New technologies for new practises in methodology teaching?

Colloque
Relier et valoriser les données
De nouvelles bases pour la statistique et les sciences sociales
Berne, May 9 2003

Daniel K. Schneider
http://tecfa.unige.ch/tecfa-people/schneider.html

TECFA
Faculté de Psychologie et des Sciences de l’Education
Université de Genève
Code: bern-2003
Goal of this talk

New pedagogics
New tools (Internet)
Setups for life-long learning
**Menu of this talk**

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1. The big issues

<table>
<thead>
<tr>
<th>Problems</th>
<th>Solutions ?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students can’t apply what they have “learnt”, can’t put things together</td>
<td>project-oriented teaching (pedagogical reform)</td>
</tr>
<tr>
<td>Students are not trained or expected to do research</td>
<td></td>
</tr>
<tr>
<td>Students are not motivated to learn &quot;abstract&quot; methodology</td>
<td>“just in time learning” (learning on demand)</td>
</tr>
<tr>
<td>Methodology is a too large field</td>
<td></td>
</tr>
</tbody>
</table>
1. The big issues

1.1. The issue of knowledge Transfer

Traditional e-learning/ ex cathedra

Traditional learning by projects

Structured socio-constructivist learning:
- scaffolding
- guidance

how ??

students can’t apply

students are lost
1.2. The difficulty of doing a project

- Students can’t formulate goals
- Students can’t formulate research designs
- Students can’t relate concepts
- Students can’t relate concepts and data to theory
- Students can’t relate concepts
- Students can’t relate data to concepts
- Vague ideas
- Chaos
- Research design
- Raw data
- Field work
- Concepts
- Theory
- Analysis
- Knowledge

New technologies for new practices in methodology teaching?

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2. New project-based pedagogics

2.1 Principles:

- learning and teaching is a complex whole and not limited to content transfer (basic knowledge)

- authentic & project-based pedagogical scenarios (real data & real problems)
- technology can help ...

.... let’s look at some details ...
2.2. Basic knowledge vs. applicable knowledge

behaviorism
(reach knowledge objectives)

constructivism
(construct knowledge)

social cognition
(learn by interacting with others)

situated & shared cognition
(learn by interacting with the situation)
2.3. “Old” school vs. “new school”


Introductory univ. courses
Swiss virtual campus
Main-stream e-learning
Industry training for low skills

Innovative graduate teaching
“Internet projects” in schools
2.4. Current methods and tools for distributed learning

bad content transmission: web pages / videos

listen
look at multi-media
surf on the Web

good content transmission: instructional pedagogies

“Learning Management Systems”

tell
exercice

do
discussion
build

socio-constructivist pedagogies:

Several Internet Tools or Activity/community Portals

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3. Case study #1: Blended project-based teaching

Minimal (!) tool requirements:

- Content & knowledge management
- Document & knowledge exchange
- Project management support
- Community management
- Work tools (if needed)

"blended" = mixed distance/presence teaching
3.1. Use of structured pedagogical scenarios

- "Open" pedagogical designs are more effective if individuals and groups have to evolve within *somewhat* specified scenarios

...we need to orchestrate somewhat
- Scenarios are sequences of activity phases within which group members do tasks and play specific roles.
- This *orchestration* implies organizing workflow loops.

... this is just the (abstract) “ur-loop” ... hold on!
3.2. The computer in a socio-constructivist perspective

- the computer is merely a facilitating structure, a thinking, working & communication tool

<table>
<thead>
<tr>
<th>Elements</th>
<th>teacher (manager)</th>
<th>learner (worker)</th>
<th>computer (tool)</th>
<th>designer (resource)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal setting</td>
<td>helps or defines</td>
<td>defines or refines</td>
<td></td>
<td>provides ideas &amp; half-baked models</td>
</tr>
<tr>
<td>planning</td>
<td>suggests &amp; controls</td>
<td>does</td>
<td>provides tools</td>
<td>observes</td>
</tr>
<tr>
<td>monitoring</td>
<td>audits &amp; helps on demand</td>
<td>self-observation, diaries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>contents</td>
<td>suggests, produces</td>
<td>uses &amp; produces (!)</td>
<td>storage, search &amp; awareness tools...</td>
<td>can provide &amp; develop</td>
</tr>
<tr>
<td>tools</td>
<td>configures, helps</td>
<td>selects, learns, uses</td>
<td>provides work tools offers reflection</td>
<td></td>
</tr>
<tr>
<td>community</td>
<td>participates</td>
<td>participates</td>
<td>is environment</td>
<td>suggests</td>
</tr>
</tbody>
</table>

- Most student and teacher activities should be supported by computational tools and lead to new “contents”
3.3. Use of C3MS Portals

