

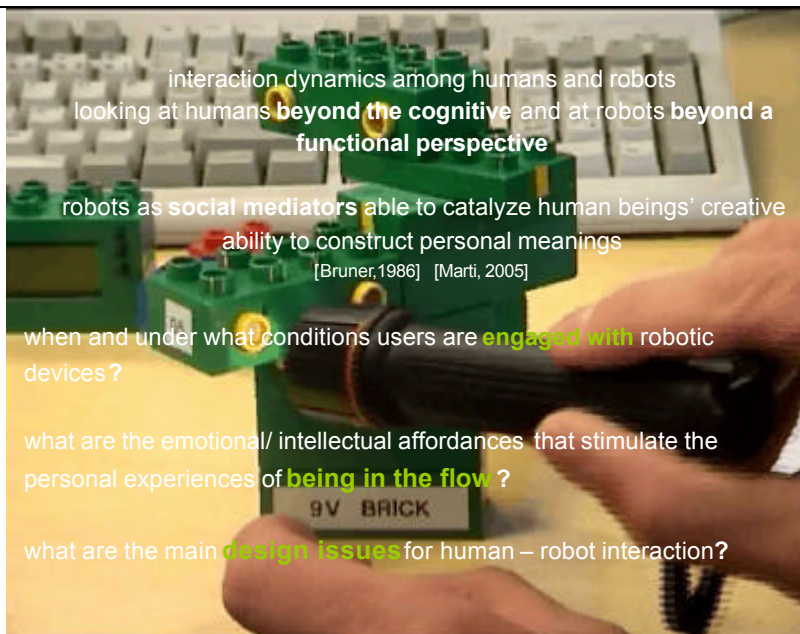
experiencing the flow

design issues in human-robot interaction

Patrizia Marti
Leonardo Giusti
Alessandro Pollini
Alessia Rullo

INTERACTION DESIGN UNIT
Communication Science Dpt.
University of Siena

sOc-EUSAI 2005
12 -14 october, Grenoble

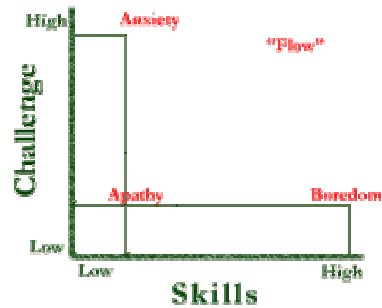


being in the flow

sOc-EUSAI 2005
12 -14 october, Grenoble

experiencing the flow [Csikszentmihalyi 1991]

clear goals;
immediate feedback;
personal skills are well suited to given challenges;
action and awareness merge;
concentration on the task at hand irrelevant stimuli disappear;
a sense of potential control;
loss of self-consciousness;
altered sense of time;
experience becomes autotelic and intrinsically rewarding;



being in the flow

sOc-EUSAI 2005
12 -14 october, Grenoble

HCI GUI Web design [Bederson 2003, 2004; Ishii et al. 1998, 2001]

interfaces targeted at improving user's ability to stay in the flow take into account speed in supporting creativity, quality, and enjoyment

configuring a system and setting the preferences/ options of a software interface means gaining control over your own environment

HRI Human - Robot Interaction

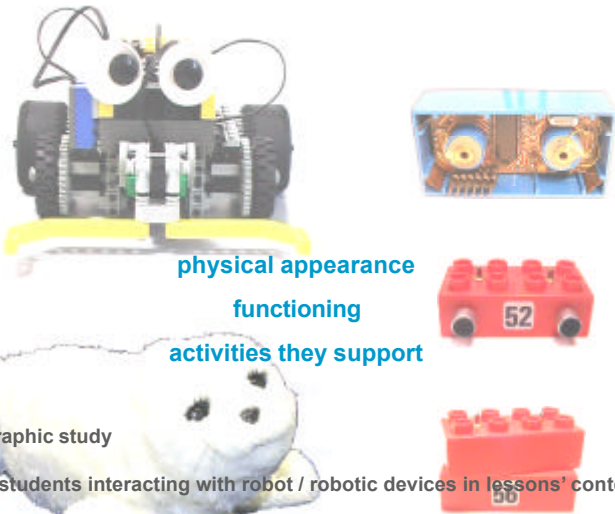
optimal experiences refers to the overall subjective feelings of high involvement, concentration, enjoyment and intrinsic interest in interacting with robots

