ICT
as a lever for
Teacher Change and Development

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Starting points

IT Competency	2000-01	2001-02	2002-03
Basic	100%	100%	100%
Intermediate	21.7%	50.6%	75.0%
Upper Immediate	6.0%	12.0%	25.0%
Advanced	3.9%	4.8%	6.7%

EMB, June 2003

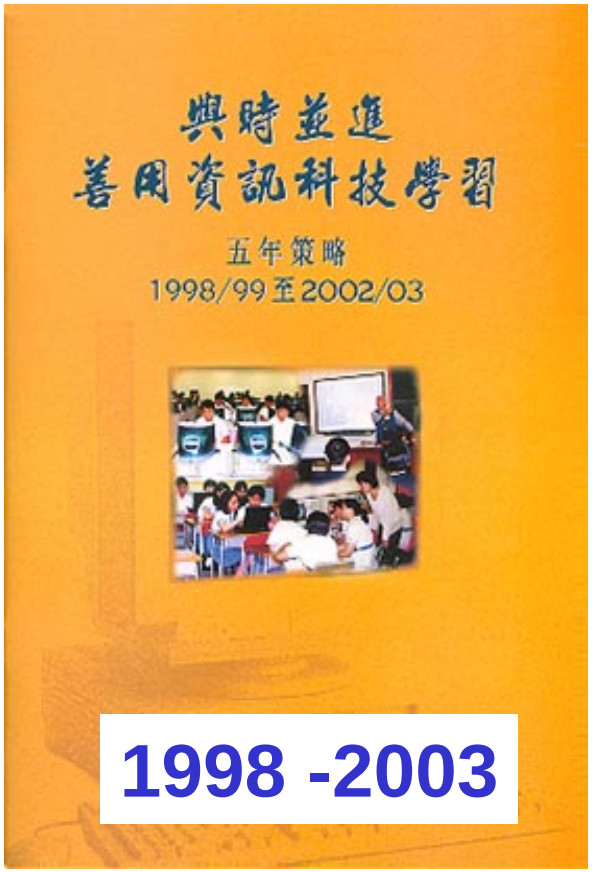
Starting points

How does your school compare to the survey result data of the Hong Kong EMB?

IT Competency	2000-01	2001-02	2002-03
Basic	100%	100%	100%
Intermediate	21.7%	50.6%	75.0%
Upper Immediate	6.0%	12.0%	25.0%
Advanced	3.9%	4.8%	6.7%

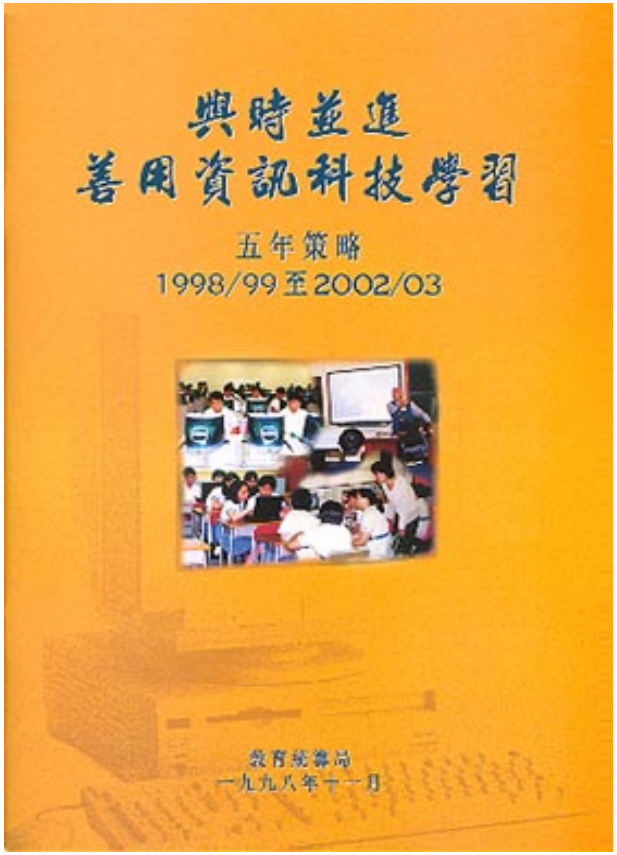
EMB, June 2003

Starting points



'We will launch a five-year IT education strategy to promote the use of IT to enhance teaching and learning. … Within five years, we are aiming to have teaching in at least 25% of the curriculum supported through IT. Within ten years, we aim to see IT being applied comprehensively in school life, and all our teachers and Secondary 5 graduates being able to work competently with IT tools'

