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<tr>
<td><strong>Author(s)</strong></td>
<td>Lindstrom, B</td>
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<tr>
<td><strong>Citation</strong></td>
<td>CAUT-CITE SEMINAR 1: ICT and changes of Higher education, Hong Kong, China, 23 February 2001</td>
</tr>
<tr>
<td><strong>Issued Date</strong></td>
<td>2001</td>
</tr>
<tr>
<td><strong>URL</strong></td>
<td><a href="http://hdl.handle.net/10722/44095">http://hdl.handle.net/10722/44095</a></td>
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ICT and changes of higher education

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Personal background

- Professor of education at Göteborg University, Sweden
- Adjunct professor of information science at University of Bergen, Norway
Personal background

• Research and teaching
• Advisor to the vice-chancellor on ICT: ICT-policy, infrastructure, administrative support systems, staff development, and ICT for learning
• Board-member of the Swedish National Agency for Distance Education, SUNET and Ladok.
Outline of the presentation

• Some general trends in changes in society, related to the question of ICT and higher education.
• General demands on and changes of higher education.
Outline of the presentation

• ICT-related changes in higher education.
• National initiatives
• “State of the art” with regard to
  • Pedagogy
  • ICT and learning
• (Some) conditions for extended use of ICT in higher education
Patterns of change in society

• Globalisation
• The new economy
• Diversity and multi-culturality
• Trans-national operations
• Shorter time-cycles / just-in-time
Important patterns of change in society with regard to ICT

• Expansion of high-quality ICT-infrastructure
• Increased functionality of ICT-tools
• Commercialisation of ICT
• Merging of mass-media and ICT
• Increased use of ICT in everyday life and at work
Expansion of high-quality ICT-infrastructure

• Access to computers at home (2000)

<table>
<thead>
<tr>
<th>Age</th>
<th>%</th>
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<tr>
<td>9-14</td>
<td>83%</td>
</tr>
<tr>
<td>15-19</td>
<td>80%</td>
</tr>
<tr>
<td>20-24</td>
<td>63%</td>
</tr>
<tr>
<td>25-34</td>
<td>78%</td>
</tr>
<tr>
<td>35-44</td>
<td>81%</td>
</tr>
<tr>
<td>45-54</td>
<td>77%</td>
</tr>
<tr>
<td>55-64</td>
<td>51%</td>
</tr>
<tr>
<td>65-79</td>
<td>23%</td>
</tr>
<tr>
<td>Tot</td>
<td>64%</td>
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Expansion of high-quality ICT-infrastructure

• Access to computers anywhere
  • 94% of students 15-24 (1998)
  • A digital divide: workers, retired, unemployed.
Expansion of high-quality ICT-infrastructure

- Access to Internet at home
  - 50% of the population (1998)
  - 78% in the agegroup 15-24 (1998)
Increased functionality of ICT-tools

- More powerful hardware
- Improved interfaces / userfriendliness
- More powerful tool for production
Commercialisation of ICT

• Information-services
• Communication-services
• Games
• Edutainment
• Multi-media
Merging of mass-media and ICT

• New standards for communication and presentation
• Changing ontologies and epistemologies
  • what is (important) knowledge
  • how do you gain this knowledge
Increased use of ICT tools in everyday life and at work

- Computer use at home on a single day (1999):
  - 39% (15–19)
  - 26% (20–24)
  - 33% (25–34)
- Average using time: 1 hr. (1999)
- Use of Internet (home, school, work) (1999)
  - 31% of total pop on a single day.
  - 45% (15-24)
General patterns of change in higher education

• Globalisation
  • New and more actors
  • Networks and co-operation
  • Virtual organisations
  • International competition
General patterns of change in higher education

• New modes of operation both for R&D and for education/teaching
  • Projects
  • Cross-disciplinarity
  • Diversity of educational courses and programs
• De-centralisation of organisation
General patterns of change of change in higher education

- Massification/Accessibility
- Demand for (pedagogical) quality
- Demand for cost-effectiveness
- Demand for responsiveness
- The notion of life-long learning
- A demand to use ICT
General patterns of change

- Pedagogy – the emergence of a new paradigm?
- Use of ICT and pedagogy
Pedagogy – the emergence of a new paradigm

- From teaching to learning
- Open and flexible learning
- Distance-learning
- Problem-based learning
- Practice-based education
- Changing roles for the teacher
Pedagogy – the emergence of a new paradigm

