

Tinkering in Informatics as Teaching Method

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background:

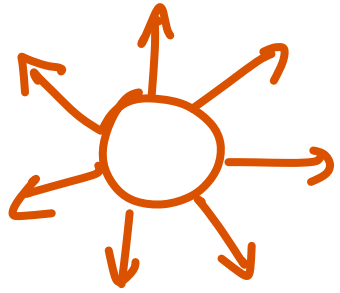
Creative Technology

▶ multidisciplinary bachelor programme

▶ diversity

background
ambition
gender
nationalities

electrical engineering
computer science
maths
design
human factors
economy/business
projects
...

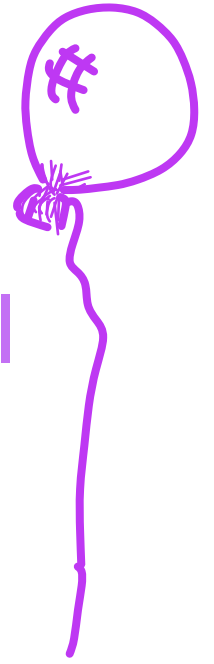


starting seemingly undirected

curiosity driven

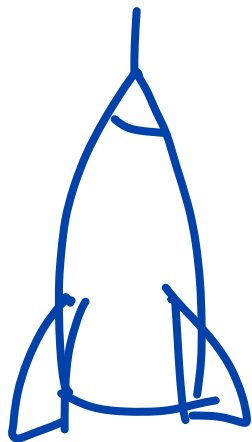


playful



tinkering

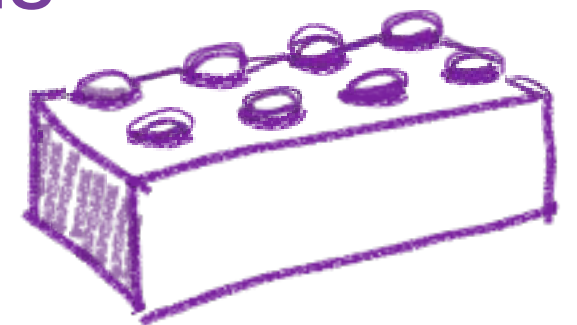
define own challenges and goals



building prototypes

explore materials, concepts & methods

iterative



The tinkering approach is characterised by a playful, experimental, iterative style of engagement in which makers are continually reassessing their goals, exploring new paths and imagining new possibilities.

hands on
knowledge

use technology
for new
applications

raising
questions

tinkering:
contribution in
academic teaching

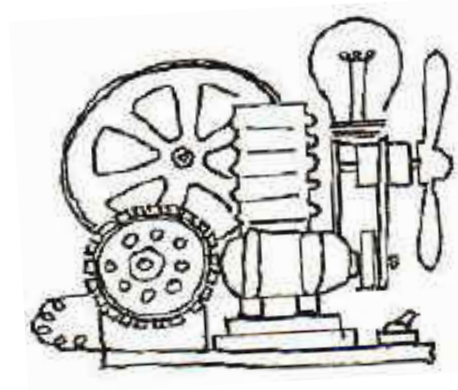
increase of
personal
toolbox

problem
framing

making
design
decisions

reflection

implementing tinkering in informatics teaching



assignment
open problem by the teacher
badly framed problem
own problem

design goal

starting motivation
examples
discussion
other students



seed

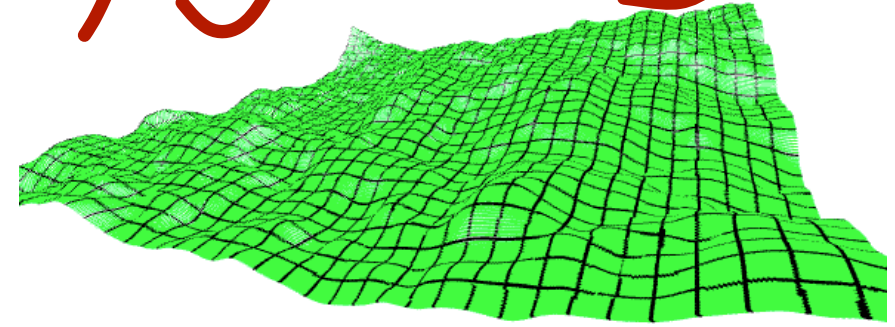
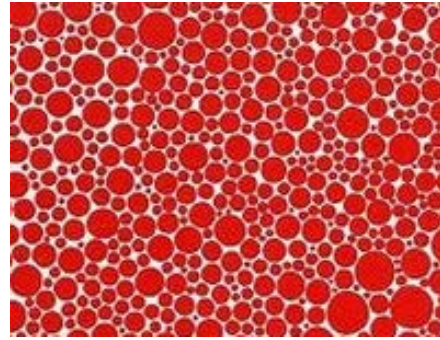
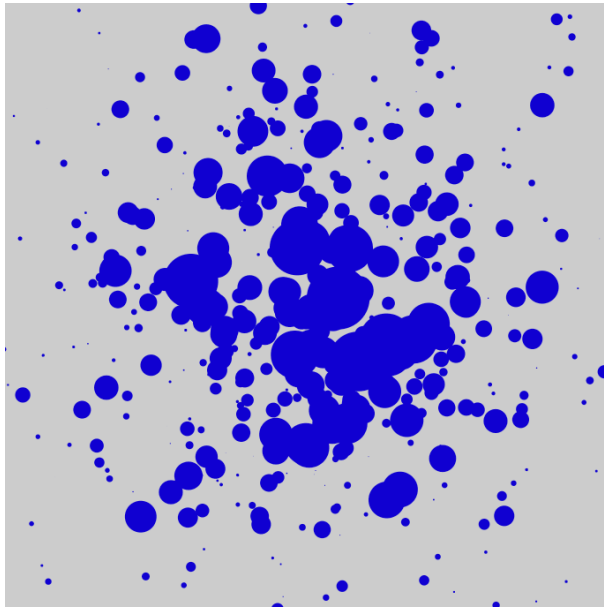
toolbox

