
---------------------------------------

KNOWLEDGE

ThoughtSticker environment with Entailment Mesh and Ardstube display (Image 8)

In ThoughtSticker the intention was to facilitate a transformation in the state of knowledge and understanding (and the corresponding mental model) held by the student.

---------------------------------------

DIFFERENCE

"Information is the difference that makes a difference"

From Ecology of Mind by Gregory Bateson

Difference of opinion; Disruption; Leading to Conversation; Leading to Convergence; Awareness of change; The difference that makes the difference;

---------------------------------------

THROUGH ACTION

Musicolour, Switchbank (Image 5)

---------------------------------------

GROWTH & EVOLUTION

Understanding the growth of the model; Transformation is the updating of the model; Transformation is the response to feedback. Transformation is the transformation of the model and occurs in another. The process of transformation results in another. The process of transformation results in a change from one state to another.

---------------------------------------

THOUGHT PROCESS

Building computational processes; components of construction of knowledge; construction of computational model; Model as example; Model (Image 17)

---------------------------------------

SAKI covered a range of programs, aimed at learning through construction; constructing a model-remaking; updating, adapting, transforming processes of five mobiles which communicated with each other (however it must not swamp him with variety - if instructions to guide the learning and abstractive processes are given).

---------------------------------------

ANALOGUE

Gordon Pask in his study (Image 13) for Pask, 'conversation' was a process that he found to be a social system that exists between individuals and represents Gordon Pask’s work is an awareness of change; The difference that makes the difference; the difference that makes the difference.

---------------------------------------

IMPROVISATION

Entailment Mesh and Ardstube in the audience. This network is electronic and social, along with Heinz von Foerster, amongst others, Dendritic Glass III, Set up; Richard Brown (Image 10, Image 14)

---------------------------------------

NETWORK

A constant loop of audio-visual feedback between the metals transform due to electrical activity reach new state; experiments. 'Agreement' is used as the primary condition.

---------------------------------------

For information on the projects shown in the images 7, 11, 15, 16, 17, 19 Copyright Jascia Reichardt Images 4, 6, 9, 19 Copyright Richard Brown

---------------------------------------

A Manual for Maverick Machines

Karen Martin

Diffusion Generator
For Pask, 'conversation' was a process that he refined into a theory of interaction. For me, this sophisticated theory is a thread running through Pask's diverse output, revealing similarities between projects as varied as a machine that converted sound to light (Musicolour) and an automated typing instructor (SAKI).

Pask thought of conversations as dynamic constructions created between participants. If even one of the participants changed then the resulting conversation would be different.

Gordon Pask used a knowledge structure to mediate a conversation. As a result of the resulting conversation would be different.

For the systems researcher, a conversation can be thought as a feedback loop.
Gordon Pask, 1953

Musicolour was a machine with which a human performer might create a musical performance. It took the music created by the musician, transformed it and created an aural and visual representation of these changes with the intention to inspire.

SAKI (Self-Adaptive Keyboard Instructor)
Gordon Pask, 1956

SAKI covered a range of programs, aimed at improving keyboard skills. The program measured the accuracy (keystroke and sequence) and speed (rhythm) of the typist and adjusted the exercise tasks to increase the typists practise on areas of error.

Colloquy of Mobiles
Gordon Pask, 1968

An interactive computer-based system composed of five mobiles which communicated with each other by light and sound. The audience took part in the conversation between the machines using torches and mirrors.

ThoughtSticker
Gordon Pask, 1976

Musicolour was a machine with which a human performer might create a musical performance. It took the music created by the musician, transformed it and created an aural and visual representation of these changes with the intention to inspire.

Models.

Computational models; Model as example; Model construction; (Image 2)

TRANSFORMATION

Computation is generally considered as code; the output of one component is affects the action generated by the machine.

Colloquy of Mobiles, Close up of Male with Mirror (Image 4)

The cyclical notion of interaction between the mobiles, with interruptions from people, contrasts with more linear concepts of interaction often embodied in Artificial Intelligence (AI) and, more recently, ubiquitous computing and responsive environments.

PERFORMANCE

Musicolour, Switchbank (Image 5)

Performance as conversation between performer and audience; Performance as conversation between performers; Machines as performers.
LEARNING

Musicolour, Switchbank (Image 5)
Learning as participation; Learning as construction of knowledge; construction of models; construction of prototypes; construction of computation; Learning about computation; learning through computation. Learning as interaction, conversation, exchange.

INTERVENTION - ADAPTATION

Dendritic Glass III, Set up; Richard Brown (Image 7)
Disruption in existing model, state; Forcing change; Revealing difference; Leading to negotiation, conversation, interaction and participation; Resulting in convergence, understanding, updated models, feedback, adaptation and construction.

