

Teachers as designers: learning environments and learning trajectories



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ProTed Centre for Excellence in Teacher Education

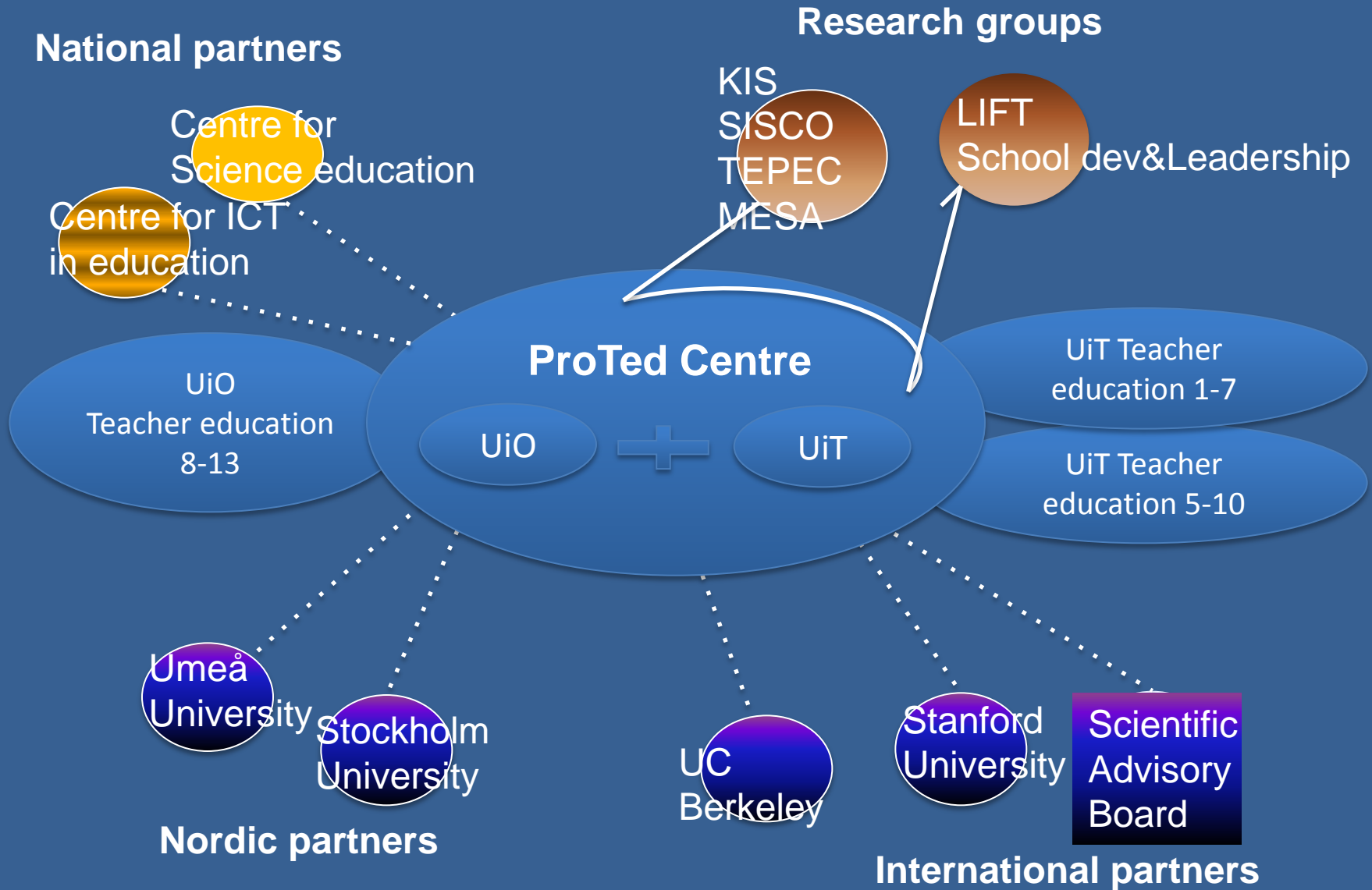
University of Oslo

Some trends in teacher education

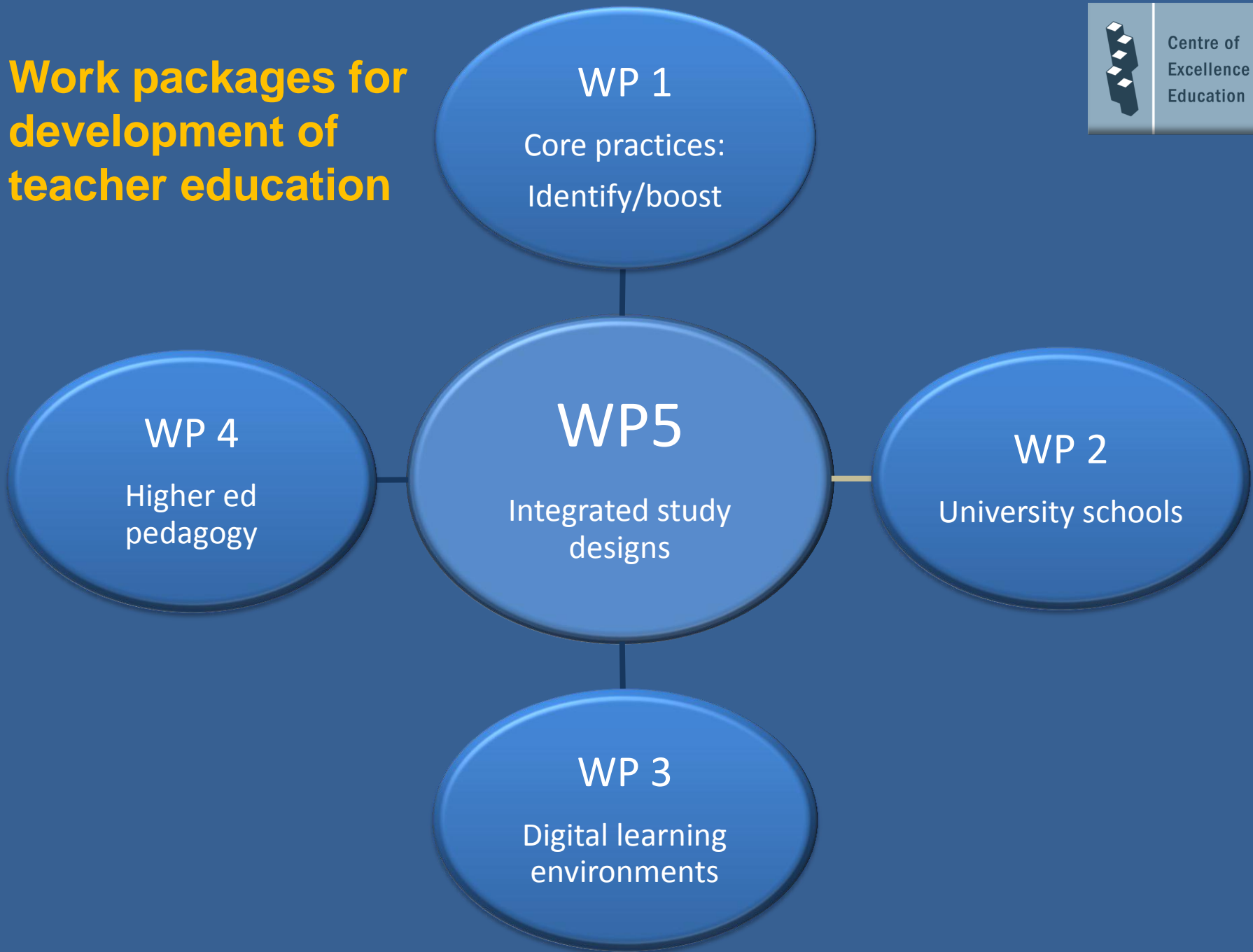


- Accelerating knowledge production
- Intergration: scientific disciplines, school subjects, pedagogy (didactics), theory and practice (praxis)
- Rapid technological development, increased complexity, interdisciplinary problem solving, collaborative and distributed settings...
- Emphasis on what counts as valid, research based knowledge
- Not merely socialize student teachers into existing practices but also prepared to design new activities and practices, «Teachers as designers»
- Andy Hargreaves (2003): Existing models for teacher education prevent innovation and contribute to innovative communities deteriorating
- Anne Edwards (2007): «Relational expertise» - when professionals from diverse fields work together on complex problems

ProTed collaborative partners



Work packages for development of teacher education



Snapshot WP3: tasks, tools, teachers and assessment



Centre of
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Education

- How ICT can increase quality of existing practices (lectures, seminars, practicum)
- To develop new task types that integrate theory and practice, science domain and school subject, individual and collaborative efforts
- To develop new assessment practices with ecological validity for the networked society

Mismatch

- “The explosion of new social network technologies has highlighted the awkward relationship between new ‘21st century’ media practices and existing educational systems” (Hickey et al., 2010)
- Digital technologies have challenged the historically stable relationship between teachers, textbooks, tasks, and tests (Clarke-Midura & Dede, 2010)
- “Mismatch” between tasks and available resources (Lund & Rasmussen, 2008)



ICT as artifact

- *'art' + 'fact'*
- representation of collective insights
- entrance to cultures
- 'glue' in cultures
- transforming cultures (activities, practises, institutions...)



Teaching as design

- Schön (1987) links design to professions where current practices are transformed into desirable, future-oriented practices through 'reflection-in-action'