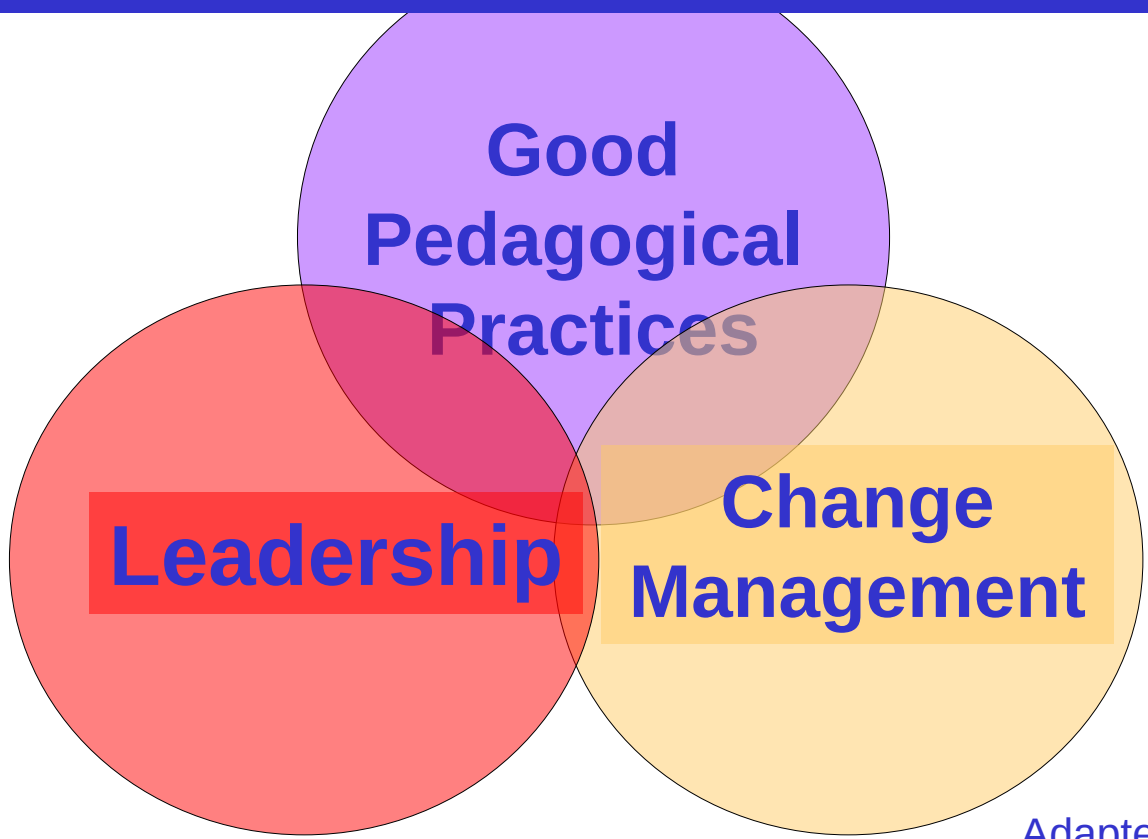
Starting points



A key document for Hong Kong.

What will happen in the **next** five years?

