



# Robotics in the curriculum for primary and secondary education in the Netherlands

SLO • nationaal expertisecentrum leerplanontwikkeling

Allard Strijker & Victor Schmidt, SLO - Netherlands Institute  
For Curriculum Development 2020-01-13 Robotics CIDREE  
Expertmeeting

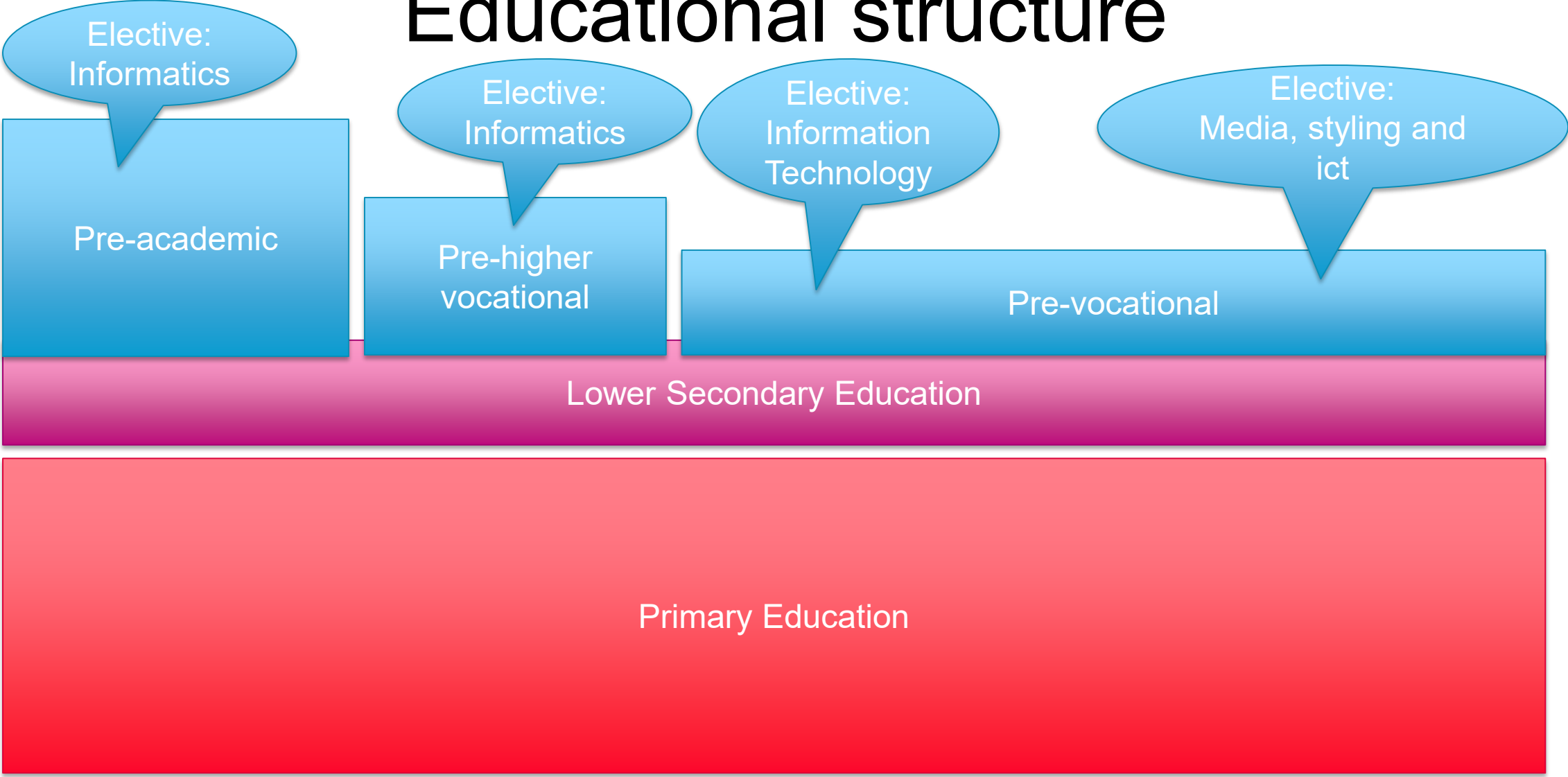
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# About SLO

- Netherlands Institute for Curriculum Development
- Assigned by Ministry of education
- Task: design and validation of national curricular *frameworks*  
(core objectives,  
attainment levels,  
examination programs)



# Educational structure



# The Dutch curriculum

- In 1993 attainment targets ('goals to strive for') for primary and lower secondary education were formulated (upper secondary education uses the examination program as goal)
- At this moment it is a mixture of common attainment targets ('goals to strive for') covering the whole range of subject domains and common standards ('goals to attain') for literacy and numeracy
- But: there is not one curriculum framework that provides a common, comprehensive and cohesive answer to the question of what is of most worth learning and teaching (freedom of education!)

