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# A Theory of Learning for the Mobile Age

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## The mobile age

- Mobile telephony is becoming ubiquitous
- Over 50% of the adult population in East Africa (Kenya, Tanzania, Uganda) own mobile phones (TGI, May 2005)
- Young people have developed a mobile culture
  - Organising social life through texting
- Work is increasingly fragmented and mobile
  - Mobile offices in cars, handheld computers
  - Working from home
- Leisure is increasingly fragmented and mobile
  - Short break holidays
  - Mobile gaming



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## Theories of learning

- No contemporary theory of learning for the mobile age
- Most recent reference to mobile learning in [www.infed.org](http://www.infed.org) is 1916!

*A society which is mobile, which is full of channels for the distribution of a change occurring anywhere, must see to it that its members are educated to personal initiative and adaptability.*

Dewey, 1916, "Democracy in Education"



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## What is distinctive about learning for the mobile age

- Distinguish from learning with handheld devices
- Mobility as the central concern
  - Learners are continually on the move
  - Even learners within a school will move from room to room and shift from topic to topic
  - Need to understand learning as a labile activity
- Embraces learning outside the classroom
- Interactions between formal and informal learning



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## Learning for the mobile age

*The processes of coming to know through conversations across multiple contexts amongst people and personal interactive technologies*



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## Vavoula's study of learning and mobility

- March-August 2004
- Diary study
- 44 participants registered
  - 15 kept diary for 2 weeks (161 episodes reported in total)
- Broad definition of 'mobile learning':
  - "Learning away from one's normal learning environment, or learning involving the use of mobile devices"



## Results

- 59% of the reported learning episodes were mobile
- 49% were not in home or office
  - 8 outdoors, 34 workplace, 10 place of leisure, 3 friends' house, 1 public transport, 23 other (e.g. places of worship)
- Most learning was to enable activity (40%) and/or solve a problem (15%)
- Only 5% of mobile and 10% of non-mobile learning was related to a curriculum
- Conversation was the main learning method of mobile learning (45% mobile and 21% non-mobile)
- Mobile learning involves more activity and interaction than non-mobile



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# Re-conceptions of learning

- **Classroom learning**
  - Learning as knowledge transmission and construction
  - Supported by ICT
  - How to design and manage an effective learning environment
- **Mobile learning**
  - Learning as conversation across contexts
  - Enabled by continual interaction with personal technologies
  - How people artfully engage with their continually changing surroundings to create transiently stable and effective sites of learning



## Sources

- **Dewey's Instrumentalism**
  - Knowing is activity in the world, involving a combination of thoughts and external artefacts as tools for inquiry
  - Every reflective experience is an instrument for production of meaning
- **Pask's Conversation Theory**
  - Conversation is the fundamental process of learning
  - Learning is a cybernetic process of "coming to know" through mutual adjustment and negotiation
- **Engestrom's Expansive Activity Theory**
  - Learning is a cultural-historical activity mediated by tools, including technology and language
  - Activity systems contain the possibility for expansive transformation, as contradictions are internalised and resolved



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## Dewey and learning through communication

“Not only is social life identical with communication, but all communication (and hence all genuine social life) is educative. To be a recipient of a communication is to have an enlarged and changed experience.”

Dewey (1916)



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## Dewey and communication

- Unclear what he meant by the term 'communication'.
  - A communication is a token that is sent and received ("to be the recipient of a communication")
  - Communication is the sharing of experience ("one shares in what another has thought")



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## Freire and learning through dialogue

Freire (1996) refers to “co-intentional learning”, where teacher and learner jointly develop understanding through dialogue

“The teacher is no longer merely the one-who-knows, but one who is himself taught in dialogue with the students, who in turn while being taught also teach. They become jointly responsible for a process in which all grow.”



