



Design Thinking

How can it be transformed to serve a sustainable educational models?

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What is Design Thinking (DT)?

- A method of work and a type of project in Industrial Design
- A way to learn and to be a creative citizen – designerly thinking
- A type of Project in mainstream schooling
- Co-creation, design, engagement with real life issues, transdisciplinary and wicked problems, designing tools and services to meet identifiable problems in individuals, society, environment



A critical review of DT in mainstream education so far

- Learning process and content
- DT and the teacher
- DT and the school context
- overall criticism



Main themes:

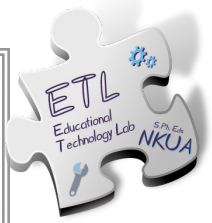
Learning process and content

- DT and creativity: from lack to overconfidence
- DT exposes the challenge of learning through productive failure
- DT exposes the lack of tolerance for ambiguity
- DT and problems in group dynamics
- DT and the gap between process and subject domain
- DT vs academic, thinking rigour
- Does DT support robust resilient learning gains?



Main themes: DT and the teacher

- Teaching practice in a DT course
- Teacher challenges
- The teacher as designer of DT courses
- Professional development for DT



Main themes:

DT and the school context

- The problems with connecting DT to curriculum
- Time economy and connecting to school structure, scripts and norms



Main themes: overall criticism

- Is DT a boondoggle?
- Is DT innovation 'hot air' ?



The ExtenDT2 approach

- Use expressive constructionist digital media to
 - Enhance the DT educational value
 - Provide a sustainable model for DT implementation in mainstream education
 - Allow for unlimited access, equity and inclusion in the DT experience for learning and citizenship
- Enhance such media and ensuing DT practices with emerging technologies



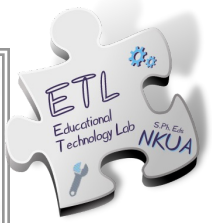
The ExtenDT2 approach

- The use of digital artefacts built with authoring systems allows for robust longitudinal learning gains
 - Embedded concepts and skills, cultivate creativity, legitimising productive failure
- Digital media as tools for modelling and co-construction
- Digital artefacts as rapid prototyping tools and as DT productions
- The productions are tangible and in the form of models for user enjoyment, reflection, creation and design for commercial solutions



The ExtenDT2 approach

- Can be embedded in transdisciplinary school projects involving the use of digital media and the cultivation of 21st century skills such as computational thinking
- There is possibility for a wide range of problem areas including wicked problems but not exclusive to these
- Requires professional development connected to the cultivation of 21st century skills and CT
- Connection to commercialisation is not necessary, the productions can be addressed as instantiations of ideas for future commercial solutions
- Analytics can provide assessment infrastructure

