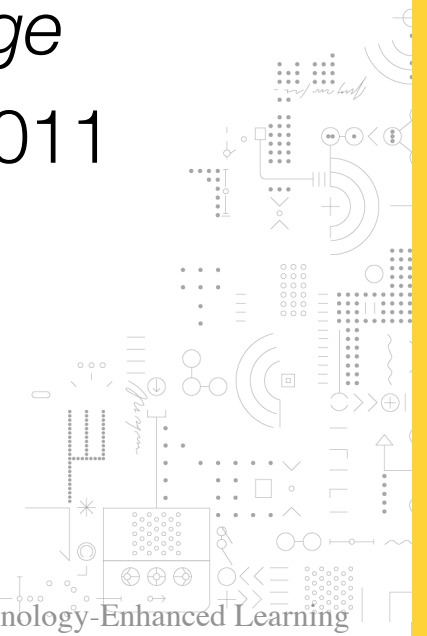# Basic concepts and their relevance for design of TEL

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INF5790 Lecture 1, UiO, Feb 4th, 2011

Overview

- Brief introduction to some basic concepts in American pragmatism and Socio-cultural theory
  - Perspective-taking, generalized other (G.H. Mead)
  - Zone of proximal development (L.S. Vygotsky)
  - Reflection-in-action (D.A. Schön)
- Application of these ideas to design
- Externalized design as method
- Critical discussion
- Open issues and further implications
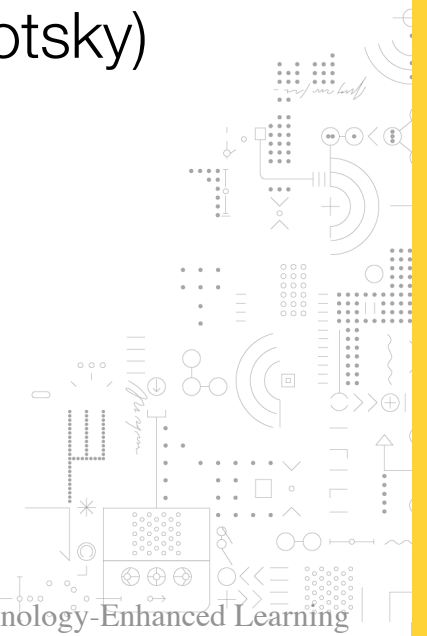
Basic issue in collaborative learning

- Incremental formalization of social interaction

- Or how to support the gradual transition from an informal social situation to one that affords learning and development

- Afterward: How to single out learning as one of the components of the overall activity

- What methods to use for the design of tools, i.e., technology enhanced learning (TEL) environments (IFI)

- What methods to use for the research (UV)

Theory-grounded research in TEL

- We study basic concepts because they provide insightful perspectives that have been rigorously tested in past research

- We make contribution to research by creating new designs and carry out empirical research

- In a few, unique cases we are able to contribute to theory by proposing new concepts

- Key concepts in educational psychology:
  - Perspective-taking, generalized other, zone of proximal development, reflection-in-action

References to original work

- Mead, G.H. (author) and Morris, C.W (editor) (1934/1967). *Mind, Self, and Society*. Chicago, IL: University of Chicago Press.

- Vygotsky, L.S. (author) and Cole, M. et al. (eds.) (1930/1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University. Published originally in Russian

- Schön, D.A. (1983). *The Reflective Practitioners: How Professionals Think in Action*. New York, NY: Basic Books.

Perspective-taking and generalized other

- Paper: Kelley, R.L., Osborne, W.J. & Hendrick, C. (1974). Role-taking and role-playing in human communication. *Human Communication Research*, 1(1), 62-74.

- The authors develop their ideas based on the major writings of G.H. Mead and J. Piaget

- We will spend more time on Mead's perspective (the sociological perspective) than on Piaget's (the developmental perspective)

Role-taking according to Mead

- "The principle which I have suggested as basic to human social organization is that of communication involving participation in the other." (Mead, 1934, p. 253)

- Two sub processes:
  - Identify a new role and learn to observe it
  - Take on the role in order to apply self-criticism and adjustment to own behaviors
  - Gestures and speech provide the data for observation, according to Mead

Role/perspective-taking cont'd

- Perspective-taking is more than seeing a phenomenon from a certain point of view, it is also to act it out as though one is the other

- This originated in the context of understanding children's games like playing doctor/ nurse/ patient, police/thief, hide/seek, etc.

- A child may alternate to play the various roles in order to learn the game and about herself

- It can be both fun and a learning experience

- URL: http://www.youtube.com/watch?v=13uKbLH16dM

Generalized other

- To highest level of perspective-taking is not to master specific roles, but to take in all of the roles by mastering roles-according-to-rules or the "common attitude" of all those who participate

- This common attitude is referred to as the "generalized other"

- It is a point of reference, which individuals adjust their actions.