# Freedom of education

- Schools are allowed to set up their own curriculum within the field of the national curricular framework
- Our national curricular frameworks concentrate on concepts and skills to be learnt by students
- In only a few cases contexts are part of our curricular framework, for instance 'climate' or 'Europe'
- Schools are free to choose contexts which they consider as suitable to attain concepts and skills
- Robotics serves roughly as such and therefore is not a compulsory part of our curricular framework

# Daily life Robotics...and education

**Robotics** is an interdisciplinary branch of engineering and science that includes mechanical engineering, electronic engineering, information engineering, computer science, and others. Robotics deals with the design, construction, operation, and use of robots, as well as computer systems for their control, sensory feedback, and information processing.

(<https://en.wikipedia.org/wiki/Robotics>)



Heb je een vraag? Stel hem aan onze virtuele assistent.

Tele2 zegt: Wil je weten wat het bellen in of naar het buitenland kost?

Jij zegt: ja

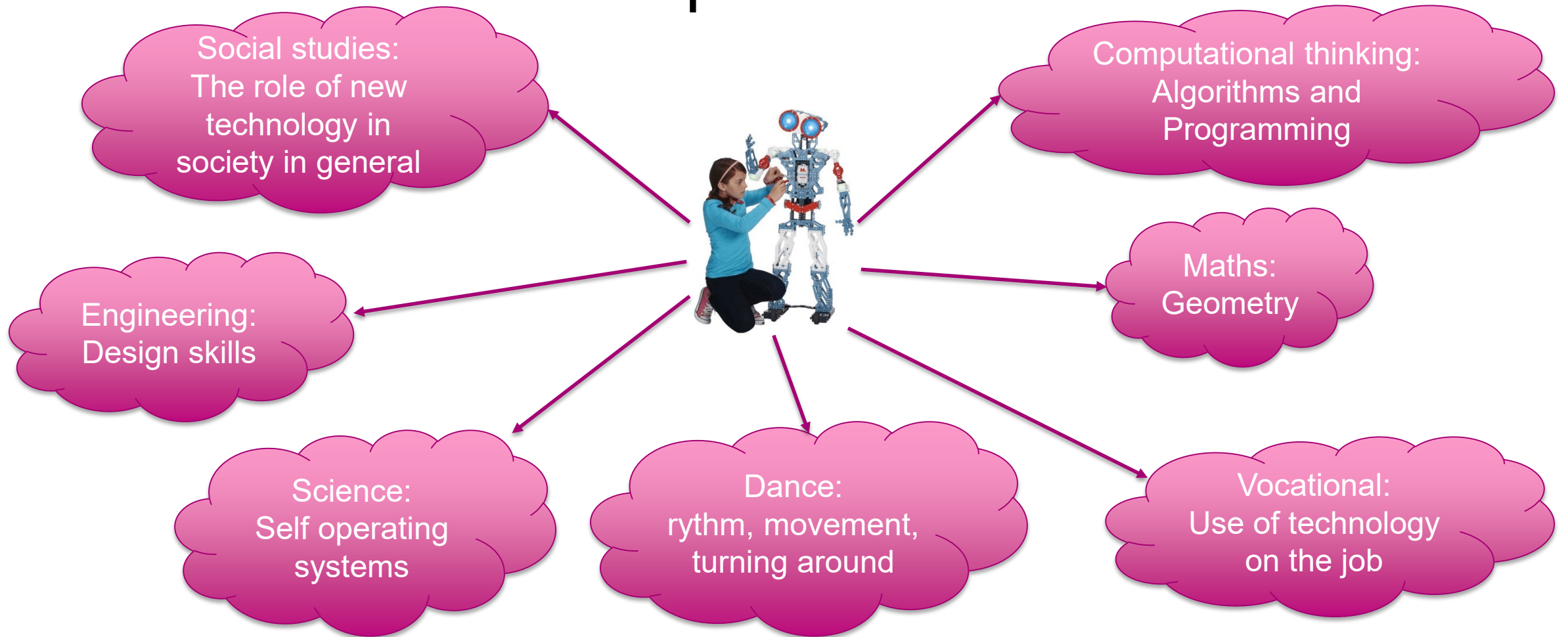
Tele2 zegt: Gaat het over je mobiele telefoon?

Jij zegt: ja

Tele2 zegt: Heb je een abonnement met telefoon of gaat het om Sim Only of Prepaid?