Leadership, Change & Good Pedagogical Practices

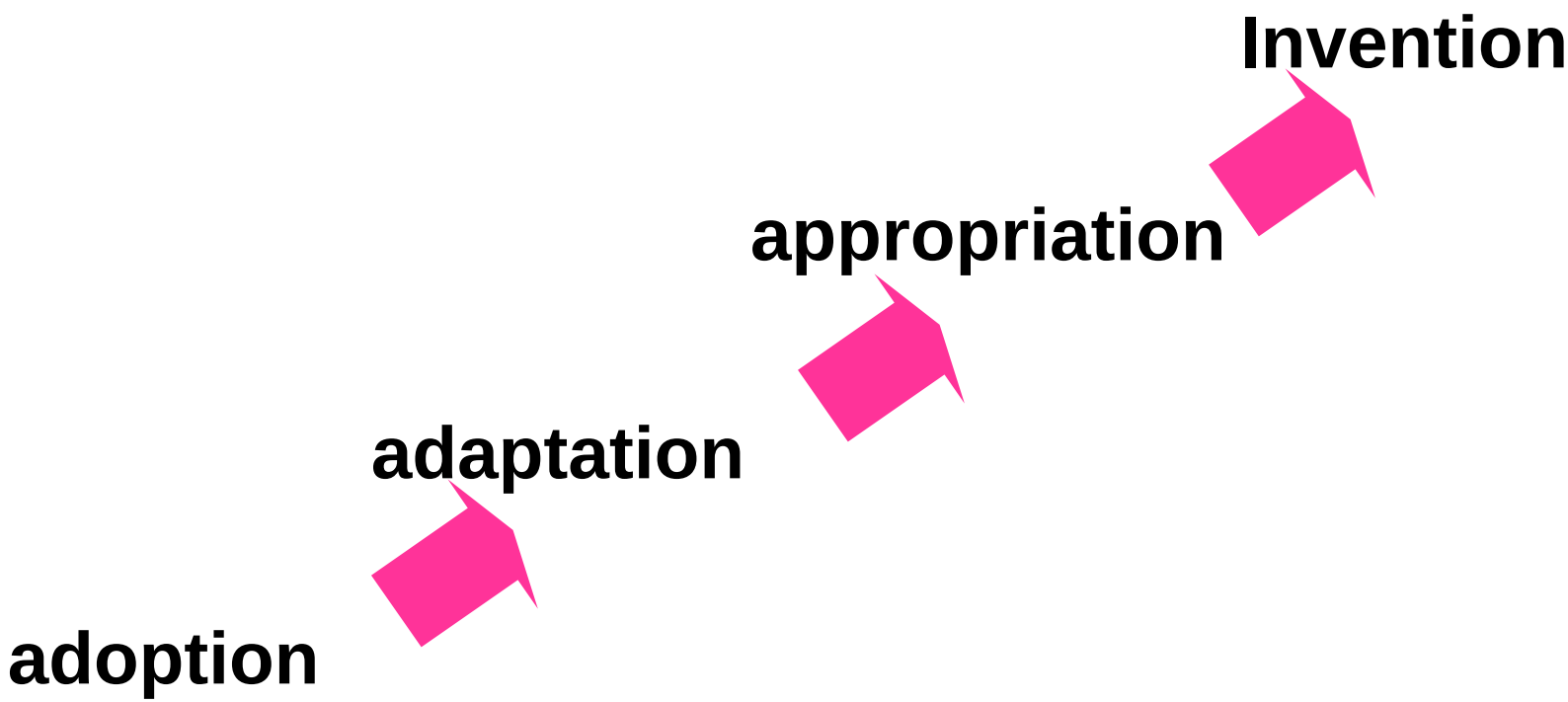


Adapted from Law 2002

Change in Teaching and Learning and the Use of IT

Technology \ Practices	Old	New
Old		
New		

Teachers' Attitudinal Change towards the use of technology in teaching & learning



ACOT, 1995

Discover new uses for technology tools, eg, designing projects that combine multiple technologies

Invention

Focus on cooperative, project-based and interdisciplinary work, incorporating technology as needed and as one of many tools

appropriation

adaptation

Integrate new technology into traditional instruction practice to increase student productivity and engagement by eg using word processors, spreadsheets and graphic tools

ACOT, 1995

adoption

Use new technology to support traditional instruction

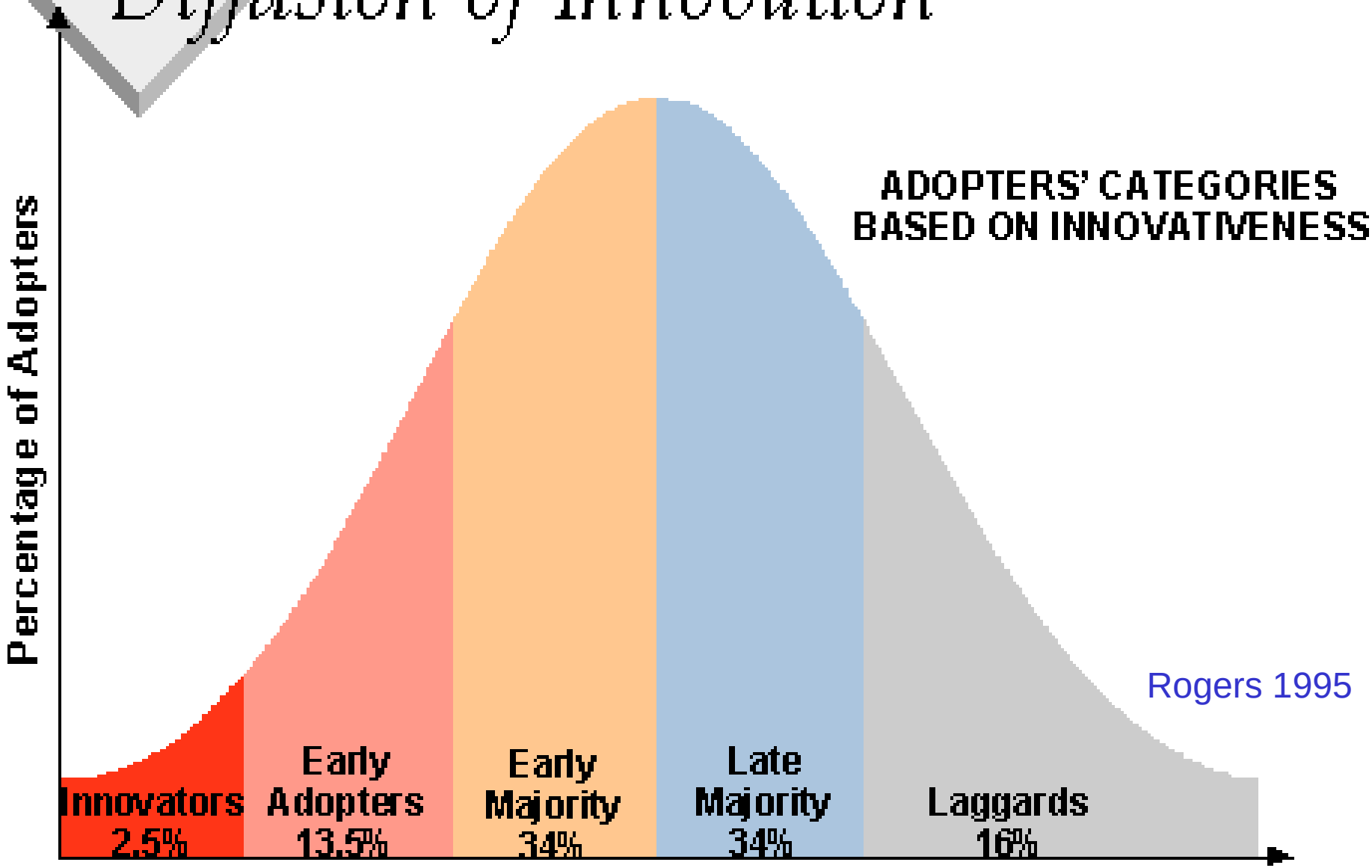
Stages identified by ACOT study

ACOT study notes that this journey through the various stages is enhanced when teachers and students have ***unlimited*** access to technology in the classroom and are able to look at different approaches to teaching and learning.