instructions
algorithms

programming style

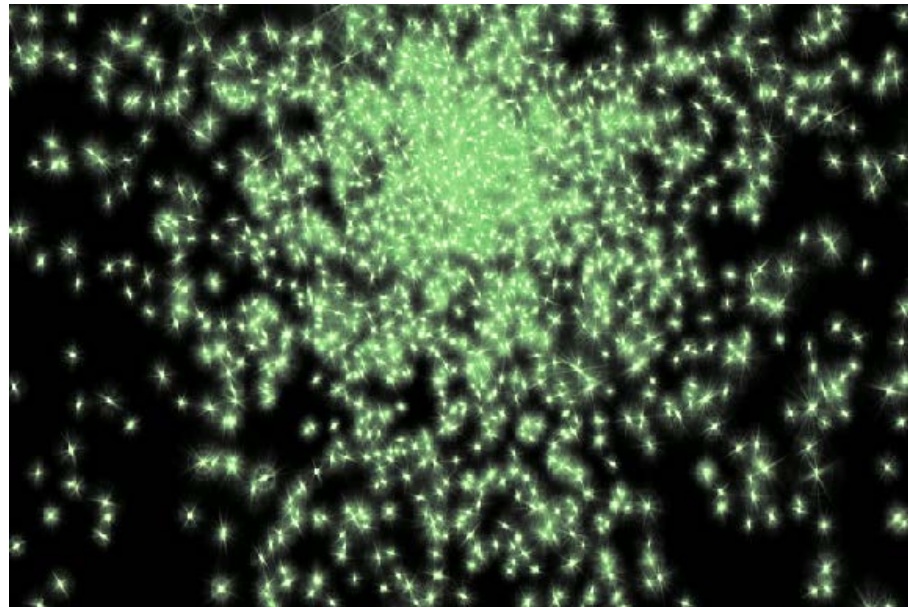
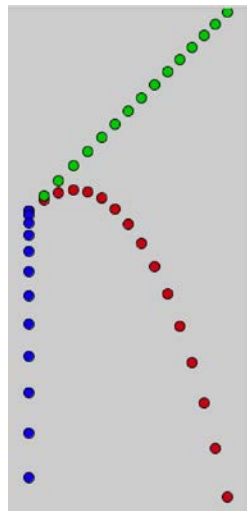


toolbox elements for programming



randomness

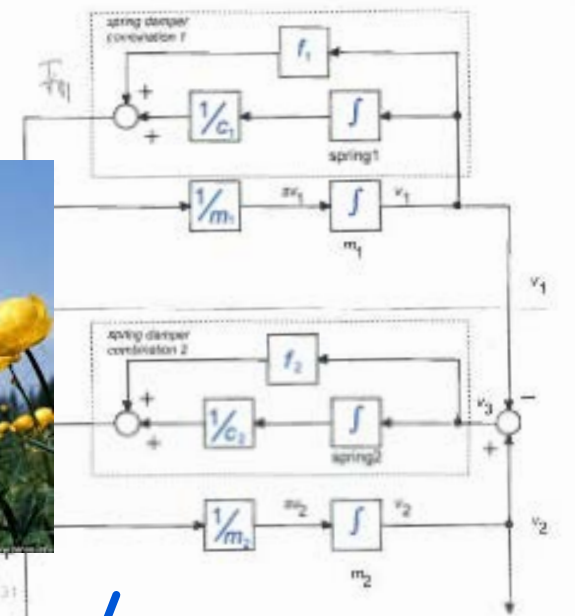
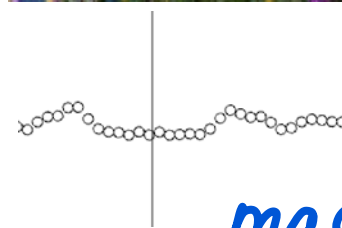
forces



