

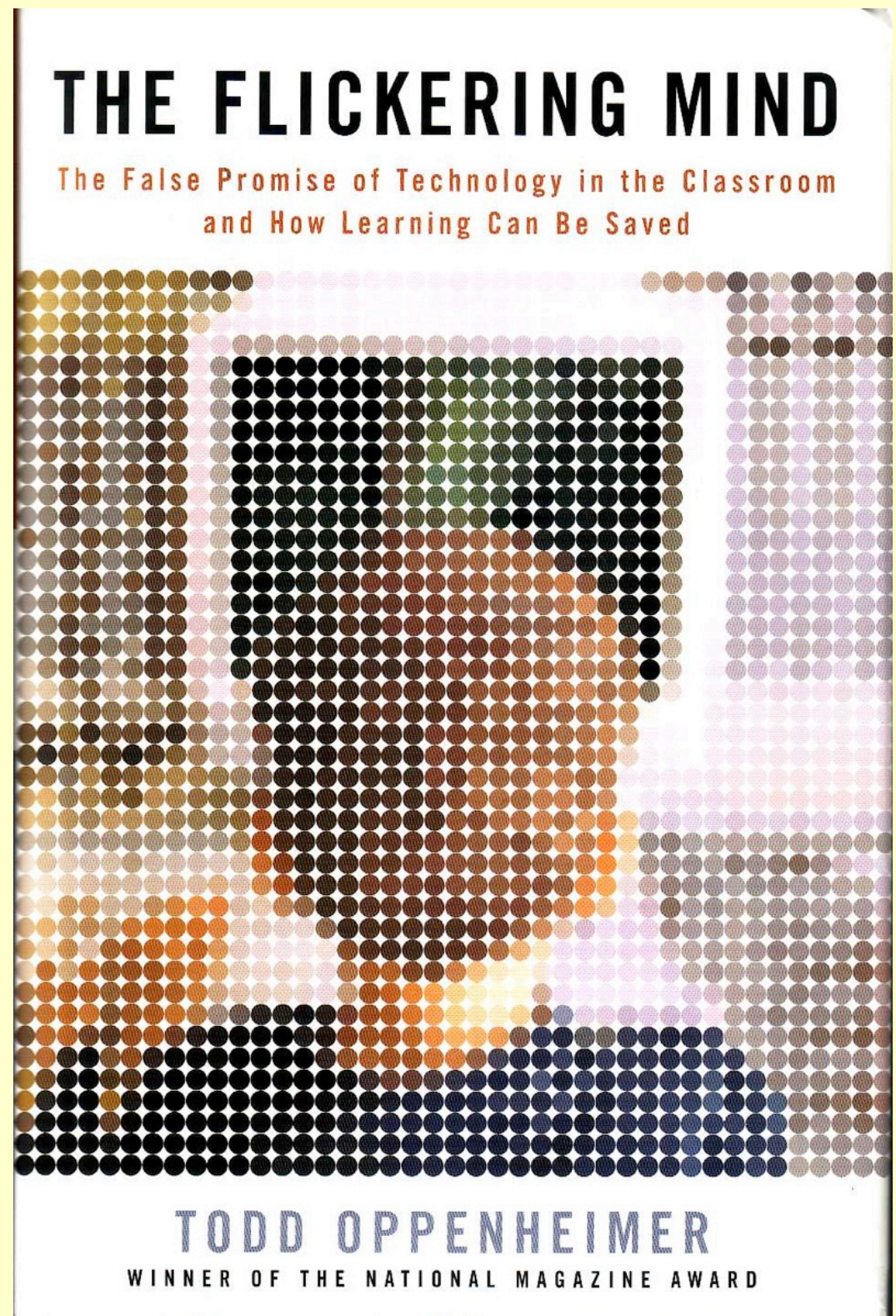
How education changes the use of computers

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Wroclaw, 17 november 2005

Overview

1. What went wrong with the educational use of computers?
2. How it should be done: example 1
3. How it should be done: example 2
4. In conclusion

- ‘the essentials of learning have been gradually forgotten’
- ‘they matter more than the novelties of technology’



- But what are the essentials? Let's listen to educational experts and their philosophies.