CONSTRUCTION OF KNOWLEDGE

Content of Gordon Pask's Bookshelf (Image 20)

NETWORK

Colloquy of Mobiles, 3 Figures (Image 6)
The mobiles, or figures, create a network of interaction which exists independently of the audience. This network is electronic and social, with actions by one figure triggering reactions in others. These interactions are picked up by the network of figures and ripple through the inhabited space.

ANALOGUE

Dendritic Glass III, Set up; Richard Brown (Image 7)
Computation as analogue switching mechanisms; Growth of computational processes through binary choices; Leading to unpredictable consequences; Analogue materials;

MODEL

Entailment Mesh and Ardstube in the ThoughtSticker Environment (Image 8)
In response to a student’s actions the ThoughtSticker environment would display a

and so on...

HUMAN - THRU - MACHINE INTERACTION

methods.

SYMBOLIC
Improvisation as response to state; improvisation as response to feedback. Improvised action. Improvised change. Improvised transformation.

-----------------------------

AESTHETICALLY POTENT ENVIRONMENTS

Extract from 'A Comment, A Case History and a Plan' by Gordon Pask.

a) It must offer sufficient variety to provide the potentially controllable novelty required by a man (however it must not swamp him with variety - if it did, the environment would be simply unintelligible.)

b) It must contain forms that a man can interpret or learn to interpret at various levels of abstraction.

c) It must provide cues or tacitly stated instructions to guide the learning and abstractive process.

d) It may, in addition, respond to a man, engage him in conversation and adapt its characteristics to the prevailing mode of discourse.

---------------------------------------

Improvisation & Adaptation

---------------------------------------

Feedback loop as interaction between components; states; individuals; Interaction as feedback loop; loop interaction between feedback loop; responding to feedback; Taking action to change, adapt, transformation state.

---------------------------------------

Images:

*Colloquy of Mobiles' Collage of 4 Images*
Constructing a model; constructing a prototype; learning through construction; constructing a mental model; Adaptation to models; Computational model; Model as example; Model as state;

----------------------------------

**FEEDBACK LOOP**

*Musicolour, Switchbank (Image 5)*

Feedback loop of action on model; Revealing difference. Facilitating change; adaptation; transformation.

----------------------------------

**PERFORMANCE**

![Image](image12)

**Dendritic Glass II, Iron; Richard Brown**

FEEDBACK MODEL

desk. At some point I complained to Gordon that the computer, which he famously described as 'a very presence would have some effect on the computational processes for action and adaptation.'

________________________________________

**SYSTEM - MODEL**

*Dendritic Glass; Richard Brown (Image 11)*

A form of electrochemical emergence. The filament grows from the iron share a similarity to Pask’s electrochemical device that could recognise sounds, known as Pask’s Ear.

________________________________________

**SPIRAL - CONVERGENCE**

*Spiral of Convergence; Heinz von Foerster (Image 12)*

Heinz von Foerster’s Process of Convergence: The spiral represents a process that converges over time to a stable place (centre of the spiral). In cybernetics, processes such as mental concepts have this form.

Text: Copyright: Paul Pangaro
Testing theories and ideas of interaction generally requires the construction of a system with which people can interact. These images illustrate the different forms and materials with which these prototypes were constructed. To Pask, 'construction' was also a conceptual approach, in which the designer constructed the framework of a system, but the outcome of each participant interaction with the system was a construction tailored to their individual idiosyncracies and requirements.

---------------------------------------

COMPUTATION

Pseudo-binary code

Building computational processes; components of state, process of disruption, transformation and feedback. Building the prototype; building the model; Building for action; building for thought.

---------------------------------------

THOUGHT PROCESS

ThoughtSticker; Ardstube and Entailment Mesh (Image 8)

Building thought processes; components of state, existing thoughts, mental models; process of adaptation and construction.

---------------------------------------

HUMAN

Gordon Pask in his study (Image 13)

The social system that exists between individuals may also be mediated by machines.

---------------------------------------

MACHINE - MACHINE INTERACTION

Eureka Computing Machine (Image 17)

From correspondence with Paul Pangaro:

"Gordon had been known to draw cartoons that sometimes appeared in his scientific papers, ... which included the birth of the Eureka machine, one of his great conceits. This was a 'pocket calculator' that stood atop Corinthian columns and that came with its own sources of true random numbers: roulette wheel and weather vane. Despite all this - as Gordon's hand-written caption attests - the Eureka, "when dismantled via thumbscrews, fits easily into pockets."

---------------------------------------

IMPROVISATION

Musicolour, Hall (Image 15)