# Robotics as a context for learning concepts and skills



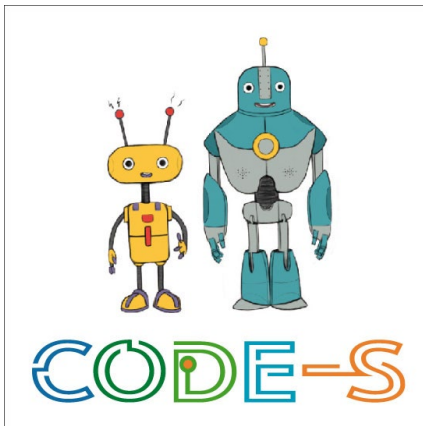
# Local initiatives

- Initiated by local or nation-wide companies or educational editors
- Much focus on primary education



BOMBERBOT

B-Bot.nl



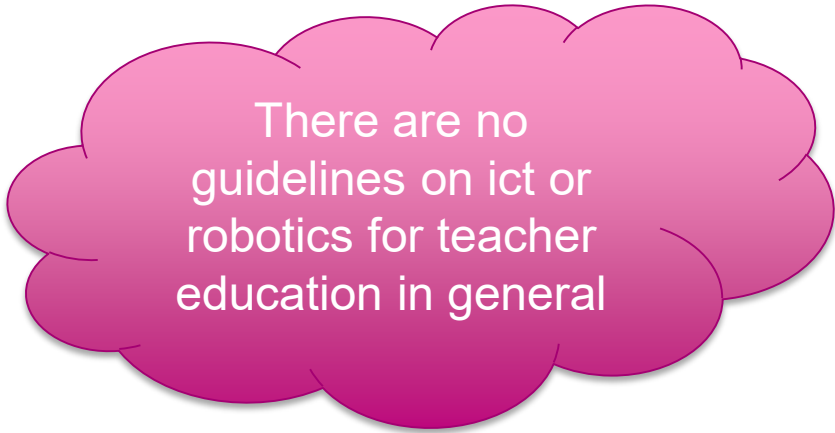


Laat ict werken **voor het onderwijs**

- Our government supports schools by funding Kennisnet ('Knowledge Net')
- Kennisnet supports schools on all aspects of ICT, not only on education, but also on school management systems

# Teacher education

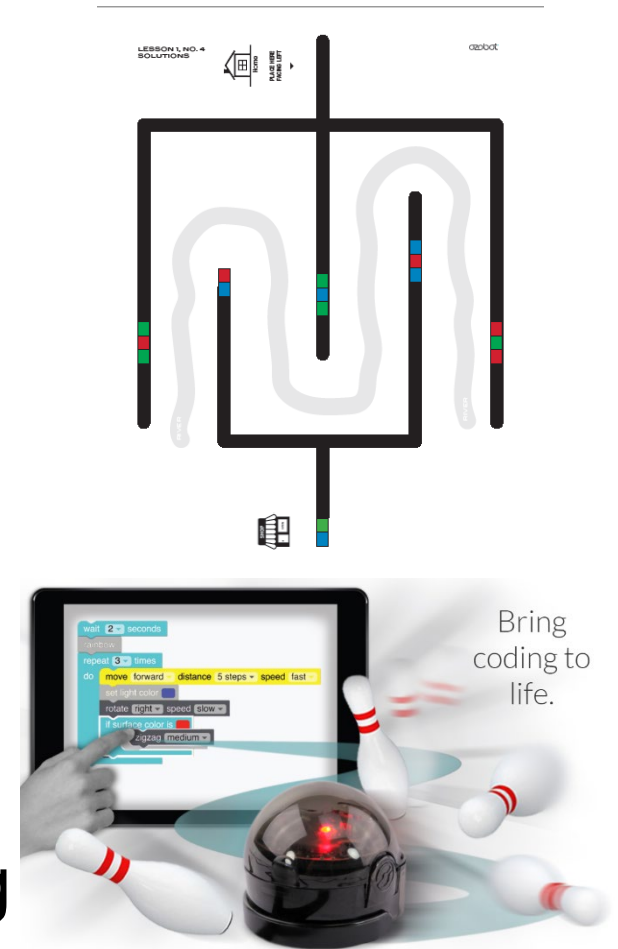
- (Pre-)vocational:
  - Construction industry, (electrical) engineering, ict and automotive
- Lower secondary:
  - Man & Technology
- Upper secondary:
  - Informatics



There are no guidelines on ict or robotics for teacher education in general

# Research

- Ozobot, programmable small robot
  - Program by colors
  - Program by coding blocks
- Research
  - Problemsolving
  - 42 couples, 15 minutes, age 8..11
  - Think out loud, observation
  - Discussing, testing, trail-error, bug-fixing