- To bring about connections and syntheses between situations and trajectories that are characterized by complexity, instability, value conflicts, uncertainty and the unexpected

Designs for technology rich environments



- Instructional design (Reiser & Dempsey, 2007)
 - monitoring and controlling the learner as well as the learning environment in order to bring about learning outcomes
 - often involved specific modules or steps
 - cultural tools such as e.g. textbooks, pen and paper, and calculators were considered instrumental learning aids
 - information processing approach
 - does not capture meaning making, transformation, dialogue, knowledge advancement...

Design in technology rich environments (2)



- Participatory design (e.g. Bødker, Kensing & Simonsen, 2004)
 - involving end users in the design of tools that will affect their everyday working life
 - focus is on the user interface design
 - interventionist approach
 - ICT *and* practices
 - philosophical roots in democracy and emancipation
 - no theoretical framework but recurrent concepts are e.g. boundary crossing, boundary objects, mutual learning, situated action...
 - Stops short of longitudinal, educational practices

Sociocultural approaches to design (1)



- Grabinger et al. (2007): *Instructional Design for Sociocultural Learning Environments*.
 - “critical thinking, problem solving, research, and lifelong learning”
 - “convergence of tools, practice and theory “
 - “Do not underestimate the importance of involving students in their own instructional designs”
 - they rarely move beyond well established, broad terms

Sociocultural approaches to design (2)



- Selander (2007). A social semiotic approach:
“Learning consists of, in other words, a series of sign producing activities”.
 - “Such designs hold material-technical as well as human-social qualities”
 - Didactics linked to interactivity in physical *and* virtual space
 - Designs involve preparations as well as learners negotiating their way through the design
 - Little/No conceptualization of practices, intentionality, object, rules, division of labor, historical development...

Sociocultural approaches to design (3)

- ‘Triological’ approach (Paavola, S., & Hakkarainen, K., 2005).
- Multi-mediation (social, semiotic, conceptual, material)
- Artifacts and interactions as ‘drivers’
- An expanding object – not ‘given’ but often at the periphery of current knowledge
- Didactic dimension?