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# Conversation Theory

Gordon Pask (1928-1996)

- A theory of the processes of coming to know
- Derived from cybernetics
- A conversation is the minimum necessary structure to enable learning
  - Multiple conversations within one mind
  - One conversation across multiple minds
  - Can involve technology as a conversational partner



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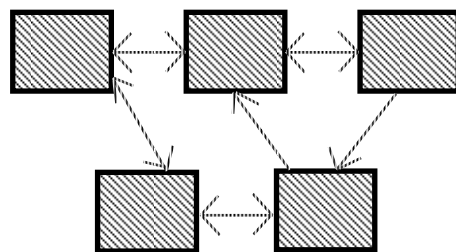
## Learning conversations


- Conversation about the how and why of a topic
- Conversation about the how of learning (for example discussing study skills and reflecting on experiences as a learner)
- Conversation about purposes, the why of learning, where the emphasis is on encouraging personal autonomy and accepting responsibility for one's own learning

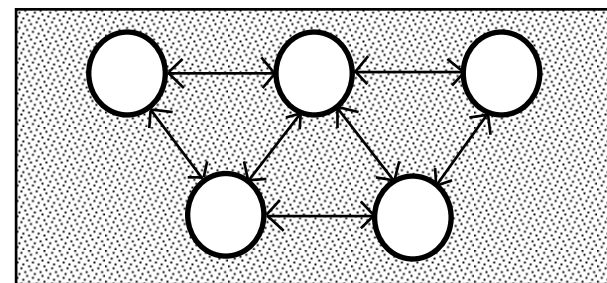



## Pask – Mobile Distributed Cognition

“There is no *need* to see minds as neatly encapsulated in brains connected by a network of channels called ‘the media’ ... I am inviting the reader to try out a different point of view; namely the image of a pervasive medium (or media) inhabited by minds in motion. Thus, media are characterized as computing systems, albeit of a peculiar kind.” (Pask, 1975)



 Organisms  $\longleftrightarrow$  Media  
as channels of communication



 Individuals  $\longleftrightarrow$  Communication  
as program sharing and linguistic interaction  
between individuals. Medium (M) as shading



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## Learning for the mobile age

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## Learning as conversations across contexts

- Cole (1996) makes an important distinction between context
  - “that which surrounds us”
  - “that which weaves together”
- Mirrors distinction in HCI between
  - context as a ‘shell’ that surrounds the human user of technology
  - context as arising out of the constructive interaction between people and technology



# A "shell" view of context



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User  $\longleftrightarrow$  Computer

Context



# A "shell" view of context



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User  $\longleftrightarrow$  Computer

is immersed  
in

Context

is represented  
in



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## Context through interaction

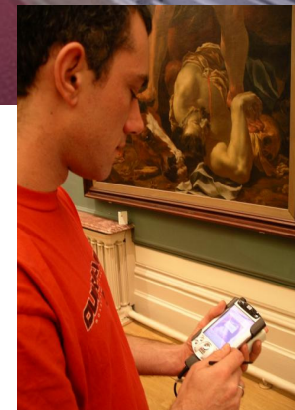
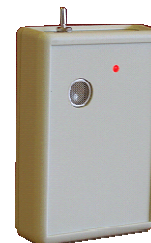
- Context is a *dynamic* and *historical* process
- to enable appropriate action (learning)
- constructed through interaction between people, technology, objects and activities



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## CAGE at Nottingham Castle

- Ultrasound tracking system
- Learning through context to engage the visitor
- Context based on location, time at location, history of interaction
- Highlight links between paintings
- Navigation by physical movement





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## Constructing context

- Traditional classroom learning is founded on an illusion of stability of context
  - Teacher, fixed location, common resources, set curriculum
- If these are removed then creating temporary islands of relatively stable context is a central concern
- Stability of context enables reflective conversation
- We construct 'micro-classrooms' from the materials of everyday interaction



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## Constructing Context

- Current activity can only be fully understood by taking an historical perspective, to understand how it has been shaped and transformed by previous ideas and practices (Engeström, 1996).
- Context can be seen as an ever-playing movie
  - each frame of current context is a progression from earlier ones
  - entire movie is a resource for learning
  - continually being constructed by the cast, from moment to moment, as they share artefacts and create mutual understanding through conversation.