particles



flocks



physics:
mass-spring-damper

results, observations & challenges

we can handle huge diversity in background

very little dropout

no gender differences in performance

plagiarism is not an issue

feedback intensive

students have fun doing assignments

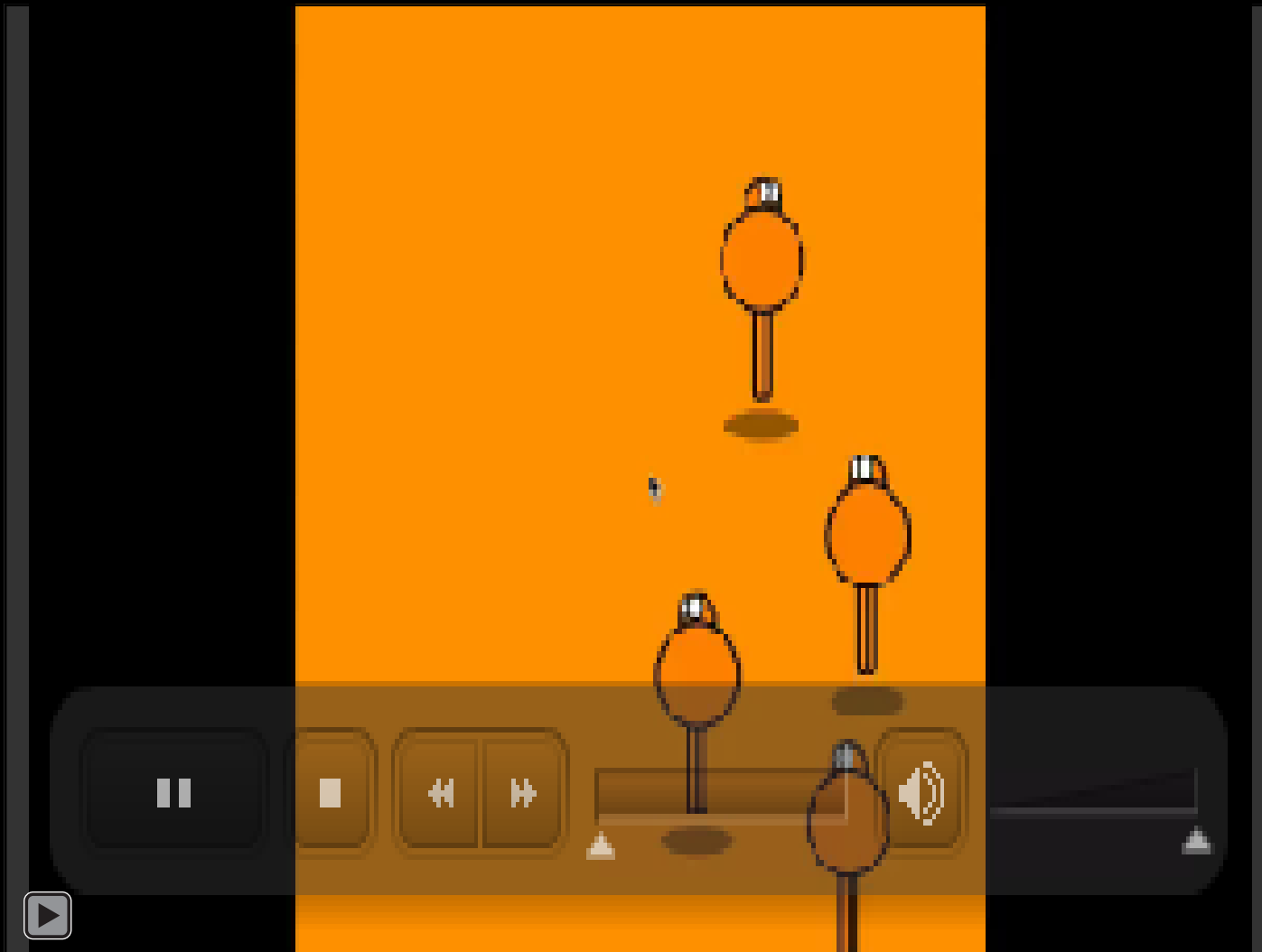
students challenge each other

some students stick to a school mindset (reproducing vs playing)

make the approach scalable:

- student assistants

- automated analysis of standard issues in programming style



Quality Criteria of



Science

truth
universality
theoretic consistence
coherence
simplicity
empirical adequacy

Engineering

practical success
applicability
reliability
effectiveness
efficiency

