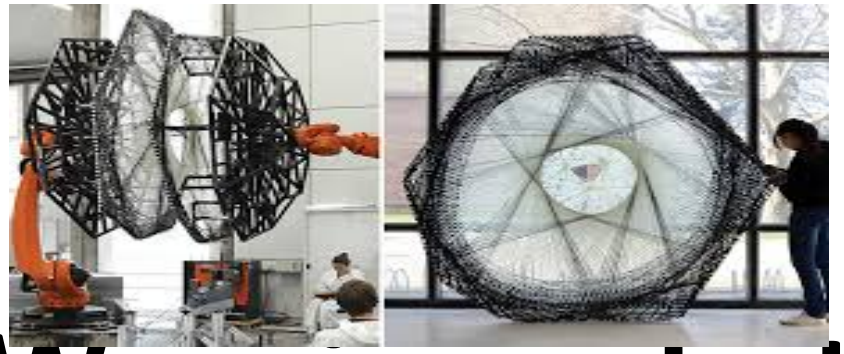
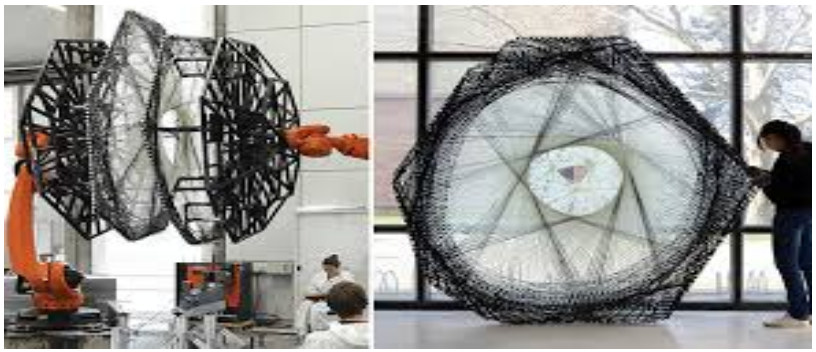
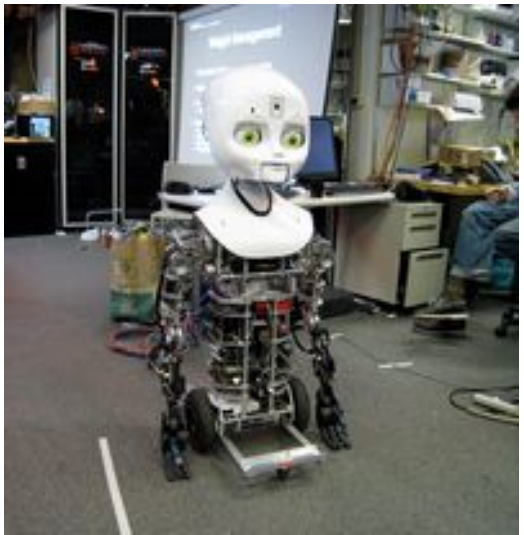




Weaving robots and baskets

A 2-day seminar in Copenhagen. Thursday – Friday May 30-31, 9.30-16.00 both days



Future Technology, Culture and Learning

- Interdisciplinary research focusing upon research at the convergence of emerging technology and cultural learning processes.

http://edu.au.dk/en/research/research-areas/future-technology-culture-and-learning/

Program

- **TUESDAY, MAY 30**
- Memory and basketry by Stephanie Bunn, University of St. Andrews, Dept. of Social Anthropology
- 11.00-12.15:Weaving robots and baskets by Cathrine Hasse, Aarhus University, Danish School of Education
- 12.15-13.00: Lunch
- 13.00-14.15:
  Neuroscience technology and embodiment by Theresa Schilhab, Aarhus University, Danish School of Education
- 14.30-15.45:
  Praktisk anvendelse af pileflet - om sansemæssig involvering by Gitte Kjær Hansen, Pileforeningen
- 15.45-16.00:
  Summing-up by Cathrine Hasse, Aarhus University, Danish School of Education

