

ICT in the school system - some conditions for success

RBLT Workshop

University of Mauritius,

December 21, 2005

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Code: rblt05

Menu of the talk

- 1. ICT in the School System 3**
- 2. ICT as a subject 5**
- 3. ICT for the teacher & teacher communities 6**
- 4. ICT for new pedagogies 7**
- 5. Technology can support all kinds of learning 8**
- 6. The theory on change management 13**
- 7. Collective teaching activities: a way out ? 20**
- 8. Perspectives for Mauritius: Don't focus on ICT 28**

1. ICT in the School System

Various dimensions to consider:

1. Teach ICT as a subject

- **Information & Communication strategies and tactics, social issues**
- **Formal aspects (e.g. programming)**

2. ICT for the individual teacher

- **Course preparation**
- **Course materials**
- **Course management, ...**

3. ICT for teacher communities

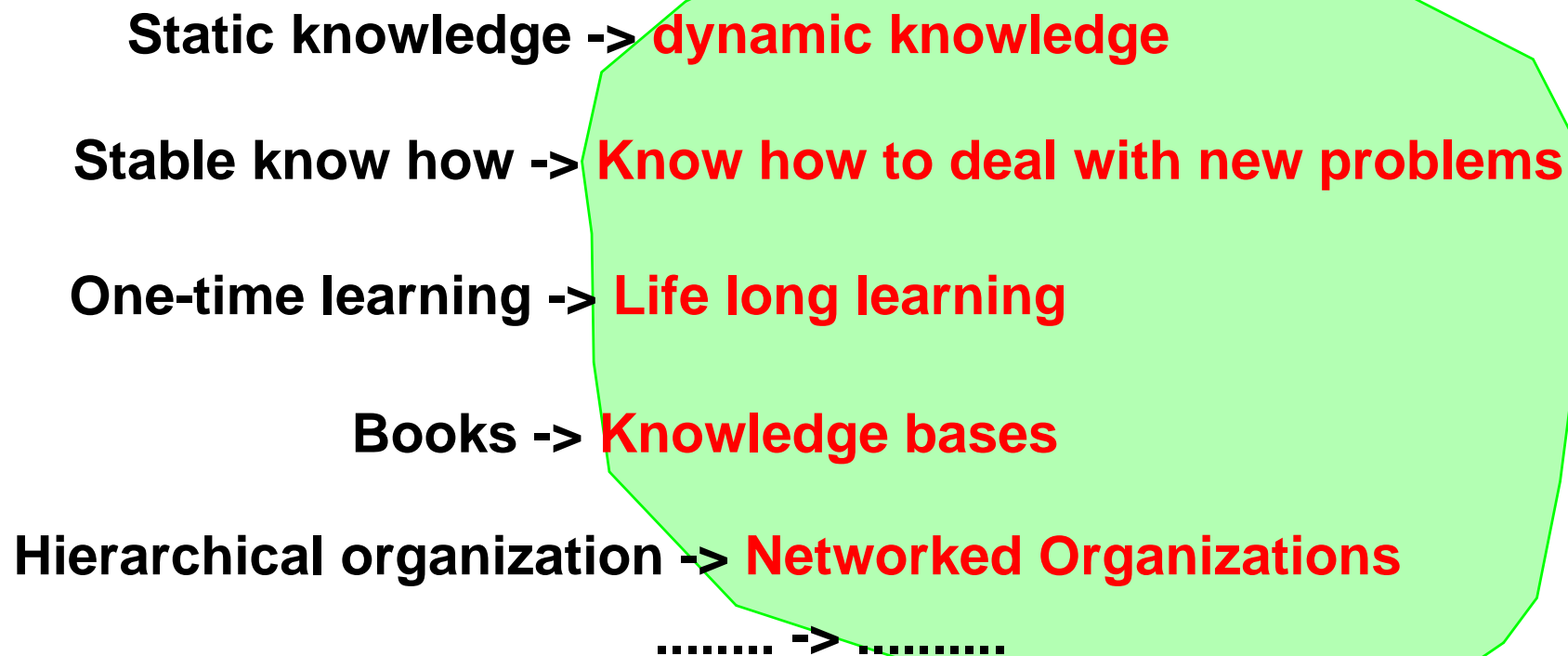
- **(all of the above)**
- **mutual sharing, mutual support**

4. ICT to support new pedagogies

- **activity-based and project-oriented learning**
- **open learning,**

All are related !

Why is ICT important ?



*The information society is both **ICT-based** and **ICT-enhanced** ...*

Information is inside the network

Communication goes through the network, can become information

2. ICT as a subject

- People should have some technical skills,
- should understand that computers deal with forms, that computers are not dogs ...

The situation in Switzerland:

- education is local (although states coordinate curricula),
- teacher education is local (huge differences !),
- important regional differences regarding ICT,
- federal (national) programs to encourage ICT in schools.

In Geneva (ages 6 to 20)

- good infrastructure (technical and pedagogical support)
- very little or no programming is taught
- some Internet usage (search, navigation, email, forums, ...)
- ICT as a subject is not considered being important

Consequences

- **Neither pupils nor young teachers understand computers**

3. ICT for the teacher & teacher communities

Teachers are creators & consumers of teaching materials

- Local or international repositories with teaching materials
 - E.g. Geneva's primary school portal has over 1500 members
 - Contributors are mostly paid to maintain it
 - Little active participation from other teachers
- Document preparation (Word, Powerpoint, etc.)

Summary (Central & southern Europe):

- A lot of teachers are willing to use information sources and productivity tools
- **Not much impact on pedagogy**
- **Very few teachers show a "networking" behavior, participate**

4. ICT for new pedagogies

4.1 Pedagogy must differentiate: all strategies are needed

	<i>Transfer</i>	<i>Tutor</i>	<i>Coach</i>
	Factual knowledge, “know-that”	Procedural knowledge, “know-how”	Social practise, “knowing in action”
	Transfer of propositional knowledge	Presentation of predetermined problems	Action in (complex and social) situations
	to know, to remember	to do, to practise	to cope, to master
	Production of correct answers	Selection of correct methods and their use	Realization of adequate action strategies
	Verbal knowledge, Memorization	Skill, Ability	Social Responsibility
	to teach, to explain	to observe, to help, to demonstrate	to cooperate, to support
Difficulty	<i>Teaching I</i> <i>Learning I</i>	<i>Teaching II</i> <i>Learning II</i>	<i>Teaching III</i> <i>Learning III</i>

