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
...
tinkering

- curiosity driven
- iterative
- starting seemingly undirected
- playful
- define own challenges and goals
- explore materials, concepts & methods
- building prototypes
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.
tinkering: contribution in academic teaching

- hands on knowledge
- use technology for new applications
- increase of personal toolbox
- reflection
- making design decisions
- problem framing
- raising questions
implementing tinkering in informatics teaching

assignment
open problem by the teacher
badly framed problem
own problem

design goal

starting motivation
everyday examples
discussion
other students

seed

toolbox

instructions
algorithms
programming style

other students
toolbox elements for programming

randomness

forces

particles

flocks

physics: mass-spring-clamp
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