Sociocultural approaches to design (4)



- Hauge, Lund & Vestøl (2007, 2012): *Teaching in transformation: ICT, activity, design*.
 - Emphasis on the *object* in order to capture direction, collective activity, and intentionality among actors – teachers as well as learners
 - Objects giving direction to the activities (“predmet”) and materialize through instantiations
 - The unexpected, serendipity, creativity, orchestration of resources, trajectory approach, the teacher as participant in the design
 - *Design for teaching* interpreting curricula and competence aims (institutional aspects), but may well involve learners in the process
 - *Design for learning* refers to the enacted design, context sensitive, relational
 - Missing links between the two design dimensions, needs theorizing as well as empirical studies

Missing link #1: Obuchenie

- “In general, the Russian word *obuchenie* refers to a double-sided process, one side of which does indeed refer to learning (a change in the psychological processes and knowledge of the child), but the other of which refers to the organization of the environment by the adult, who, (...) is a teacher in a formal school with power over the organization of the children's experience” (Cole, 2009: 292).
- Cf other languages (Finnish, Maori...)
- Teaching | Learning - the “Sheffer stroke” capturing dialectic relationships (Roth & Lee, 2007: 197).
- Video on [obuchenie](#)

Missing link #2: Didactics

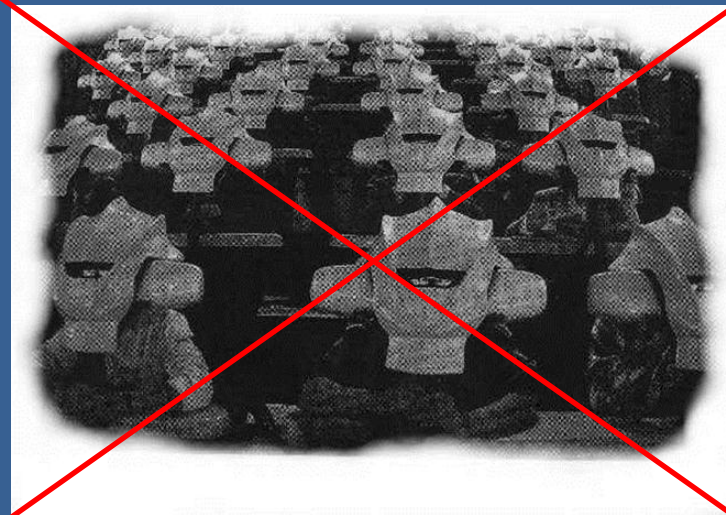
- Networked environments: Complexity, uncertainty, collectivity, knowledge advancement; the need for instruction in the shape of informed intervention and participation
- Our definition: Didactics can be understood as the design of social practices in which learners, teachers and (social and material) resources are configured and re-configured in activities that make knowledge domains and knowledge advancement visible, and that continuously create teach | learn opportunities for reflective participation in such activities

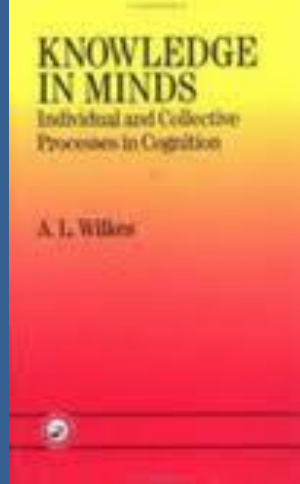
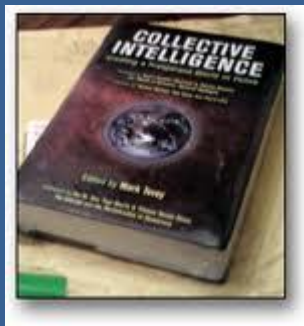
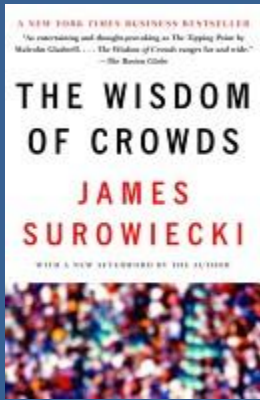


