



Making construals as a new digital skill for creating open educational resources

Meurig Beynon, Steve Russ and Jonathan Foss

Computer Science

University of Warwick



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New ways of using computers ...

... New ways of learning

Before writing a program we have to imagine the subject – for example, what it's about, the context of its use, how it will change.

Imagine managing your house heating 'intelligently', or managing a local sports event. We call such imaginings 'construals'. Usually our construals are 'in our heads' and maybe partly in documents.

The innovation in CONSTRUIT! is making construals on computers – *before* we make programs, and as an *approach to* programs.



New ways of using computers ...

... New ways of learning

CONSTRUIT! builds on previous research and development in Empirical Modelling and in educational technology over many years at Warwick. Team leaders at Warwick are:

Mike Joy (Co-ordinator)

Meurig Beynon

Steve Russ

<http://www2.warwick.ac.uk/fac/sci/dcs/research/em/>

<http://www2.warwick.ac.uk/fac/sci/dcs/research/edtech/>



New ways of using computers ...

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The CONSTRUIT! Project is part of an EU-funded Programme to share innovation and good practice in computing and ICT at all levels. It has a special focus on work in schools.

It is for 3 years with 6 partners. Warwick Computer Science is the 'lead', others in Edinburgh, Finland, Netherlands, Slovakia, Greece.

Starting: last September ... ! Initial meetings of partners were held at Warwick in October, December. Next meetings in Finland and Greece (April/May) will use material for students and teachers.



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The main objectives of CONSTRUIT! are:

- to use the computer to help us in 'making construals';
- to make this widely available to students and teachers;
- to make this facility useful for learning;
- to evaluate the effectiveness of our approach and methods.



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For all those objectives we are calling for collaboration with students and teachers who are willing to try out our materials.

Anyone can experiment with current environments already, you may find they are not easy to use..... We hope that will change!

Later this term we shall call for 'evaluators' (teachers and students) to register with us for specific and on-going feedback on the environments and their illustrative applications.



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Places to find out more:

<http://www2.warwick.ac.uk/fac/sci/dcs/research/em/construit/>

(Local site with links to resources for an open online course)

<http://www.construit.org/>

(The official site under development)

For enquiries: (Meurig)

(Steve)

wmb@dcs.warwick.ac.uk

steve.russ@warwick.ac.uk

Qualities of / aspirations for
making construals

Basic concepts

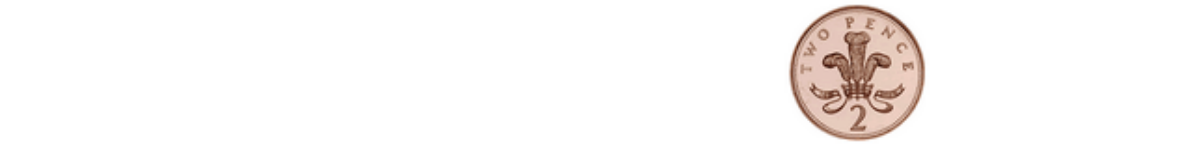
Scripts of definitions capturing

- Observables
 - Dependencies
 - Agents / agency
- a playground for exploring agent interaction
- “Metaphorical” representations of state

Characteristics

- Capturing understanding of state and potential for state change in a domain
- Provoking reflection on the basis for understanding and misunderstanding
- Potentially personal and subjective

Canvas HTML5 [picture]

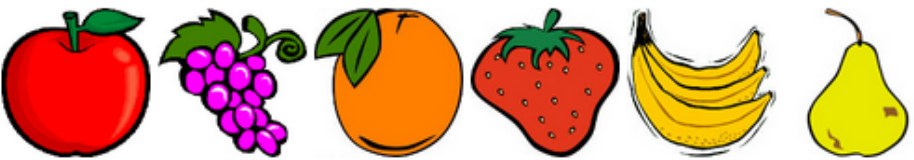


Content of purse

50p 2p 5p 5p 50p 2p 5p 20p



Coins tendered



Items for Sale

1.5 0.36 1.25 1 0.4 2.48



Basket Content

```
Observable List [view_0]
basket|bill|items
itemsselected = [0, 1, 0, 1, 0, 0]
basket = ["id2", "id4"]
bill = 1.3599999999999999
baskethtml = " <div class="simple"> <table border="0" a
basketdisplay = Div(basketcontent, 10, 350, ...)
items = [{"id1", 1.5}, {"id2", 0.36}, {"id3", 1.25}, {"id4", 0.36}, {"id5", 1.0}, {"id6", 0.4}, {"id7", 2.48}]"
```

```
Function List [view_2]
whic|cost|coi
costitems
coindisplayhtml
whichcoinabovemouse
whichitemabovemouse
```

```
Observable List [view_1]
purse|coins|tendered
coinshtml = "<h2>Britain</h2> <p>1 Pound sterling = 100
purse = [50, 2, 5, 5, 50, 2, 5, 20]
coinsselected = [1, 1, 1, 1, 1, 0, 1, 1]
pursehtml = " <div class="simple"> <table border="0" al
pursedisplay = Div(pursecontent, 10, 10, ...)
tendered = 1.37
```

```
Agent List [view_3]
make
makecoinselection
makeitemselection
```

```
Observable List [view_4]
change|short|hav
haveenoughmoney = true
shortfall = 0
change = 0.01
```

To explore the demo for yourself ...

1. Launch the JS-EDEN environment. The best tested version is currently:

<http://jseden.dcs.warwick.ac.uk/construit.c5/>

2. Enter the following command in the Input Window, and press **Submit**:

```
include("models/shopping/shop7.js-e");
```

Read the brief introduction to the construal in the **Plain HTML View**.

3. To set up the environment as pictured in the previous slide, use the **New** drop-down menu to create suitable views then type in the expressions that are displayed in the search boxes in these views.

Issues to consider

- Enough / exact change for bus-fare home
- Exact payment for item / simplifying change
- Cooperative purchase
- Quantity of items at a certain cost per item
- Different currency / exchange rate
- Saving up pocket money
- Representation of cash $103\text{p} = \text{£}1\text{-}03\text{p} = \text{£}1.03$

Target themes

- Collaborative development and interaction
 - concurrent environment for making construals
 - integrating contributions from participants with diverse levels of expertise
- Integration with other resources e.g. combining the demo with the construal of giving change by a former MEng student – cf. the paper:
<http://www2.warwick.ac.uk/fac/sci/dcs/research/em/publications/web-em/01/greedy.pdf>
- Scope for empirical study with teachers and pupils in local schools