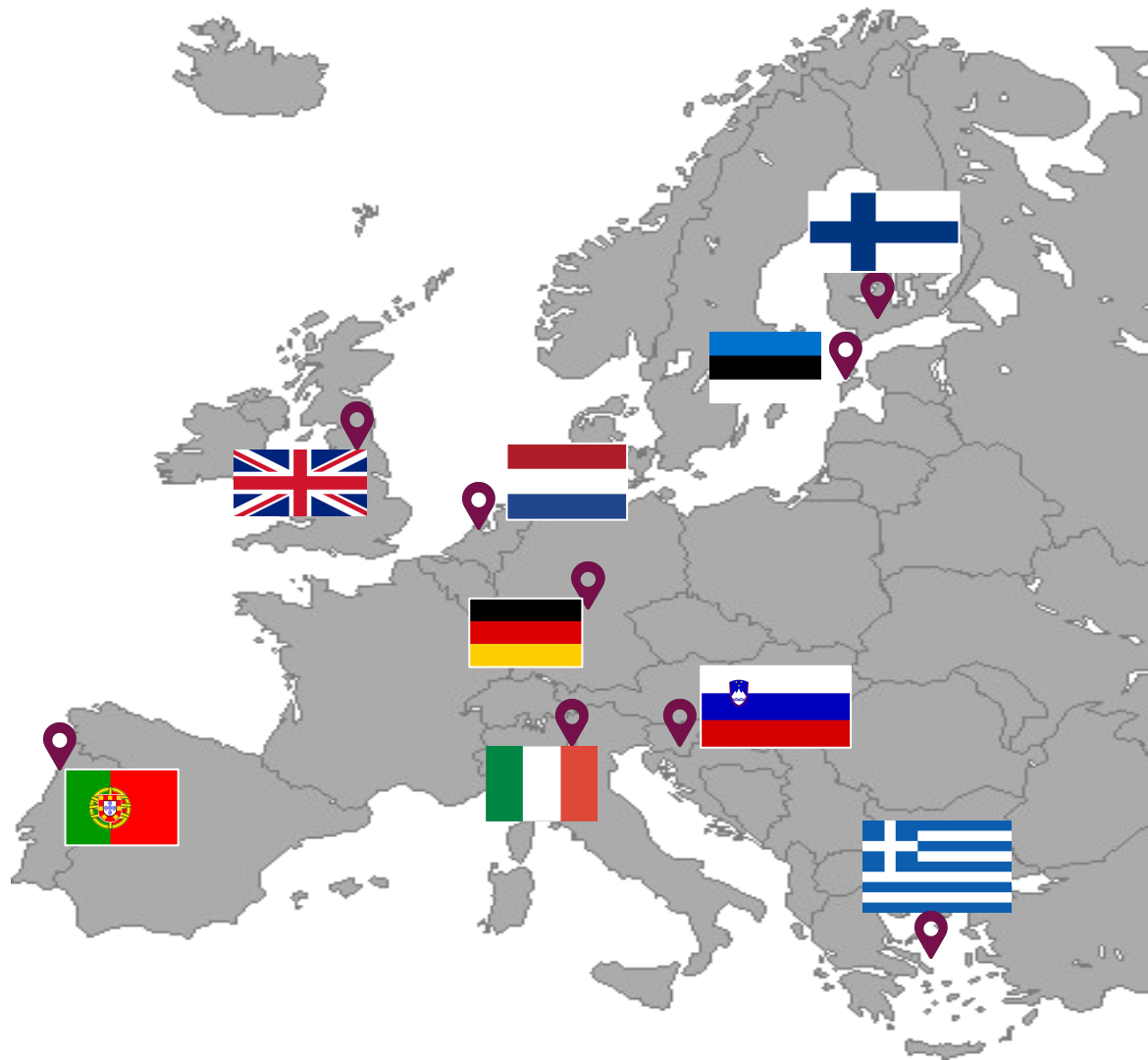


Design^{STEM}

e-tools for the integrated education of design and STEM





Design STEM



Partners



ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ
UNIVERSITY OF PIRAEUS



Fakulteta za
informacijske študije
Faculty of information studies

GUTENBERG
SCHULE



ipb
INSTITUTO POLITÉCNICO
DE BRAGANÇA



LUMA CENTRE FINLAND

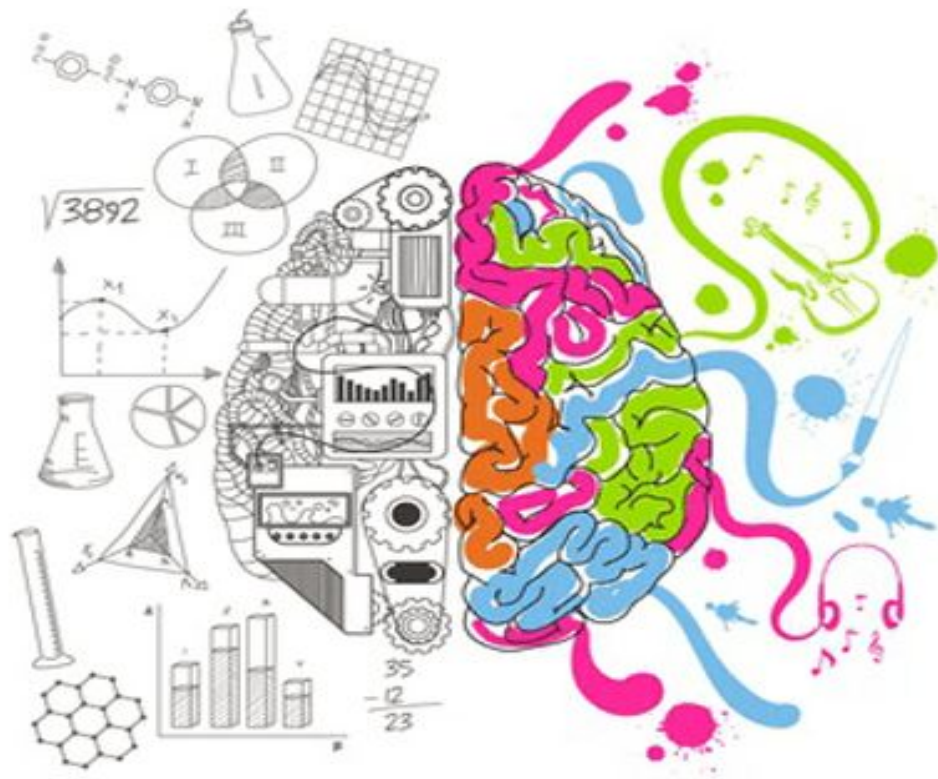


Chi siamo

Who we are?

ricercatori
docenti
artisti

Design^{STEM}



Chi siamo

Who we are?

Design STEM



LINK

Come abbiamo lavorato
How we did it?

Design STEM

Creative and Co-operative Modus Operandi



NL: TRIANGLE BEACH

Host: Sandra

PROG-
RAMMING

CRAFT/
INDUSTRIAL
DESIGN

3D
MODELLING

STEM
INPUT

geometry!

Eleni
Serialisation

2D

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NL: SUNSHADE

Host: Horika

PROG-
RAMMING

CRAFT/
INDUSTRIAL
DESIGN

3D
MODELLING

STEM
INPUT

geometry!

Eleni
Serialisation

2D

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NL: STRANDBEEST

Host: Horika

PROG-
RAMMING

CRAFT/
INDUSTRIAL
DESIGN

3D
MODELLING

STEM
INPUT

geometry!

Eleni
Serialisation