**WHAT 'S IN FOR THE FUTURE?**

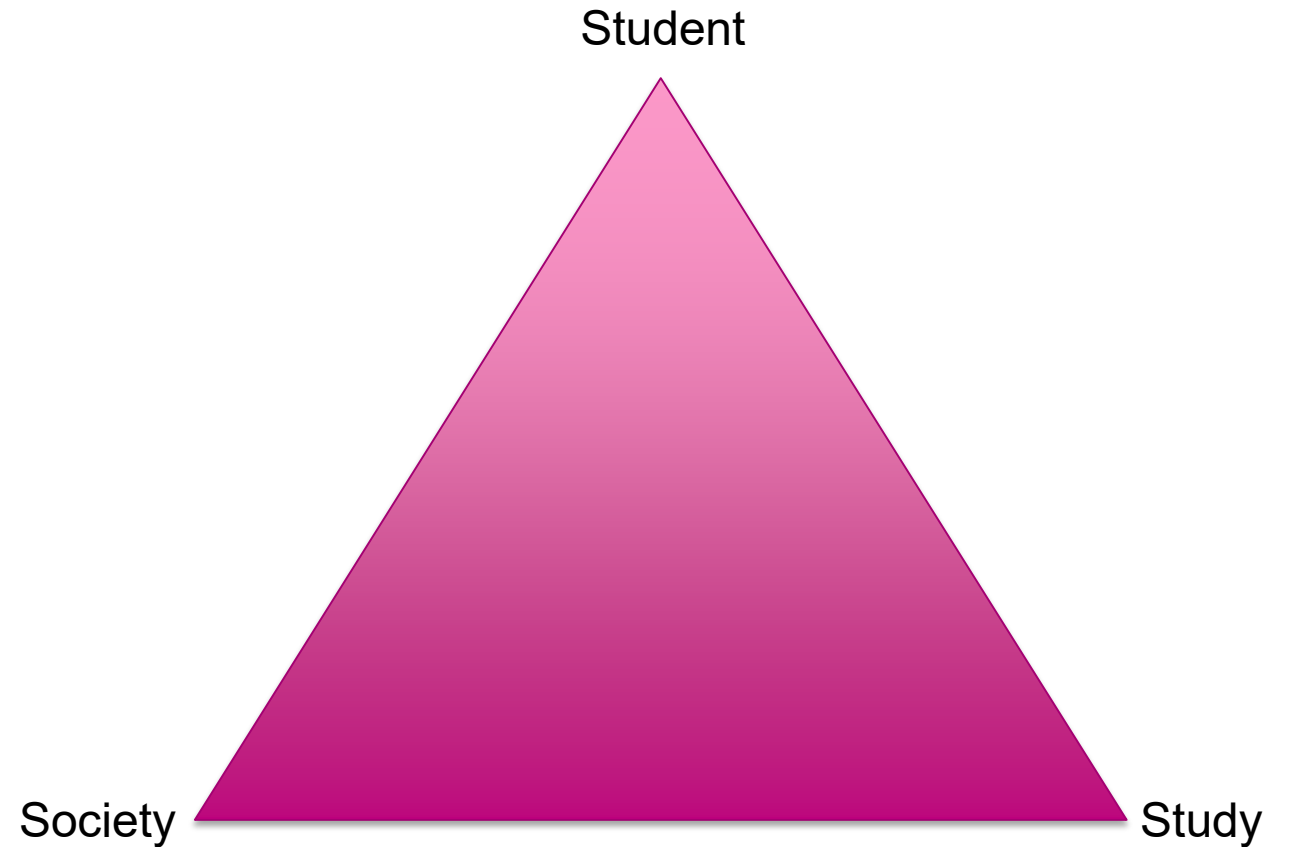
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# A new curriculum, why?





- Clear descriptions what knowledge and skills are required for the future
- Reduce the perceived overload in the curriculum
- Increase coherence
- Describe learning trajectories
- Make clear what parts are mandatory and optional