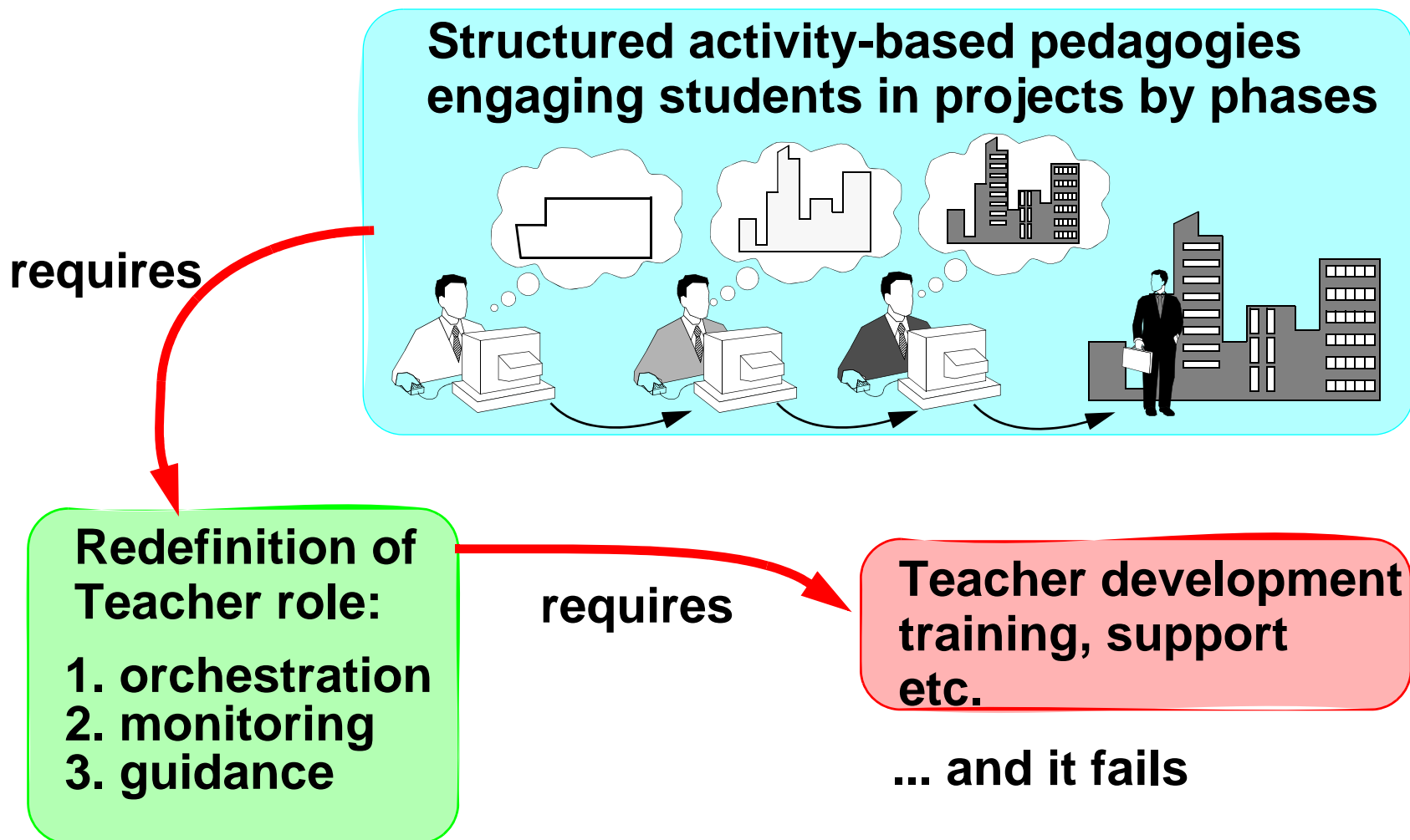
5. Technology can support all kinds of learning

<i>Technology (is not innocent !!)</i>	<i>Teaching I "know-that"</i>	<i>Teaching II "know-how"</i>	<i>Teaching III "knowing-in- action"</i>
E-learning Systems	***	*	
Hypertext, Wikis, CMS (exploring, reading)	***	*	
Groupware (help desk, discussion mgmt)	*	***	**
Microworlds (exercising, simulating)		***	*
Hypertext, Wikis, CMS (producing, collaborating)	**	*	***
Community portals (C3MS)	*	*	***
Computer supported coll. learning (CSCL)	*	***	*

- **You can not get away with a single focus !!!**
- **ICT is most productive for Teaching III (less difficult than teaching II)**

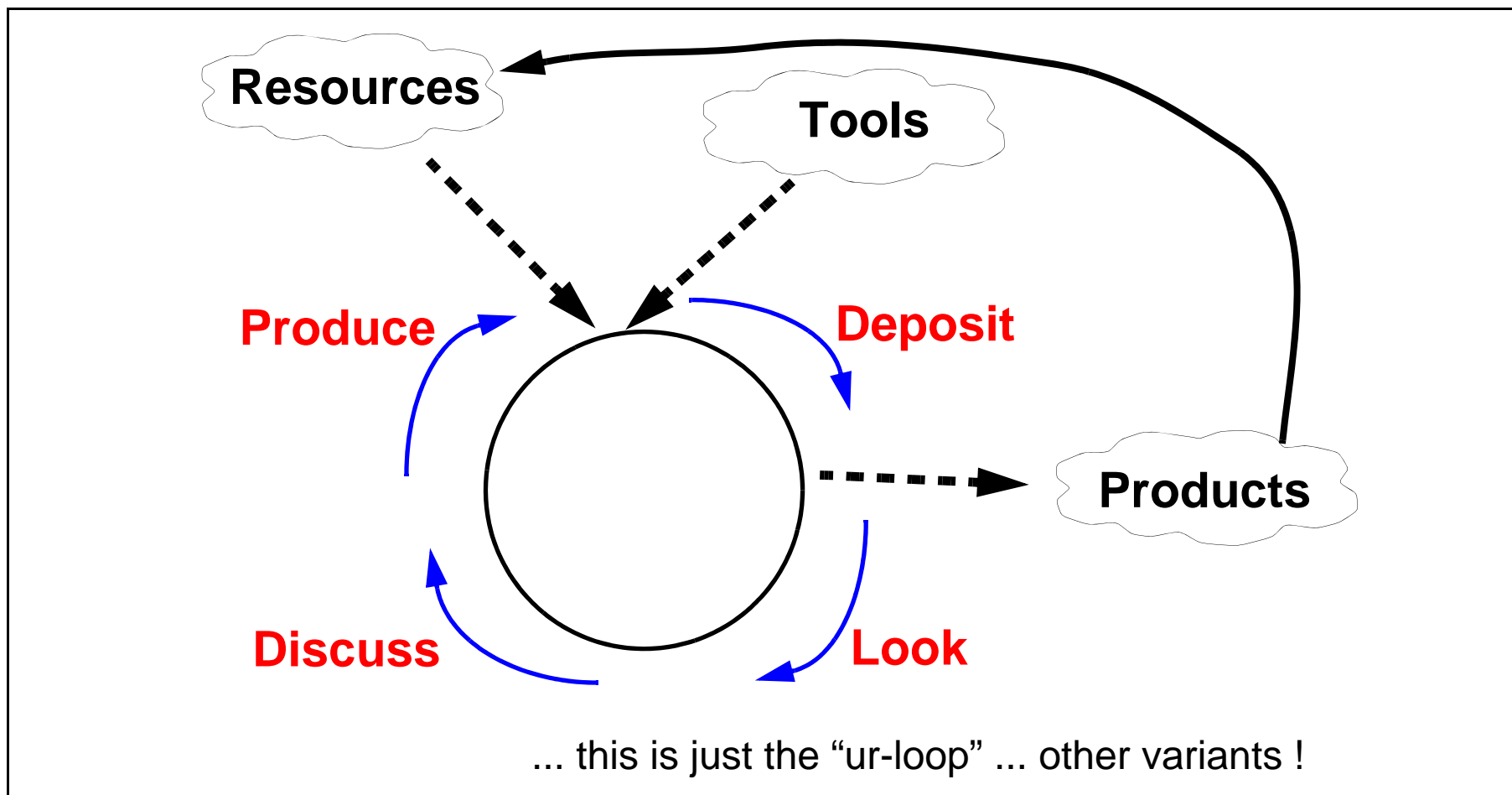
5.1 A Learning III strategy

- Project-oriented learning favors knowing-in-action
- Difficult to implement without adding structure (story-boarding)