In your school, do teachers ***and*** students have unlimited access? What other constraints eg curriculum and formal examination?

ACOT, 1995

Diffusion of Innovation



Rogers 1995

Diffusion of Innovation Model

Different **adopter categories** identified:

- **Innovators 2.5%**
- **Early adopters 13.5%**
- **Early majority 34%**
- **Late majority 34%**
- **Laggards 16%**

Rogers 1995

Key Institutional Asset

People – the most valuable asset of any educational institution is the quality of the people involved.

Inside - the teachers, the students, supported by administration, management, leadership, and

Outside - government and community support.

How can we best use this asset?

One Thing That's Always Constant

Change!

We have to learn to embrace change in all forms and at all levels.

We have to take advantage of new opportunities.

We have to work and learn together in organisations that learn.

Understanding the change process – Michael Fullan

"Consistent with our own research … it is not good enough to have: vision and strong curriculum, instructional resources, built-in professional development, partnerships and collaboration ..."

"What is needed in addition is "A very strong underlying conception of the change process"

(Fullan, 2002)

Understanding the change process – Michael Fullan

"You have to learn how to deal with resistance more effectively. Teachers who are resistant often have a few good points; and they are essential concerning the politics of implementation (see Fullan, *Leading in a Culture of Change*, Jossey-Bass, 2001).

"Focus also on the lead role of the principal (see the May, 2002 issue of Educational Leadership …)" (Fullan, 2002)

Understanding the change process – Michael Fullan

"Work on improving the infrastructure (district role, other agencies)

"Appreciate the time line …

"Work on the conditions for sustainability:

improving the moral/social environment; learning in context; leadership at many levels; improve the working conditions of the teaching profession (see the May Educational Leadership article)" (Fullan, 2002)

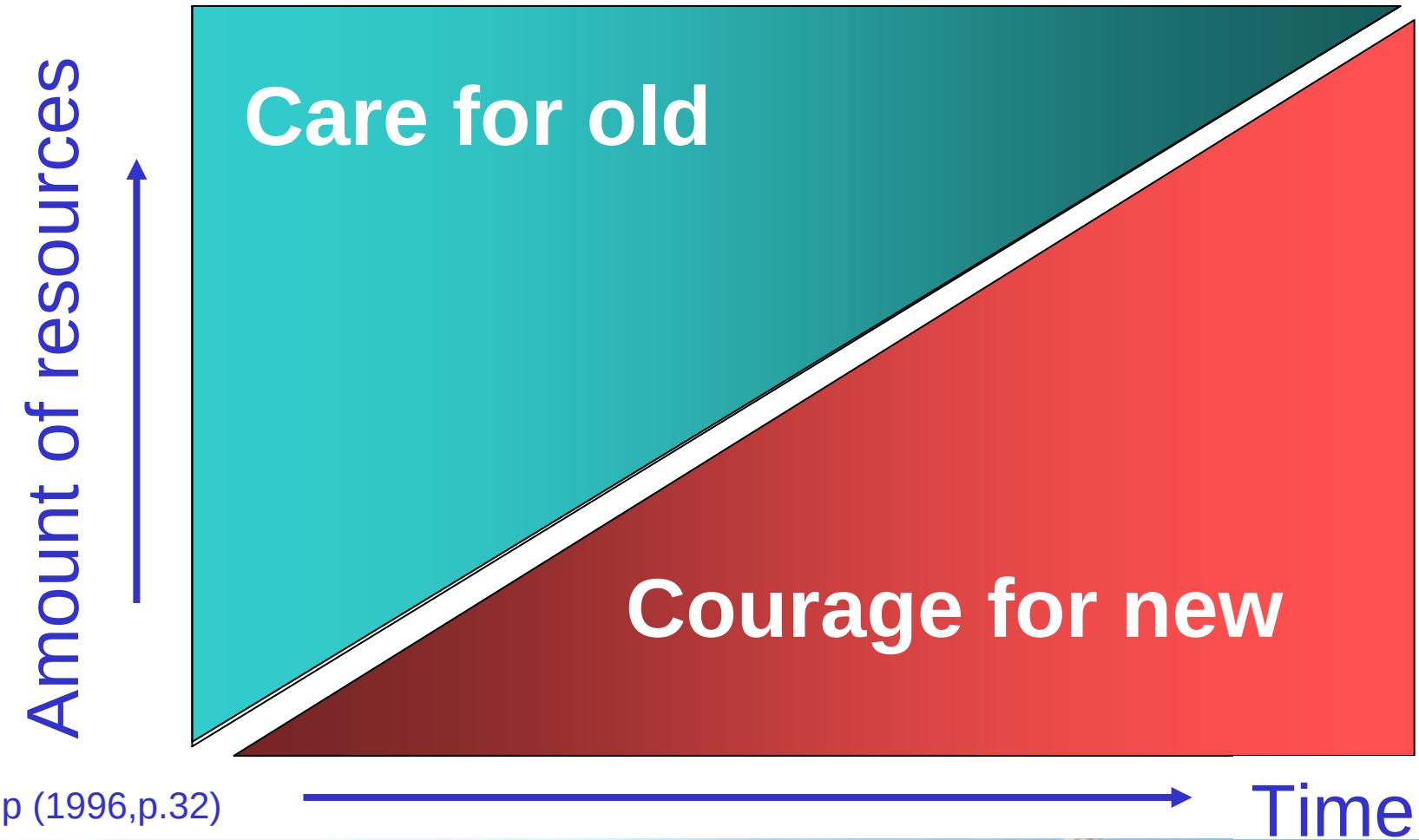
5 principles crucial for schools to be **Learning Organizations**