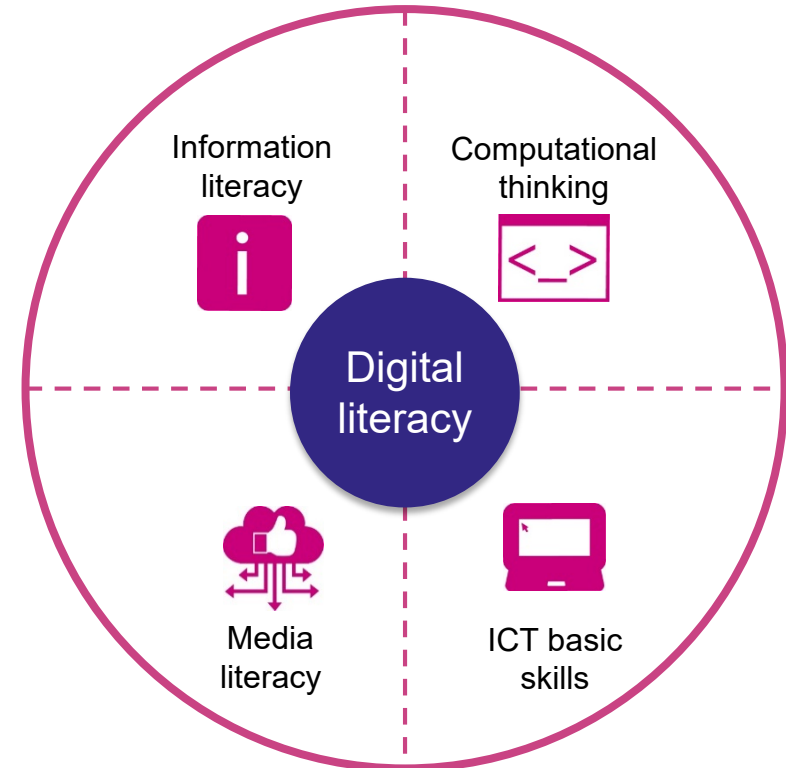
# Goals of education

- Personal development
- Society
- Study and profession



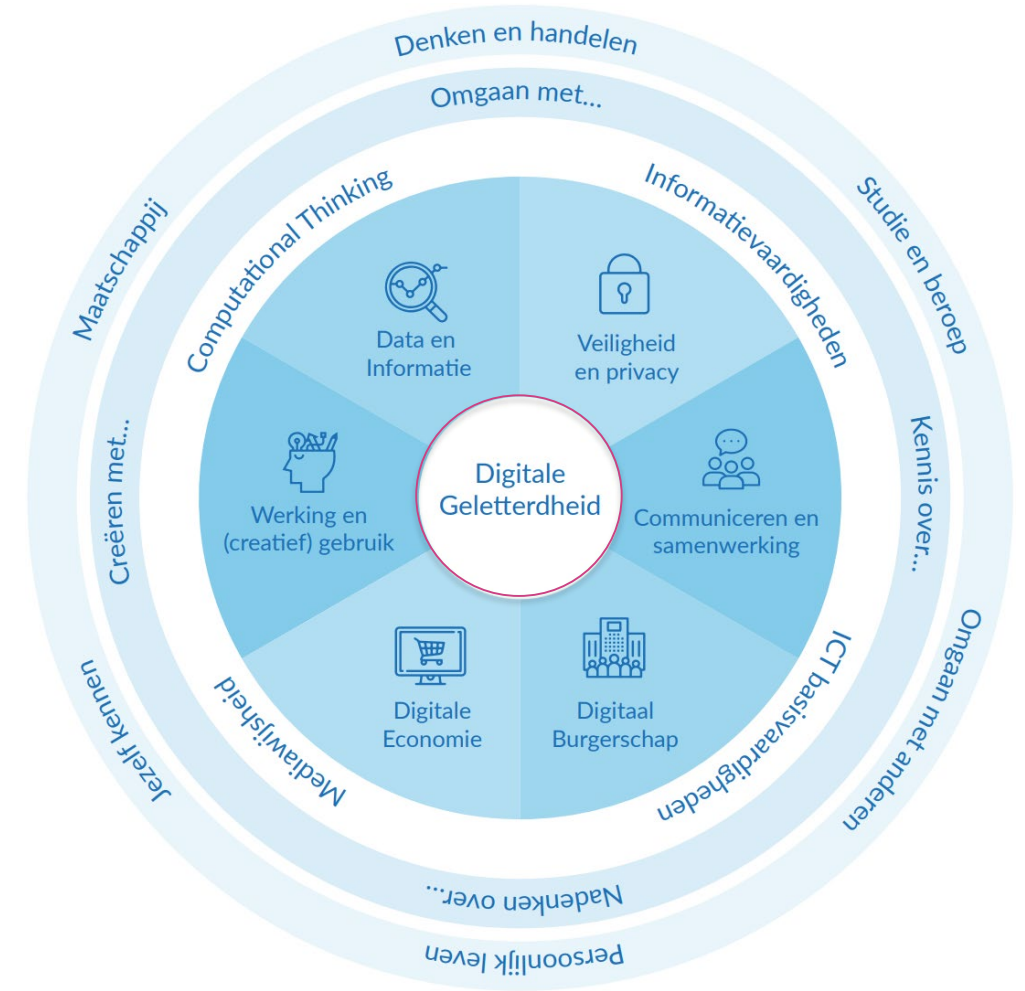
# Digital Literacy

- Digital literacy is the whole of ICT (basic) skills, media literacy, information skills, and computational thinking
- ICT (basic) skills 
  - able to deal with ICT
- Media literacy 
  - conscious, active and critical use of media
- Information literacy 
  - search, select, process and use relevant information
- Computational thinking 
  - (re) formulating problems so that they can be solved with the computer