**Community, Content, & Collaboration Management Systems**

- **Story engine** ("stories, logs") + annotations
- content mgmt.
- calendar
- forums
- web links mgmt.
- download mgmt.
- project mgmt.
- ... many other tools

- **Integration** of most applications (authentication, interfaces,...)
- **Plug-in architecture**! (YOUR organization can write modules)
3.4 C3MS portals + educational scenario scripting

Projects

Activities (scenarios)
- characteristics
- Stages
  - stage 1
  - stage 2
  - stage 3

smaller activities

C3MS bricks (software)

+ community tools !!
3.5. Teacher “scripts” flexible project scenarios

(1) definition of pedagogical scenarios

(2) selection & configuration of tools (modules)

Teacher’s portal

TECFA modules

extra modules

standard modules

C3MS portalware

installation + configuration
3. Case study #1: Blended project-based teaching

3.6 Example: “Staf18” course @ Tecfa

Blended (mixed presence/distance) format
- duration: 6 weeks (a few initial half days in classroom)
- 2 hours presentation at the end of the course
- public: graduate students in educational technology (different backgrounds and age)

Project-based
- large freedom for choice of subjects within the general theme
- requirements: research plan, respect of task schedules
- some mandatory collective work

Theme 2002/3: “Exotic hypertexts”
- New languages (e.g. Topic Maps, RDF/RSS), Wikis, MOOs, etc.
- Build a system or do empirical research and write a paper
In **ADDITION**: shoutbox, links manager, news feeds from other portals, wiki (collective hypertext), various forums, articles, annotations, calendar, awareness tools (who is here, what is new) + **external tools**

<table>
<thead>
<tr>
<th>Major activity phases</th>
<th>Date</th>
<th>software tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Look at subject</td>
<td>21-NOV-2002</td>
<td>links, wiki (coll. hypertext), weblog</td>
</tr>
<tr>
<td>2 project ideas, Q&amp;R</td>
<td>29-NOV-2002</td>
<td>classroom</td>
</tr>
<tr>
<td>3 Initial project ideas</td>
<td>02-DEC-2002</td>
<td>news engine, weblog</td>
</tr>
<tr>
<td>4 Start project definition</td>
<td>05-DEC-2002</td>
<td>ePBL (proj. mgmt), weblog</td>
</tr>
<tr>
<td>5 provisional research plan</td>
<td>06-DEC-2002</td>
<td>ePBL, weblog</td>
</tr>
<tr>
<td>6 Finish research plan</td>
<td>11-DEC-2002</td>
<td>ePBL, weblog</td>
</tr>
<tr>
<td>7 Sharing</td>
<td>17-DEC-2002</td>
<td>links, weblog, annotation</td>
</tr>
<tr>
<td>8 audit</td>
<td>20-DEC-2002</td>
<td>ePBL, weblog</td>
</tr>
<tr>
<td>9 audit</td>
<td>10-JAN-2003</td>
<td>ePBL, weblog, news engine</td>
</tr>
<tr>
<td>10 Finish paper and product</td>
<td>16-JAN-2003</td>
<td>ePBL, weblog</td>
</tr>
<tr>
<td>11 Presentation of work</td>
<td>16-JAN-2003</td>
<td>classroom</td>
</tr>
</tbody>
</table>
4. Case study #2: games and programming

- In both situations, user involvement can be very high
- Both are not very good metaphors for pedagogics
  - Games are made for entertainment
  - Before one can program, one needs to learn a lot ...
- ... but we can learn about motivational features ....

<table>
<thead>
<tr>
<th>Elements of interest to education</th>
<th>gaming activities</th>
<th>programming activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>imagination</strong></td>
<td>X</td>
<td>x</td>
</tr>
<tr>
<td><strong>network of goals</strong></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>feedback</strong></td>
<td>X</td>
<td>x</td>
</tr>
<tr>
<td>“right” challenge</td>
<td>X</td>
<td>x</td>
</tr>
<tr>
<td><strong>community</strong></td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
5. What’s the difference again?