TWEAK

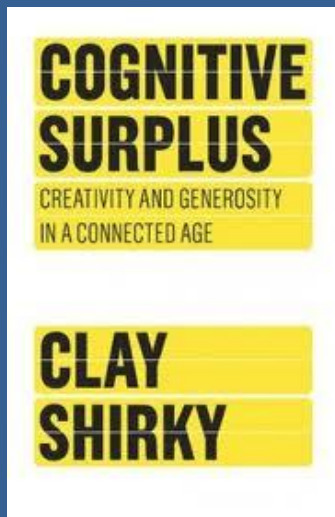
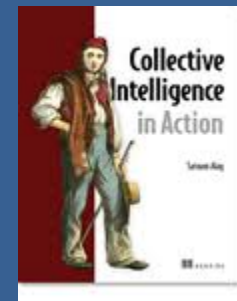
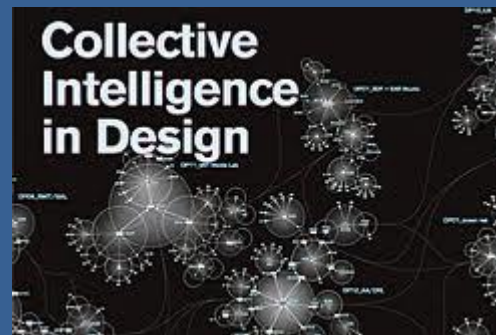
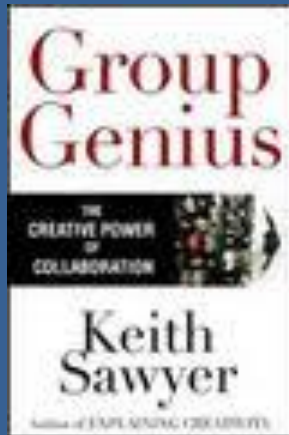
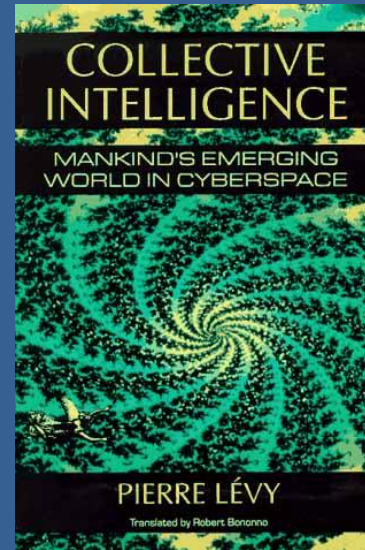
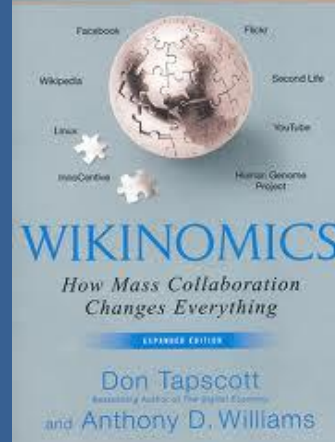
2006 – 2011 → ?

- “Learning environments of the future”
- Tweaking Wikis for Education and the Advancement of Knowledge
- Unit of Analysis: the mediated activity of a **collective entity**





A *BusinessWeek* and *New York Times* Business Bestseller
"An intriguing and important book, one belongs on your shelf!"
—*The Washington Post*



Collective cognition



A dynamic concept, emerging when two or more people reach insights that neither could have reached alone, and that cannot be traced back to one particular individual's contribution, i.e. cannot be reduced to the sum of individual contributions (Stahl, 2006)

- **Sociology** (Durkheim 1898, Moscovici 1998)
- **Philosophy** (Rousseau, Levy 1997)
- **Social psychology** (Hutchins 1995, Valsiner & van der Veer 2000, Sawyer 2007)
- **Linguistic/Dialogic** (Bakhtin 1979, 1986, Allwood 1997, Tomasello, 2003)
- **Computational** (Heylighen et al 2004)
- **CSCL** (Stahl, 2006)
- **Educational** (Mercer 2000, Hargreaves 2003)
- **Economics/Organization** (Tapscott, 2006, Sawyer 2007)
- **Neuroscience**: "Mirror neurons" (Rizzolati, 1995, Ramachandran, 2006).

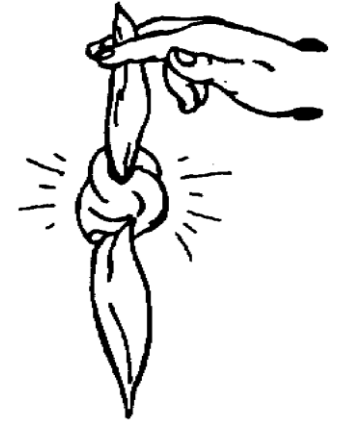


Research questions

- How do teachers and learners communicate when facing collectively oriented tasks?
- How can we support collective cognition and communication (ccc) in classrooms?
- What is the role of language?
- What is the role of technologies, how can they be made conducive to ccc?
 - Why is not ccc a vital issue in schooling?



S2



S1



Types of wikis/tasks

Product	Characteristics	Tasks
MediaWiki	Encyclopedic	<ul style="list-style-type: none"> a) How we perceive the USA (2 w) b) Build a typical British town (1 sem)
XWiki	Hierarchic + pres tool	<ul style="list-style-type: none"> a) Impact of Anglo-American culture (2 w)
Confluence	Project oriented	<ul style="list-style-type: none"> a) An immigrant story of Norway (4 w) b) Re-enacting the Cold War (2 w) c) Counter factual versions of WW1 (2 w)
WikiSpaces	Online "hotel"	<ul style="list-style-type: none"> a) A collectively written account of ESL student teachers' placement experiences (8 w) b) ESL student teachers' collectively produced and annotated resources (2 sem)

Two empirical cases



article discussion edit history move watch

Forrest Gump

Forrest Gump – The movie

United States, 1994 U.S. Release Date: 07.06.94 Running Length: 2 hours and 22 minutes Cast: Tom Hanks, Robin Wright, Gary Sinise, Mykelti Williamson, Sally Field Director: Robert Zemeckis Producers: Wendy Finerman, Steve Tisch, and Steve Starkey Screenplay: Eric Roth based on the novel by Winston Groom Cinematography: Don Burgess Music: Alan Silvestri U.S. Distributor: Paramount Pictures

<http://movie-reviews.colossus.net/movies/f/forrest.html>

A man is sitting on a bench in [New York City](#), waiting for the Bus. A woman sits down next to him, and he starts to tell her about his life. He introduces himself as **Forrest Gump**, a man who has experienced a lot in his life. He has been a soldier in [the Vietnam War](#), he taught [Elvis](#) his moves, he was a ping-pong champion and he has shaken hands with several Presidents. "My mother used to say: "Life is like a box of chocolate - you never know what you're gonna get"

This movie teaches us about American history in an entertaining way. We go through the 50s with [segregation](#) issues, the 60s with the Vietnam War, the death of [John F. Kennedy](#) and the Hippies, the 70s with the [Watergate](#) scandal and the 80s with [the Cold War](#).