# Vision

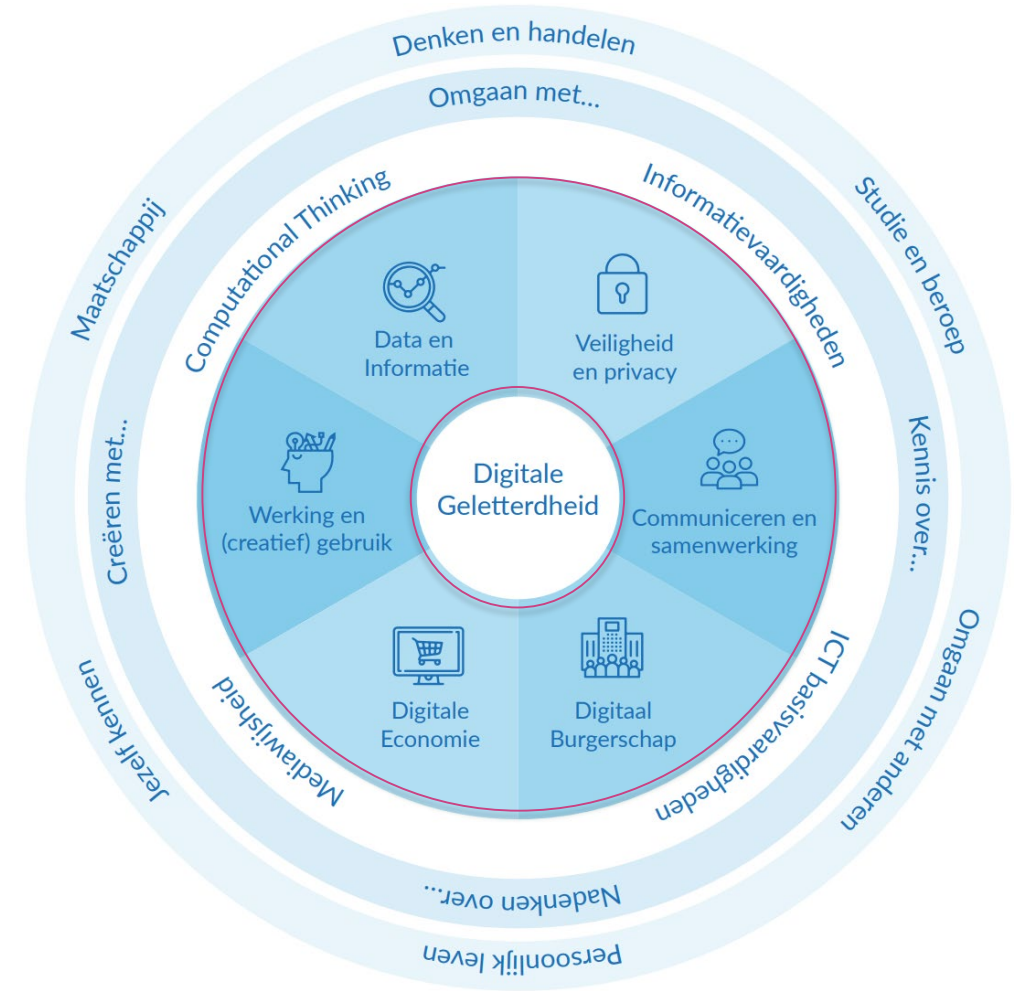
- The vision describes why Digital Literacy is important for learners in primary and secondary education for learning, working and living in a future society