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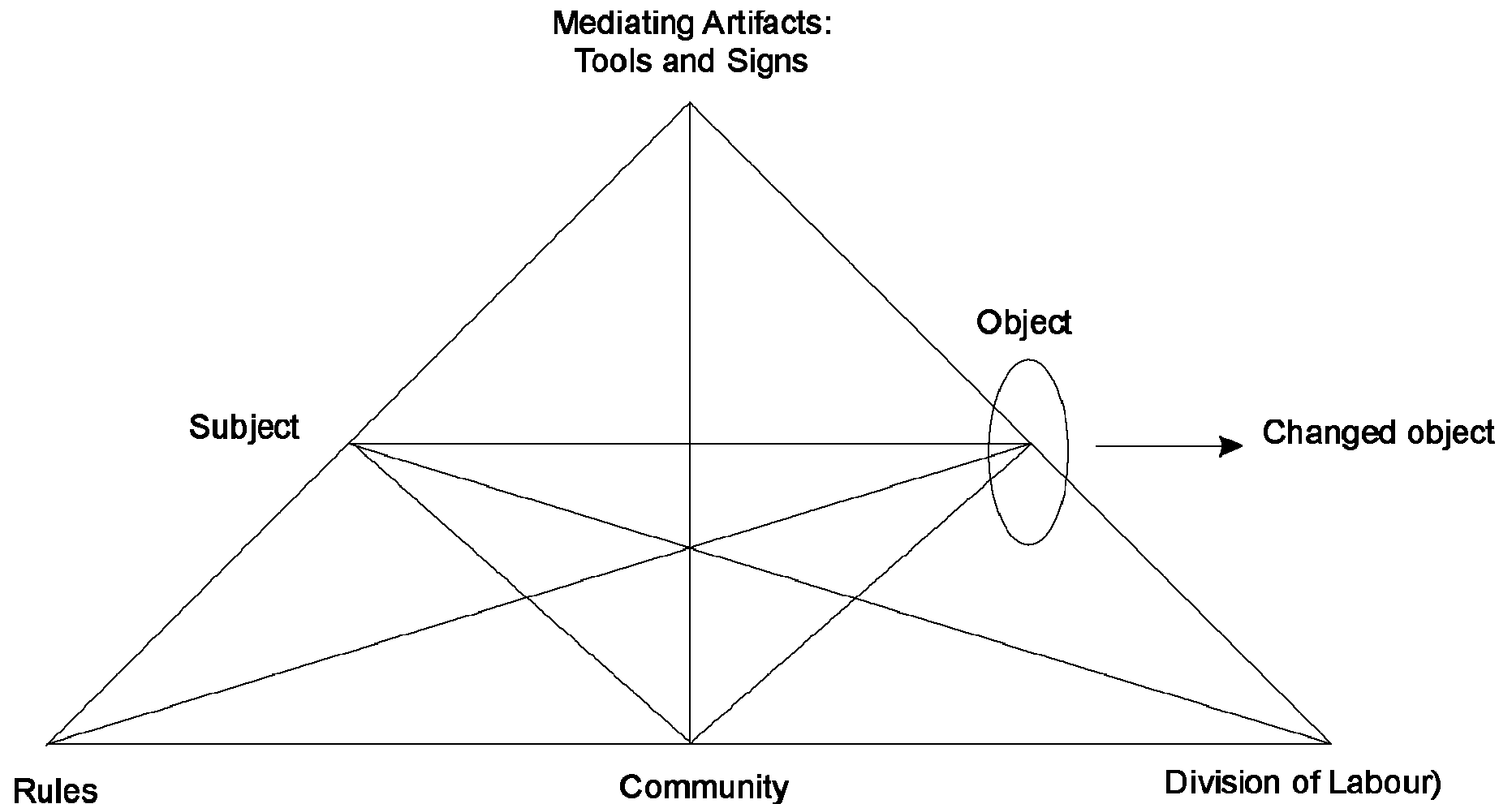
# Expansive mobile learning

Yrjö Engeström's Expansive Activity Theory

- Learning is a cultural-historical activity mediated by tools, including technology and language
- Activity is the focus of analysis
- Activity systems are multi-voiced, with many perspectives, transitions and interests in continual interaction
- Activity systems are shaped over time
- Activity systems contain the possibility for expansive transformation
  - They go through extended periods of qualitative change, as the contradictions are internalised and resolved, leading to the emergence of new structure, tools and activity.