1. Personal mastery – personal visions & awareness
2. Mental models – to be shared
3. Shared vision –iterative and ongoing
4. Team learning – through ongoing collective enquiry
5. Systems thinking – viewing goals and problems as part of larger whole and not isolated issues

Change described above can only take place if it is led by dynamic and visionary leadership capable of developing and implementing a collective plan to bring about changes in organization culture, belief and practices (Senge et al. 2000).

To what extent is your school a “learning organisation”?

Effecting Change



Plomp (1996,p.32)

CARE FOR OLD

Implementation strategies to encourage good use of ICT in traditionally important teaching practices (as "**care**"):

- provide training on baseline technology skills for teachers and students,
- provide good technology infrastructure including computer access; network connectivity to teachers and students,
- challenge the teacher training institutes to systematically integrate ICT in the teacher education programs as well as to become actively involved in supporting the change process, and
- Establish centres for learning technology in teacher training institutes to support the institute & related schools in the systematic integration of ICT in education

COURAGE FOR NEW

Implementation strategies to support the development & adoption of emergent teaching practices (as "**courage**"):

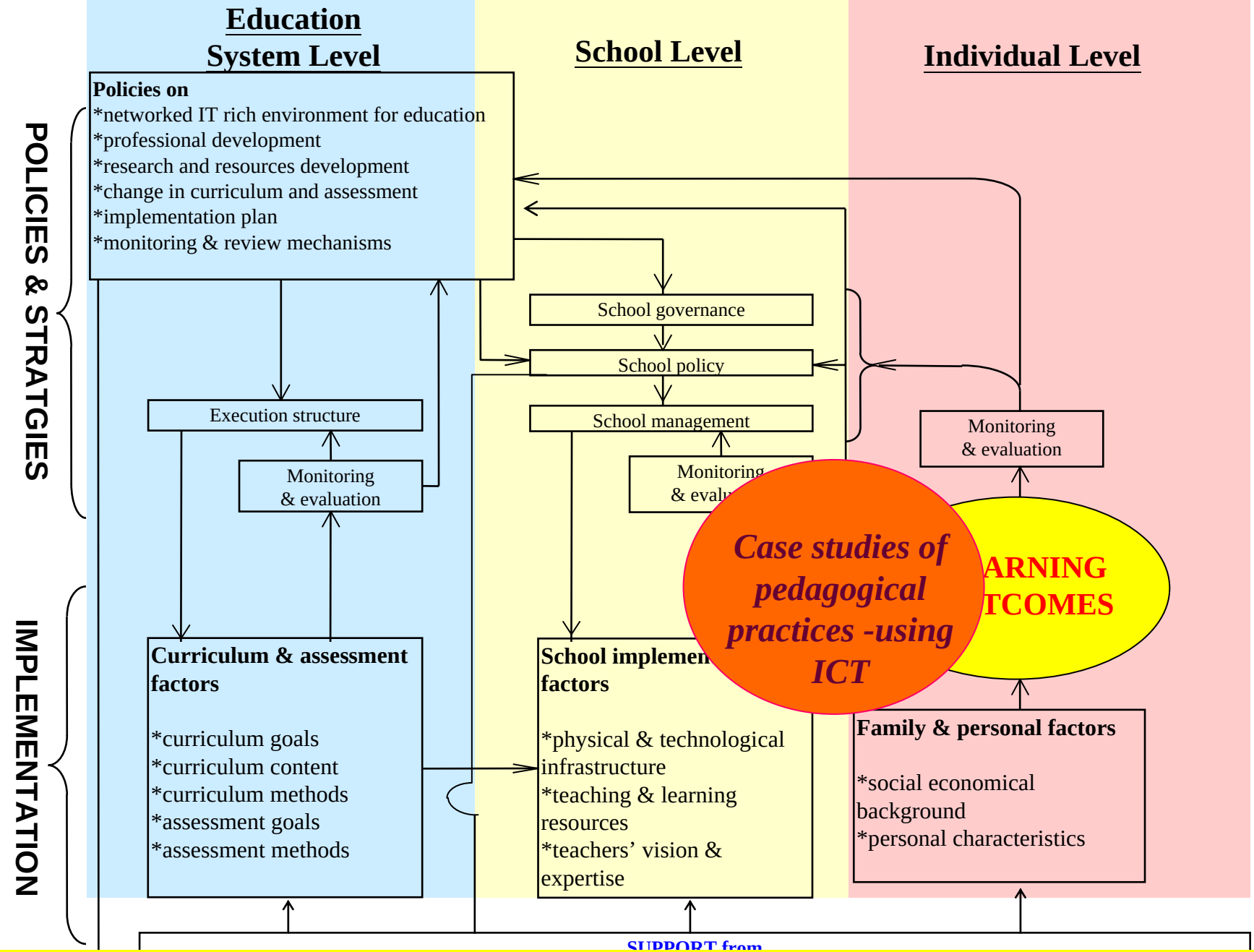
- Stimulate and fund proposals that aim to create examples of desired future arrangements that integrate ICT in ways that develop students' lifelong learning and move schools in the direction of a **learning organization**,
- Establish an experimental institute to develop and experiment with new approaches to teacher education with the aim to transfer knowledge and experiences to regular training institutes, and
- Encourage universities and centres to engage in research on the use of technology in education and to develop knowledge bases to guide school efforts.