- **WEDNESDAY, MAY 31**
  09.30-09.45:Welcome and speaker introduction by Cathrine Hasse, Aarhus University, Danish School of Education
- 09.45-11.00:
  Weaving robots by Kasper Støy, IT-University of Copenhagen
- 11.00-12.15: Robot work and wickerwork; the weaving of engagement by Jamie Wallace, Aarhus University, Danish School of Education
- 12.15-13.00:
  Lunch
- 13.00-14.15:
  Historical baskets by Steen Madsen, Pilefletforeningen
- 14.15-16.00:
  Wickerwork workshop by Steen Madsen, Pilefletforeningen

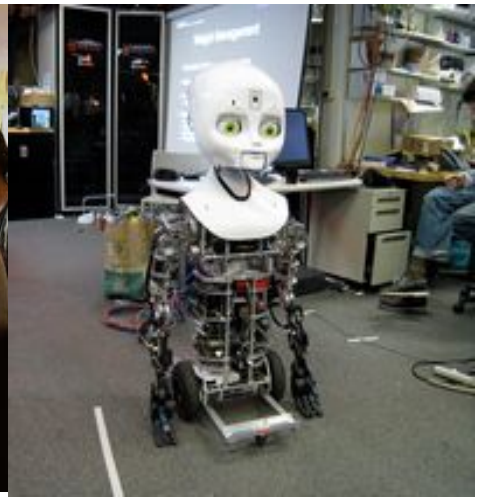
Cathrine Hasse, University of Aarhus, Department of Education, Program for Future Technologies, Culture and learning.
Mail: caha@dpu.dk

Outline of a diffractive weaving of robots and baskets:

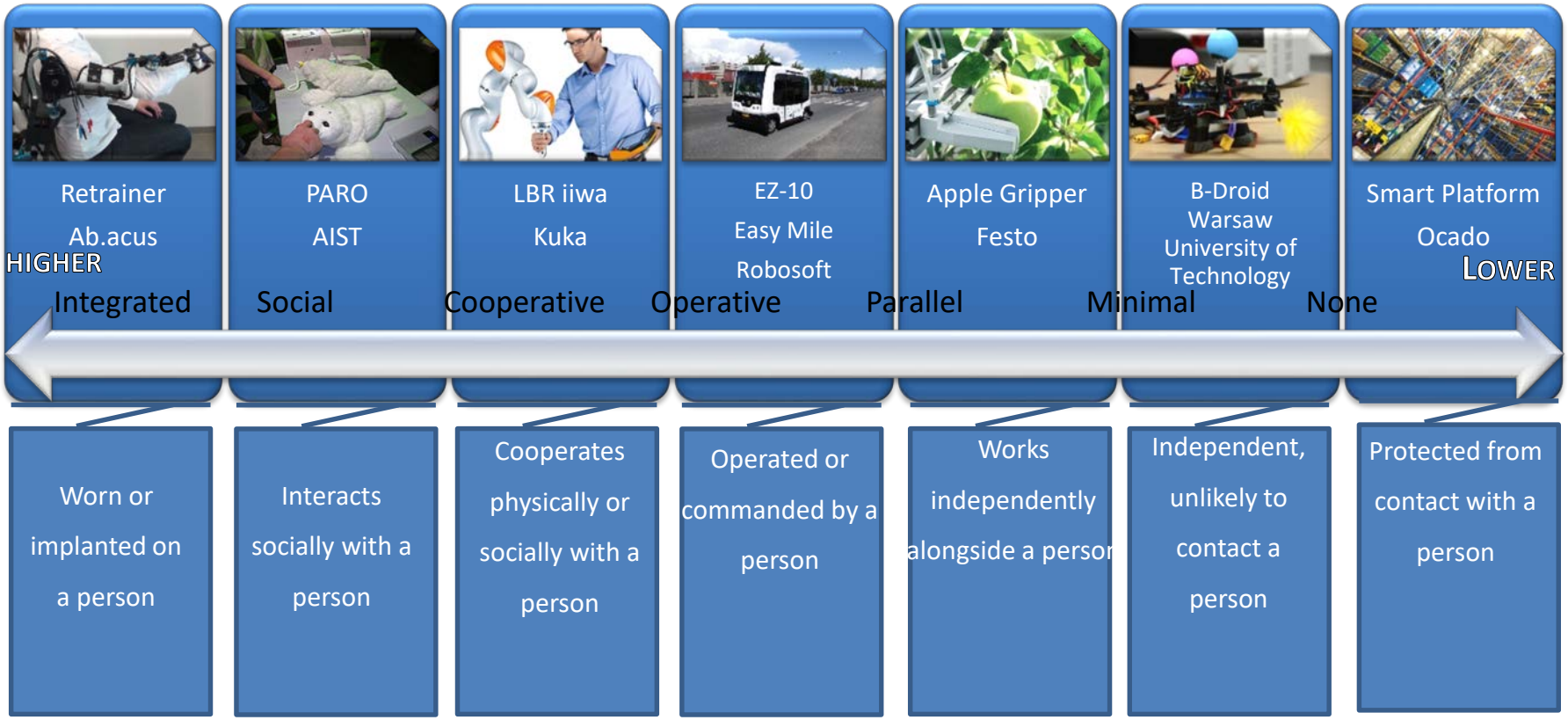
1. What is weaving?