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EST/KUR: STROBOSCOPIC VINYL

Host: Horika

PROG-
RAMMING

CRAFT/
INDUSTRIAL
DESIGN

3D
MODELLING

STEM
INPUT

geometry!

Eleni
Serialisation

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NL: 2D→3D PATTERNS

Host: Sandra

PROG-
RAMMING

CRAFT/
INDUSTRIAL
DESIGN

3D
MODELLING

STEM
INPUT

geometry!

Eleni
Serialisation

2D

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2D

NL: MATERIAL WASTE / BONE CHAR

Host: Sandra

PROG-
RAMMING

CRAFT/
INDUSTRIAL
DESIGN

3D
MODELLING

STEM
INPUT

geometry!

Eleni
Serialisation

2D

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FI: WUSHROOMS TATTOO (BIOSENSING)

Host: Sandra

PROG-
RAMMING

CRAFT/
INDUSTRIAL
DESIGN

3D
MODELLING

STEM
INPUT

geometry!

Eleni
Serialisation

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NL: MATERIAL WASTE / FLAX CHAIR

Host: Sandra

PROG-
RAMMING

CRAFT/
INDUSTRIAL
DESIGN

3D
MODELLING

STEM
INPUT

geometry!

Eleni
Serialisation

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NL: MATERIAL WASTE / IVORY TUSE

Host: Sandra

PROG-
RAMMING

CRAFT/
INDUSTRIAL
DESIGN

3D
MODELLING

STEM
INPUT

geometry!

