IFIP - Melbourne 2003...

"The computers are fine, the staff's down."

Thinking skills and ICT use in the classroom
(Is it working and what does it do?)
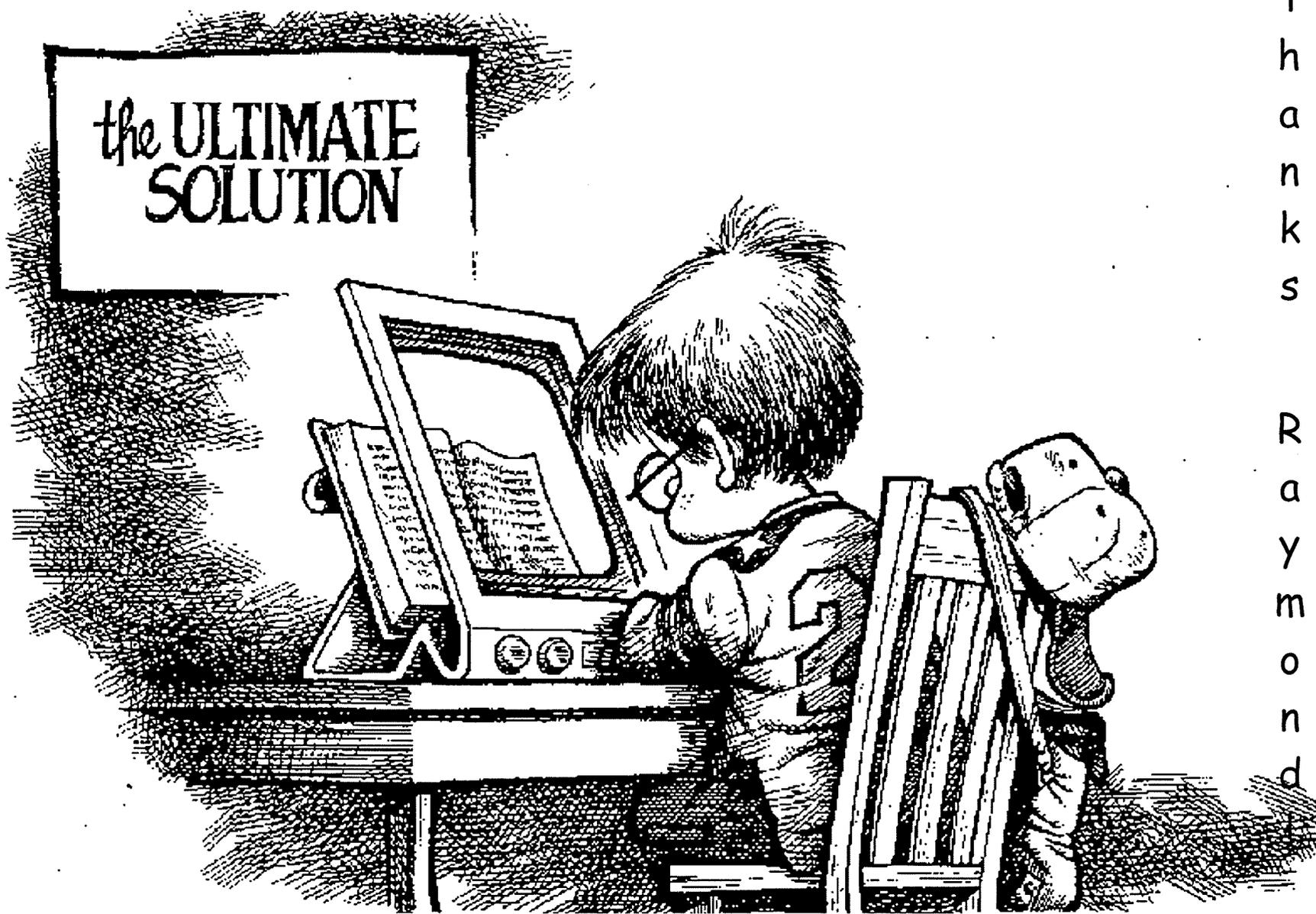
Tim Denning