Partnership and leadership

- Partnership - only effective if coupled with participatory decision-making.
- School management - structured (or restructured) to empower schools and its members.
- Schools - given increased autonomy from centralized bureaucracies
- School level decisions - involve participation from teachers as well as other stakeholders such as parent associations and student representatives.

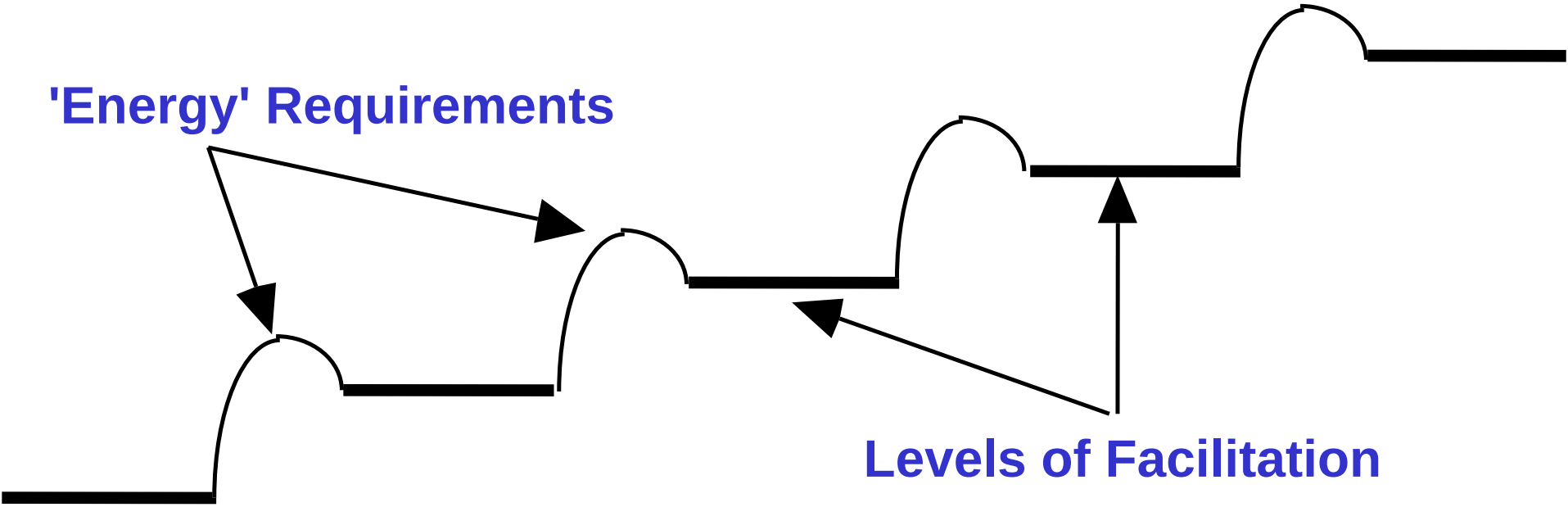
Partnership and leadership

Participatory decision-making needs to be focused on the cultural core of curriculum and instruction. For this, a systems approach to change leadership that involves different levels of involvement would be necessary



A systems model of leadership for IT in education

SOME FORCES ACTING ON TEACHERS INFLUENCING LEVEL OF PC USE



Concept of increasing levels of facilitation of computer support for learning requiring increasing levels of ‘energy’ from the teacher with an initial ‘hump’

Newhouse et. al. (2002)

Vision	Skills	Incentives	Resources	Action Plan	Collegiality	Change
****	Skills	Incentives	Resources	Action Plan	Collegiality	**Confusion**
Vision	****	Incentives	Resource	Action plan	Collegiality	**Anxiety**
Vision	Skills	****	Resource	Action plan	Collegiality	**Resistance**
				plan		
Vision	Skills	Incentives	Resource	****	Collegiality	**Treadmill**
Vision	Skills	Incentives	Resource	Action plan	****	**Isolation**

Without all of the above factors, change is limited

Teacher Evaluation and Instructional Improvement

Department of Education, Science and Training

DEST (2002, p. 21) report notes that an *accomplished* teacher has these common attributes:

- A commitment to students and their learning;
- A deep knowledge and understanding of their subject discipline and of effective pedagogy;
- The ability to implement effective monitoring, assessment and reporting of student progress;
- A commitment to reflect critically on their own practice and to ongoing professional development; and
- A willingness to participate and contribute to the whole educational community at a range of levels.