5.2.Orchestration = designing scenarios

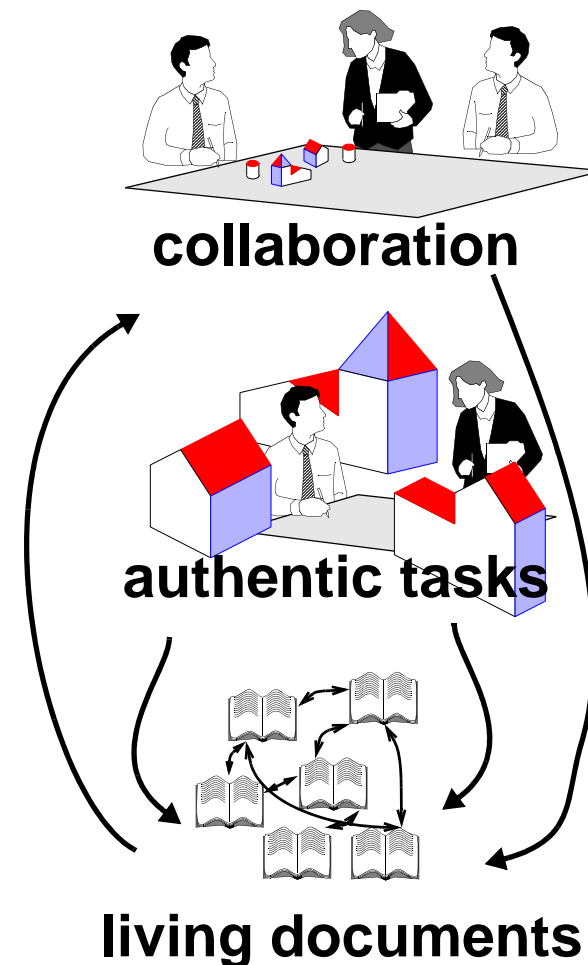
- Scenarios are **sequences** of **activity phases** within which learners **do tasks** and **play specific roles**
- This orchestration implies organizing **workflow loops**



5.3 The Computer as facilitating structure

To orchestrate, to monitor & to facilitate:

- the computer as **scaffolding tool**
 - the computer as **writing tool**
 - the computer as **reflection tool**
 - the computer as **exchange tool**
 - the computer as **workflow tool**
 - the computer as **knowledge engine**
 - the computer as **community engine**
 - the computer as
-
- The computer as **enabling tool** for the teacher as designer, manager & facilitator
 - Can be implemented with relatively simple tools (e.g. Wikis or Community portals)



6. The theory on change management

6.1 The big four

**Teacher
development**

(technical
& pedagogical)

**Institutional
support**

(support for
innovation,
help, ...)

Infrastructure

(computers &
network)

Curriculum

(differentiated
pedagogies)



better chances for success

6.2.Initial teacher training

Current situation in Europe: low importance

- **Typically 1-2 semester courses on how to use ICT**
- **Very little within specific didactics courses**

Resistance of the teacher training system

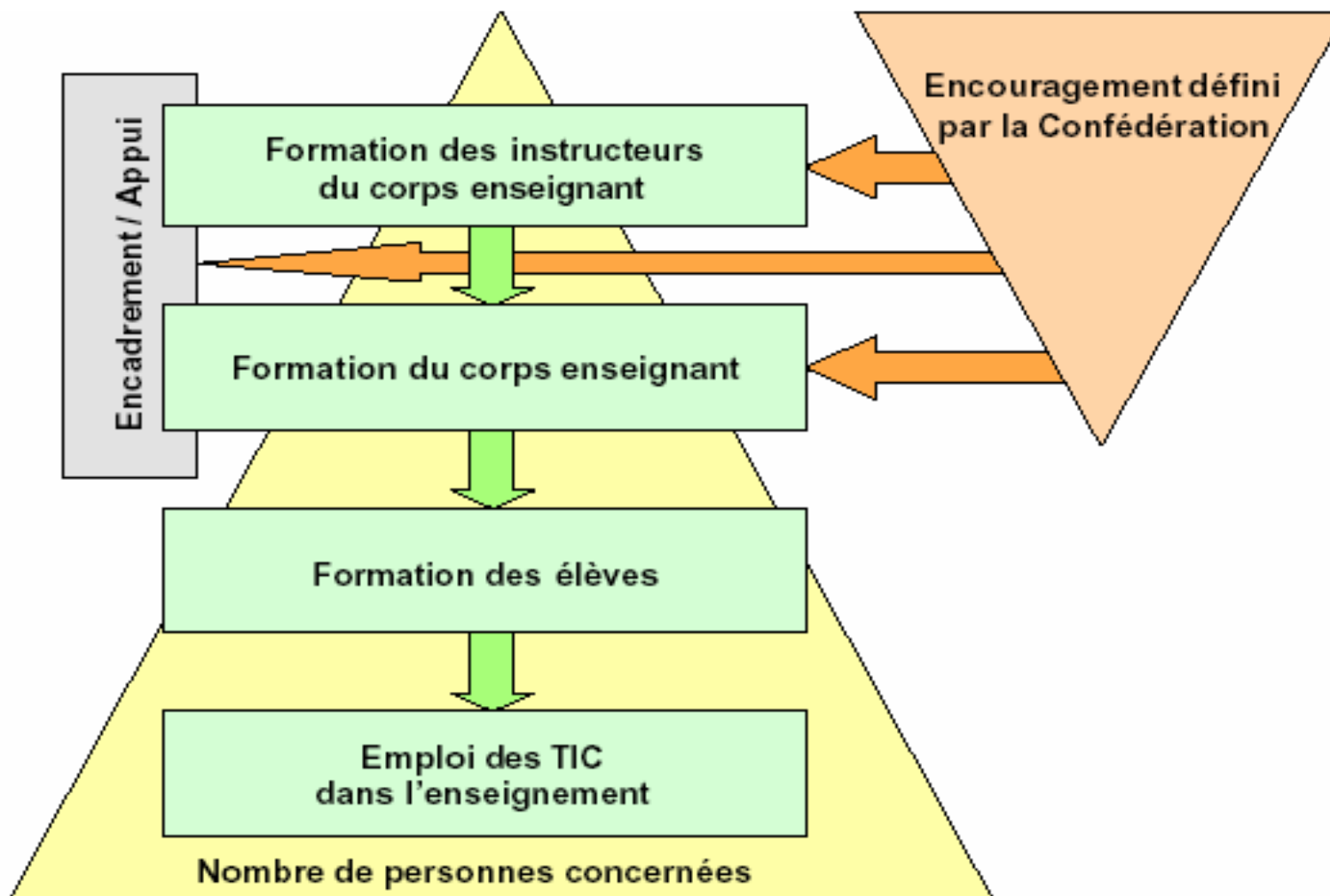
- **Individual "natural" resistance by teacher's teachers**
- **Optimistic belief that ICT training could be integrated into other topics (it should, but it is not)**
- **Underestimation of conceptual and technical difficulties**
- **Confused politics at national levels increase teachers' resistance**