• Focus on
  • the individual student
  • the individual in the context of the group
  • resources for learning – not teaching learning materials
  • complementary media technologies / ICT
Pedagogy – the emergence of a new paradigm

• Focus on
  • Learning as knowledge construction in specific subject-matter areas
  • General problem solving skills
  • Communication
  • Collaboration
  • Processes of learning, not only products
ICT in higher education

• as a goal – content
• as a mean – a tool for work and learning
• as a battering ram – promotion of structural and organizational change/transformation
Swedish initiatives

• Large programs to promote usage of ICT in universities and schools
  • Council for the Renewal of Undergraduate Education
  • National Agency for Distance Education
  • KK-foundation
  • Wallenberg-foundation
• However, a major part of the financial burden is carried by local universities – as part of their mission
Focus of initiatives

• Improving quality of
  • ICT-infrastructure and services
  • ICT-competence
  • Pedagogical tools and usage
  • Technologies

• Organizational restructuring
  • Collaboration universities-schools-companies
  • Networking – virtual constructions
Visions and realities

• In general
  • Use of ICT in higher education is widespread
  • However, the ”pedagogical usage” is not very developed
Usages

• Writing, writing, writing, writing!
• Electronic publishing, sometimes
• Email / Communication
• Information searching on the Internet
• Collaboration
Usages

• Modelling and simulation
• Multimedia
• CBT
• “Electronic books”
Usages

• Many isolated projects
• Not built into an institution
Conditions for technology use

- Infrastructure and services
- Competence
- Professional tools, content, culture and mindset
- Pedagogical ideas and approaches
- Financing
Infrastructure and services

• High quality highways (SUNET)
• Mixed quality of local university networks
• Workplaces never enough for students
• Teachers
  • Access to computers/networking at the workplace
  • Access at home through private initiatives and special programs
  • The digital divide!!
• Students
  • Access to computers/networking at school
  • The digital divide!!
ICT in higher education – infrastructure and services

• Support
  • Access to technical support is a crucial factor, generally noted by teachers and students.
  • Support for utilizing the pedagogical potential of the computer is sought for
  • In most universities there are some initiatives to support teacher in using ICT for pedagogical purposes in the classroom and for production of material
ICT in higher education – competence development

• Most teachers and students have basic knowledge and skills of using the computer as a personal tool, but are not proficient
• Subject-matter related competence is more developed
• Competence in using ICT for pedagogical purposes is not very high
• But habits of using ICT on an everyday basis are more and more common
Professional tools, content, culture and mindset

- Attitudes towards “new” technology (Becker, RRV)
- Use of ITC as a professional tool (Runesson & Lindström)
- Work routines (Ekeblad et. al.)
Pedagogical ideas and approaches

• Teaching/learning models
  • Pedagogical philosophy and amount and type of use co-vary (Becker; Juhlin Svensson)
  • Examination forms/institutionalised demands is crucial for how students work (Bergqvist & Lindström; Lindström, Marton, Lurillard et. al.)
Financing

• Costs for production of ICT-based material, support and re-investment in infrastructure are problematic.
Important notes

• Empirical observations of the introduction of computers in education tell us that, so far, the changes of basic pedagogical forms are not very revolutionary.
• The didactical use of ICT is of minor importance, despite the e-learning movement.
• ICT is much more a tool for personal productivity.
• A trend that pedagogical development is driven by use of ICT as a subject-matter tool.
Important notes

• The administrative use of ICT for handling information is basic.
• More important are general usage (habits) of ICT and societal “ICT-literacy”.
• Access to a developed infrastructure is necessary, but not sufficient.
• The single most important factor is the examination procedures used.
• Technology push pedagogy to a very little extent. The major finding is that new technology is used to “re-dress” old pedagogies.
Important notes

• Tools for flexible learning must be customisable.
• New ICT-based tool for production of “text” (multimedia), information search and handling, and communication will probably make a difference in the longer run.
• Higher education is very much a matter of socializing people into certain modes of thinking and acting, which makes it difficult to base it more exclusively on ICT.
Important notes

• Teacher roles will become more crucial.
• Costs is a major issue.
• The digital divide is a real problem!
Finally

• Universities are cultural institutions
  • They will change slowly,
  • but perhaps faster than we believe today