Teacher Evaluation and Instructional Improvement

DEST (2001) report "*Making Better Connections*" suggests a framework be used to clarify the goals and purpose of educational technology of a number of programs and initiatives by asking:

"What educational outcomes do schools and systems hope to achieve by increasing the extent to which ICTs are integrated into classroom practice?

Consider what your school hopes to achieve through the integration of ICT into classroom practices.

Teacher Evaluation and Instructional Improvement

DEST (2001) report "*Making Better Connections*".

Educators are promoting ICT use in classrooms for several distinctly different reasons including:

Type A: encouraging the acquisition of ICT skills as an end in themselves

Type B: using ICTs to enhance students' abilities within the existing curriculum

Type C: introducing ICTs as an integral component of broader curricular reforms that are changing not only how learning occurs but what is learned

Type D: introducing ICTs as an integral component of the reforms that alter the organization and structure of schooling itself

What type of Staff Development happens mostly at your school?

Type A: encouraging the acquisition of ICT skills as an end in themselves

Type B: using ICTs to enhance students' abilities within the existing curriculum

Type C: introducing ICTs as an integral component of broader curricular reforms that are changing not only how learning occurs but what is learned

Type D: introducing ICTs as an integral component of the reforms that alter the organization and structure of schooling itself

Innovative Classroom Practices

Dimensions for exploring educational innovations using ICT

SITES Database

http://sites.cite.hku.hk/index_eng.htm

Sites

Second Information Technology in Education Study
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Centre for Information Technology in Education

What pedagogical practices are found in the 174 Cases Reports from 28 participating countries?

In analyzing the cases, **6 types of pedagogical practices** were identified:

1. Project work (92 cases)
2. Scientific Investigation (8 cases)
3. Media Production (32 cases)
4. Virtual School & Online Course (15 cases)
5. Task-Based Activity (24 cases)
6. Expository Lessons (3 cases)

How do we understand degrees of 'innovativeness'

ICT can be integrated into education to deliver **old** classroom practices for the achievement of long existent goals, or it can be used in practices that bring about **new** learning goals and new modes of learning that will define and shape the future of schooling.

Practices / Technology	Old	New
Old		
New		

How do we understand degrees of 'innovativeness'

How do we compare innovations?

By identifying dimensions of innovativeness

6 dimensions of comparison:

1. Goals
2. Teacher's Role
3. Students' Role
4. ICT used
5. Manifestation of Learning Outcome
6. Connectedness

6 dimensions to understand innovativeness

1. Goals

Subject-based knowledge → Higher Order Thinking → Ability to function effectively as members of a learning community

2. Teacher's Role (Belief towards teaching and learning)

Transmitter of information and evaluator of learning → Design learning tasks; provide resource for learning → Coach to establish and support the development of learning communities

3. Students' Role

Follow instructions → Determine learning strategies and schedule → Develop own learning goals, learning strategy, self monitor & evaluate contribute to communal knowledge building

6 dimensions to understand innovativeness

4. ICT used

No ICT used → General software for classroom presentation → Sophisticated technology tailored for specific educational purposes

5. Manifestation of Learning Outcome

Unidimensional → Multiple ways to assess learning outcomes → Multidimensional; knowledge, skills, abilities and attitudes operating in concert for complex problem solving

6. Connectedness

Standalone classroom → Partial involvement of outsiders → Multiple ways of involving outsiders in the curriculum process

Different Teachers' Roles

Identified from the cases studies,
the **13** roles not mutually independent

- **T1 Explain or present information**
- **T2 Give task instruction**
- **T3 Monitor students' task progression**
- **T4 Assess students**
- **T5 Provide learning support to students**
- **T6 Develop teaching Materials**
- **T7 Design curriculum and learning activities**
- **T8 Select ICT tools**
- **T9 Support students' enquiry process**
- **T10 Co-teaching**
- **T11 Support team building of students**
- **T12 Mediate between students and experts**
- **T13 Liaise with parties outside school**

Teacher's Roles and Innovations

Cluster analysis of the innovations revealed 5 typologies in the roles played by the teachers.

2 are more 'emergent':

facilitating exploratory learning and ***guiding collaborative enquiry*** in supporting the development of students' learning outcomes.

Teacher's Roles and Innovations

The other 3 typologies were more traditional:

administering learning tasks, providing learning resources

and

presenting, instructing & assesing students.

Different degrees of innovation in Teacher's Role

Case studies revealed different degrees of innovation in pedagogical roles of teachers, according to the 'scale of innovativeness' on the basis of the 'magnitude of change' of the teacher's role.

Different degrees of innovation in Teacher's Role

In some cases, teachers undertook the most innovative pedagogical roles and they contributed in facilitating exploratory learning (e.g. NO005, CN008) or guiding collaborative enquiry (e.g. ZA001)

In other cases teachers played an 'emergent' role, carrying out some new pedagogical functions such as administering learning tasks (e.g. CN003, FR005) and providing learning resources (e.g. FI007).