- Navigation
- Main Page
- Community portal
- Current events
- Recent changes
- Random page
- Help

Search

Go Search

- What links here
- Related changes
- Special pages

This page was last modified 01:04, 7 Dec 2005.

This page has been accessed 57 times. [Disclaimers](#)

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Findings from Case #1:



- The group struggled to make sense of contradictory information beyond their current understanding.
- The use of some artifacts (props for dramatization, web-based material with affective content, etc.) threatened to replace the original object (making sense of the senseless) and become a parasitic object. Other artifacts (websites, search engines, presentation tools) proved to be conducive to knowledge advancement.
- The teacher exercised only a subtle presence, leaving major decisions and final representations of the object to the learners.
- The group, through negotiations and exploration, expanded their understanding of the object, but they failed to share it with their classmates.

Findings from Case #2:

- The “closed task universe” (strong relationship between task and textbook, individual orientation) challenged by the “open task universe” (invites exploration, negotiation, and large-scale collaboration, appears fragmented and even unreliable)
- Individual and collective epistemologies - a radical shift
- Mismatch between learners’ assignments and tasks and the available cultural tools
- Need for assessment features in the wiki so that individual contributions as well as their relevance to the collective product are accounted for
- Teachers experience difficulties of establishing a presence in a wiki. Established expertise in class management is challenged or suspended

Learners' voices:

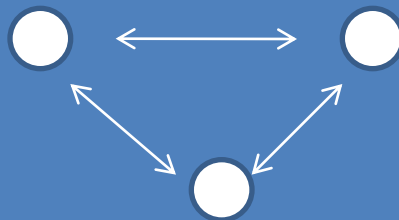
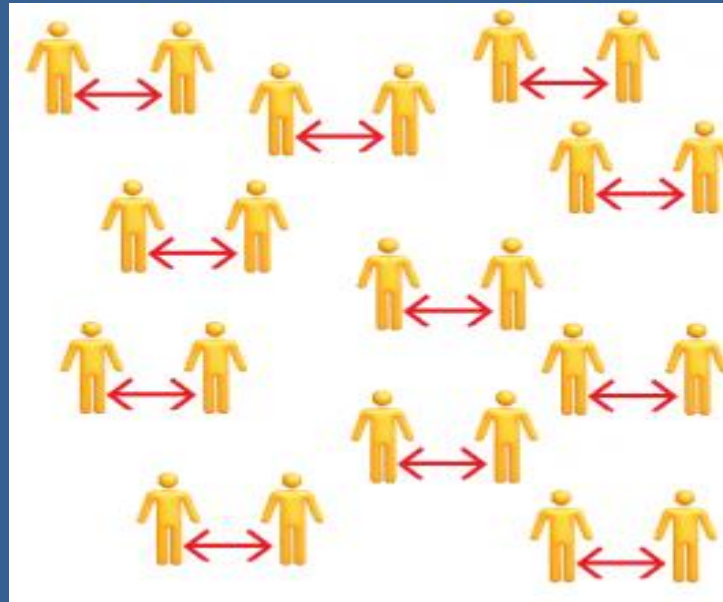
- I like this because it is a **win/win situation**. To help others and **get help back** is nice. Co-operating is very important in our daily lives and our future jobs!
- I like this because we so easily can **compare and share** information on what we know and **what we do not know** about the American way of living
- We never worked alone, and many helped me with my work
- **It doesn't matter if it is yours or others**. This way it is possible for people to argue and discuss
- Because then I don't have to be afraid of making a mistake 'cause **there will always be someone there to clear it up!**
- Someone can **change** what you have written, **even when you know what you have written is correct**
- My texts got **deleted**
- **You socialize... in a weird way**



Teacher's concerns

Teacher: “(...) I **lost** the learners (...) it was **difficult to trace**, for me as a teacher, who had contributed with what, and I felt that I **lost** the learners, I **did not know where to go** in order to **guide** them (...) because in general there is no extensive space for a teacher (...) it becomes **a separate world** (...) they [learners] tend to **disappear into their separate worlds** and it becomes difficult for me to **guide** them and **maintain my job as a knowledge provider**. (...) I don't know what is the **end product**, what I am supposed to **assess** at the end”

2 persons, 1 relationship



Add one person →
2 more
relationships



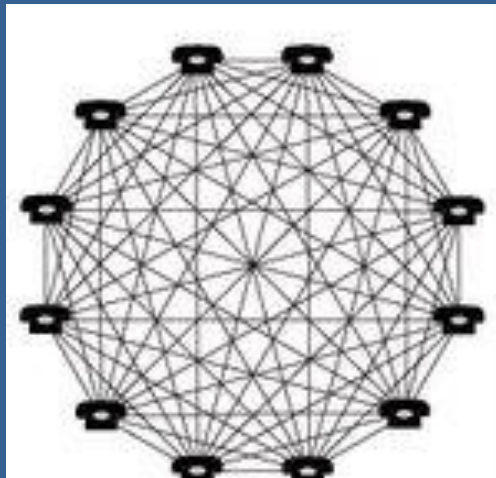
Metcalfe's law: number of links between people = $n(n - 1)/2$

Examples a) with 12 people b) class c) network

a) $12(12 - 1)/2 = 12 \times 11 = 132 / 2 = 66$ possible relations

b) $30(30 - 1)/2 = 30 \times 29 = 780 / 2 = 435$ possible relations

c) $120(120-1)/2 = 30 \times 29 = 14280/2 = 7140$ possible relations





Keywords or labels used for separate pages and this page

Overview of the four participating classes, 3A as active window

Navigation tree with tasks and contributions in the form of wiki pages from learners