guidelines for designing in robotics and HRI

visibility — invisibility
construction — de construction
user control — autonomy

being in the flow

sOc-EUSAI 2005
12 -14 october, Grenoble




examples

physical appearance
functioning
activities they support

ethnographic study
master students interacting with robot / robotic devices in lessons' context
video recordings augmented by more conventional fieldwork (observation and interviews) in order to explore the dimensions of flow

sOc-EUSAI 2005
12 -14 october, Grenoble

baby seal robot whose **morphological, perceptual and behavioural** characteristics have been exploited to stimulate interaction and engagement [Shibata et al., 2001]



Paro

sOc-EUSAI 2005
12 -14 october, Grenoble



Paro

feed back

Paro provides a **quite sophisticated response** to the external stimuli: its behavior critically depends on the history of previous interactions and it's not directly controllable by the user

sOc-EUSAI 2005
12 -14 october, Grenoble



Paro

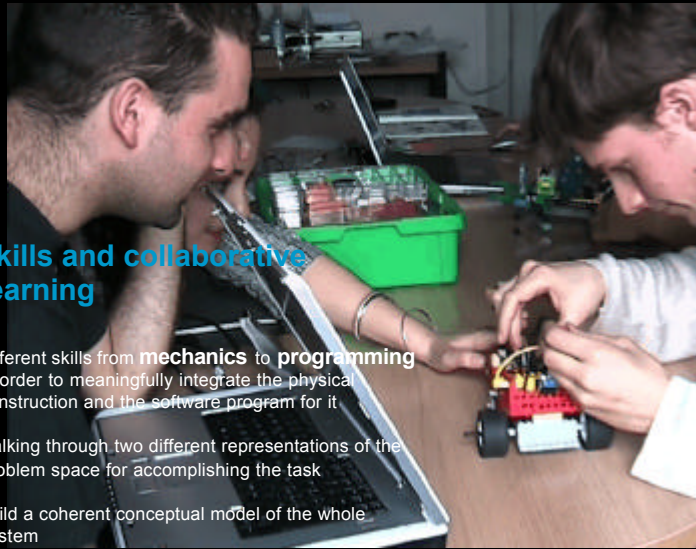
control

does not require any specific skill

people **do not need** to be completely in control of the interaction

as an **autonomous agent** Paro has self-initiated movement that people see as intentional and goal-directed

sOc-EUSAI 2005
12 -14 october, Grenoble



skills and collaborative learning

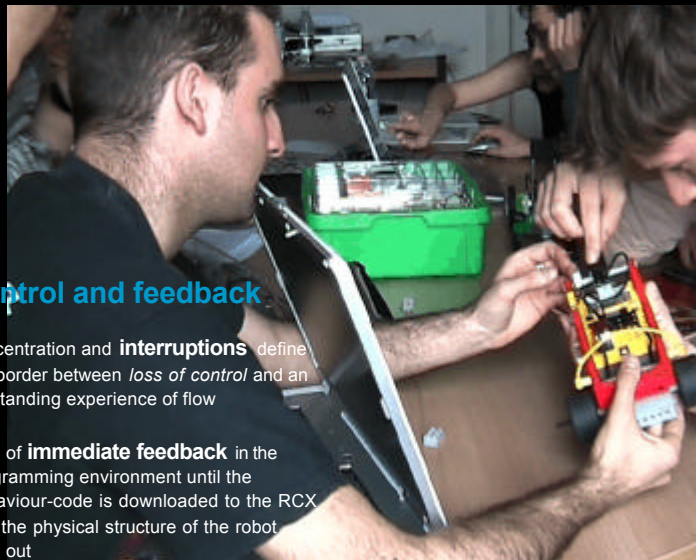
different skills from **mechanics** to **programming** in order to meaningfully integrate the physical construction and the software program for it

walking through two different representations of the problem space for accomplishing the task

build a coherent conceptual model of the whole system

LEGO mindstorms

sOc-EUSAI 2005
12 -14 october, Grenoble



control and feedback

concentration and **interruptions** define the border between *loss of control* and an outstanding experience of flow

lack of **immediate feedback** in the programming environment until the behaviour-code is downloaded to the RCX and the physical structure of the robot tried out