2. The body or embodiment?

3. Changed environments and skills



REELER: RESPONSIBLE ETHICAL LEARNING IN ROBOTICS
- THE HUMAN BODY LEARNING PROXIMITY SPECTRUM



REELER: RESPONSIBLE ETHICAL LEARNING IN ROBOTICS
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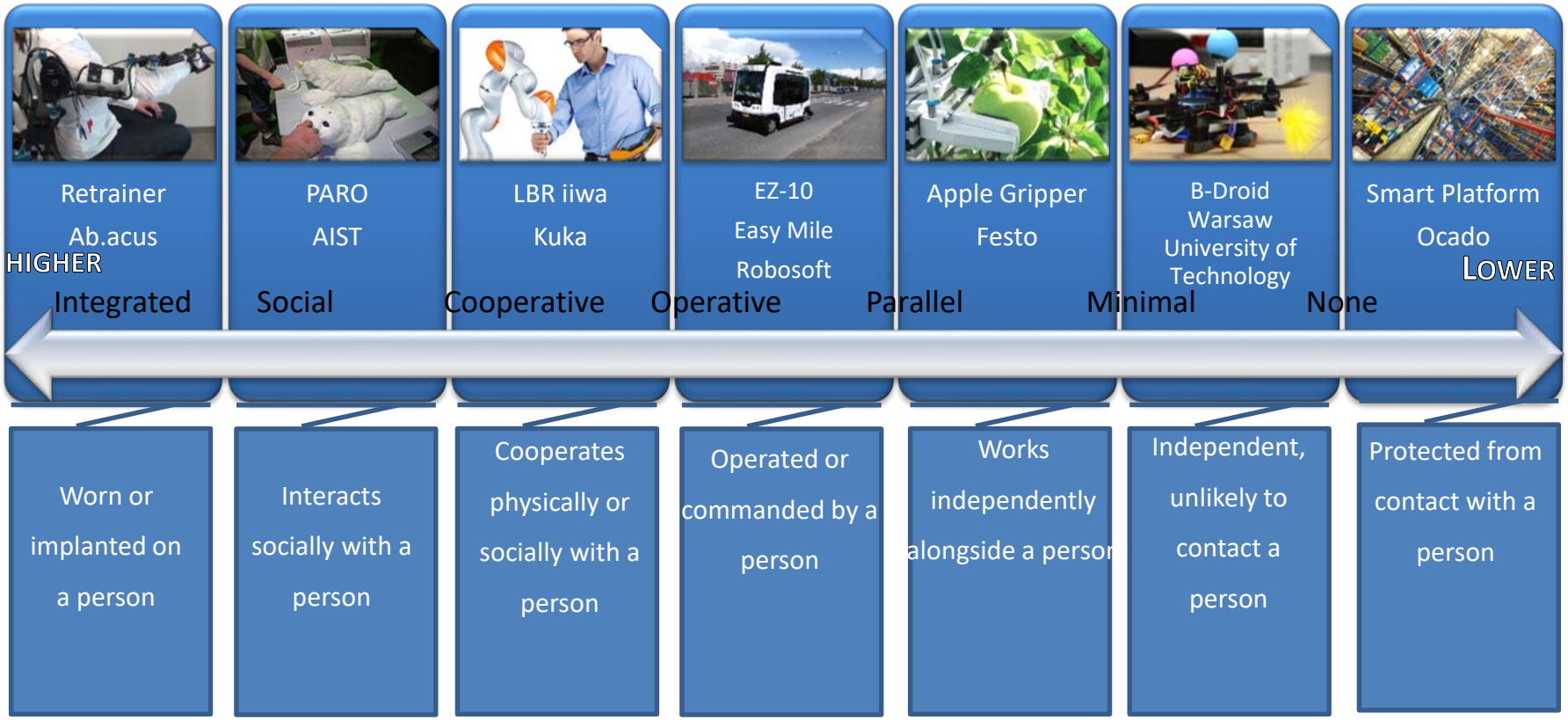


