



The CONSTRUIT! Project

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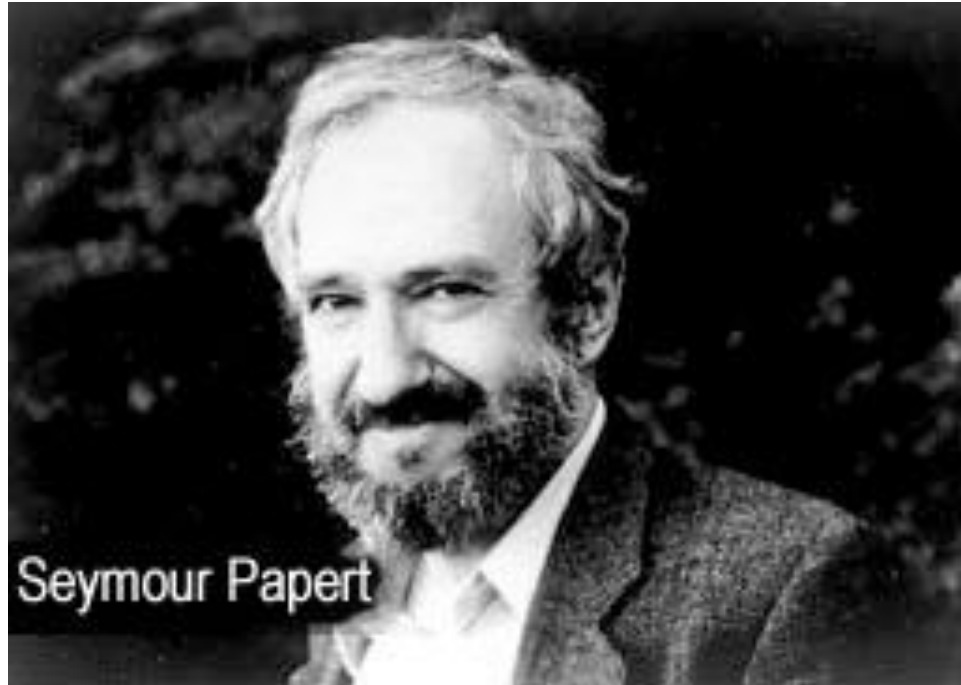
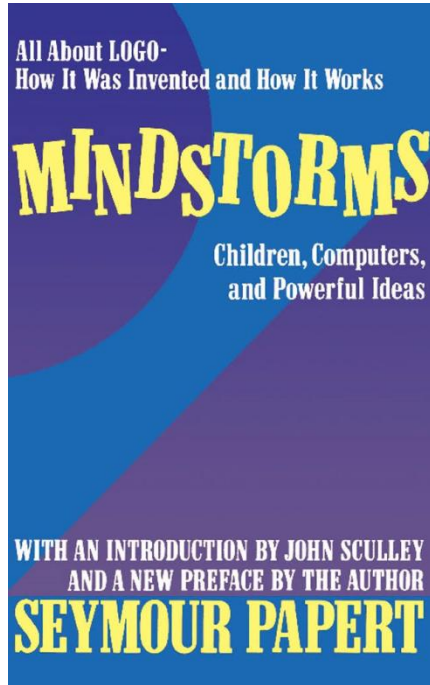


Content

- The problem
- The solution
- Historical perspective
- The CONSTRUIT! project
- Summary

The problem

- Computers have a major role in *making* activities
 - Concrete outcomes
- Aspiration for a close integration between automated and human agency (Licklider)
- Constructionism – linking learning to computing by stressing the role the computer can play in making (Papert)



Seymour Aubrey Papert (February 29, 1928 – July 31, 2016)

For example ...

- Spreadsheets
 - Facilitate sets of accounts
- GPS use
 - Facilitate map reading
- Faraday electric motor
 - Exploratory activities

“Programming” is non-trivial, but a lay person may wish to engage with it

Critique of constructionism

- Problem of learner as builder
- Making activities and transferable skills
 - Learning to program in Logo → geometry
 - Debugging (a Logo program)
 - Bricolage (Turkle and Papert)
- Intersubjectivity (Crook)
 - More 'modest' goal than learner as builder
 - Users projecting their beliefs and expectations into others
 - Object-to-think-with as object-to-converse-with

The solution

- Constructionism issues:
 - ‘Simplifying’ programming
 - Beyond computational thinking → sense-making
- The need to think more broadly about the nature of the contribution programming can make to learning

‘Objects-to-think-with’

“= construal”