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t.j.denning@educ.keele.ac.uk
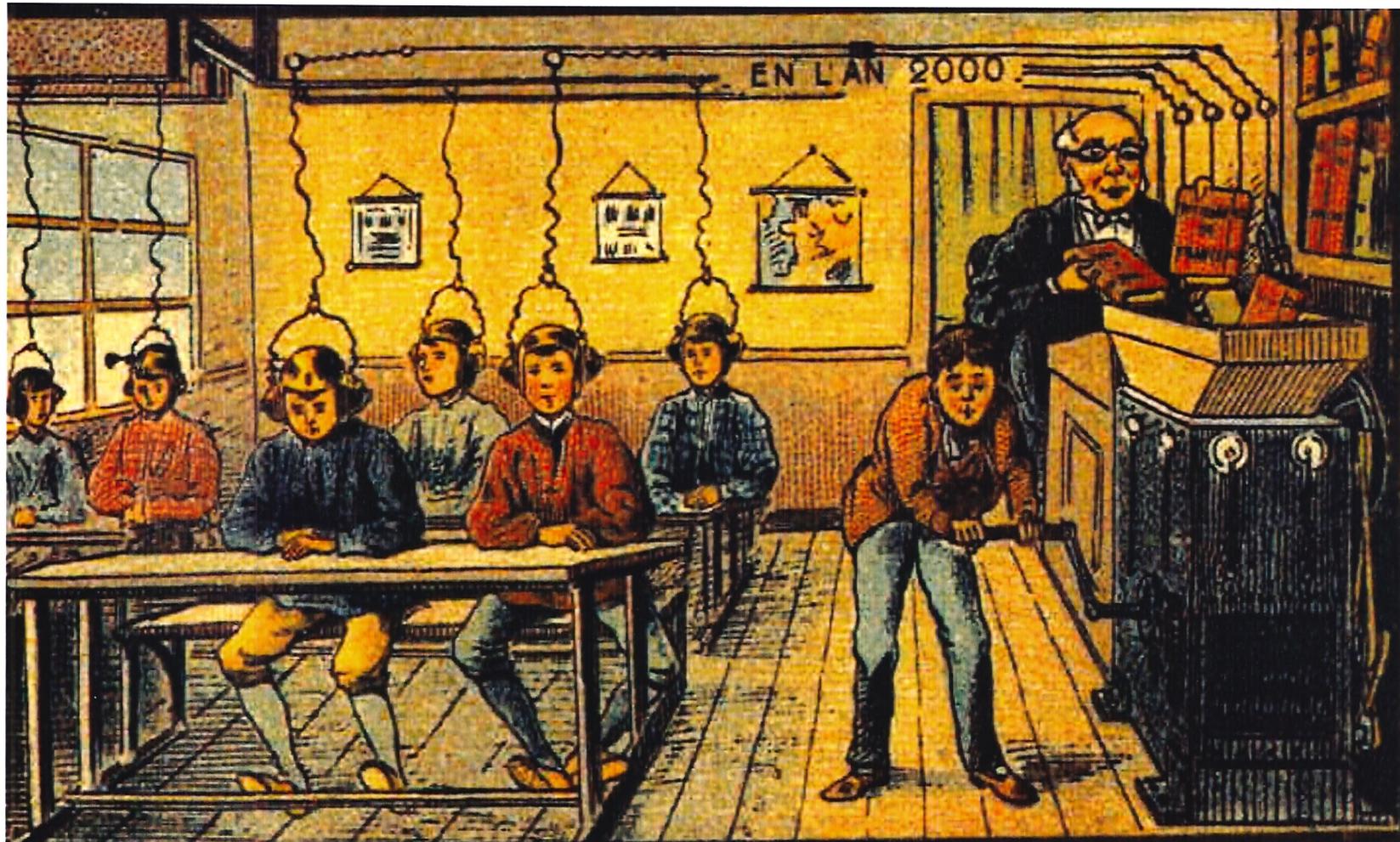
With a lot of help from:

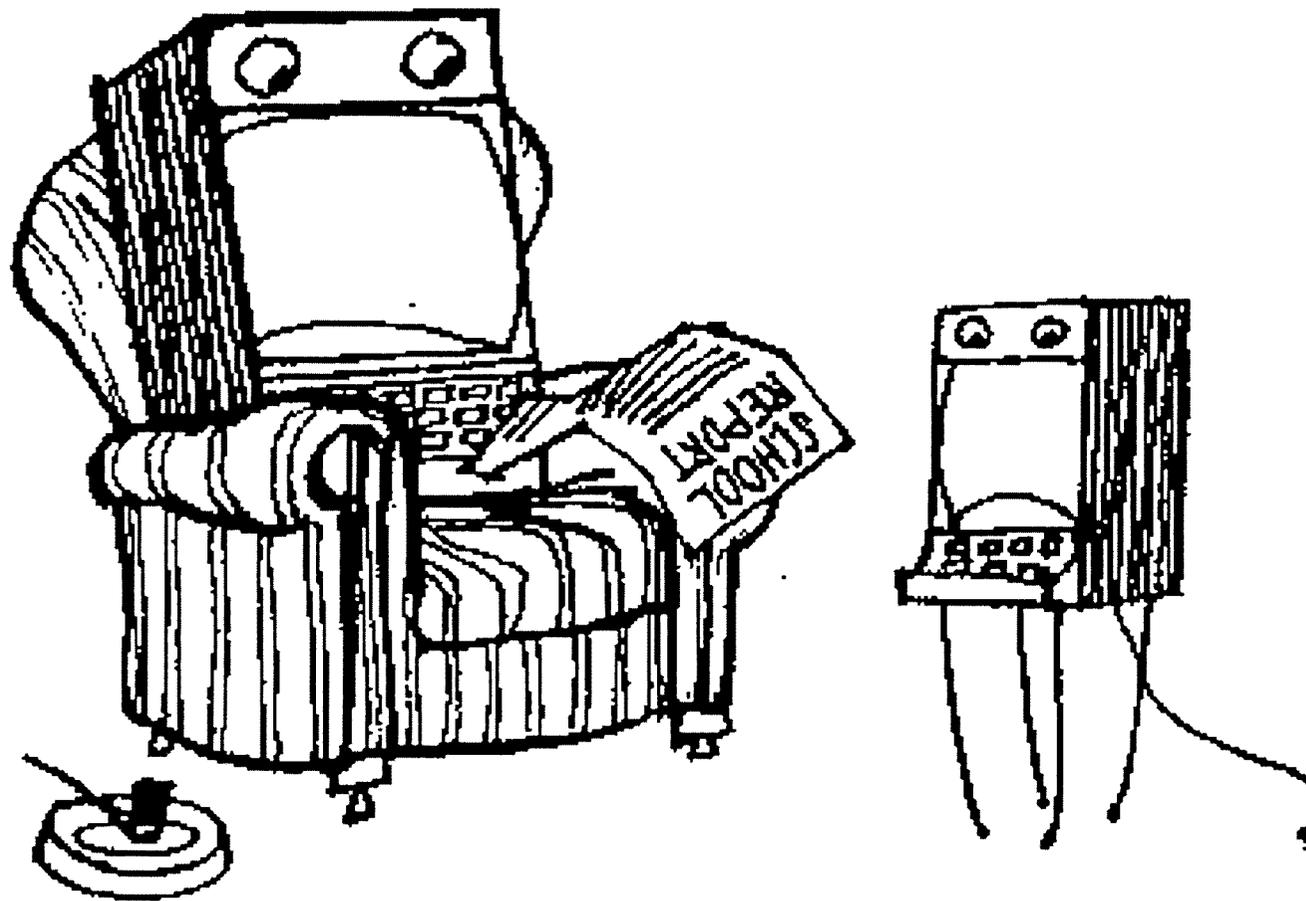Avril Loveless – Chris Higgins – Tony Fisher – Rob Tweats

Thanks Raymond

But ...

"It says you're fast and accurate, but lacking in initiative and ideas of your own."

Consider...

Current indicators of success for ICT tend to focus on hardware, infrastructure and traditional measures of performance, linked to literacy and numeracy.

The success of public ICT investment by government utilises such measures.

Globally, current evidence does not suggest a significant impact.