Etymology

- Old English *wefan*, of Germanic origin, from an Indo-European root shared by Greek *huphē* ‘web’ and Sanskrit *ūrṇavābhi* ‘spider’

What is weaving?

- weave (v.1)
- Old English wefan "to weave, form by interlacing yarn," figuratively "devise, contrive, arrange"
- "combine into a whole" is from late 14c
-
- weave (v.2)
- From 1200 bc "to move from one place to another," of uncertain origin, perhaps from weave (v.1).
-
- weave (n.)
- 1580s, "something woven," from weave (v.). Meaning "method or pattern of weaving" is from 1888.

What is weaving?

The robot

The human

The agency of bodies

‘Often in practice we bracket off non-human materials, assuming they have a status which differs from that of a human. So materials become resources or constraints; they are said to be passive; to be active only when they are mobilized by flesh and blood actors. But if the social is really materially heterogeneous then this asymmetry doesn’t work very well. Yes, there are differences between conversations, texts, techniques and bodies. Of course. But why should we start out by assuming that some of these have no active role to play in social dynamics?” (Callon & Law 1997, p.168).

Robot and human bodies and embodiment

The body

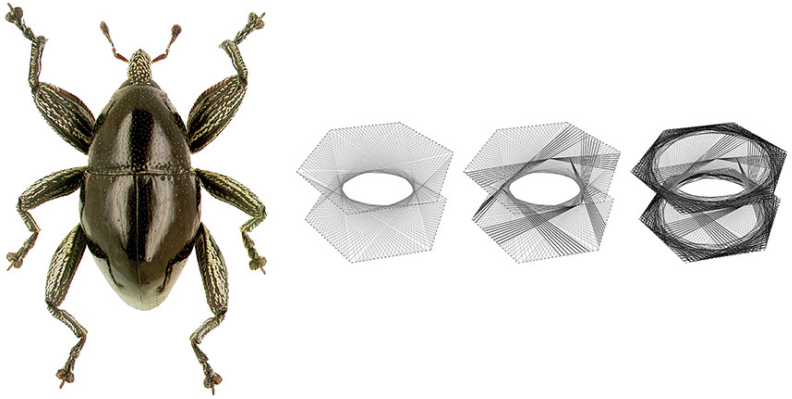
- The body is normative relative to conceptualization or some sets of criteria.

Embodiment

- "Embodiment is akin to articulation in that it is inherently performative, subject to individual enactments, and therefore always to some extent improvisational. Whereas the body can disappear into information with scarcely a murmur of protest, embodiment cannot, for it is tied to the circumstances of the occasion and the person" (Hayles 1999, 96-98).

