

LinCS The Linnaeus Centre for Research on Learning, Interaction, and Mediated Communication in Contemporary Society

Learning, media and hybrid minds: from cave paintings to mobile technologies

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The Linnaeus Centre for Research on Learning, Interaction and Mediated Communication in Contemporary Society (LinCS) (www.lincs.gu.se)

and

The University of Gothenburg Learning and Media Technology Studio – LETStudio (www.letstudio.gu.se)



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LinCS and LETStudio: Multidisciplinary groups, research on learning, interaction and development (seniors, juniors) in various settings:

- Visualization and imaging technologies in health care (radiology, tomography, PET-scanning etc.)
- Transformation of work (heavy industry, IT-industry)
- Virtual learning environments (virtual labs, Webmicroscopes etc.)
- Storage and access of information (organization of databases, libraries, user perspectives etc.)
- Computers/digital technology and schooling/classroom practices (mathematics, language learning, simulations etc.)
- Literacy, numeracy and 'information skills' for citizenship in contemporary society





Learning endodontics



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Tomography













An literactive presentation of the chemical reaction triggered in the ocean by the increase of atmospheric CO2 concentration. B, virtual lab bench where users run the experiment following a procedure. They will grow sea urchin larvae at two different pH levels.





Outline of speech

- 1. How societies build up and reproduce a *collective* or *social memory*, i. e. how we are able to cumulate social experience (knowing, information, skills, values, ethics ...)
- 2. How communicative and cognitive habits are *shaped* by the manners in which societies reproduce information and knowledge; how development is contingent on engagement with *sociomaterial* technologies
- 3. The role of intellectual/sociomaterial technologies, and the merger between *inscriptions*, *materiality* and *minds*, development of *hybrid minds* (*Donald*, 1992)











The extended mind The sociomaterial basis of intellectual skills: the case of literacy







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Digitization, information and human knowing

- Digitization is a very pervasive technology that penetrates into most human activities.
- Digital tools are used for communicating, remembering, organizing and processing information, playing, socializing etc.
- ... this is happening ...
- ... the questions are what this means for human development, for knowing and for instruction/schooling.



Digital tools and analogue people in collaboration

- In 2014, there were 13,3 million mobile phone subscriptions in Sweden (population 10 million)
- In 2014, well over 90 per cent of all Swedish teenagers had access to a smartphone
- In 2013, over 50 per cent of all Swedish two year olds were active on the Internet on their own, and by age six it is more than 90 per cent.
- In the average Nordic classroom, there are more digital tools (smartphones, calculators, laptops, tablets etc.) than people.
- Mobility and constant access to information.



World's oldest stone tool/artefact





Primary artefacts



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The production of primary artefacts

- ... implies a transformation of natural objects into artefacts through the use of experiences, ideas and distinctions (**design**)
- ... contributed to the ability to 'think' in terms of **models**
- ... presupposes skills of **planning** and **consideration of alternatives**





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Early Persian cuneiform (ca 5 000 years old)

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Interacting with inscriptions and symbols





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Interacting with inscriptions and symbols











Humans and sign-making

Inscriptions, representations and symbols are decisive for our ability to think, to cumulate knowledge and information and to share human experiences. Sign systems allow us to *externalize* human experiences.

But we do not externalize what is already in our minds, the *engagement* with signs and modes of expression is in itself the source of knowing





Inscriptions











Inscriptions and documentary practices (secondary artefacts)





• Development from iconic to increasingly symbolic (and abstract) forms of inscriptions



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Intellectual technologies utilizing inscriptions on material artefacts resulted in

- At the societal level: Document societies
 - Remembering and social coordination through written laws, contracts, receipts, influential religious texts, libraries ...
- At the individual level: Involvement in new modes of mearning-making and new epistemic practices
 - Reading, writing, book-keeping, increasing capacity of for reflection, theorising ...



The invention of the activity of studying





The notion of a hybrid mind

- The human mind operates in symbiosis with material and symbolic tools of the social memory
- •Our minds and mindful practices rely on productive "*mergers and coalitions*" (Clark, 2003) with symbolic artefacts
- No sharp line of division between minds/reasoning and artefacts





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The design and functioning of *artificial memory* systems (AMS) or *external symbolic storages* (ESS)





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Externalization and reification

- Externalization of human experiences
 - Through communicative practices (language, body ...)
 - Through inscriptions
 - Through intellectual technologies (material artefacts using inscriptions)
- ... results in the building up of *external memory fields* in which *hybrid minds* operate (Donald, 2000)



Inscriptions

- All symbolic tools rely on *interpretive practices* and *interpretive communities*
- Processes of *reification/fixation* of meaning through *signs*
- The *act of using reifications* as a creative process









1 + 1 = 2



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1 + 1 = 2





Inscriptions and materiality





What artefacts do:

- Stabilize human cognitive practices
- Facilitate continuities across generations
- Provide platforms for inventions of new technologies
- Co-ordinate and discipline human reasoning by suggesting how to do things. Artefacts are *in*-structive and *in*-formative, they are *enacted*.
- Reorganize the relationship between mental, communicative and physical elements of human action.





Characteristics of artificial memory systems (unlike the human memory)

- Exist in public space
- Are relatively permanent
- Can be used repeatedly
- Are unlimited in their capacity
- Are increasingly accessible
- But ... use relies on socialization into specific meaning-making and literacy practices





'Externalization' or objectification of

• Information (texts, spoken narratives etc.)









'Externalization' or objectification of

• human thought processes





Externalization of cognitive functions

- Computer software (spell and grammar checks, statistical analysis packages etc.)
- Search engines
- Book-keeping programs
- Graphical calculators
- Facerecognition devices
- GPS-navigators
- •



What are the consequences of digitization?

- Increasing reliance on external "thinking" tools as "cognitive amplifiers"
- New "access points" to the social memory
- New "learning trajectories"
- Integrates uses of earlier symbol systems/inscriptions (e.g. letters, numbers, texts) but also transforms them
- A mobile revolution



Integrated and mobile in activities

















Black boxing (Latour)





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A hybrid mind develops

- through interconnectedness with the world
- through participation in communities, many of which will be virtual
- through engagement in practices rather than from mere "in-struction"
- through co-construction of knowledge



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Transformations of learning and challenges to education as we know it

- We master complex tasks without understanding the sequential steps
- Technology functions as a 'black box', and it is no longer possible for education to 'unpack' ('white box') all that is embedded in technological tools
- We increasingly learn from the 'complex' to the 'elementary'
- We 'understand' as part of practices, we do not necessarily 'understand' as part of hierachically organized knowledge (such as in the disciplines)
- Learning is in the *performative* (rather than in the reproductive)



Thank you!

More at: www.lincs.gu.se



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