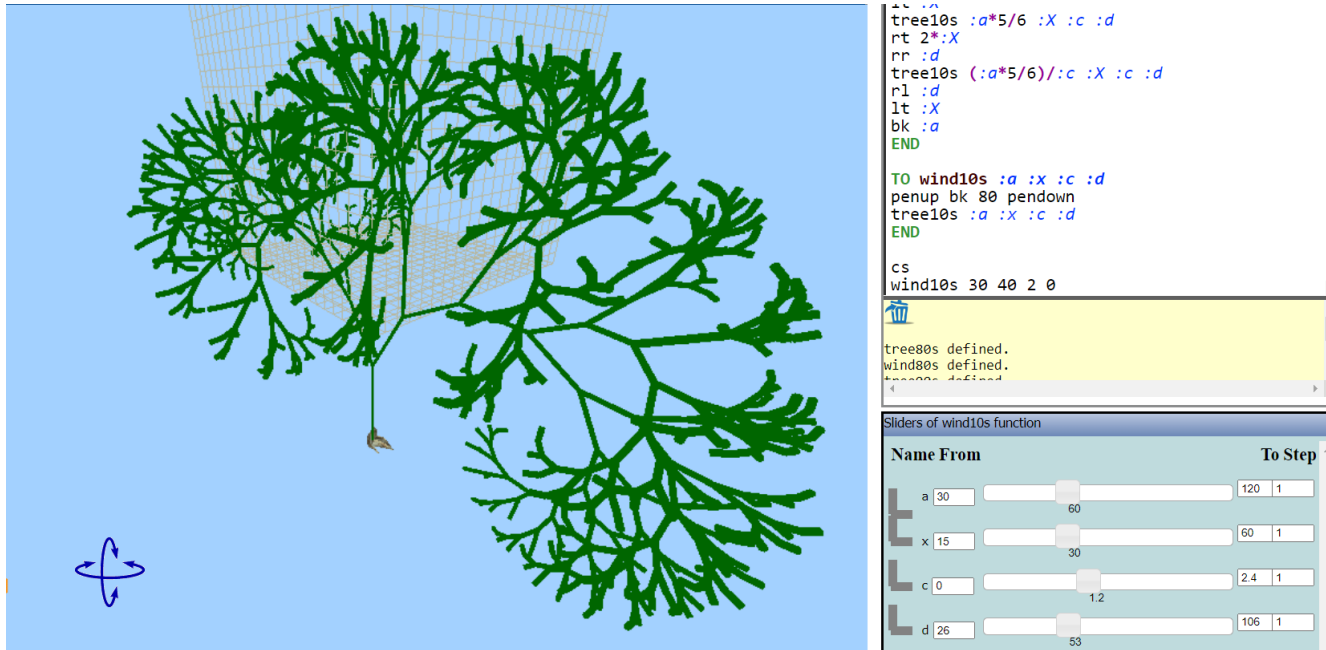


The ExtenDT2 model: examples of digital media for DT

- Authoring Systems affording 'design for all'
- Computational Thinking: Embedded Concepts & afforded practices
- Authorable socio-scientific issues
- Modelling, making choices, classifying

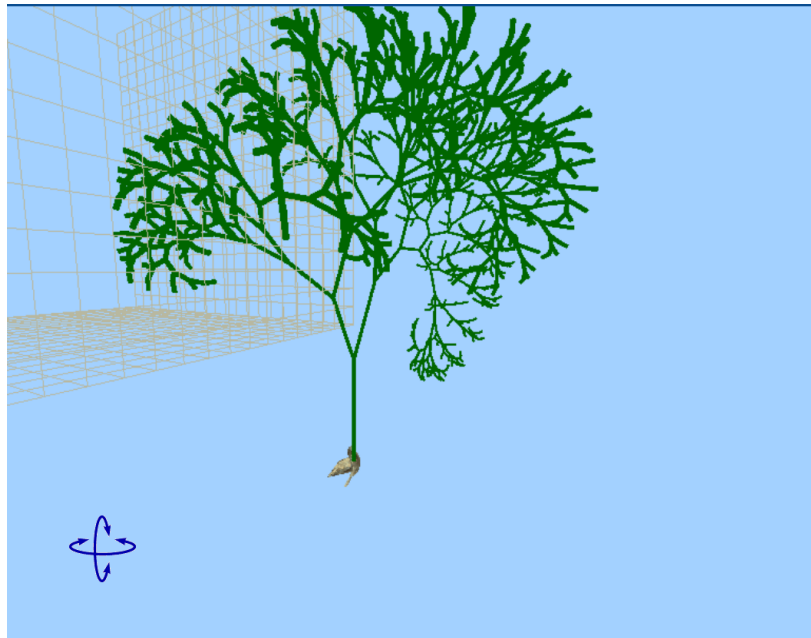


The ExtenDT2 technologies (1): 'MaLT2' – MachineLab Turtleworlds Programmable modelling of 3D animated figural models <http://etl.ppp.uoa.gr/malt2>





A tree in the wind



```

tree10s :a*5/6 :X :c :d
rt 2*:X
rr :d
tree10s (:a*5/6)/:c :X :c :d
rl :d
lt :X
bk :a
END

```

```

TO wind10s :a :x :c :d
penup bk 80 pendown
tree10s :a :x :c :d
END

```

```

cs
wind10s 30 40 2 0

```

```

tree80s defined.
wind80s defined.