The embodied agency

- University of Stuttgart's Institute for Computational Design



The embodied skills of Kuka robots

The embodied skills of basket weavers

Embodiment

- Inscribing practices and incorporating practices
- (Hayles 1999)

- Embodiment as skills

As skillful knowledge

- **Habit** is a **knowledge** and a remembering in the hands and in the body; and in the cultivation of **habit** it is our body which 'understands. (Connerton 1987)

Variation in human culture: variation in skills

Skill, in short, is a property not of the individual human body as a biophysical entity, a thing-in-itself, but of the total field of relations constituted by the presence of the organism-person, indissolubly body and mind, in a richly structured environment. That is why the study of skill, in my view, not only benefits from, but demands an ecological approach.

(Ingold 2000 , p. 353)

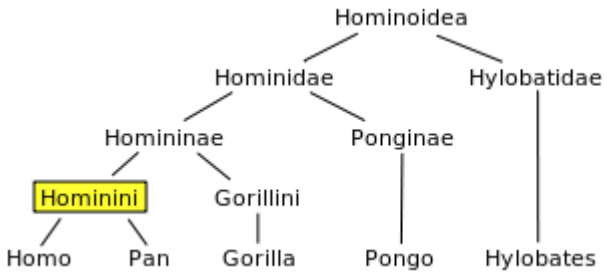
What is special about human skills?
We are ultrasocial learners.

Humans are great apes in the human clade**.**

As a species we are not just social, but ultra-social through cultural learning:

"We have gone beyond the sophisticated primate social-cognitive skills for competing and cooperating with conspecifics, **to evolve skills that enable us to actually create different cultural groups, each with its distinctive set of artifacts, symbols and social practices."**

Herrmann, Call, Hernandez-Lloreda, Hare & Tomasello
"Humans have evolved specialized skills of social cognition:
The Cultural intelligence Hypothesis" *Science* 2007



The Robot Revolution challenges human skills

- Skills is:
- “a mastery that we carry in our bodies and that is refractory to formulation in terms of any system of mental rules and representations” (Ingold 1996, 105)
- Robots run on system of ‘mental’ rules and representations = algorithms

New forms of procedural memory

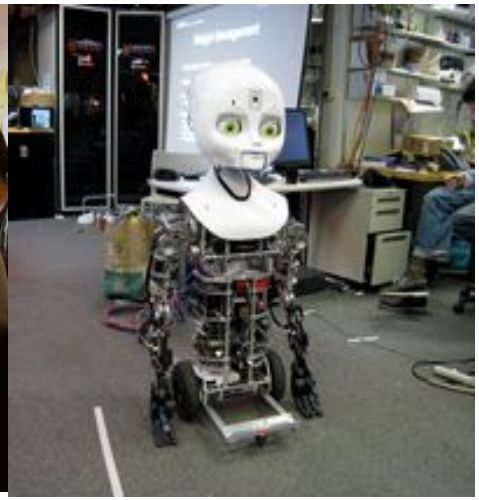
- What is the unacknowledged motor skills today (habits) was the body learning of yesterday.
- Procedural memory begin as learning
- We learn not just in school but all the time
- (*Eysenck* & *Keane*, 2010).
- Not a linear process
- (e.g. like Dreyfus and Dreyfus: novice-expert)

Weaving new embodied skills:
arrange our embodiment in new environmental wholes that include robots. What are the new skills we need?

Embodied memory of how to move things from one place to another may be delegated from hands to machines and programs
How does it matter?







Humans as ultrasocial body learners: Parka

Complex skills are learned in social communities (e.g. the making of Parkas in Central Inuit – Copper and Netsilik):

Caribou skins harvested in autumn

Hides were repeatedly stretched, scraped, moistened, and then stretched again

Clothing was stitched together with fine thread made from sinew taken from around the vertebrae of caribou.

