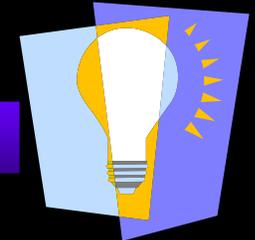
Search / Match

Reusable Learning Objects Database

Previous Questions *<meta tags>*

Previous Answers *<meta tags>*

NO

Duty Tutor

New Answer

YES

Trigger

"Immediate" academic feedback to student
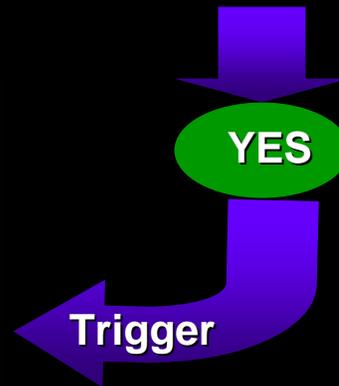
5th Generation

In effect, fifth generation distance provides students with quality tuition and effective pedagogical and administrative support services at lower cost.

Leadership Challenge

"The single greatest challenge facing managers in the developed countries of the world is to increase the productivity of knowledge and service workers"

Peter Drucker (1991).

The e-Revolution?

"Any new technology environment eventually creates a totally new human environment".

Marshall McLuhan

In 1803 the British deployed a military attachment to stand on the Cliffs of Dover to watch for Napoleon.

- It was not until 1927 that the detachment was disbanded.

- Napoleon Bonaparte died in 1821.

Source: Stace & Dunphy (2001)