Consequence:

- **Most national efforts focus on teacher development**
 - **State initiatives can't change teacher schools, so they try to change schools with extra incentives**
 - **Curriculum reforms are too dangerous for the system, therefore it just finances computers and networks and continuous teacher training.**

6.3. Continuous teacher training (teacher development)

Swiss federal (national) ICT in education policy:



- This is slow (because no substantial curricula changes)

4 stages of ICT development at school level according to IFIP/Unesco

1. Emerging Approach

- Schools have some computers
- Don't have any real usage scenarios

2. Applying Approach

- ICTs in some subject areas with specific tools and software
- ICT in school administration

3. Integrating Approach

- Wider range of activities
- ICT to promote authentic contextualized learning, etc.

4. Transforming Approach

- ICTs to creatively rethink and renew school organization
- Focus of the curriculum is now learner-centred
- ICTs are taught as a subject area (...)

... This is slow at best and dangerous at worst

6.4.The Geneva F3MITIC model (used in several Cantons)

Objectives

- **Former des formateurs et des formatrices**
- **Former des personnes-ressources dans les écoles**
- **Promouvoir la réflexion, l'échange et la diffusion des expés. locales**

Requirements for participation

- **Être expérimenté-e**
- **Être prêt-e à s'engager dans le développement et le soutien d'actions ...**
- **Se sentir à l'aise dans un des deux domaines**
- **Pouvoir justifier de bonnes connaissances générales dans l'autre domaine**
- **Avoir intégré les MITIC dans sa pratique pédagogique**

Course structure and participation:

- **12 jours et demi de séminaires, 150 heures de travail collaboratif (scénarios)**
- **Une journée d'échange avec un groupe d'experts**

Certification

- **Présence et participation active, 7 scénarios,**
- **travail réflexif de fin de formation**

Let's look at teacher types found in Geneva

Luis Gonzales (2004), Pilot study among auto-selected primary teachers who use ICT

	<i>Type</i>	<i>Features</i>	<i>N=38</i>
1	The convinced & technology-savvy	Masters both activity-based pedagogies and technology. Is not a technology-freak	1
2	The active teachers	Use ICT (for documentation), CBL/multimedia. Don't find enough time for extended classroom activities. Don't use technology much for themselves	15
3	The stalled teachers	Are motivated, use ICT for themselves, but don't find enough time in curriculum, dislike of infrastructure	14
4	The interested teachers	Don't master the technology, in principle want to do more	6
5	The tech-savvy non-users	Very good with technology, but doesn't use it much with his pupils	1
6	The adept but tech-weak	Uses technology for himself and in the classroom, but has difficulties	1

Only 1 perfect teacher out of 38

Training and technology skills **don't correlate** with ICT use in the class !

6.5. So why doesn't it happen ?

H 1:

- Typical teacher training only has an impact on attitudes but not on behavior. (Teachers are **can't create scenarios** with ICT)
- Teacher's **can't do it without experiencing** it themselves (change teacher training)

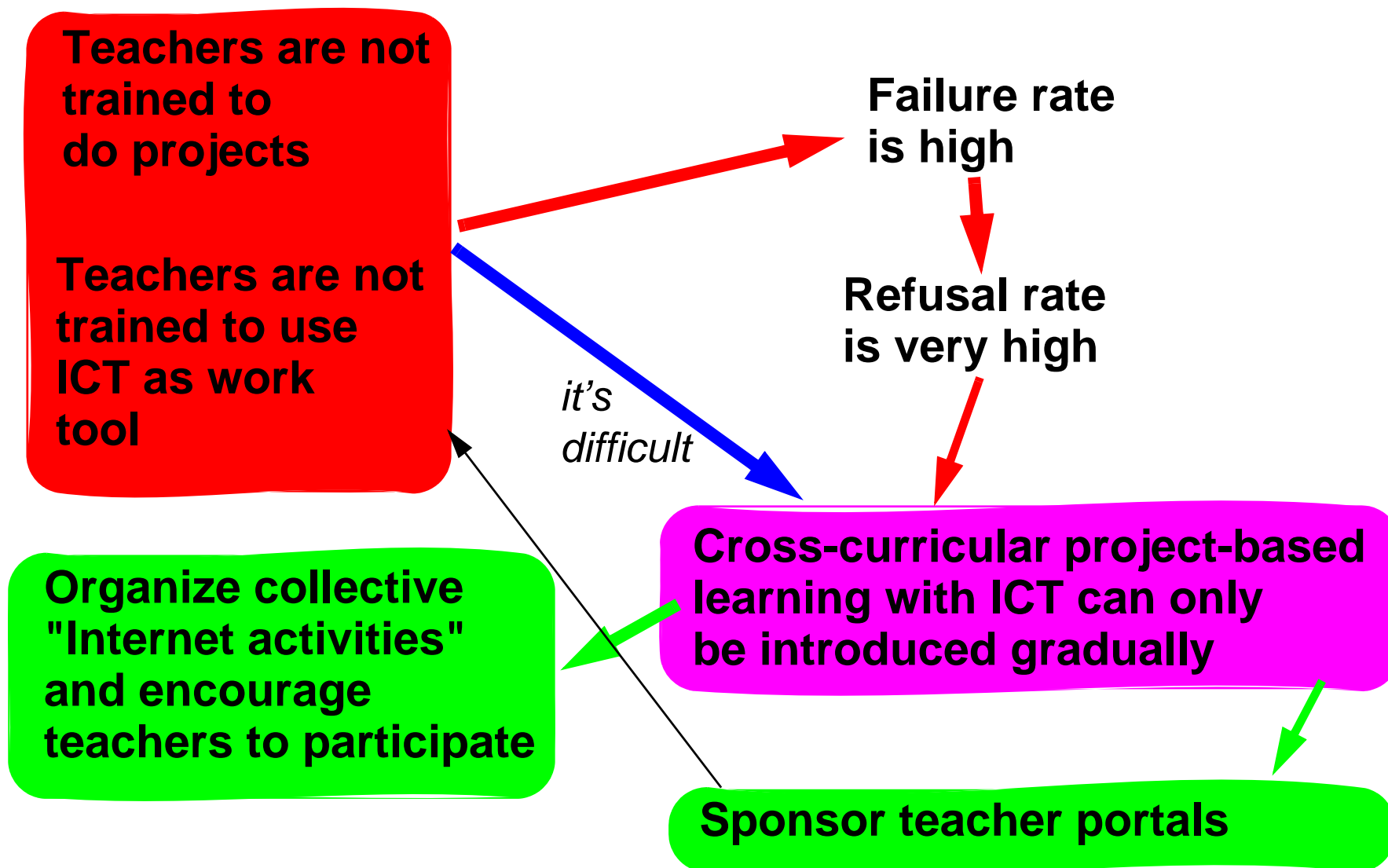
H 2:

- The **system is rather hostile** (not necessarily by principle)
 - system = technical infrastructure administration and middle education management
 - Systems support people are control freaks
 - Management is under pressure by officials, newspapers, parents, ...
 - Both are afraid of Internet
 - Both can't understand why teachers need control (ownership)
 - Reforms are too frequent and too chaotic

H 3:

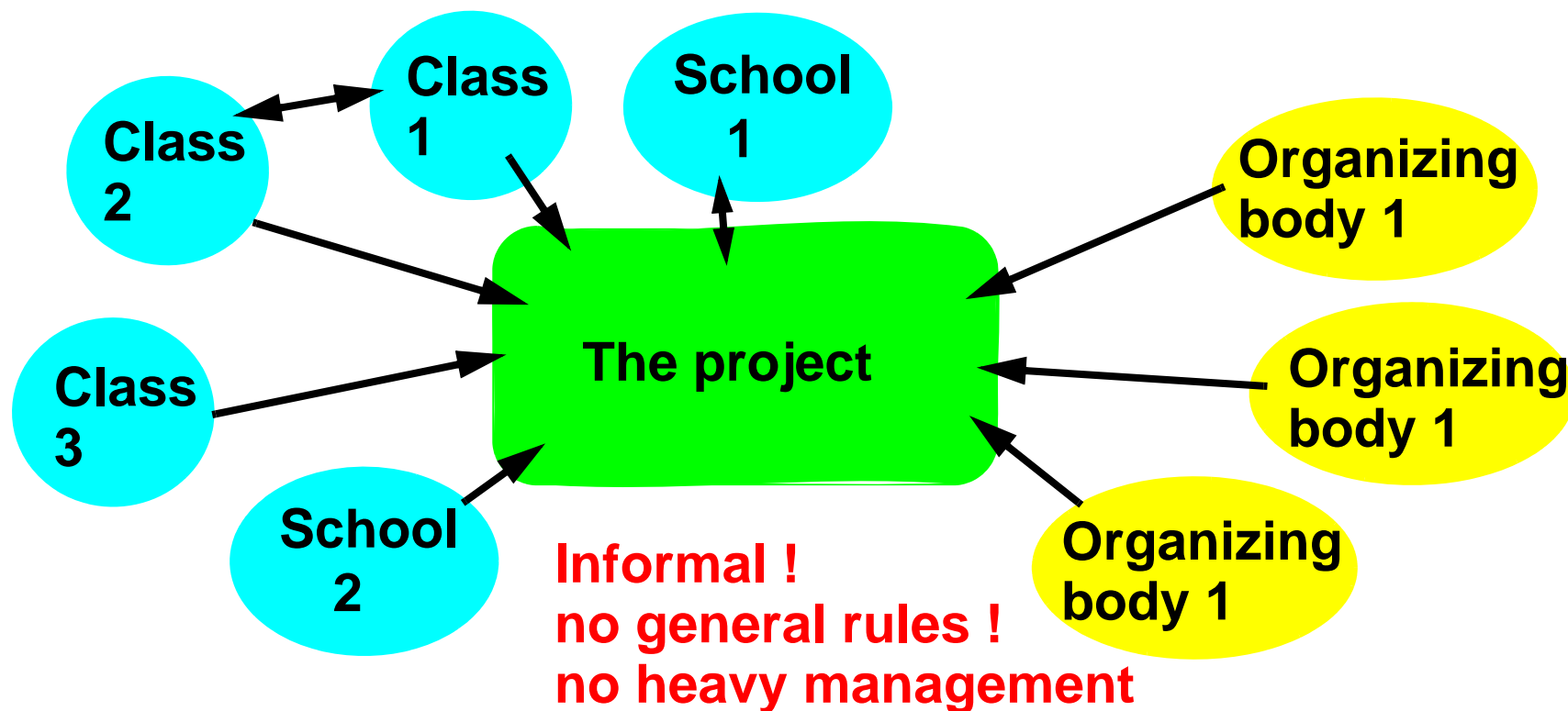
- **Curriculum** and **time** are big issues

7. Collective teaching activities: a way out ?



7.1. So what are so called "Collective Internet activities" ?

- "Organized" by some consortium (different stakeholders)
- Often an interdisciplinary topic
- Often a set of various activities & various levels of participation
- Teachers can participate with their class
(on their own decision or with the support of a school)



7.2.Example Activities on water with "Terre des hommes"

url: <http://tecfaseed.unige.ch/tdh03/>

- **Stakeholders: NGO, a few teachers, TECFA (my group)**
- **Goal: Work on issues related to "water"**

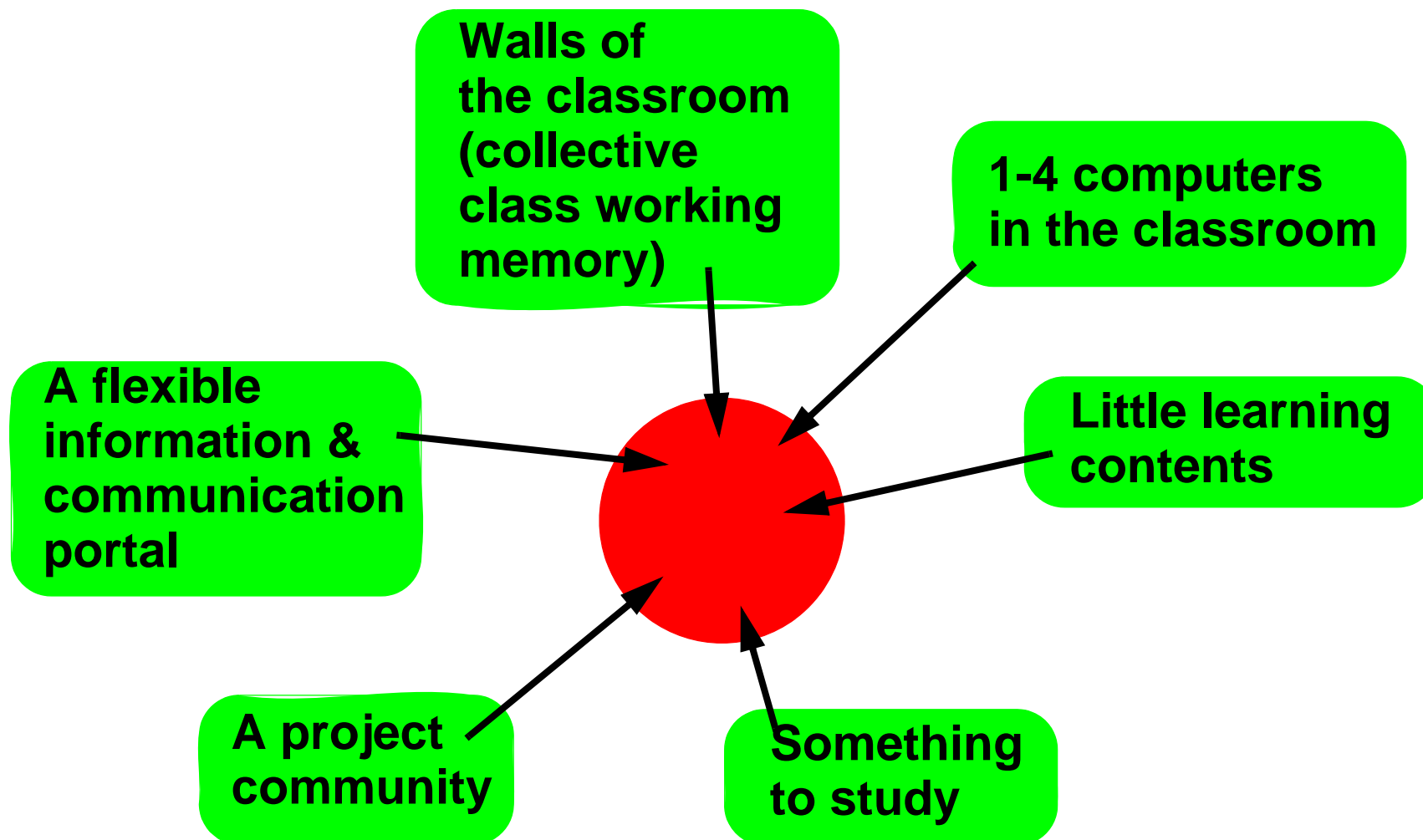
Main activities:

- 1. Queries (enquêtes) or react to news (réagir à l'actualité)**
- 2. Photo and picture albums (+ annotations / comments)**
- 3. Make a quiz or do a quiz**
- 4. Add links (+ comment)**
- 5. Enter a glossary item, a quotation or a poem**
- 6. Free discussion**

Teacher-teacher activities:

- 1. Forums**
- 2. Scenario definitions (teachers describe good scenarios)**

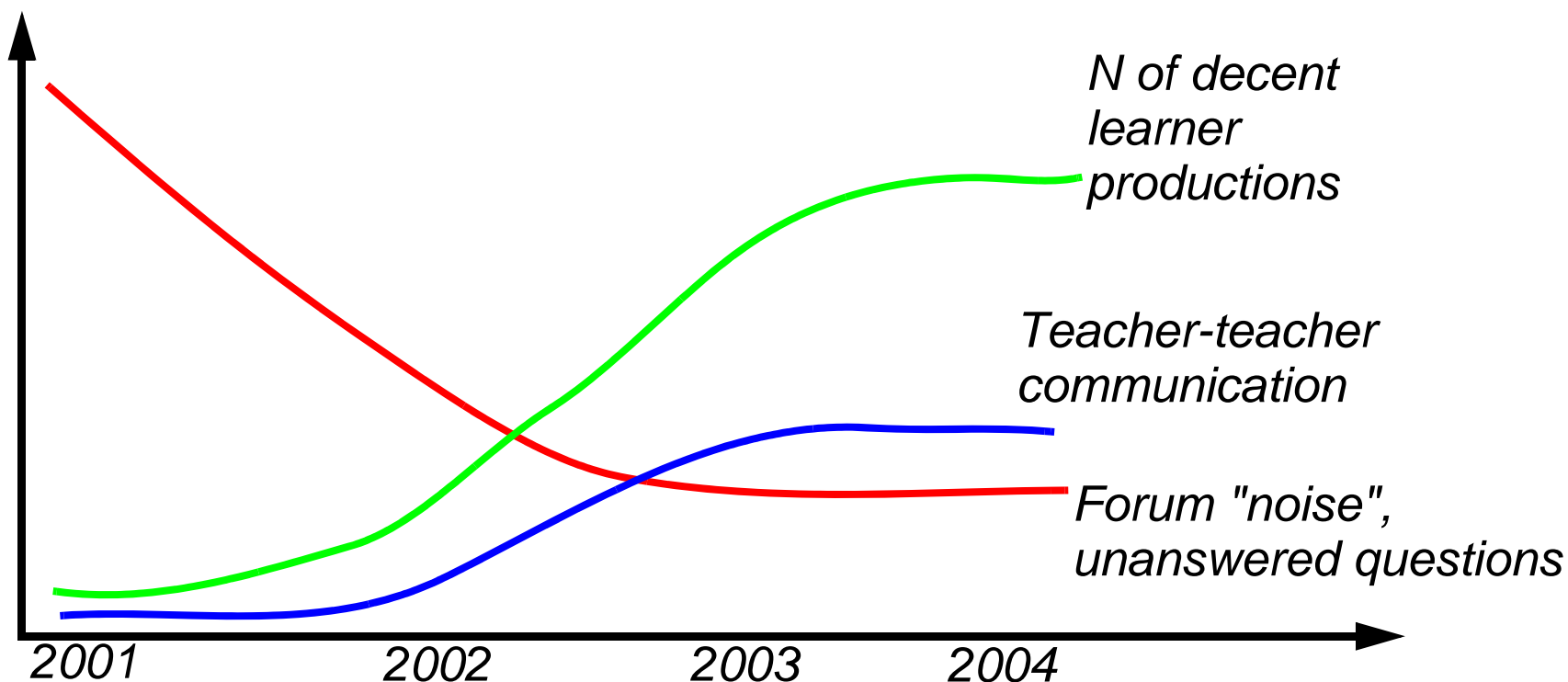
7.3. What kind of Infrastructure do we need ?