The sinew had to be cleaned, scraped, shredded, and twisted to make thread. Several different kinds of stitches were used for different kinds of seams. A complicated double stitch was used to make footwear waterproof. To make these stitches, Central Inuit women used fine bone needles that made holes that were smaller in diameter than the thread

Boyd, R. P. J. Richerson and J. Henrich (2011) The cultural niche: Why social learning is essential for human adaptation, In the Light of Evolution: Volume V: Cooperation and Conflict. PNAS, National Academy of Sciences, p. 363-375

Culture loss of ultrasocial body learning

No one to designate body learning skills

Bodies learn 'habit-specific knowledge' of beneficial technologies in social communities

The Lost European Explorer Experiment

(Boyd et al. 2011, 370)

King Williams Island, 1846 [Qikiqtaq]

The best equipped British Expedition led by John Franklin

Netsilik survived through a Millennia, 129 British sailors all died

(Amundsen survive because he learned skills from local people)

Boyd, R. P. J. Richerson and J. Henrich (2011) The cultural niche: Why social learning is essential for human adaptation, In the Light of Evolution: Volume V: Cooperation and Conflict. PNAS, National Academy of Sciences, p. 363-375

When lines are cut: Body learning of Parka-making

The “world we inhabit” is a relational field, a “meshwork of entangled lines of life, growth and movement”

(Ingold 2011:63).

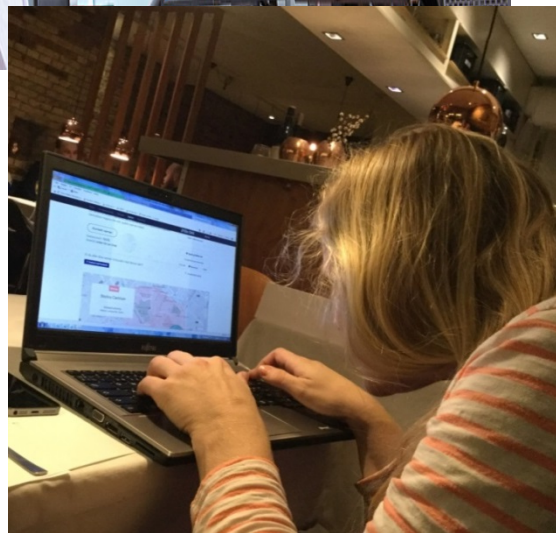
How are we affected as ultrasocial body learners when our skills become robot skills?

Three ways of culture loss: The Parka

1. The ‘Parka’ :
Cultural loss of material artefacts
(bone, sinew, fur).

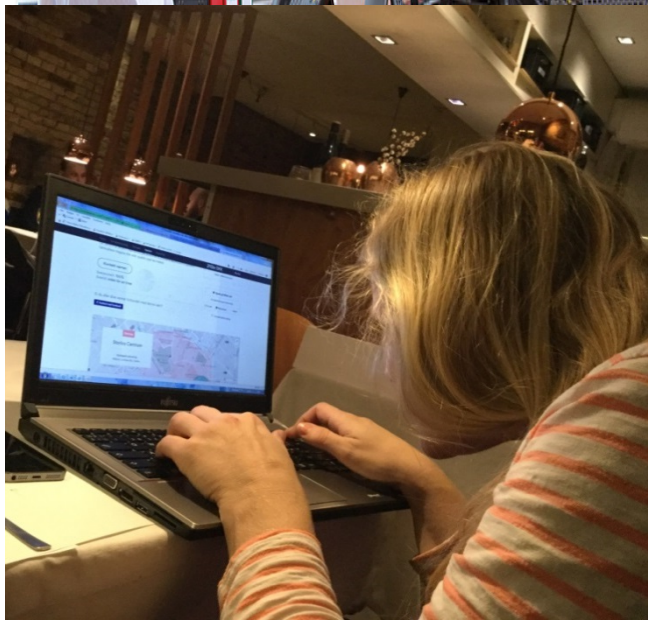
2. Similar Task:
Cultural loss of procedural
body learning (sinew sowing, sowing on
Machines, computer operated)

3. General loss of body learned skills:
From many complex processes
to body screen learning

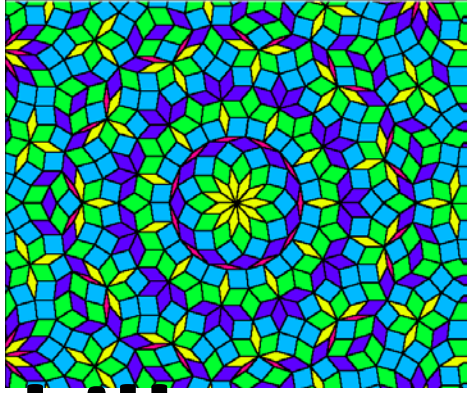


A pattern of new body learning skills?