<table>
<thead>
<tr>
<th></th>
<th>Project-based e-learning</th>
<th>Main-stream e-learning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>“new school”</td>
<td>“old school”</td>
</tr>
<tr>
<td>Activity-based</td>
<td>yes</td>
<td>little</td>
</tr>
<tr>
<td>Authenticity / embeddedness</td>
<td>yes</td>
<td>little</td>
</tr>
<tr>
<td>Community</td>
<td>yes</td>
<td>little</td>
</tr>
<tr>
<td>Creativity</td>
<td>yes</td>
<td>little</td>
</tr>
<tr>
<td>Contents</td>
<td>little</td>
<td>yes</td>
</tr>
</tbody>
</table>

... let’s now discuss community & creativity.
5.1. Learning within a community and within context

A sampler of arguments:

- members of a community tend to make better progress (peer intellectual & emotional help and mutual stimulation)
- some goals can’t be reached alone (distributed cognition)
- a group can develop special language and practice adapted to specific problems
- knowledge through enculturation (collective memory)
- cognition is tied to experience (grounded)
- communities can extend beyond formal groups of learners
- a lot of learning is informal
- good communities are knowledge management aware
5.2. Important creativity variables

<table>
<thead>
<tr>
<th>Analysis level</th>
<th>Main variables of interest</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intellectual traits:</strong></td>
<td>• e.g. fluency of ideas, flexibility in thinking, increased reflectiveness</td>
</tr>
<tr>
<td><strong>Personality traits:</strong></td>
<td>• e.g. sensitivity to environment, preference for complexity, intrinsic motivation, self-control, balance between new and old...</td>
</tr>
<tr>
<td><strong>Cognitive structures:</strong></td>
<td>• expertise of some domain, “networks of enterprise” (goals, projects, etc.), scope, ...</td>
</tr>
<tr>
<td><strong>Domain Environment:</strong></td>
<td>• domains (symbol systems) into which possibilities can be introduced.</td>
</tr>
<tr>
<td><strong>Field environment</strong></td>
<td>• network of people, support, instruction, evaluation, recognition, cognitive and affective support, .....</td>
</tr>
</tbody>
</table>

Some of this can be conditioned ...
6. Design of learning environments (LE)

6.1 Input from creativity research

- A LE must provide advantageous conditions at all
6.2. Input from education science

- A learning environment must be complete!

- A learning environment must be complete!
6.3. Input from research on virtual environments

features of a virtual environment

critical variables

RSS feeds
wiki
publication of student work
project tool
work tools
weblog
quizzes
shoutbox
home page
work index
annotations of all text
reflection
emotional support
identity
productivity
goal orientedness
recognition
exploration transfer?
domain support
intellectual help
articles
forum / chat
links

New technologies for new practises in methodology teaching?
6.4. Input from activity based distance teaching

- For each project there are central activities and tools
6.5. Major features of a task-oriented learning environment

- design of an LE must be project and task(s) centric
6.6. Some conclusions

(1) Shift the focus from learning *materials* to learning *activities*.
Support work *processes*!
Have students *produce things*!

(2) Activity-based learner-centered pedagogics is teacher-centered design.

(3) Need careful balance between structure & improvisation between monitoring and freedom.

(4) Start with pedagogies & technologies that are somewhat *familiar*. E.g. use real workplace tools if possible.
7. Life-long methodology teaching: now what?

7.1 Situation 1: “On the spot” open learning

Diagram:
- Learner
- Problem
- Help desk
  - Forums/Chat
  - Knowledge base
  - Tutorials
  - ..... support infrastructure
- Dispatch
- Answer
- Comment
- Peers
- Specialists

Actions:
- submit
- consult
7.2. Situation 2: methodology “schools”

- Learn. env. tool box
- Public data Sets
- Private data sets
- On-line tutorials
- Project tools
- Community tools

- Vague project ideas
- 3-5 day workshops (methodology intro. + work on design)
- Individual/collective project work (3-6 month)

- Start phase
- Intensive phase
- Follow-up phase
7.3. Infrastructure: the "grass roots" model

installed & hosted by an existing structure

Resource & Community portal

community management (1/2 position)

academics

Special Fund

resource

resource

teaching portal (s) ....

select tools "ad hoc"

find support per project

quick & easy funding for little projects or pedagogical training

install + configure + adapt

free-lance open source people

cost: little visible costs ... if organizations participate
7.4. Infrastructure: the "big thing"

- Administration development tech. support (1 full time +)
- Community management + pedag. support. (1 full time +)
- Accreditable courses (embedded academics, part time)

1 M / year minimum!

Integration via "web services"

- Document server
- Data archive
- Web links server
- Authentication server

Portal server
- Portlets software
- Teaching portal(s)
- Community portal

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8. Endnote: See the SEED project

Tecfa SEED community site

- [http://tecfaseed.unige.ch/door/](http://tecfaseed.unige.ch/door/)

Available now:
- exchange & some support
- examples of running portals (school & university education)

Available soon (summer/fall 2003):
- repackaged and documented “PostNuke” C3MS software
- modules for activity planning, project management, workshop organization, concept teaching, etc.
- Catalog = **cookbook** with “half-baked” **scenarios** and **tools**

SEED is an European IST programme project (No IST-2000-25214) and the swiss part is sponsored by the Swiss Federal Office for Education and Science (No OFES: 00.0287).