Task: Argumentation for the Soviet perspective on the Berlin wall

Body text with links

Comments section with comments from teacher and learners

The screenshot shows a web browser displaying a wiki page. At the top, there is a navigation bar with the text 'Velkommen Andreas Lund Historikk Logg ut Aktivitetskart'. Below this is a search bar and a list of keywords: 'andre-verdenskrig beskyttelsesaksjon blücher filippinene innvandre kildekritikk krig krigføring lokalt makro_mikro marcos norge provins revolusjon skolegang skolen slektsforskning sovjet sovjetunionen spionasje ss stalin staten storbrannia stovner svensk-historie sveige taiwan tyskland union usa utvandre velferdsstaten vest-berlin vietnam vietas x3 årsaker øst-berlin'. The main content area has a header 'Oppgave 3, Sovjets syn - Vinh' and a sub-header 'Sovjets viktigste argumenter for Berlinmuren:'. The text discusses the Soviet perspective on the Berlin Wall, mentioning 'Sovjet' and 'Berlindmuren'. There is a link to 'http://www.bonham.edu/halsall/mod/1991berlin-usa-usar.htm'. The page was created by 'Hoang Vinh Tuong' on 'Mar 26, 2008 08:56'. A comments section is visible at the bottom, with a comment from 'Bao Truong Mai' dated 'Mar 24, 2008 19:37'. On the right side, there are buttons for 'HJELP' and 'CHATVINDU'. At the bottom of the browser, the status bar shows 'Internet' and '100%' zoom.

Identification of participant; history of this page and other wiki content; activity monitor showing revisions, interlinking etc for learners, cf. "swim lanes"

Resources: Search window for wiki contributions; help function; chat feature for immediate consultation

































































Aktivitetskart for 1st12

show all

Comments

Labels

bidrag

Uke	
<input checked="" type="checkbox"/> (0) Bård Lorentze	
<input checked="" type="checkbox"/> (6) Chetan Sethi	     
<input checked="" type="checkbox"/> (4) Daniel Gidske	   
<input checked="" type="checkbox"/> (1) Dehar Ademi	
<input checked="" type="checkbox"/> (0) Demet Yasemi	
<input checked="" type="checkbox"/> (3) Eileen Klemets	  
<input checked="" type="checkbox"/> (1) Erena Lindholt	
<input checked="" type="checkbox"/> (0) Farah Nuhshe	
<input checked="" type="checkbox"/> (27) Hamad Jahar	     
<input checked="" type="checkbox"/> (15) Hashim Bhatt	 
<input checked="" type="checkbox"/> (7) Helene Rosenf	 
<input checked="" type="checkbox"/> (0) Ingunn B. Østr	
<input checked="" type="checkbox"/> (14) Khubeb Bakh	 
<input checked="" type="checkbox"/> (0) Marijan Hama	
<input checked="" type="checkbox"/> (5) Marianne Morc	 
<input checked="" type="checkbox"/> (0) Marita Shoor	
<input checked="" type="checkbox"/> (0) Mathias Ross J	
<input checked="" type="checkbox"/> (31) Nabeel Ahme	           
<input checked="" type="checkbox"/> (8) Petter Kristian	        
<input checked="" type="checkbox"/> (14) Prathepa Kiri	             

Nabeel
"English Schoolwork"

1a) The scene would like to choose that gives or describes the conflicts in the film Crash, I would choose the scene, where the

Created by: nabeel2308 , updated by: nabeel2308

I believe you have chosen the right scene, and I think I understood what you were going for. Some weird sentences though.

[Lag kommentar](#) [Til bidrag](#)

Two new criteria

- How does your own contribution relate to the overall assignment? Show the relevance of your contribution.
- How does your own contribution relate to one or more of your classmates' contributions?