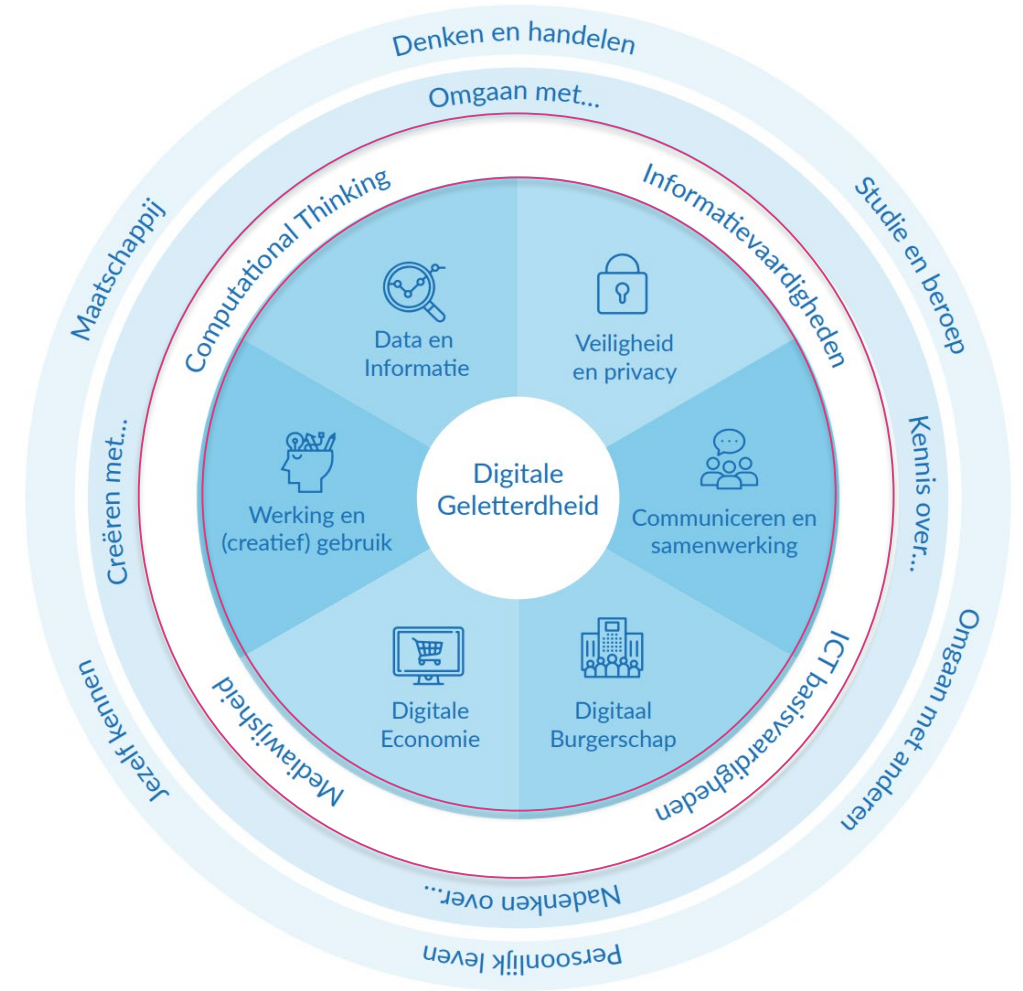
# Big ideas / Themes

- Data and Information
- Safety & Privacy
- Understanding and Creative Use
- Communication and Collaboration
- Digital Citizenship
- Digital Economy