IFIP WCCE 2001 Conference – Copenhagen

We got really excited about...

Department for Education and Employment
Research Briefs
Research Report No 115

From Thinking Skills to Thinking Classrooms

Carol McGuinness

School of Psychology, Queen's University, Belfast

Main points...

A framework for developing thinking skills.

- the need to make thinking skills explicit in a curriculum;

- taking a metacognitive perspective;

- The impact of collaborative learning (including computer-mediated learning);

- creating dispositions and habits of good thinking;

- generalising the framework beyond a narrow focus on skills to include thinking curricula, thinking classrooms and thinking schools.

McGuinness, 1999

And...

Information and Communication Technologies

- Linked to the thinking skills framework in several ways

- Provides a tool for enhancing children's understanding and powers of reasoning through exploratory environments/microworlds, multi-media and hypermedia.

- Networked communication (local and wide area) provides special opportunities for collaborative learning.

- **Considerable evaluation remains to be completed on learning outcomes for both individual and whole class learning.**
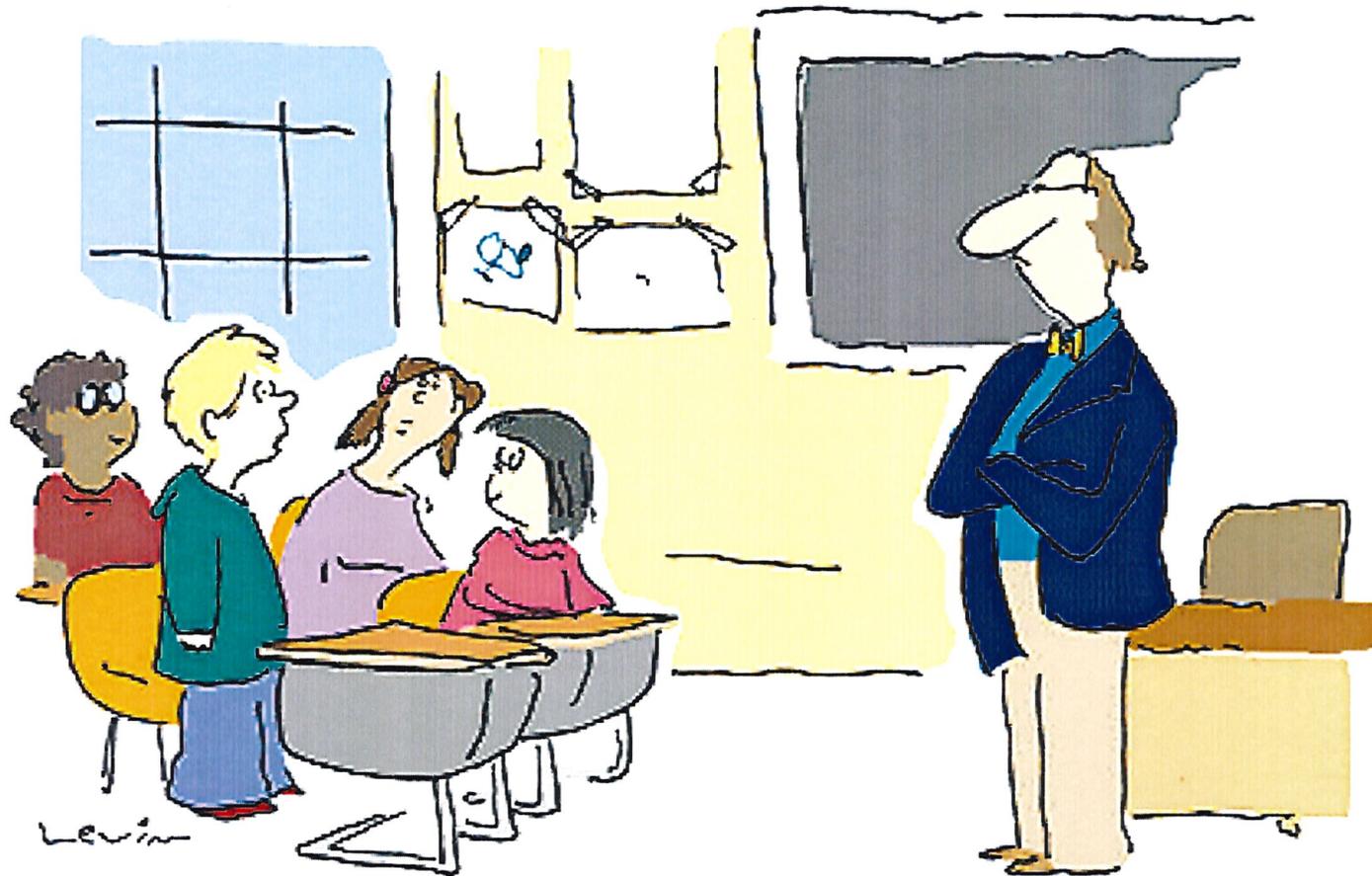
McGuinness, 1999