Learning Theories

Behaviorism		Cognitivism		Constructivism	
proponents	B.F. Skinner	Jerome Bruner	Lev Vygotsky	John Dewey	Knowles
applications	training, e.g. flight simulators	any deep processing: exploring, organizing, synthesizing content		Collaborative learning	
instructional design focus	Instructor designs the learning environment.	Instructor manages problem solving and structured search activities, especially with group learning strategies.		Instructor mentors peer interaction and continuity of building on known concepts.	
view of learner	basically passive, just responding to stimuli	Learners process, store, and retrieve information for use. (Bruner's Discovery Learning)		Learners create their own unique education because learning is based on prior knowledge.	
assets	integrating complex muscular and cognitive activities	Vygotsky's Zone of Proximal Development focuses on interactive problem solving.		Learning is interactive, dialogic.	
implications	<p>Climate for Learning: Does the environment have the right stimuli to promote learning?</p>	<p>Readiness: Students will learn concepts that are maturing.</p> <p>Opportunity: ZPD = area between what a learner can do individually vs. assist by peer interaction, research and teaching.</p> <p>Learners Customize Their Learning: Provide a range of learning activities and concepts for core course objectives.</p>		<p>Prior Knowledge: Design learning to assist students to build on what they know.</p> <p>Inquirey Learning: Adult learners have a mutual vested interest in their learning and want to involve real experience; teachers are not the sole possessors of knowledge and perspective but co-learners and guides. (Knowles' andragogy)</p>	

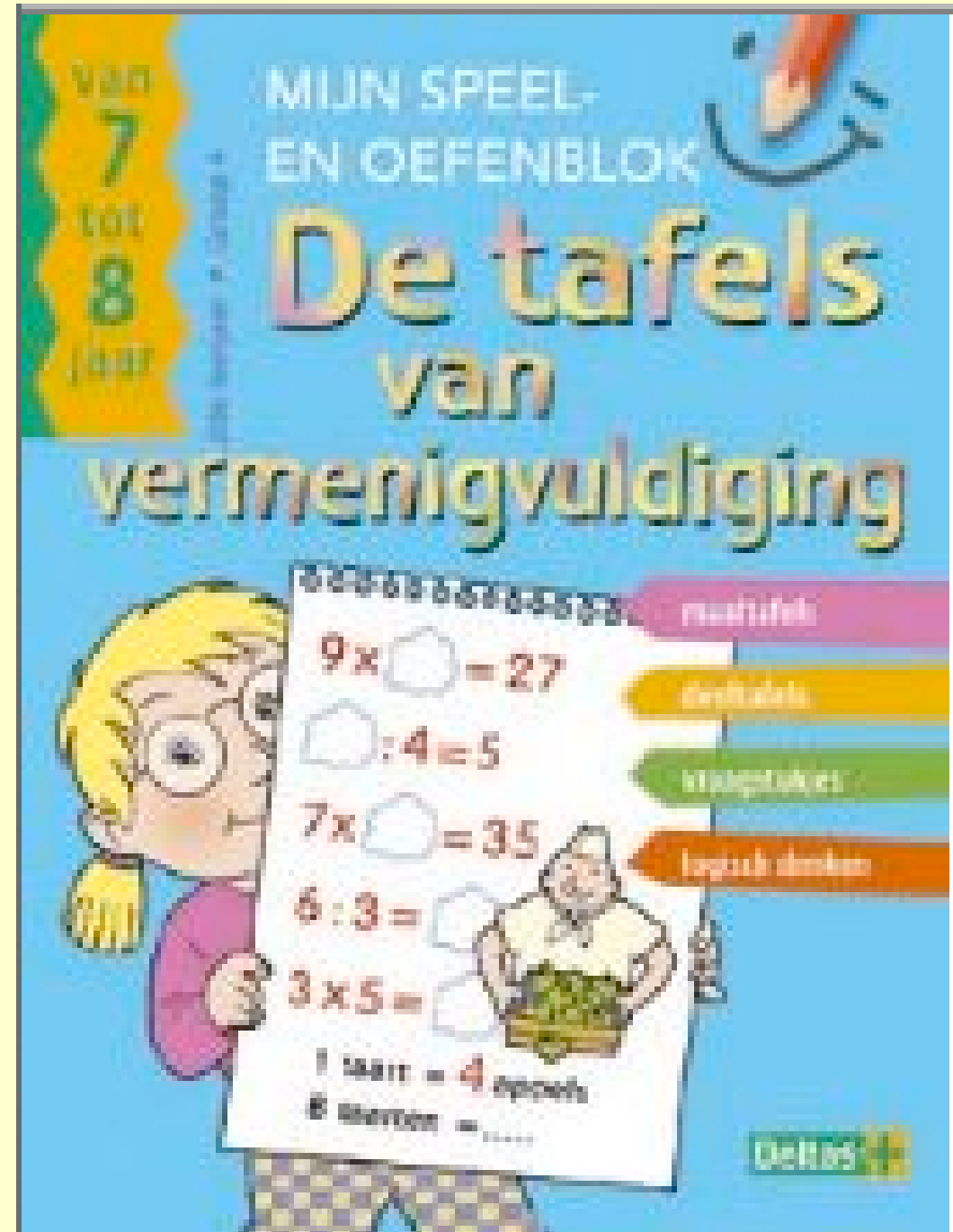
Judith Boetcher: <http://vccslitonline.cc.va.us/usingweb/bckgrnd.htm>

- So there is more than one view, and I haven't even mentioned subviews such as problem based learning, learning by doing, project based learning, distance learning, etc.
- How to choose then, should one choose?
- I argue that one should be practical even pragmatic about this.