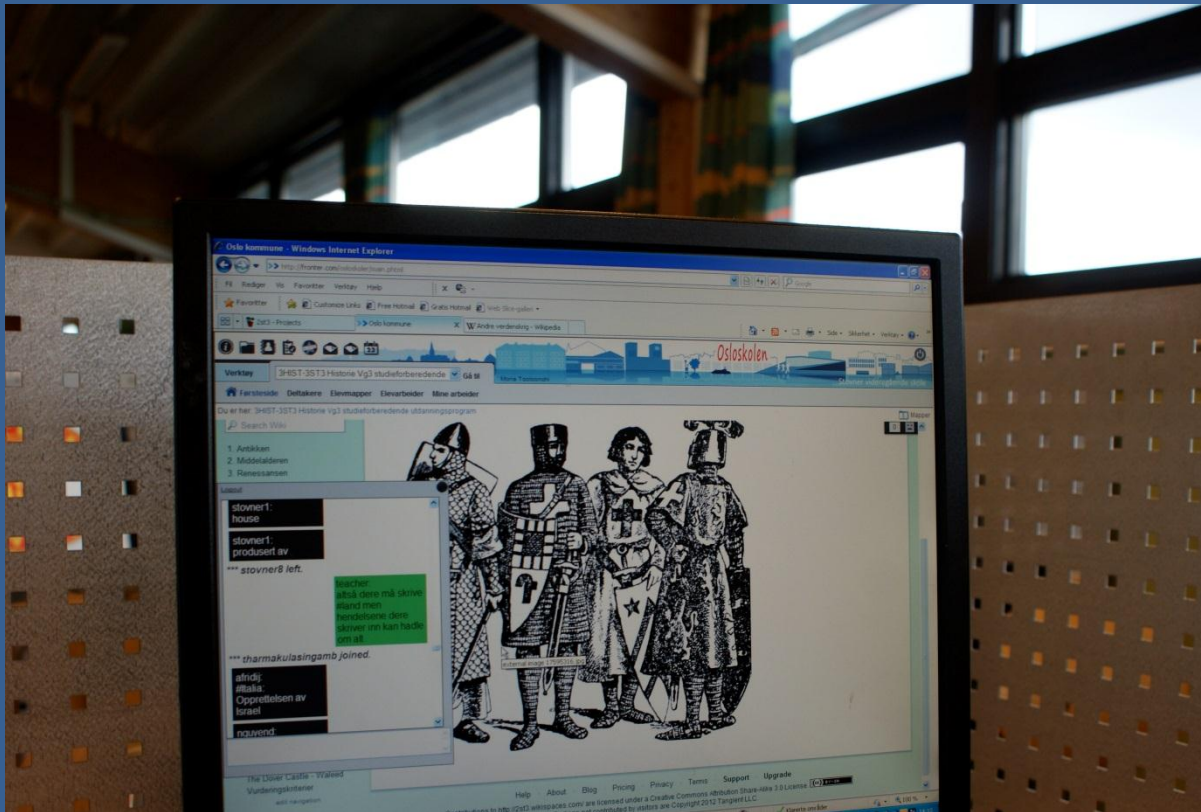


Phase 2: The App



- The Socius app is a note-sharing tool designed to bridge computer-based individual work, group work and class discussion
- **Design intention:**
 1. To facilitate preparation: Encourage students to write short notes based on their individual work
 2. To facilitate sharing: The notes appearing on a tablet can be displayed on a whiteboard during class discussions
 3. To facilitate participation: New notes can be added during discussion

Sending twitter-like notes from essays (individual work)

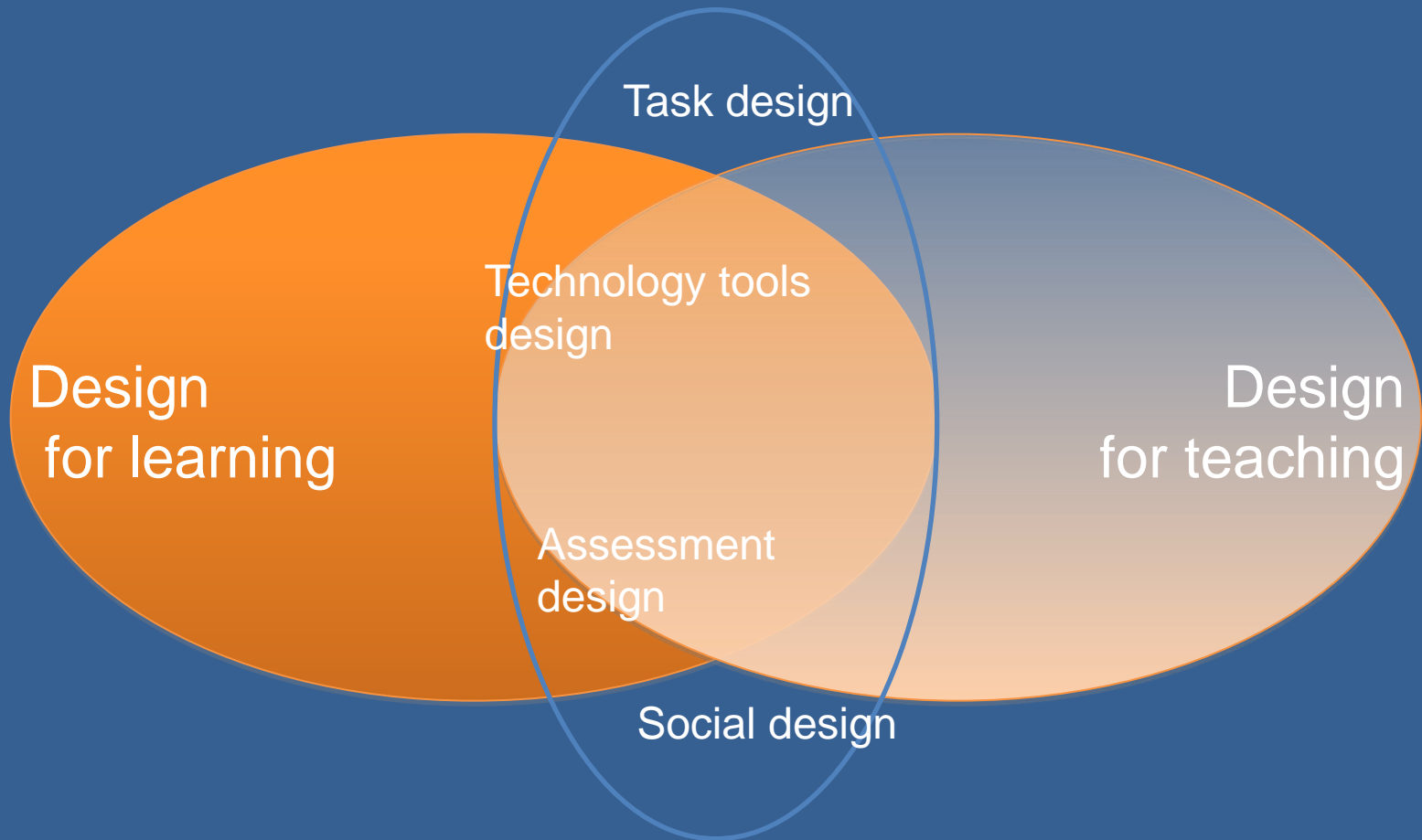


Discussing in groups



Whole class discussion





ProTed's position:

We propose socioculturally informed designs that materialize at the juxtaposition of teaching and learning, and which require that teachers participate with persistent presence in learners' trajectories.