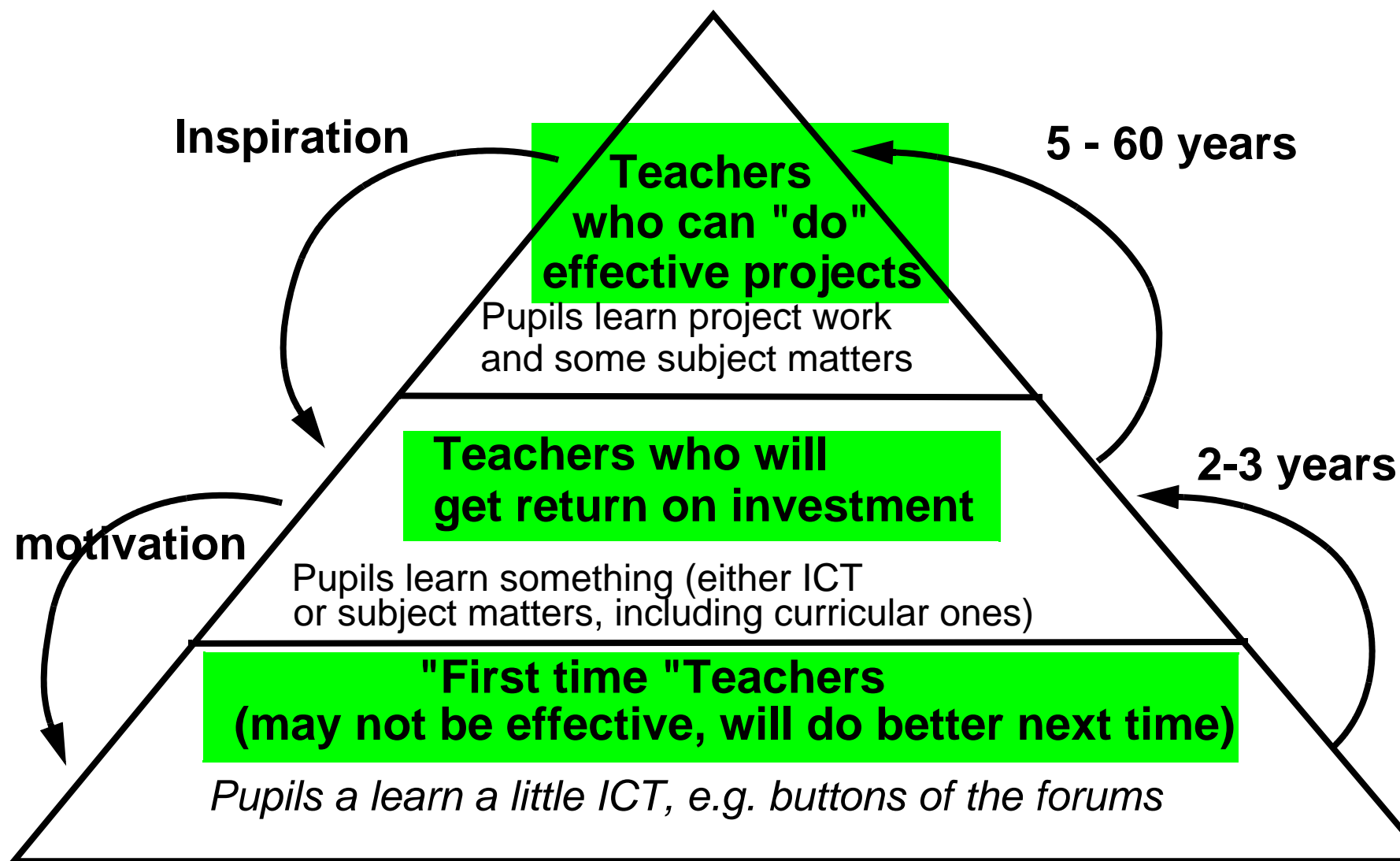
7.4. Results over a 3-year period

- Each activity was organized during 4-6 weeks
- Auto-selected classes in Geneva and around the world
- 2001-2003 scaffolded by TECFA, 2004 without us (!)

Main results (roughly !):

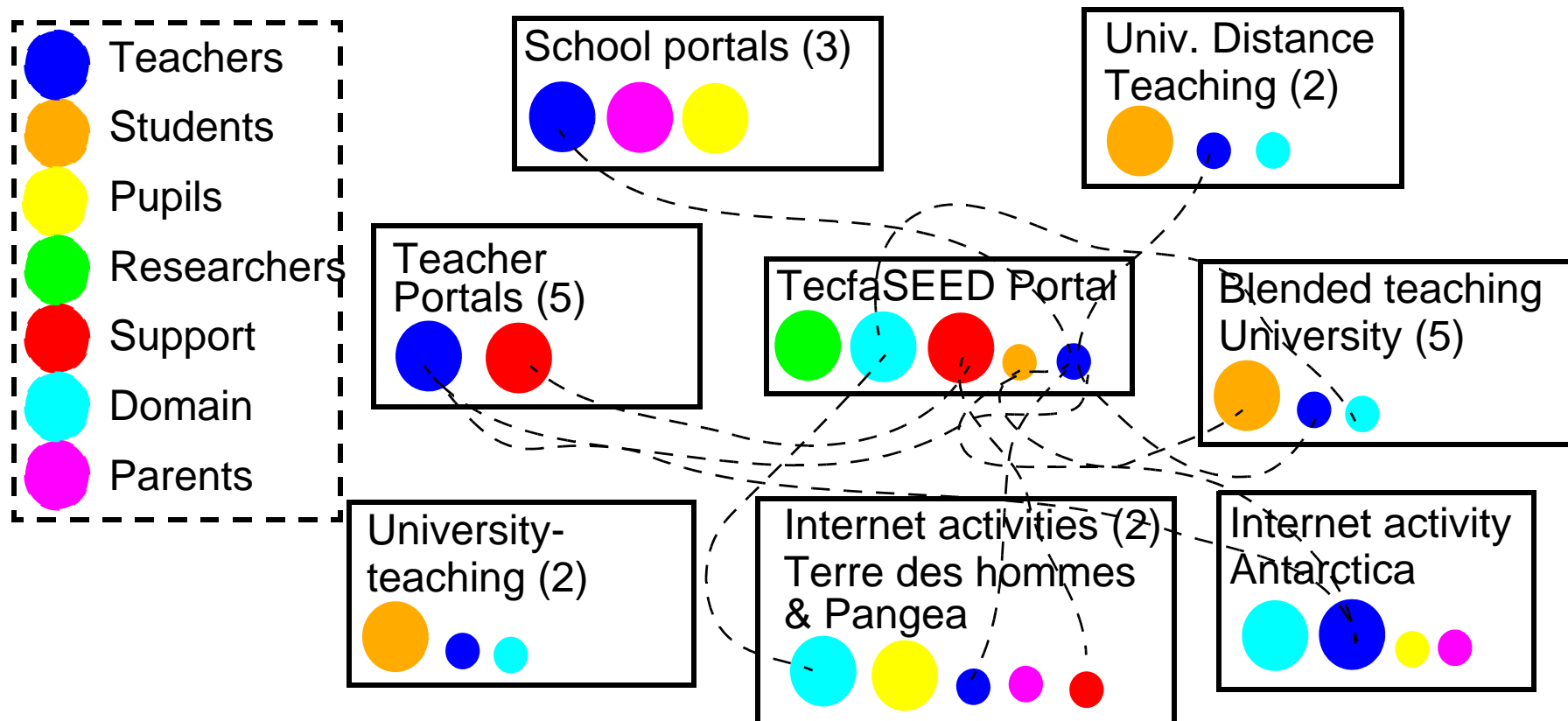


7.5. Internet activities as teacher development



- **Conclusion: somewhat effective**

7.6 Furthermore: Portals (networking) everywhere !

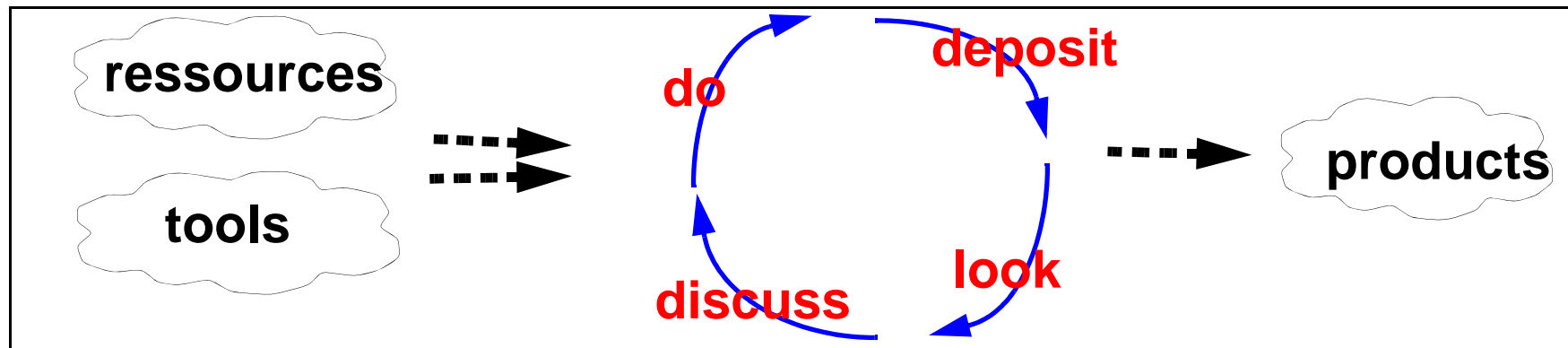


- various kinds of portals, in each one actors can become active
- between 10 and 1500 users
- all levels of schooling
- hosted by us (since the system is too slow and a bit hostile)