Example



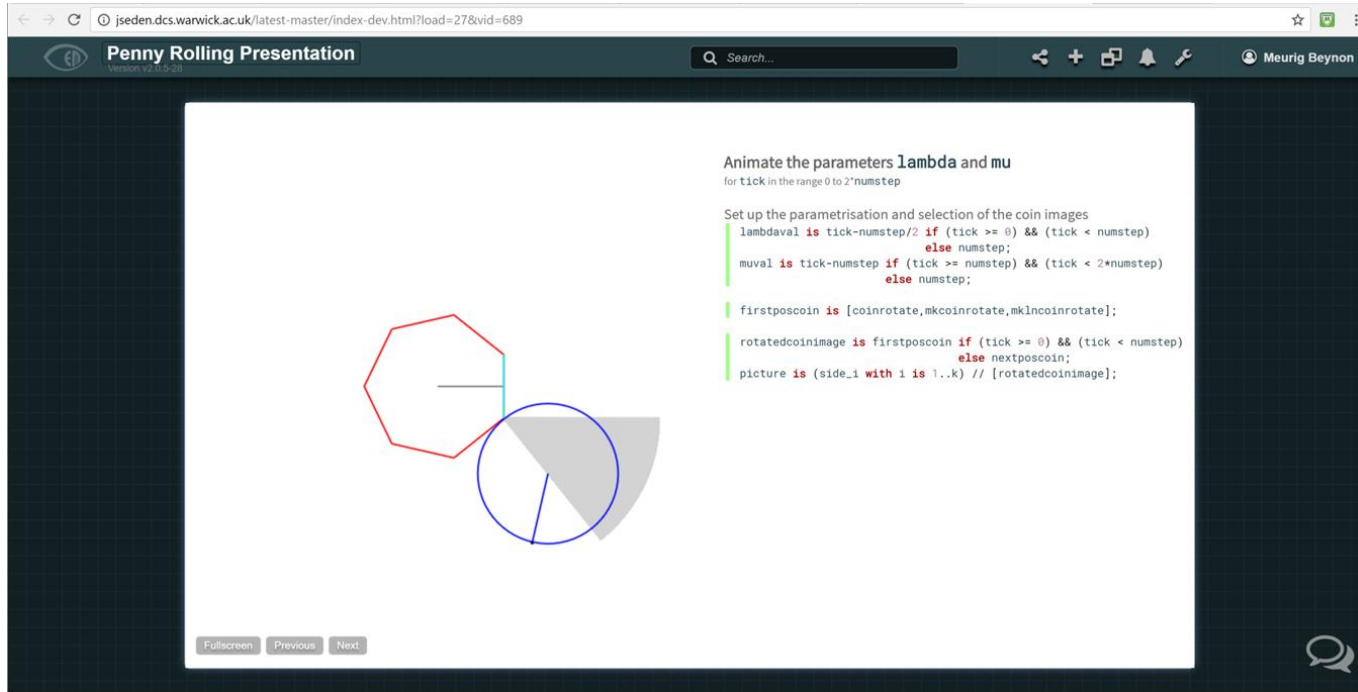
The **Penny Rolling** puzzle (cited in Mindstorms p. 150)

“If one penny rolls around another penny without slipping how many times will it rotate in making one revolution? ...”

“... One might guess the answer to be one, since the moving penny rolls along an edge equal to its own circumference, but a quick experiment shows that answer is two; apparently the complete revolution of the moving penny adds an extra revolution.”

Martin Gardner: *Mathematical Carnival*

Rolling penny “construal”



jseden.dcs.warwick.ac.uk/latest-master/index-dev.html?load=27&vid=689

Penny Rolling Presentation
version 02.0.0-28

Search...

Meurig Beynon

Animate the parameters λ and μ
for tick in the range 0 to $2 \cdot \text{numstep}$

Set up the parametrisation and selection of the coin images

```
lambdaVal is tick-numstep/2 if (tick >= 0) && (tick < numstep)
           else numstep;
muVal is tick-numstep if (tick >= numstep) && (tick < 2*numstep)
       else numstep;

firstposcoin is [coinrotate,mkcoinrotate,mkIncoinrotate];

rotatedcoinimage is firstposcoin if (tick >= 0) && (tick < numstep)
                  else nextposcoin;

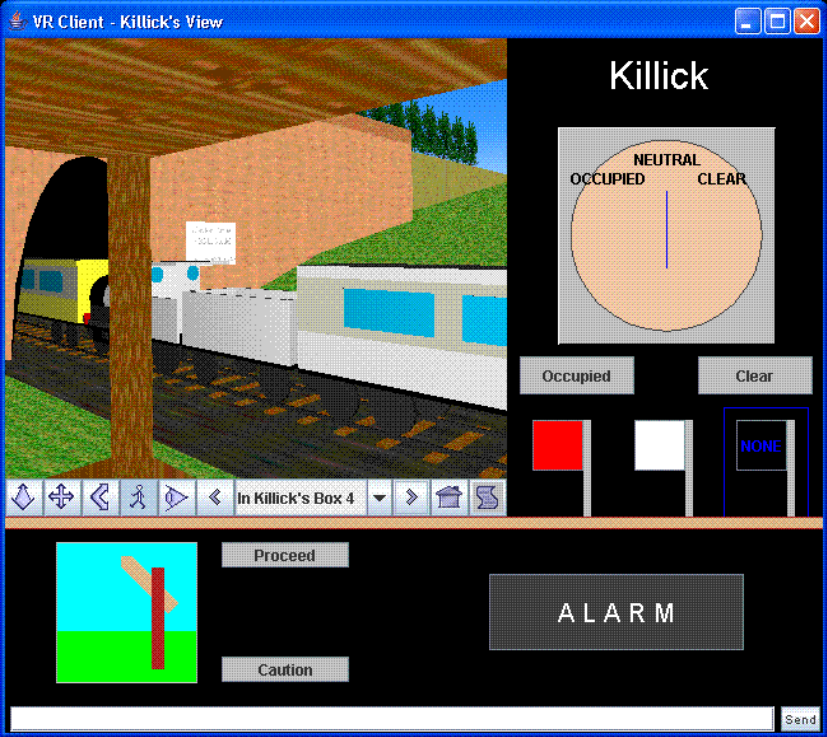
picture is (side_1 with 1 is 1..k) // [rotatedcoinimage];
```