1. Complex ultrasocial human body learning replaced by machine learning: Making the Parka by screens
2. Ultrasocial storytelling of e.g.hunting caribou replaced by automated entertainment netservice
3. Ultrasocial activities (e.g. Hunting caribou) replaced by individual netbased orders of bying a Parka-coat



Embodied skills in a community takes time to build



1. Embodied skills are learned - not innate
2. They can only be built up in relation to socio-material environments
3. They are always lost

The Robot Revolution Changing our cultural ecology

OECD: 5,2 million jobs lost to robots by 2020

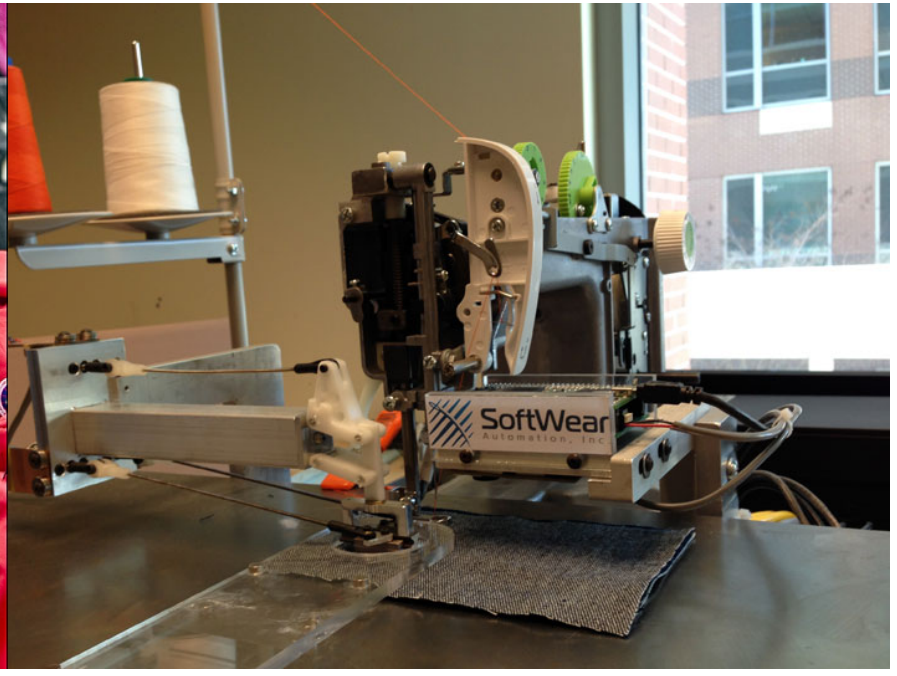
"Robots are expanding in magnitude around the developed world."

"Overall, robotics is expected to rise from
a $15 billion sector now to $67 billion by 2025."

(West 2015, 2)

"According to our estimate, 47 percent of total US employment is in the high risk category"

(Frey and Osborne 2013, 32)