# Engeström's 1987 model





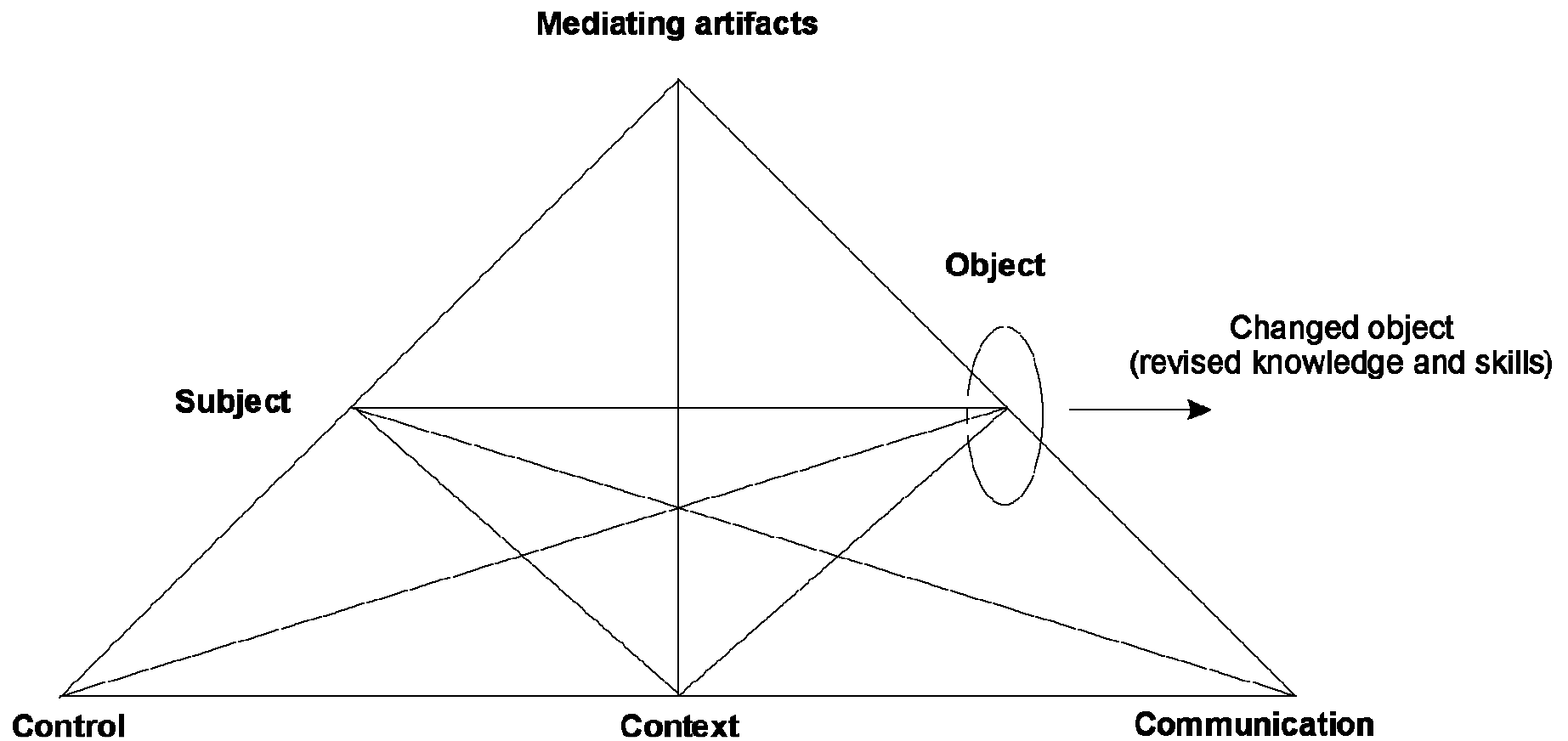
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## Extensions to Engeström's model

- Put mobility as the focus of analysis
- Make clearer the dialectic relationship between learning and technology