Fullscreen Previous Next

History

- 1984 ARCA (student project)
- 1986 BTRL: Concurrent Systems Modelling
- 1987 Eden / the ADM / DoNaLD
- Agent-oriented modelling
 - Definitive representations of state
- 1992-2014 MSc modules (“Empirical Modelling”)
- CONSTRUIT! Sept 2014 – Aug 2017

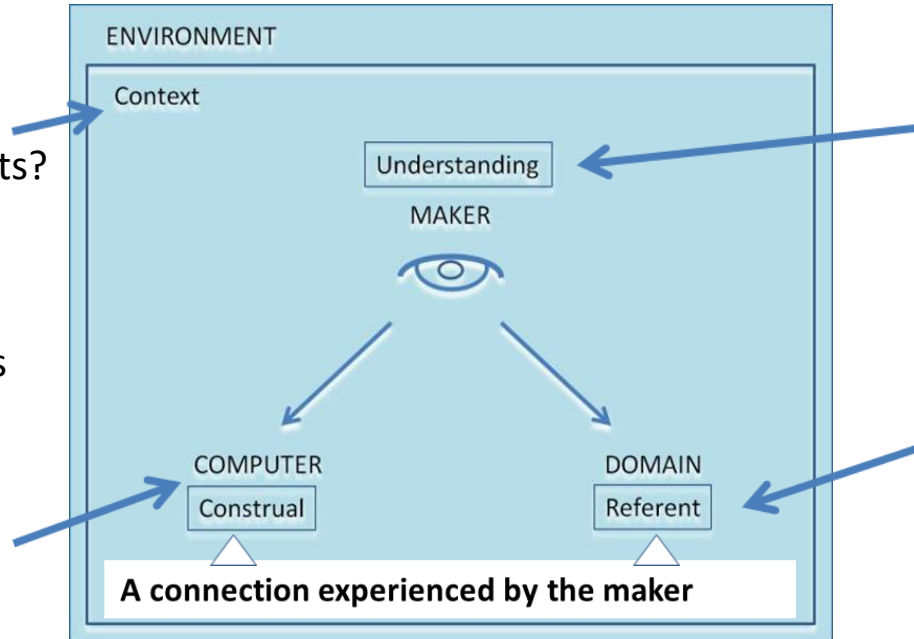
Clayton Tunnel simulation



Making a (“digital”) Construal

From which perspective is the maker making the construal e.g. Agents? Constraints?

Script of definitions of *observables* with associated **network** of *dependencies*



What interactions and interpretations is the maker familiar with? Convinced of? puzzled about?

What external subject does the maker have in mind when interacting with the construal?

EU Erasmus+ 2014-2017

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Helix5



“Making Construals as a new Digital Skill For Creating Interactive OERs”



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Constructionism and OERs

- Relevance to OERs: openness demands that OERs can be understood and repurposed
 - Demands that what is constructed can be approached by the non-specialist
- Key idea is to link construction as closely as possible to making connections within the subject domain

Challenges for OERs

- Problems of the OER culture ...
- Not a shortage of examples – re-use is championed but in practice not realised
- Obsolescence of software
- Highly attuned customisation is demanded
- The ‘right-answer’ mentality
 - support for plurality – can be adapted

Claims for investigation

- Accessibility
- Comprehensibility
- Collaboration
- Assessment
- Topical in relation to physical computing etc.
- Breadth of applications

A new digital skill for creating interactive OERs

Examples

Over to Meurig ...

Summary

A construal of the online resources for CONSTRUIT!

jseden.dcs.warwick.ac.uk/construit-v2.0/?load=49

More info:

construit.org

warwick.ac.uk/em

Empirical Modelling on Wikipedia:

en.wikipedia.org/wiki/Empirical_modelling

CONSTRUIT! 2017 Conference

Making, Thinking and Learning in the Digital Age

Thursday July 13th – Sunday July 16th 2017

University of Warwick

To contribute, join the CONSTRUIT 2017 Interest Group