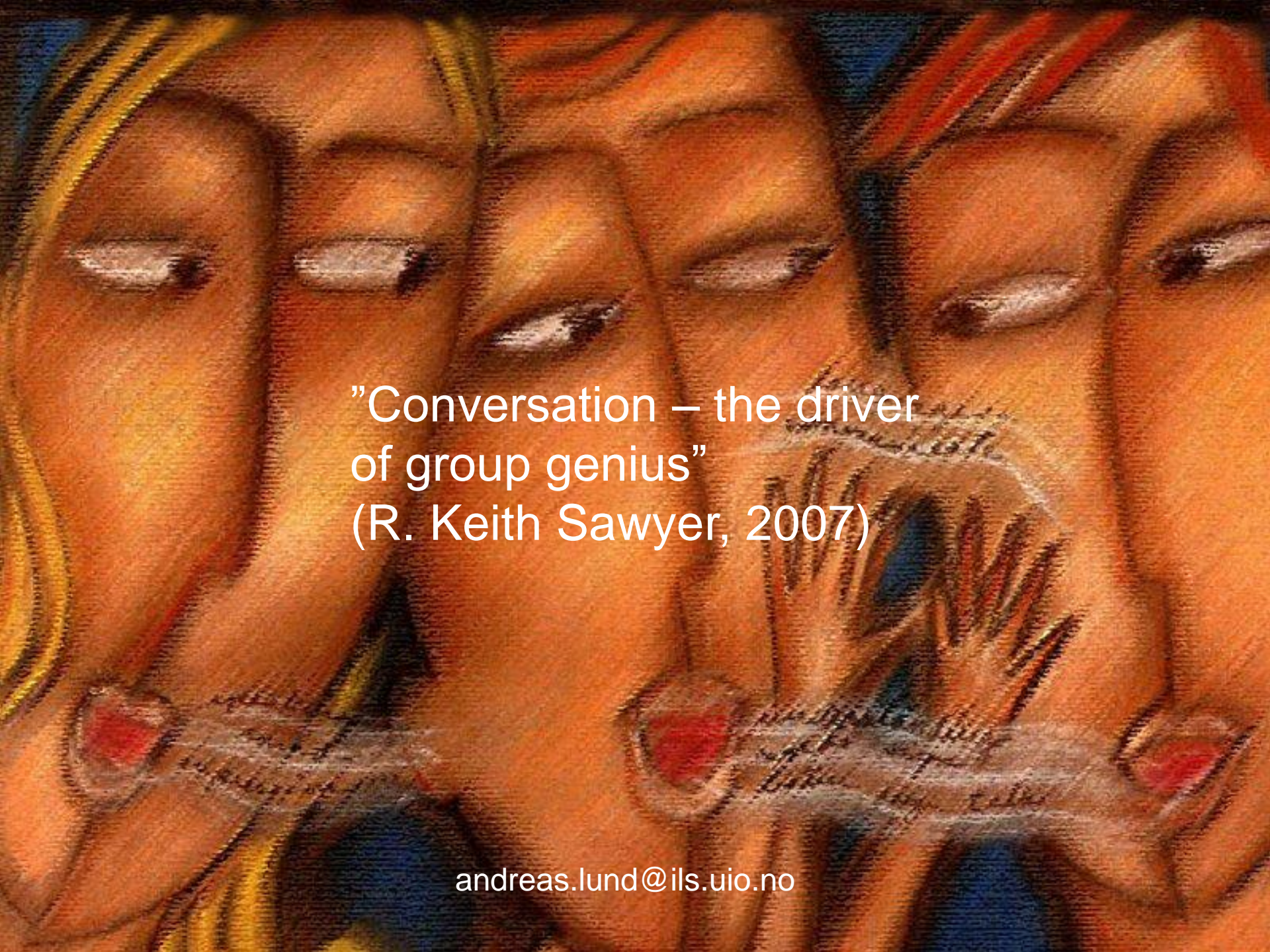
DESIGN ↔ OBUCHENIE ↔ DIDACTICS

Teacher education

...

- Theory informed (artifacts and social dimensions)
- View of technology that affords transformation of existing practices
- Tasks, tools, activities, trajectories – and assessment!
- ICT links minds, hands – and maybe hearts...





”Conversation – the driver
of group genius”
(R. Keith Sawyer, 2007)

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Some publications



- Lund, A., & Smørddal, O. (2006). Is There a Space for the Teacher in a Wiki? *Proceedings of the 2006 International Symposium on Wikis (WikiSym '06)* (pp. 37-46). Odense, Denmark: ACM Press.
- *Teaching in Transformation. ICT, Activity, Design (2007)*.(Hauge, Lund & Vestøl).
- Lund, A., & Rasmussen, I. (2008). The right tool for the wrong task? Match and mismatch between first and second stimulus in double stimulation. *International Journal of Computer-Supported Collaborative Learning*, 3(4), 25-51.
- *Designs for Teaching and Learning in Technology Rich Learning Environments (2011)*. *Nordic Journal of Digital Literacy* (Lund & Hauge).
- *Changing Objects in Knowledge Creation Practices,m (2010)* (Lund & Hauge). In Ludvigsen et al.: *Learning Across Sites...*
- (2009). Joint Designs for Working in Wikis: A case of practicing across settings and modes of work (2009).(Lund, Rasmussen, & Smørddal). In H. Daniels et al., *Activity Theory in Practice: Promoting learning across boundaries and agencies*
- Lund, A., & Rasmussen, I. (2010). Tasks 2.0: Education Meets Social Computing and Mass Collaboration. In C. Crawford, D. A. Willis, R. Carlsen, I. Gibson, K. McFerrin, J. Price & R. Weber (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2010* (pp. 4058-4065). Chesapeake, VA: AACE.
- (2009). VideoPaper as a Bridging Tool in Teacher Professional Development (Hauge & Norenes). *Journal of Technology, Pedagogy and Education*
- *Towards an Activity-Driven Design Method for Online Learning Resources (2012)* (Hauge & Dolonen). In Olofsson & Lindberg: *Informed design of educational technologies in higher education* .