# Adaptation of Engeström's model



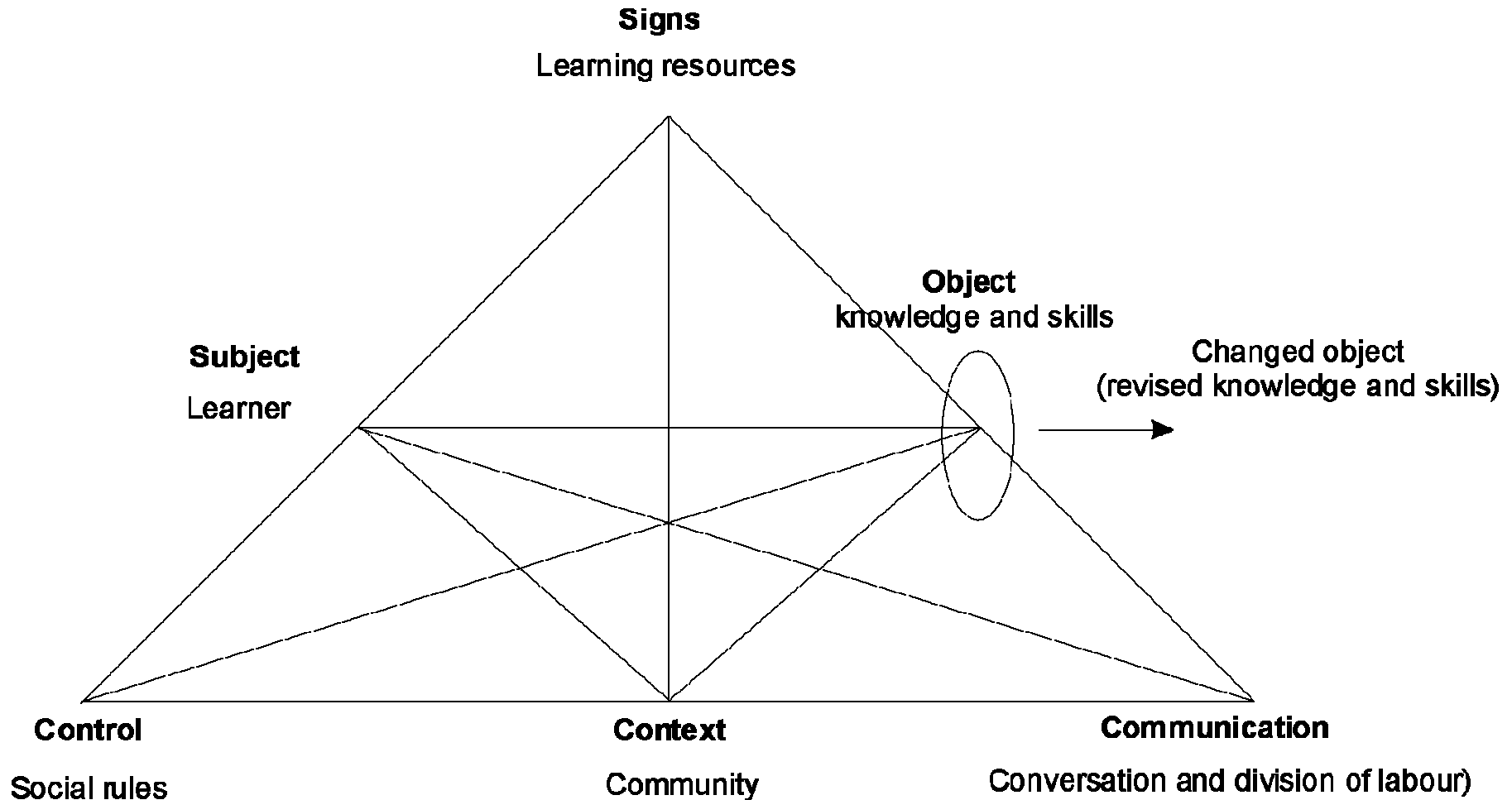


# Semiotic layer

(for educational researchers – socio-cultural perspective)