```

Sliders of wind10s function

Name	From	To	Step
a	30	60	120 1
x	15	30	60 1
c	0	1.2	2.4 1
d	26	53	106 1



The ExtenDT2 technologies (2): 'ChoiCo' A 'choices with consequences' sustainability game for socio-scientific issues <http://etl.ppp.uoa.gr/choico>

Covid_Risk ↑ Physical ↑ Fun ↑ Social ↑ Money ↓ No of Choices

24 135 60 78 15 3

+

-

Birthday Party

Enter Home

Super Market

Local Store

Running

Play Football

Walk with a friend

Rest at the Park

Shopping at the Mall

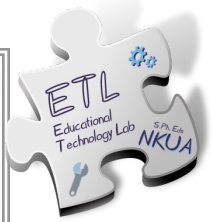
Bank

Point Information

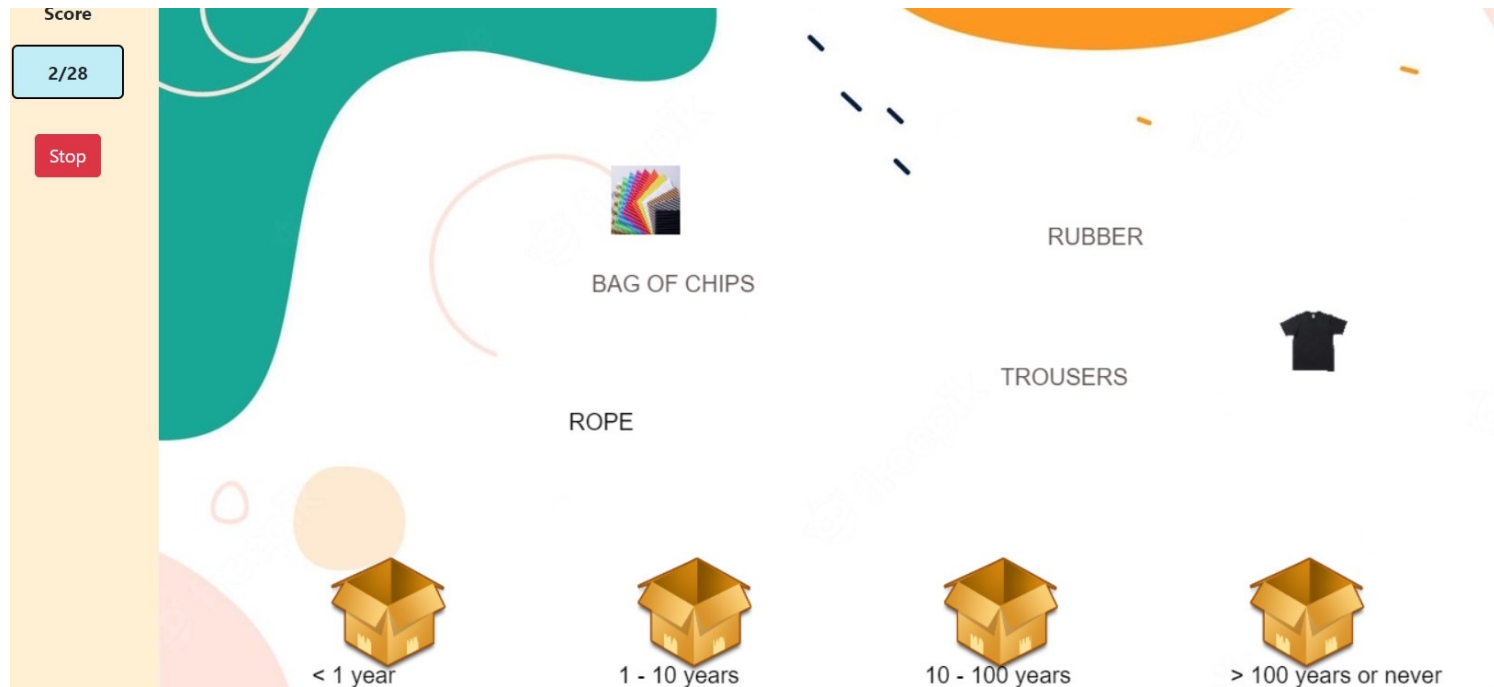
Description	Walk with a friend
Covid_Risk	Covid_Risk+ rand (5, 15)
Physical	20
Fun	20
Social	30
Money	-5