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Problem: how teach children the multiplication tables in elementary school?



- However ‘engaging’ you may make it, the bottom line is that you learn them by heart
- In Bloom’s taxonomy this is ‘knowledge’
 - Taxonomy: knowledge, comprehension, application, analysis, synthesis, evaluation
- Hoe to use computers in this case?

- Drill and practice-programs
- I made one myself for my kids when they were young (in Hypercard)
- Boring, but effective, as they could practice themselves and the program knew what went well and what went wrong

- Underpinning educational view: behaviorism, which is well suited to acquire knowledge
- Using the computer is probably more effective and efficient than reciting the tables in class
- It is probably more effective and efficient because the program has built-in intelligence

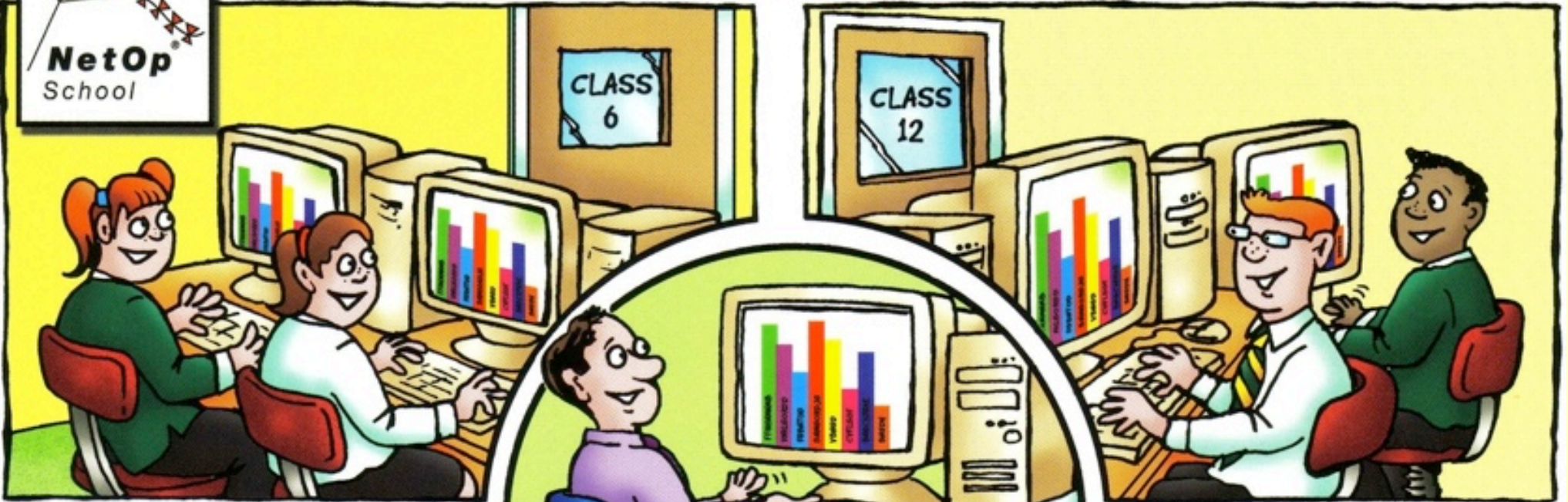
Questions

- Is it true that a behaviorist approach best suits teaching knowledge - to the extent that you should do that?
- Do you know of other examples - language learning, learning procedures?

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WANT TO CREATE A VIRTUAL CLASSROOM?



International Journal of Instructional Technology & Distance Learning

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Editor's Note: Most instructors find teaching online courses requires more time than traditional courses. Both teachers and learners agree there is usually more interaction between teacher and learner and among learners than in a traditional course. Dr. Tomei's study measures the difference in instructor time for parallel version of a live vs. online course and establishes ideal class size.