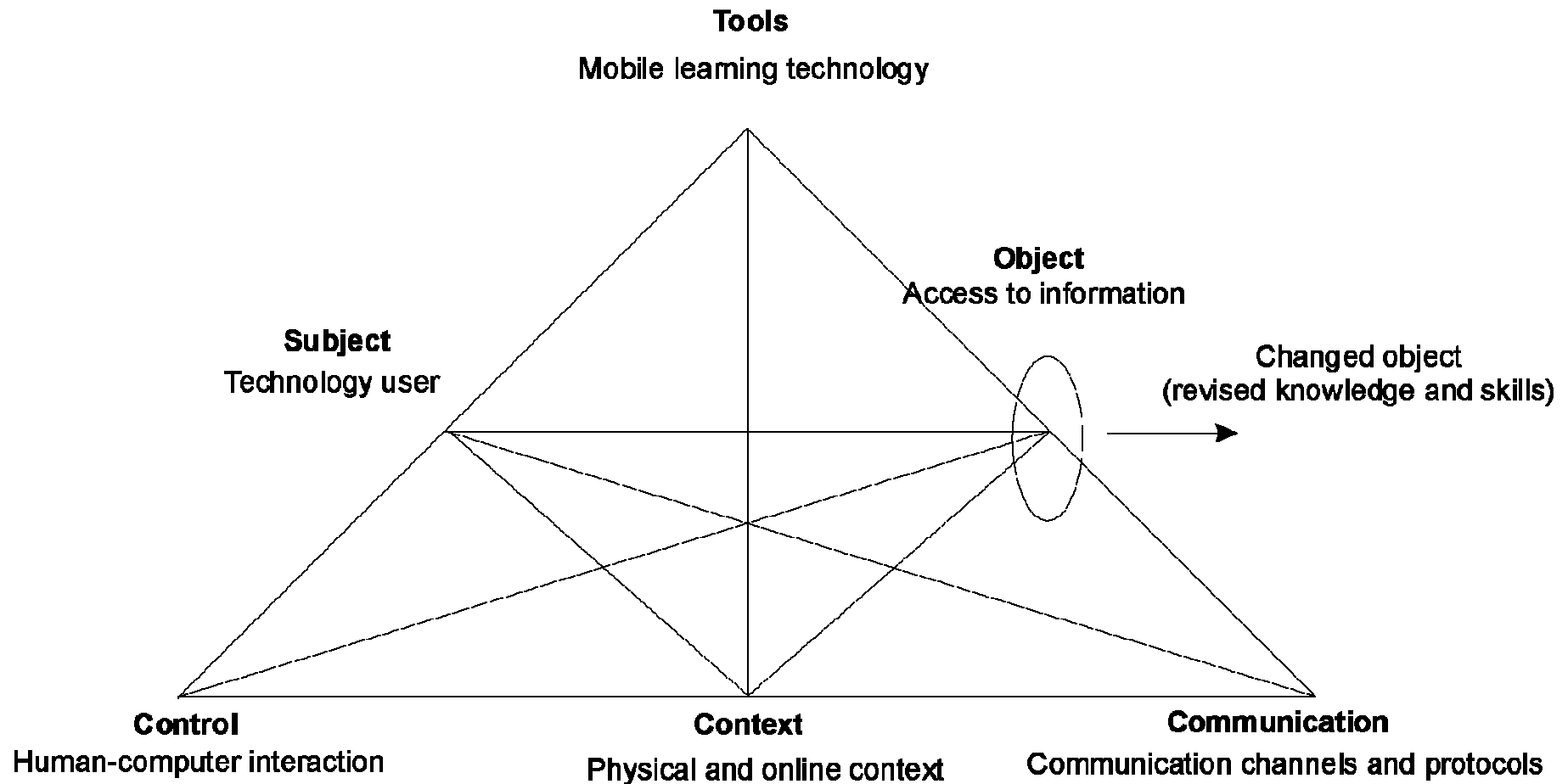
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