And this...

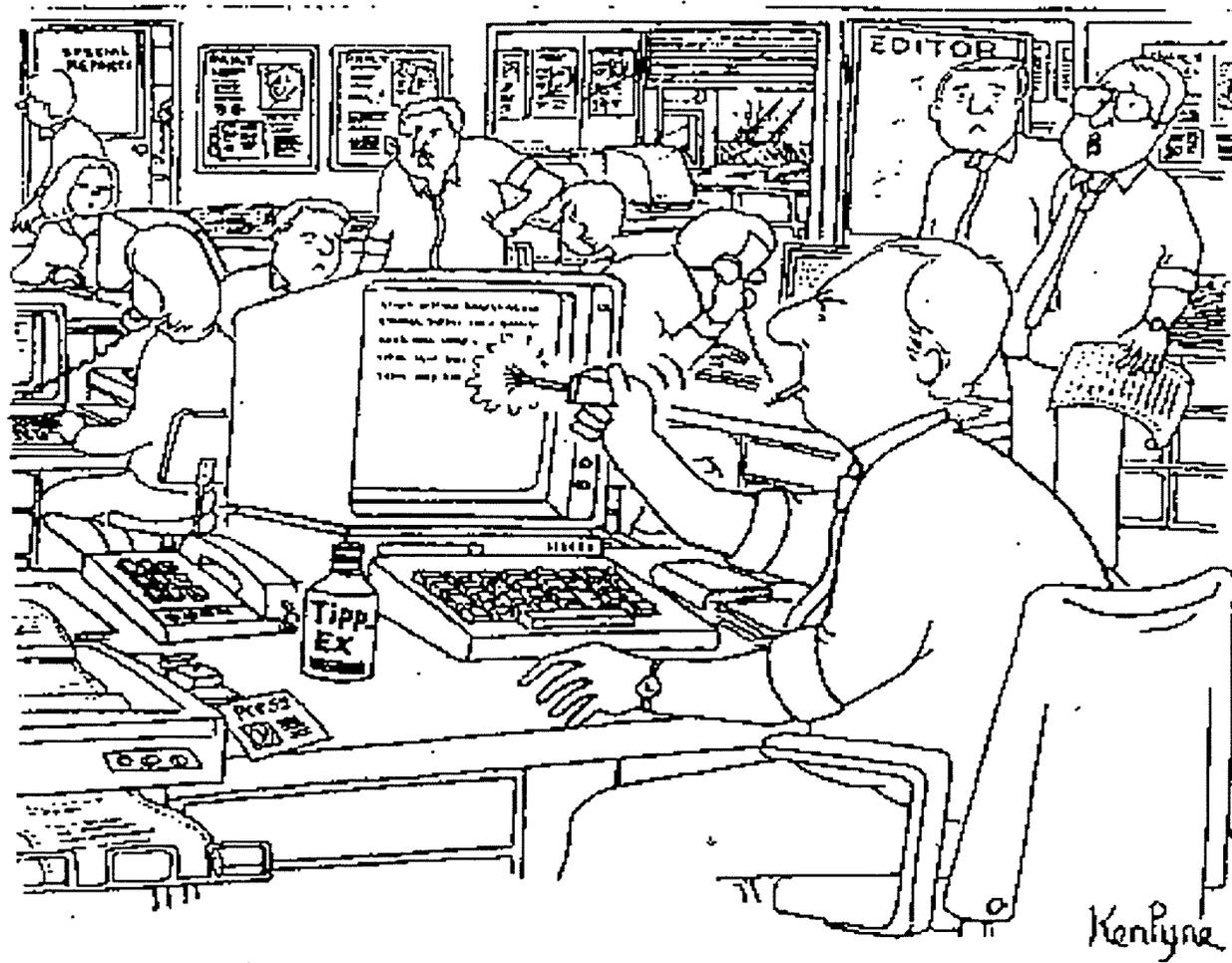Nesta Futurelab Series
Report 2

A Literature Review in Thinking Skills, Technology and Learning

Rupert Wegerif

School of Education - Open University

"A computer virus ate my homework."

I'm afraid he still hasn't quite mastered the new technology.

Professional Development Initiatives...

And so...

BECTA ICT RESEARCH BURSARY: HOTSHOTS

(HIGHER ORDER THINKING SKILLS, HIGHER ORDER TEACHING STRATEGIES)