7.7.Final remarks

Teachers as learners:

- Teachers too **must be exposed to learn with technology** (their products are their designs, what their students do, etc.)
- Learning portals also must be designed as teacher development portals



Teachers as teachers:

- **must have control**, i.e. technology must be enabling

Other work and outlook:

- There are many other teams with similar projects !!
- Not clear how we can do this sort of thing with regular curricular content it may take another 20 years !

8. Perspectives for Mauritius: Don't focus on ICT

1. Status quo

- Slowly loose ground ...

2. Melt-down

- Rich kids will go to private school (South America)
- System has to retrain people after schooling (France)

3. Catch-up (Central Europe, 20-60 years)

- Invest a lot of money into ICT
- Don't change curricula, teacher training and the infrastructure bureaucracy

4. Accelerate (Canada, 20 years ?, see 7. above)

- Train teachers through real projects
(teachers in training must implement and report from the field)
- Sponsor well-thought networked Internet activities.
(e.g. study climates, history, wild-life of Mauritius)

5. Leap frog (Scandinavia, 10 years)

- Change the curriculum & change teacher training (but keep good things !)
- Engage all actors, encourage parent-school and teacher communities
- Introduce **activity-based & project-oriented learning** even before ICT

Some more suggestions

1. ICT as a subject

- Rather teach **formal grammars & programming** instead of HTML tags (integrate with mathematics and language teaching)
- Rather teach **SVG** instead of HTML (integrate with mathematics, e.g. symmetry & trigonometry)

2. ICT for the individual teacher & teacher communities

- Give **incentives** to teachers who help others (e.g. share course materials)
- Use ICT for school management and related activities

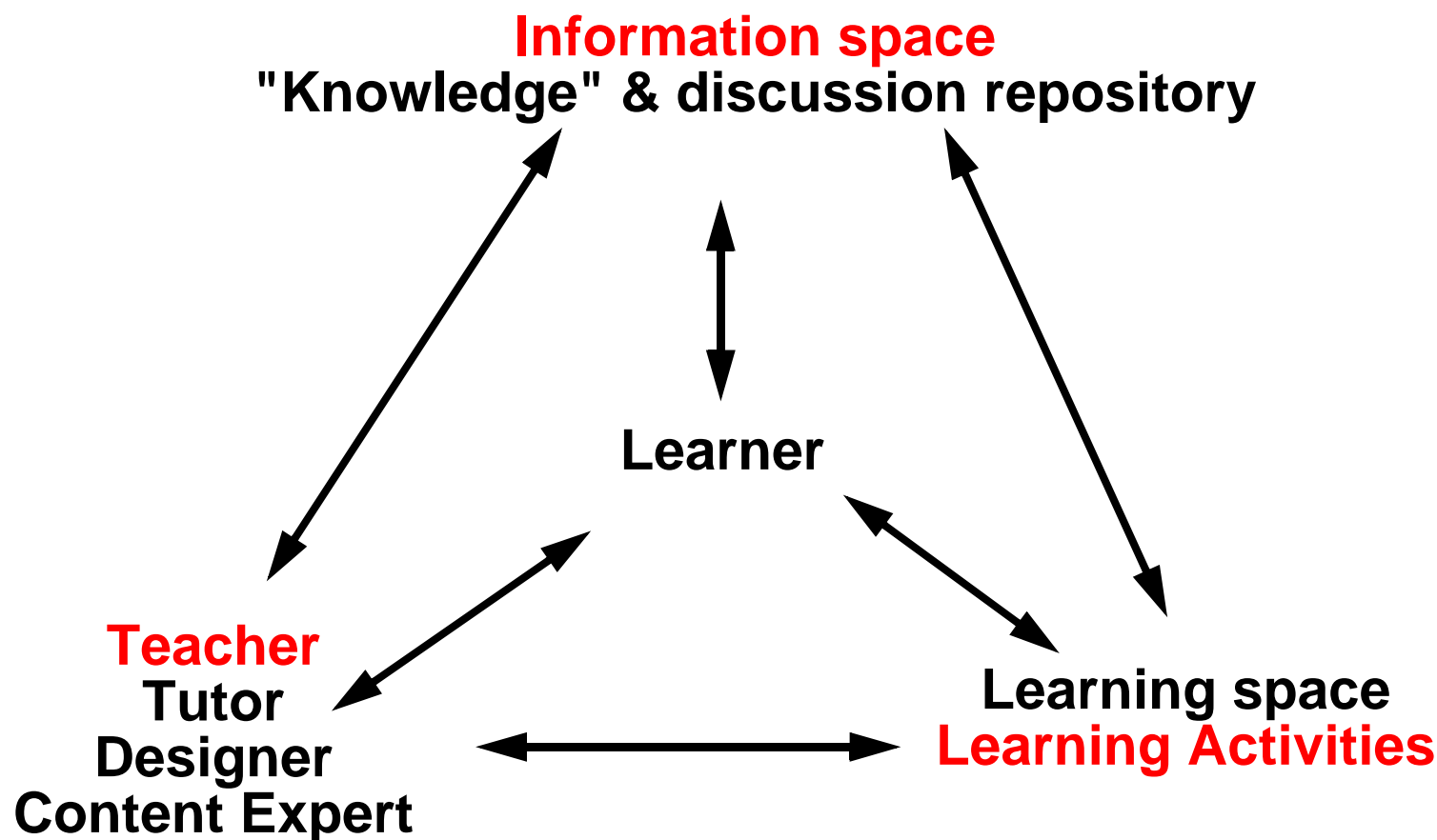
3. ICT to support new pedagogies

- You may start with extra-curricular project-oriented learning
- Use **ICT to solve problems and to do projects** in **all** curricular domains !!
- Rather teach **how to write with ICT** than how to surf the Internet
- Encourage **collective production systems** (e.g. wikis) instead of multi-media
- Introduce **evaluation rubrics** for activity-based pedagogies

4. Infrastructure

- Don't let control freaks take over, **let teachers run the infrastructure**
- Let **teachers have control** (evaluate quality of scenarios, not conformance)
- **Integrate with classrooms** (buy portable computers instead of labs)

Use some a simple, but global picture to start discussions, e.g.:



- Curricula, infrastructure and training policies should focus on the full range of learning activities (I, II, III). Don't forget the teacher
- Thanks for your attention !