Select Point

Leaflet

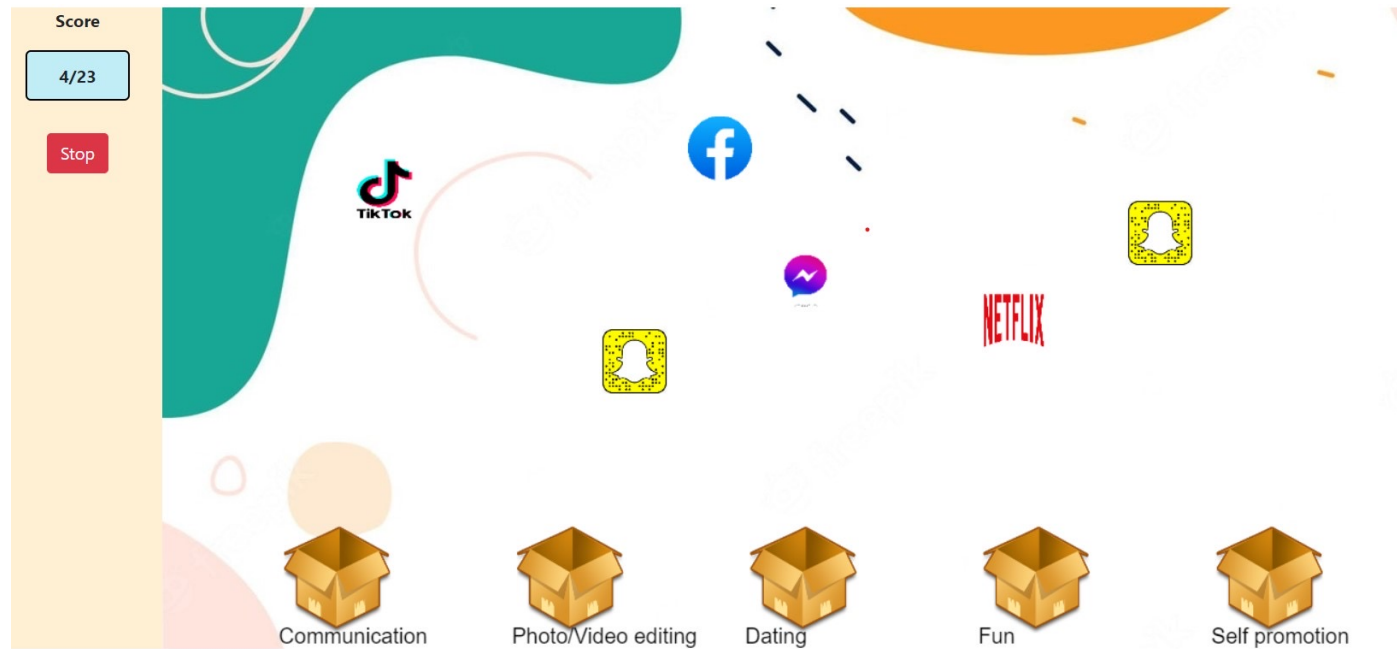


The ExtenDT2 technologies (3): 'SorBET' a sorting tetris-like game for whatever it makes sense to classify <http://etl.ppp.uoa.gr/sorbet>





Classifying to grapple with complex unclassifiable issues





Extending the media with emerging technologies to further serve

- Analytics and AI
- Augmented reality
- 3D printing



Contact and resource details

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ExtenDT2: extending Digital Thinking with Digital Technologies

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**Co-funded by
the European Union**

11-05, project 101060231