What is the potential impact on thinking skills of ICT in the classroom and how might this impact be tracked?

Our intentions...

"... to provide the initial framework for an assessment process that, subject to further development, would allow teachers to integrate the monitoring of higher order and metacognitive skills into their regular classroom teaching and assessment."

Becta Bursary Bid – Autumn 2002
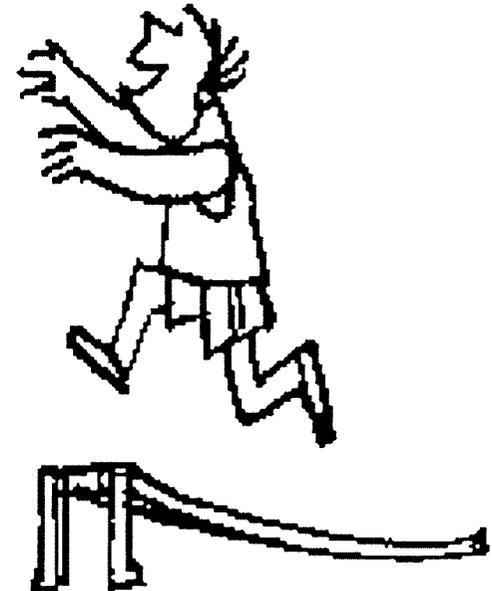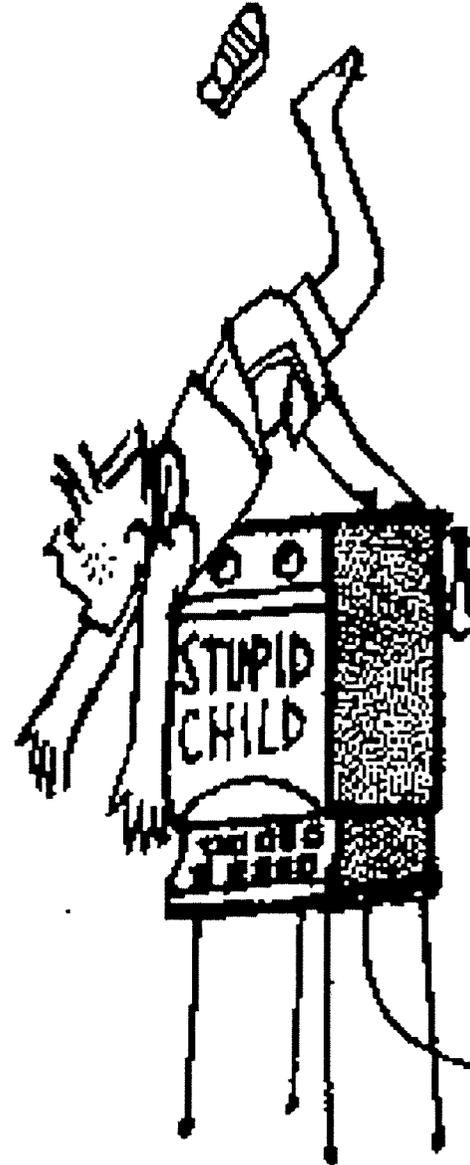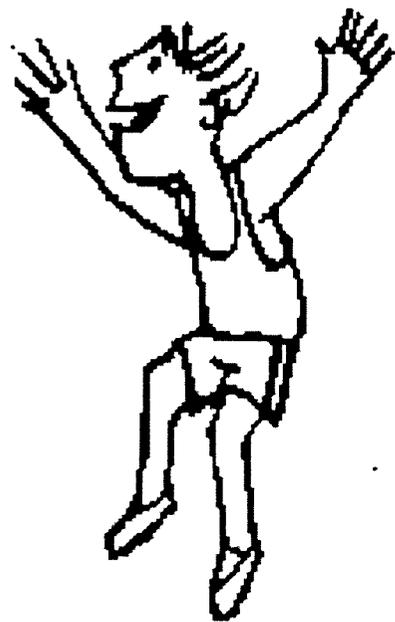
Our activities...