The Impact of Online Teaching on Faculty Load

Computing the Ideal Class Size for Online Courses

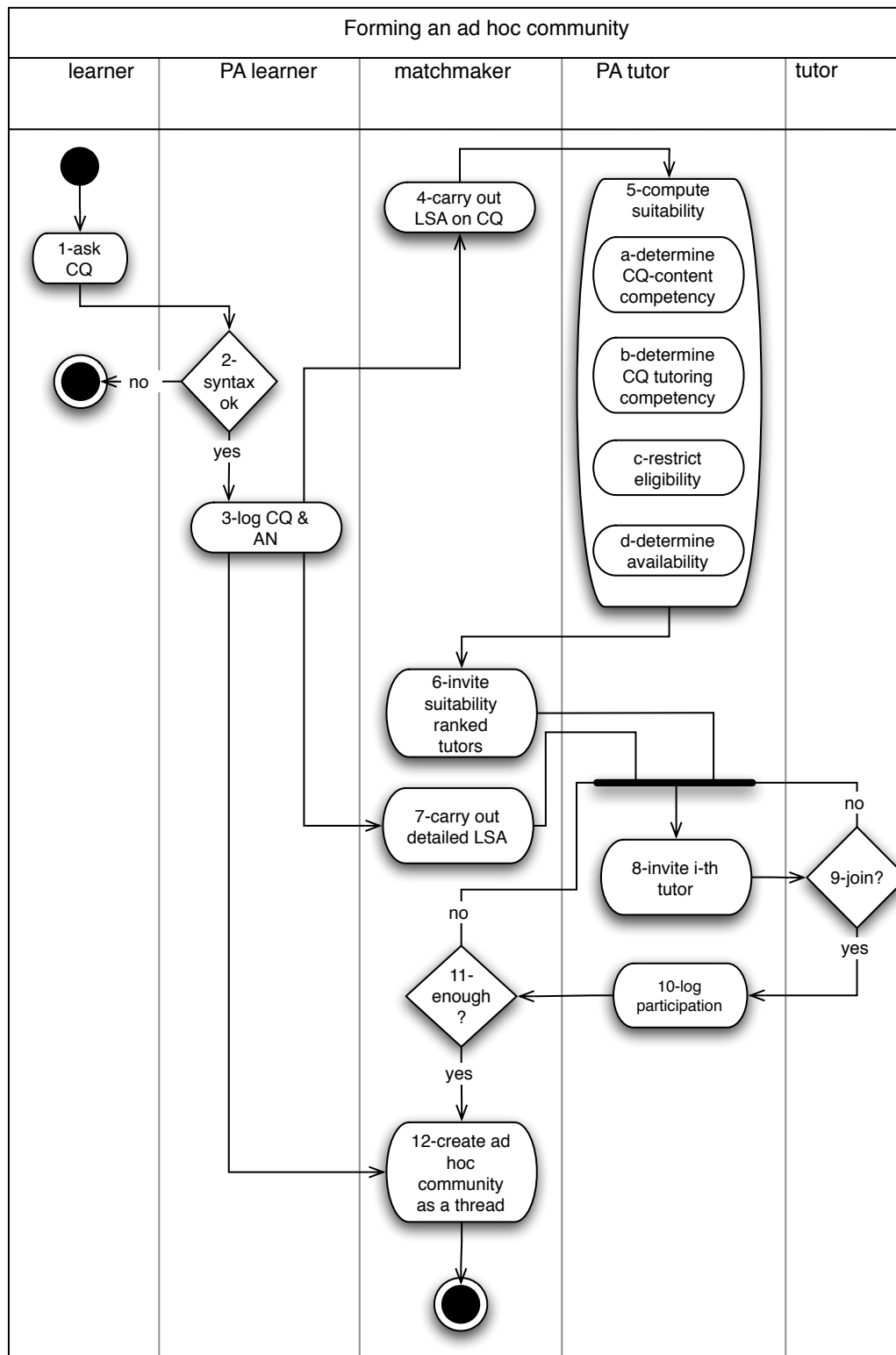
Lawrence Tomei

these assumptions, it was computed that **the ideal traditional class size was 17 students while the ideal online class size was 12 students.**

- Problem: how to solve the teacher bandwidth-problem in online learning environment

- analyse question using latent semantic analysis
- find and select 'suitable' peer-tutors
- set up wiki and create ad-hoc, transient community around it
- seed wiki with proto-answers
- log results in FAQ, portfolio, community database

Forming an ad hoc community



- Underpinning educational view: social-constructivism; learning together by talking together
- Only efficient and effective for hard problems: difference between temperature and heat, nature and nurture, good and bad
- Only efficient and effective for Bloom's higher categories: comprehension and up

Questions

- Is it true that a social-constructivist approach best suits hard problems?
- To what extent would the approach be useful in blended learning environments?

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Lesson to be learned

- Thinking about the educational use of computers should start with thinking about pedagogically relevant problems
 - How better to teach multiplication tables?
 - How to solve the teacher-bandwidth problem?

Proviso I

- It may of course also be sensibly used in support processes
 - financial and student administration
 - managed learning environments

Proviso 2

- There is nothing against being inspired by the latest gadgets and imaginative software
 - podcasts with iPod; mobile computing; tablet PCs; gps receivers
 - wikis and weblogs, social software in general

Proviso 3

- Ignore implementation issues at your own peril!!
- innovators early adopters versus sceptical majority



Thank you for your attention

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