LEGO mindstorms

sOc-EUSAI 2005
12 -14 october, Grenoble

experiencing the flow

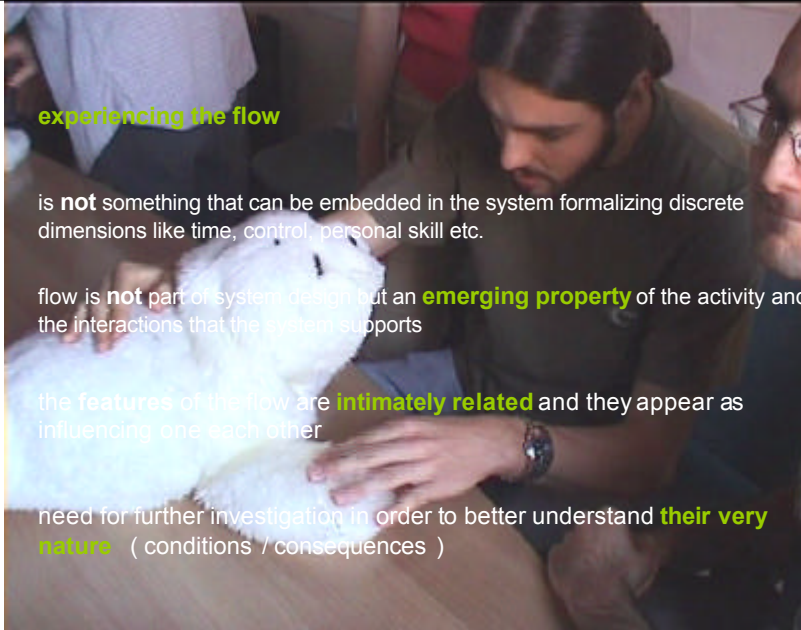
is **not** something that can be embedded in the system formalizing discrete dimensions like time, control, personal skill etc.

flow is **not** part of system design but an **emerging property** of the activity and the interactions that the system supports

the **features** of the flow are **intimately related** and they appear as influencing one each other

need for further investigation in order to better understand **their very nature** (conditions / consequences)

discussion



visibility

invisibility

construction

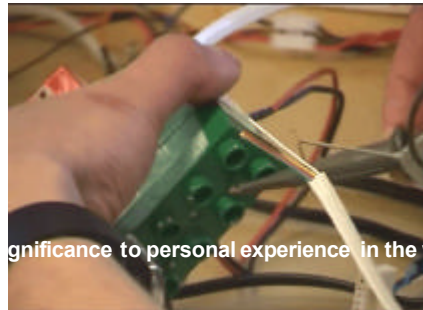
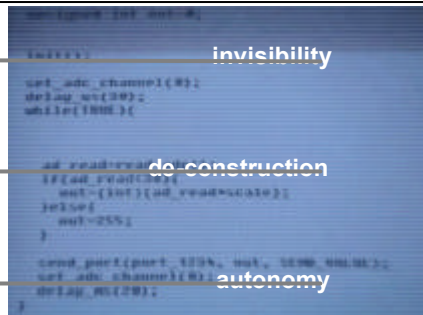
de-construction

user-control

autonomy

how to complement the extremes
how to exceed the extremes
how to find the mediation

toward sense making



gnificance to personal experience in the v

discussion

thinking about robotic applications...

that are **flexible** and **rich enough** to support flow experiences in the context of stimulating activities that engage users individually and collectively

that allow **interpretation** of the activity

for which the 'meaning' of the system is not supplied by the designer but rather by the **situated understanding** of users

thank you for your attention

marti@unisi.it

giusti@media.unisi.it

pollini@media.unisi.it

rullo@media.unisi.it

conclusion