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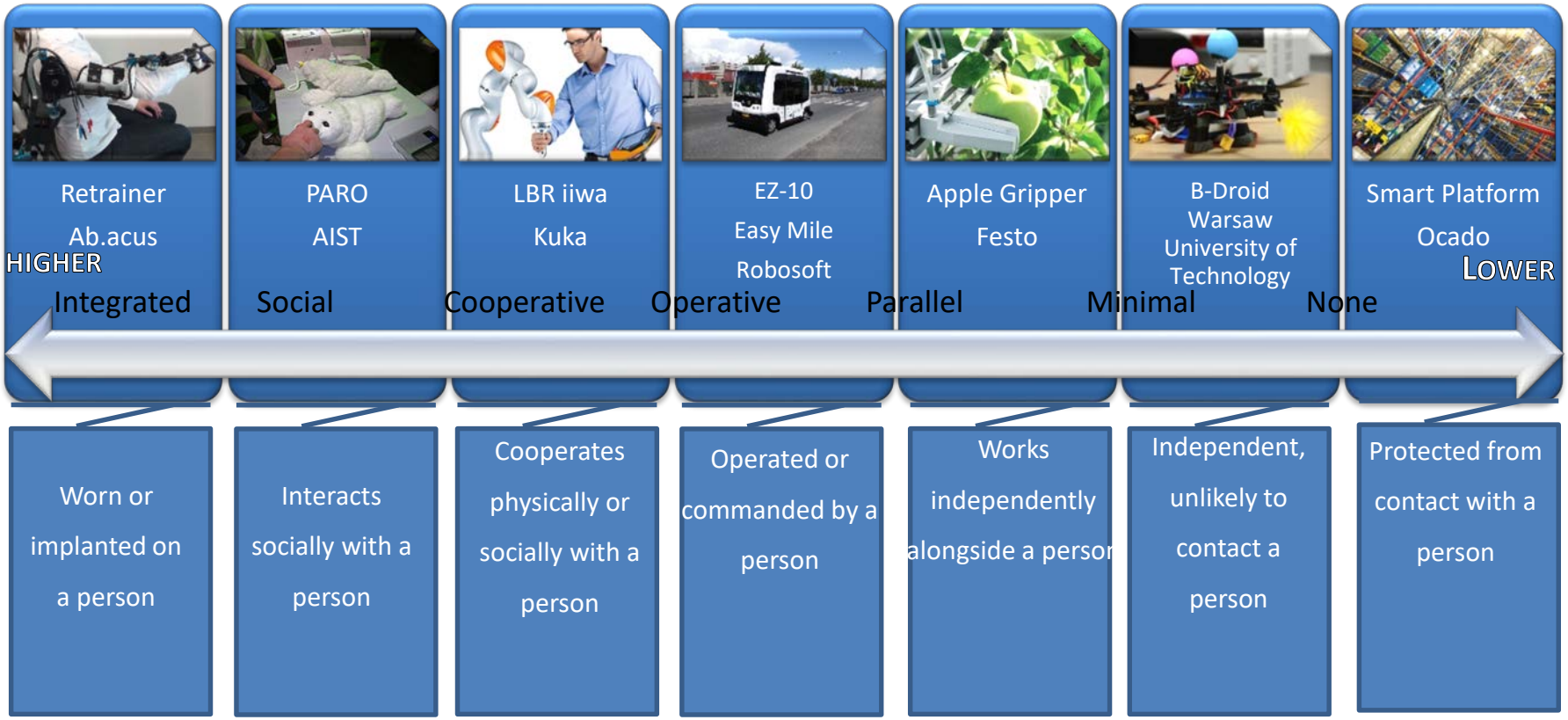

Are we entitled to learn complex embodied skills?

From compliant material to algorithmic learning:

What Robot can't do:

1. Originality: "The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem."
2. Service Orientation: "Actively looking for ways to help people."
3. Manual Dexterity: "The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects."
4. Gross Body Coordination: "The ability to coordinate the movement of your arms, legs, and torso together when the whole body is in motion."

Frey, C.; Osborne, M.; and Holmes, C. 2016. "Technology at Work v2.0. The Future Is Not What It Used to Be." Oxford Martin School Working Paper. Citi GPS: Global Perspectives & Solutions.

Conclusion: Culture loss

Culture loss (vulnerable ‘sailors’:

We increasingly learn from machines not each other in communities as ecologies change to robot cultures

We increasingly learn social designation and reactions as individuals from machines running on algorithms

It is a loss of embodied skills following a lack of opportunity to learn from others (by getting social reaction, observing, imitating, asking questions, participating).

Should we stress complex body learning e.g. in schools to counter culture loss in learning in a robot culture?