Eleni
Serialisation

2D

2D

2D

2D

Perchè questo progetto

Why we did it?

Design STEM

Le discipline STEM **STEM disciplines**

S = science = physics, chemistry, biology (fisica/chimica/biologia)

T = technology (tecnologie)

E = engineering (informatica)

M = math (matematica)

sono **poco studiate in Europa** pur essendo fondamentali per ogni ambito di studio e lavoro.



Perchè questo progetto *Why we did it?*

Design STEM

L'obiettivo del progetto è stato evidenziare **l'importanza** delle

STEM

e **renderle più attraenti** integrandole con il

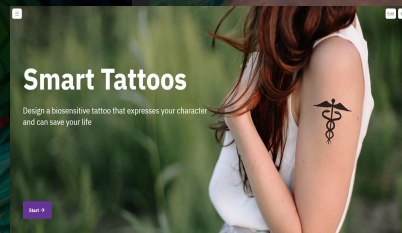
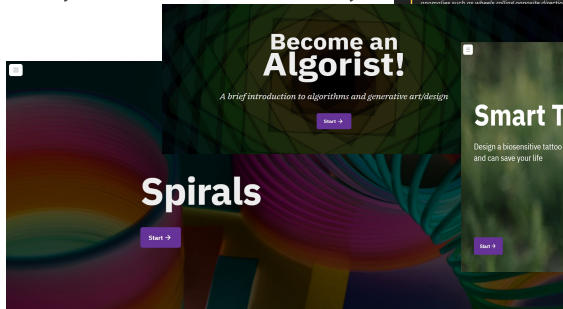
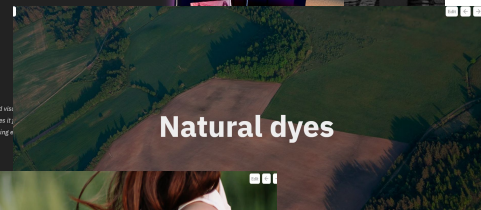
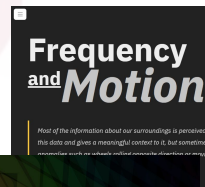
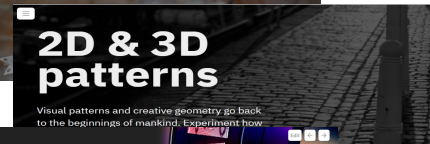
Design



What we did

Risultato del progetto

- 15 progetti Creative Commons “ready to use”
- Facilmente adattabili alle proprie esigenze
- Ricchi di etools: animazioni, simulazioni, materiali multimediali...



Destinatari

Target groups

Studenti di design (15 - 25 anni)

Studenti STEM (15 - 18 anni)





Struttura pedagogica e digitale

Pedagogical and digital framework



5E



Fachwerk

Progetti Didattici Projects

Design STEM

timetable

name

Frequency and Motion

🕒 20 min + 15 min + 45 min + 10 hrs extended exercise

👤 Individual work or 2-5 people in group

🔧 turntable, paper, scissors, pencil(s), printer, smartphone / tablet / computer

[Go to project →](#)

materials

class settings

description

Learning goals

Students learn to define *frequency* and *motion* *philosophically* and *technologically* by *hands-on* tasks such as creating a simple *analogue animation* with the help of the turntable.

Motivation

It is clear that as technology is advancing rapidly, teaching and its methods are evolving towards digitization. Thus, it's

Progetti Didattici: strumenti

Projects: etools

Design STEM

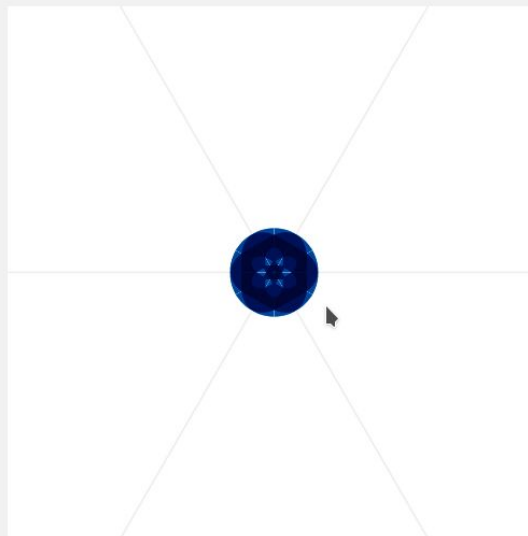
Result 3.1

over 100 *interactive components* for teachers and students to build custom-made projects

– plus several *interactive "playgrounds"*, where components can be mixed and matched and experimented with

Next →

This is an interactive example from our Patterns project



We can combine the *reflection* and *transformations* we learned earlier.