- Literature Review - to identify and report on possible assessment activities – ***now completed***

- Assessment Model Development - creating an assessment instrument sensitive to identified 'Thinking Skills' that could be deployed using web technologies. – ***under way***

- Trials and Reporting - a small scale trial and the preparation of a written report suitable for publication. – ***scheduled for February/March 2003***

These made it very clear...
(How much there is to do.. and how little we know!!)

The ERIC Thesaurus..

And a Web Search
...because...

"This is our laptop model."

So far...

- We have adopted the idea of a cognitive profile – selected aspects of cognitive activity that might be indicators of wider, richer and more complex capability cf Resnick and Anderson/Krathwohl

- We are considering metacognition and perhaps learning styles as two areas for further work

- We have identified some possible resources

With a little help from...

NFER - Nelson

Learning Styles and Metacognition

Norah Frederickson and R.J.Cameron

- Cognitive Styles Analysis – Riding 1991

- Metacognitive Self Knowledge Questionnaire – Goos 1999

- Metacomprehension Strategy Index – Schmitt 1990

We have hunted for material....

- How People Learn - Bridging Research and Practice
- How People Learn - Brain, Mind, Experience, and School
- The ETS Test Collection database.
- Critical Thinking On The Web
- Mind Tools - Helping you to live an excellent life!
- Cognitive Development and Intelligence
- Cognitive Development Lab
- Cognitive Development

And ...

- e-kolb
- The Interactive Institute
- Computer Adaptive Testing Tutorial
- Statistics Home
- DfES Publications
- Cognitive Science Links
- ERIC-AE Full Text Internet Library - (TESTS & TESTING)
- ERIC-AE Full Text Internet Library - (LEARNING THEORY) EPAA Vol. 6 No. 10 Wilson Educational Standards and the problem of Error
- Integrating testing with teaching. Rudman, Herbert C.
- Strategies for teaching critical thinking. Potts, Bonnie

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(Is it working and what does it do?)

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With a lot of help from:

Avril Loveless – Chris Higgins – Tony Fisher – Rob Tweats

Resnick...

- Higher Order Thinking is non-algorithmic. That is, the path of action is not fully specified in advance.tends to be complex.

- The total path is not 'visible' (mentally speaking) from any single vantage point.

- Often yields multiple solutions, each with costs and benefits, rather than unique solutions.

- Involves nuanced judgement and interpretation.

- Involves the application of multiple criteria, which sometimes conflict with one another.

- Often involves uncertainty. Not everything that bears on the task at hand is known.

- Involves self-regulation of the thinking process. We do not recognize higher order thinking in an individual when someone else 'calls the plays' at every step.

- Involves imposing meaning: finding structure in apparent disorder.

- Is effortful. There is considerable mental work involved in the kinds of

Metacognition...

- Metacognition refers to higher order thinking which involves active control over the cognitive processes engaged in learning.

- Activities such as planning how to approach a given learning task, monitoring comprehension, and evaluating progress toward the completion of a task are metacognitive in nature.

- Because metacognition plays a critical role in successful learning, it is important to study metacognitive activity and development to determine how students can be taught to better apply their cognitive resources through metacognitive control.

1997   Jennifer A. Livingston gricco.net