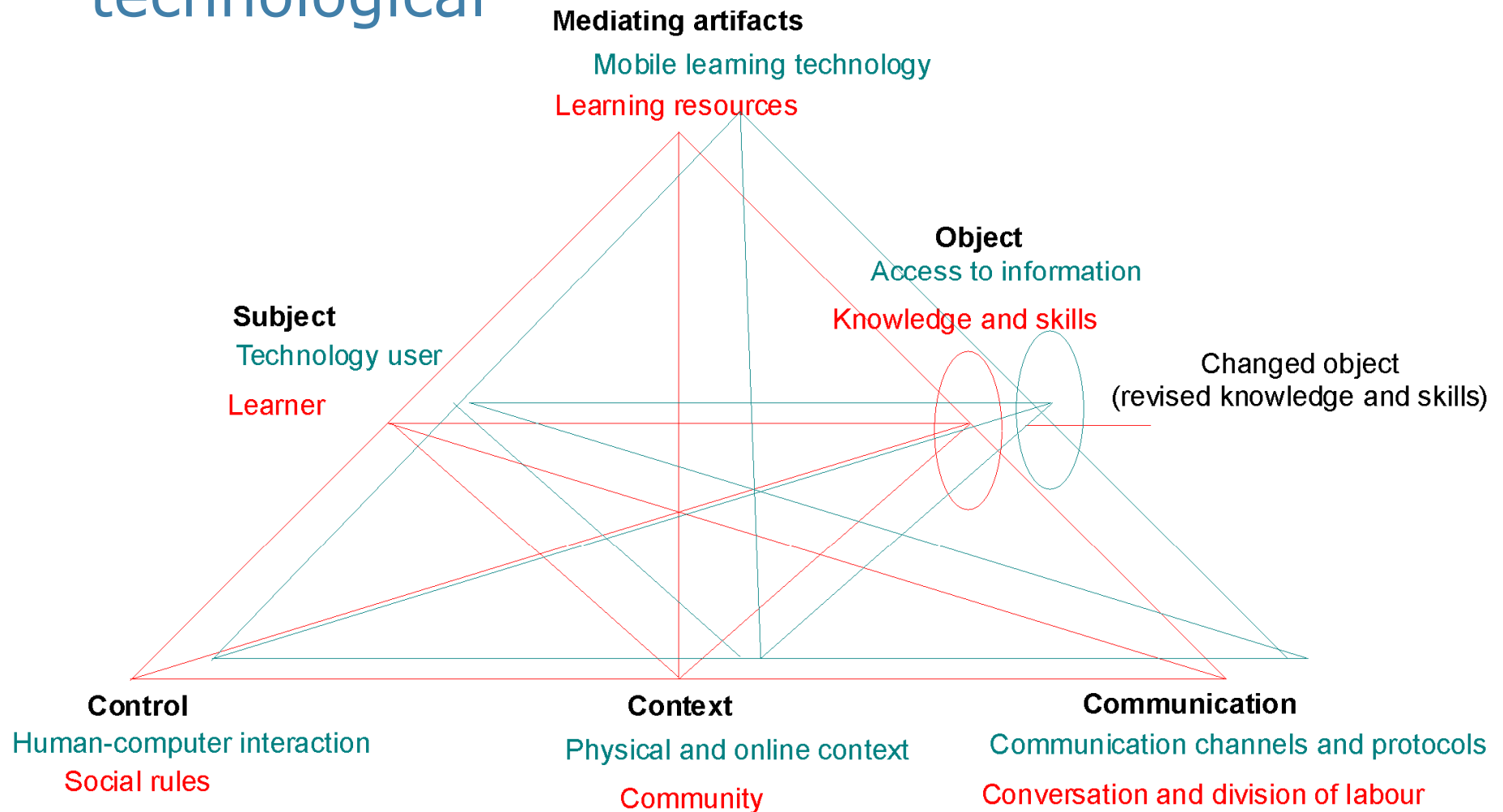
# Technological layer