Around x axis 0



Around in y axis 0



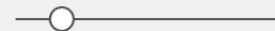
Element rotation 0 ×



Number of rotations 6



Element scale 1



Progetti Didattici: Fachwerk

Projects: Fachwerk

Design^{STEM}

**COME FARE
DESIGN+STEM sul WEB?**



Fachwerk



Progetti Didattici: Fachwerk

Projects: Fachwerk



Fachwerk

A VueJS and Markdown based framework for creating interactive learning materials.

DesignSTEM



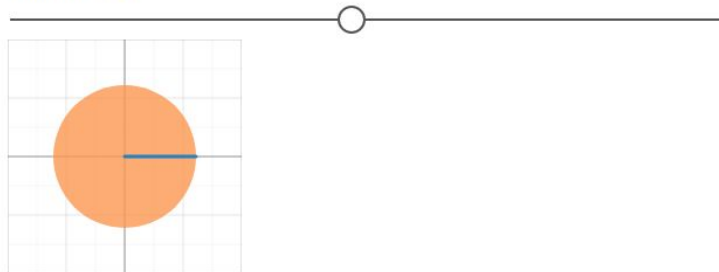
Progetti Didattici: Fachwerk

Projects: Fachwerk

Circle *area* and *radius*

Let's explore further, this time circle area *a* and radius *r*, but let's make *r* an adjustable parameter:

r value is 1.22



$$a = \pi \cdot r^2$$

$$a = 3.141592653589793 \cdot 1.22^2 = 4.675946505603048$$

http://www.buonarroti.tn.it/designstem_fachwerk/

```
<f-slider
```

```
  from="0.5"
```

```
  to="2"
```

```
  step="0.01"
```

```
  set="r"
```

```
/>
```

```
<f-scene grid width="200" height="200">
```

```
  <f-circle
```

```
    :fill="color('orange')"
```

```
    stroke-width="0"
```

```
    opacity="0.8"
```

```
    :r="get('r',1)"
```

```
  />
```

```
  <f-line :x2="get('r',1)" :stroke="color('blue')" />
</f-scene>
```



Raccolta delle unità didattiche *Final e-tool*

<https://designstem.github.io/projects>

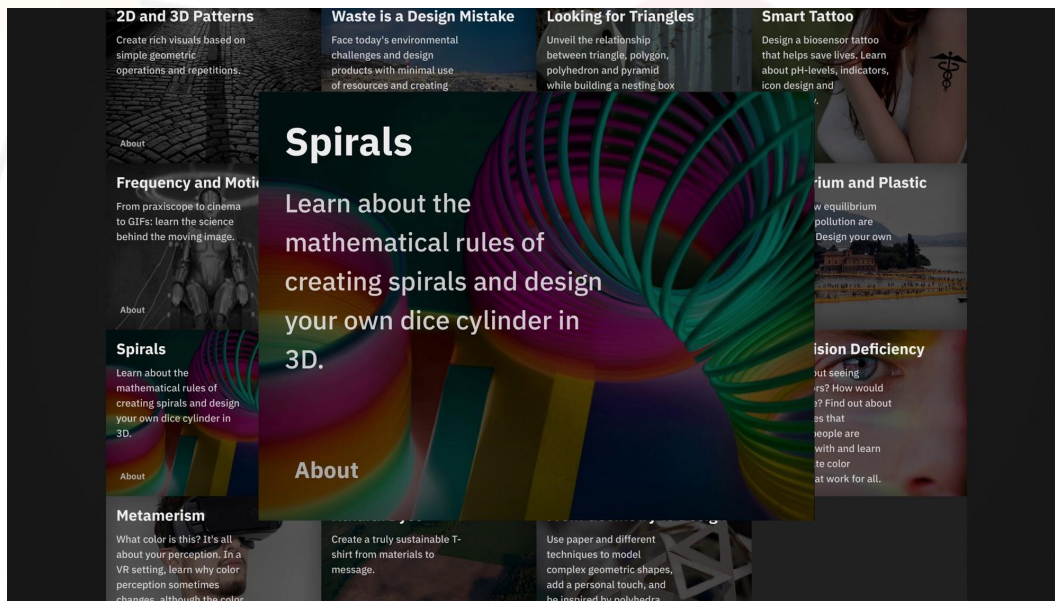
Oppure dal sito web dell'istituto www.buonarroti.tn.it -
sezione internazionalizzazione



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Raccolta delle unità didattiche

Final e-tool



LINK



GRAZIE PER L'ATTENZIONE