- It emerges over time and is not a deliberate "object"

- In a "good process" of role-taking, according to Mead, it proceeds from the viewpoint of a particular other to the generalized other, like playing a complex game

Zone of proximal development

- Also known as ZPD

- ZPD is the "distance between the actual developmental level as determined by independent problem solving, and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers." (Vygotsky, 1978, p. 86)
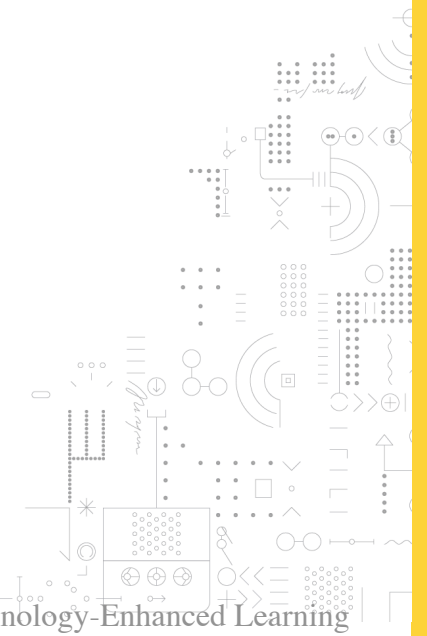
From social to individual learning

- ZPD is Vygotskys most famous concept of development by learning, which is intimately rooted in social interaction

- It entails the learners is given a task that is beyond her current capabilities, but with a teacher or more knowledge person to assist

- When the learner demonstrates mastery of the task, the assistant gradually fades away and provides assistance only on request

- Eventually the learner will perform the task on her own

ZPD

- ## Examples from children's learning

- ## URL:

- http://www.youtube.com/watch?v=hx84h-i3w8U

Basic concepts as technique for traversal across social-individual divide

- There is no easy path from social interaction to individual learning

- By starting from the "generalized other," one can learn to see others in order to order to perform better, i.e. to adjust by seeing oneself from the "outside"

- It is a catalyst for higher order thinking, like reflection, awareness, self-criticism, and adjustment

- ZPD provides techniques and stages for aiding this process, leading towards independent problem solving

- Independence will in the next round lead to new encounters with the social, to iterate the process

Why these three concepts

- They have been influential (directly or indirectly) in HCI, CSCW and CSCL, both for analysis and for (educational technology) design

- They have had enormous *implications* for research in education and sociology, and have been extensively written about and cited

- They have also numerous *applications* to technology design, which we will talk more about today and in 2 weeks from now

Externalized design as method for idea-based design

- Find a recognizable idea that can be expressed in physical form

- Balance creativity against utility

- Make the connection between inspirational idea and physical expression subtle but identifiable, for the user/reader to appreciate, and to learn from

Externalized design of artifacts: Two examples

Peel chair:
Design inspired by orange peels falling to the ground

Portland building:
Elements of the nearby buildings are integrated in the facade

Externalized design of software

- *Selection* of theoretical idea one wishes to express, understand, and communicate in computational form

- *Appropriate* the idea (e.g generalized other, reflection-in-action), so that its basic elements stand out in a contemporary (digital) design context;

- *Translate* the elements into a user interface expression (GUI, configuration, functionality)

Transformation map (coarse grained)

Sub-processes	Janus	FLE-Assistant
Selection (*theoretical idea*)	Reflection-in-action (D.A. Schön)	'Generalized other' (G.H. Mead)
Appropriation (*design context*)	Action, reflection, action-present, back-talk	Game, roles, rules, roles-organized-according-to-rules
Translation (*GUI components*)	Work area, design units, critic messages argumentative hypertext	Participation measure, statistics, aggregated performance conceptual awareness, advice

Interaction design (GUI)

Janus

Work area

Design units

Argumentative hypertext

Critic messages

FLE Assistant

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Conceptual awareness

Participation measure

Statistics

Advice

Aggregated performance

Summary and issues for discussion

- A goal of externalized design of software (EDOS) is to make theoretical ideas concrete, so they can be interacted with by end users and be subject to empirical scrutiny

- Other levels of a system (below the GUI) can also benefit from being informed by theoretical ideas, but they are much harder to put to empirical tests

- What are some other applications of theoretical ideas towards design (e.g. design outside of technology)

Added after lecture for clarification

- ## How does EDOS compare with other approaches to design?

  - EDOS is a type of theory-based design (TBA)
  - It compares (and can combine with):
    - Empirical-based design (user needs requirements)
    - Participatory design (involving actual users)
    - Evolutionary design (improving existing technology)
    - Technology-drive design (starting with new tech)
    - Other approaches