(for engineers – technology perspective)



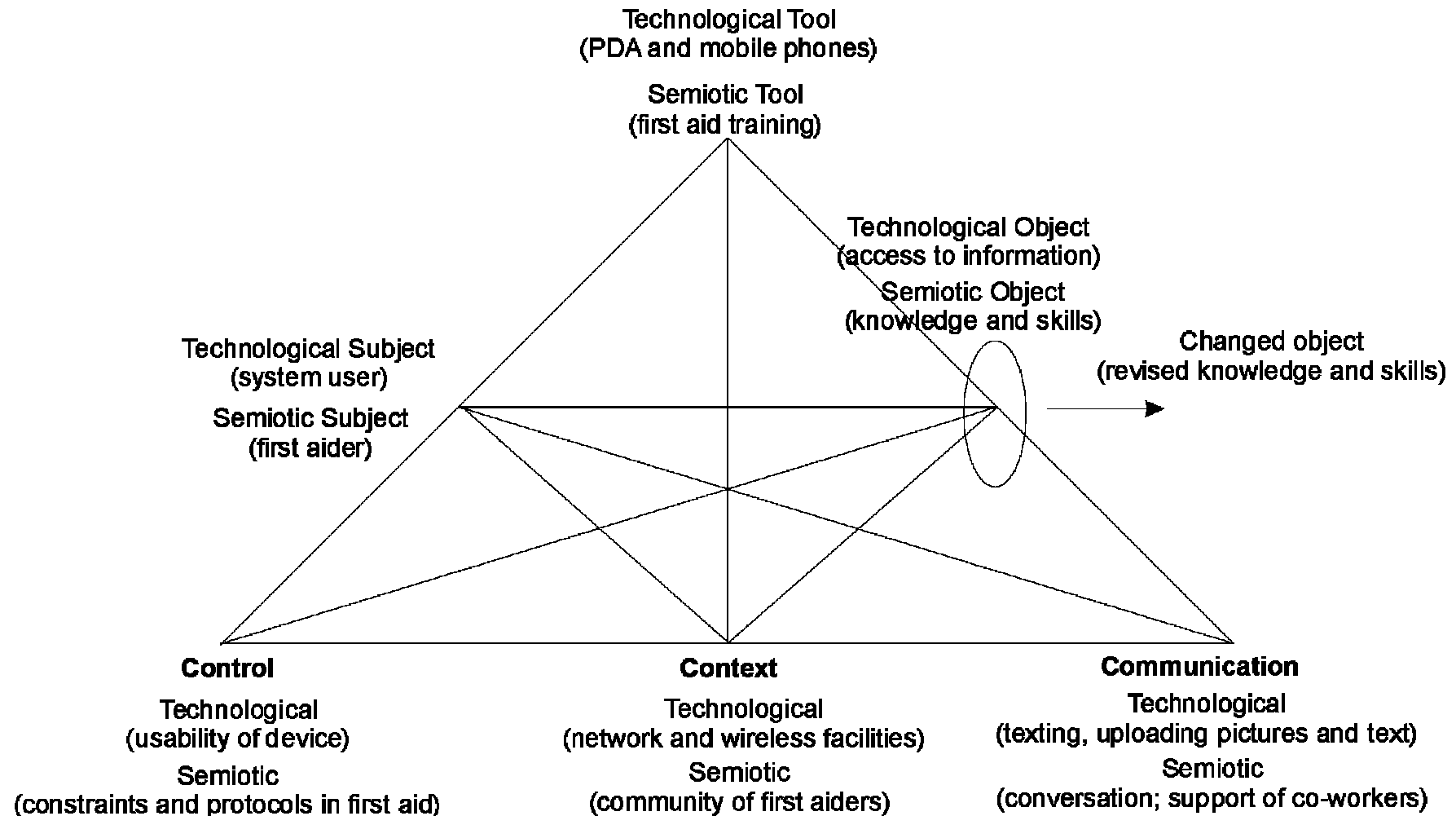


# Interaction between semiotic and technological





# Application to mobile learning scenario: first aid training





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# Expansive transformations of mobile learning

- Technology provides a bridge between contexts
  - New conversations and micro-classrooms
- Tensions
  - Between conversations of social networking and classroom teaching
  - Between control by learner, teacher, commercial interests
- Contradictions
  - In ownership of the means of learning
- Dangers
  - Disruption of formal education



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## Subversive conversations

*Toronto students banned from using cellphones in schools (CBC News)*

Once students walk through the school doors, "it's time to turn it off, put it away and listen to what your teachers say," he said. [He] argued cellphones caused disruptions in class, distracted students and allowed them to cheat by accessing the internet on their phones or receiving answers via text message.



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# Expansive transformations of mobile learning

- Technology provides a bridge between contexts
  - New conversations and micro-classrooms
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  - Between control by learner, teacher, commercial interests
- Contradictions
  - In ownership of the means of learning
- Dangers
  - Disruption of formal education
  - Colonisation of everyday learning
- Possibilities
  - For 'co-intentional learning', where the richness of everyday learning is valued and supported, through conversations across contexts



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## A theory of learning for the mobile age

- Learning as conversation across contexts
- A cybernetic process of exploration of the world and negotiation of meaning, mediated by technology
- Bridging classroom and everyday learning
- Containing the possibility for expansive transformation