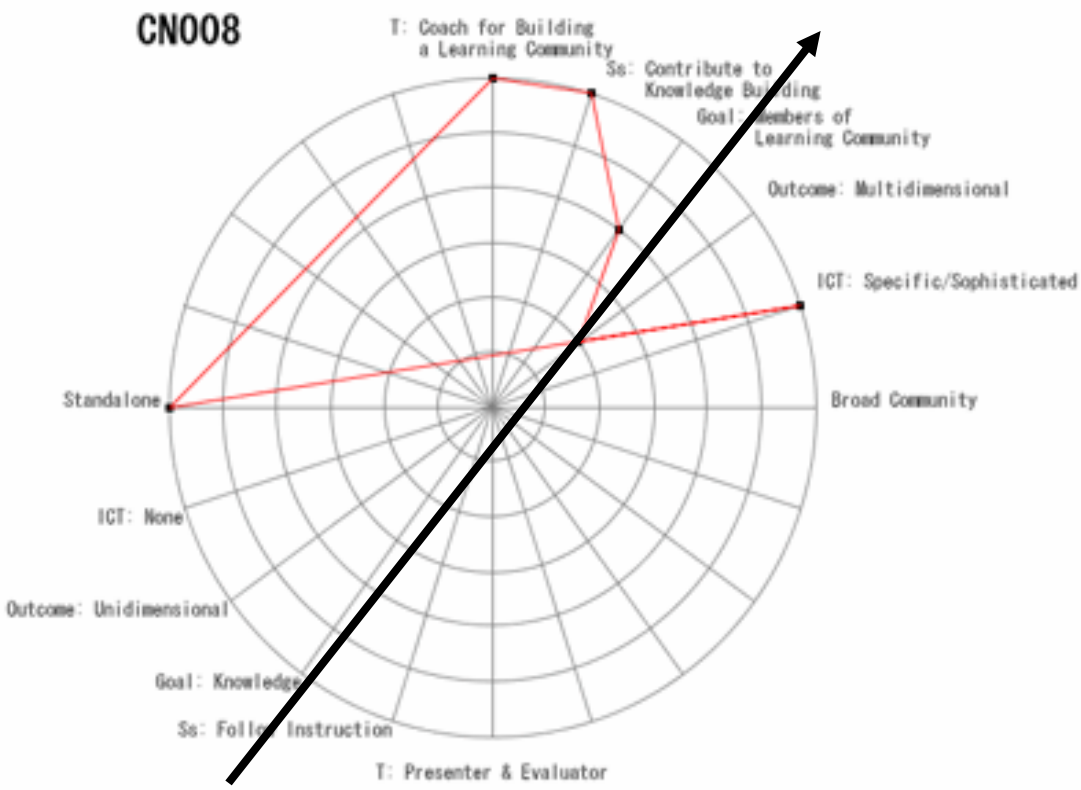
Problem Based Learning: Computer Assisted Scientific Investigations

CN008

- Subject(s): Physics, Chemistry, Biology
- Level: Upper Secondary
- Type of Practice: Scientific Investigation
- Role of Teacher(s): Facilitating Exploratory Learning
- Role of Students: Enquiry-based Learning

Case Report

More Innovative



Less Innovative

Different degrees of innovation in Teacher's Role

Other cases which had highly innovative features along other dimensions, yet did not exhibit perceivable innovation in the pedagogical role such that the teachers' tasks were mainly the traditional roles of presenting information, giving instructions and assessing students (e.g. PH001, TW006, US020).

What types of practices are more likely to be associated with 'emergent' teacher's roles?

For practices where the prominent roles played by the teachers were related to supporting enquiry, nearly all of them were organized in the form of project work (e.g. ZA001), media production (e.g. NO005) or scientific investigation (e.g. CN008).

This indicates that these 3 forms of pedagogical practices probably provide the kind of learning contexts that are more conducive to facilitating student enquiry, and are referred to as 'emerging pedagogical practices'.

What types of practices are more likely to be associated with 'emergent' teacher's roles?

Emerging ◄——► Traditional

Teacher's role cluster \ Type of practice	Scientific investig-ation	Project work	Media production	Virtual sch./online courses	Task based learning	Expository teaching	Total
Facilitating exploratory learning	4	14	7	1			26
Guiding collaborative enquiry		10	5				15
Administer learning tasks	1	16	8	4	7		36
Provide learning resources	1	8	4	4	5	1	23
Present, instruct & assess	1	8	5	5	9	2	30
Total	7	56	29	14	21	3	130

Emerging ↕ Traditional

Case studies in the Asian region indicate a stronger allegiance to more traditional teaching methods.

Nevertheless, studies reveal that examples of innovation of teachers eg in Hong Kong is equal to levels of innovation elsewhere in the world.

Research findings

Indicate that deep changes in pedagogy in schools and classrooms even for the innovative pedagogical practices collected in the SITES M2 study are needed.

Staff development that promotes deep changes in teachers' roles and practices are of paramount importance.

Reflections

Where are we now?

Where we should go?

How we could get there?

Invitation

Responding to Change in Education: IT as a Lever for Innovation -

Information session on the

MSc[ITE] program

The University of Hong Kong

Date: **Saturday, February 7, 2004 at 2.30**

Venue: **The University of Hong Kong**

Details: **http://www.cite.hku.hk/**

Questions and Answers

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