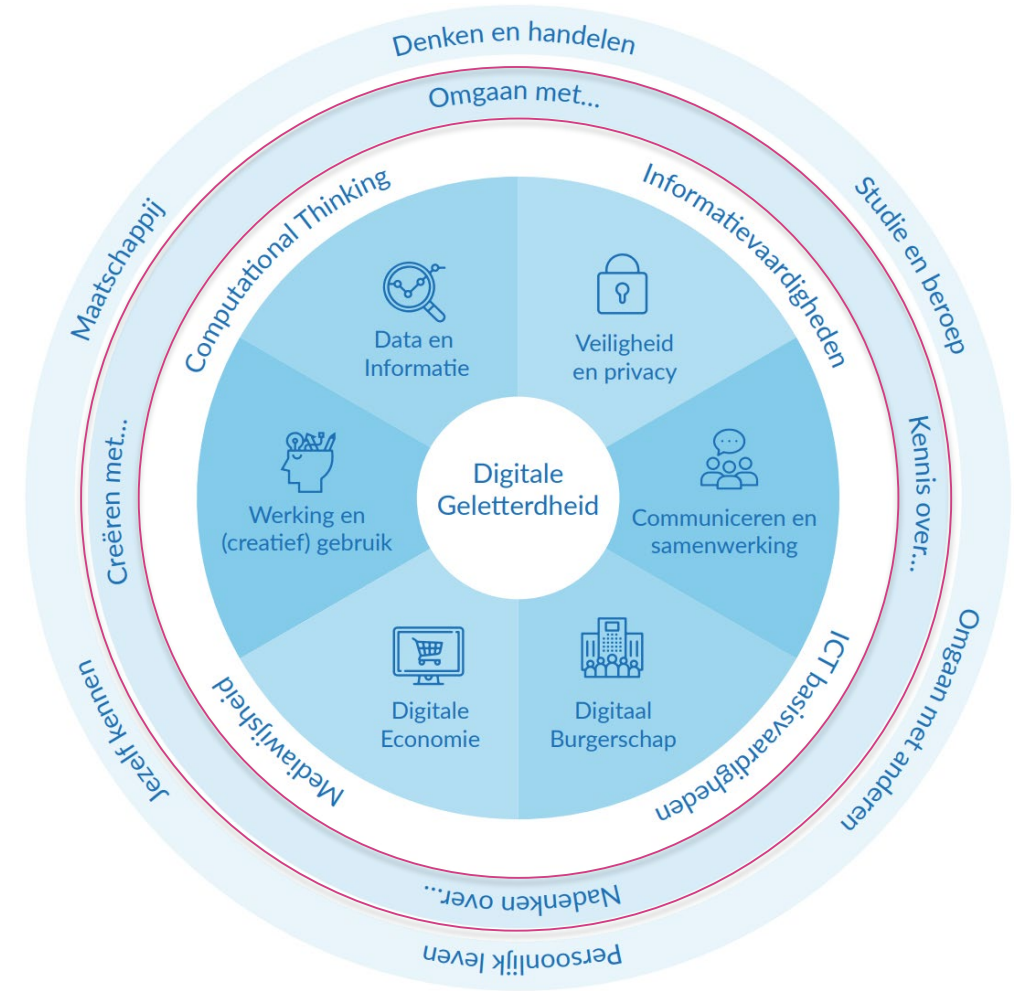
# Digital literacy skills

- ICT (basic) skills
- Media literacy
- Information literacy
- Computational thinking



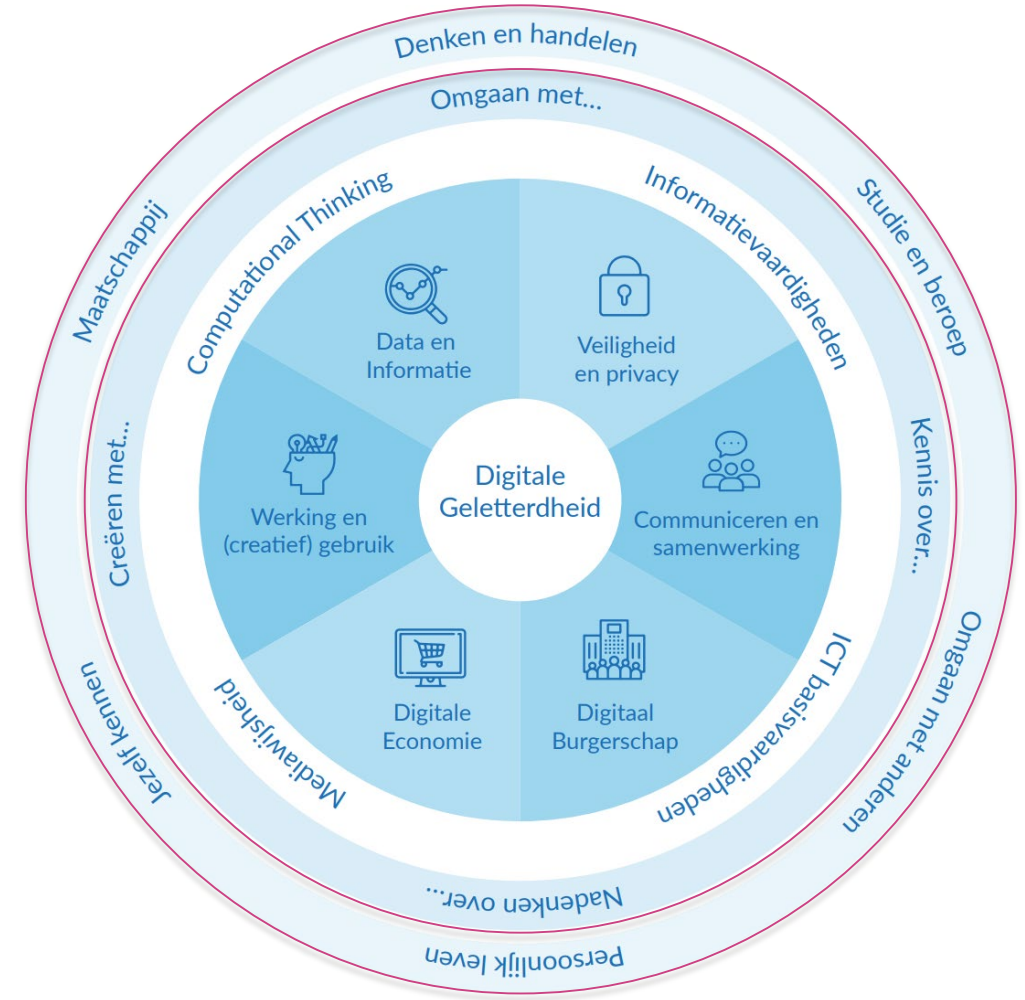
# Perspectives on digital literacy

- Dealing with digital technologies
- Knowing about digital technologies
- Thinking about digital technologies
- Creating with digital technologies



# General skills

- Thinking and acting
  - Creative thinking
  - Problem solving
  - Critical thinking
- Dealing with others
  - Communication
  - Collaboration
  - Social and cultural skills
- Knowing yourself
  - Self regulation
  - Orientation on yourself and career
  - Entrepreneurship





Data and information	Safety and privacy	Understanding and Creative use of Digital Technologies	Digital Communication and collaboration	Digital Citizenship	Digital Economy
<u>From data to information</u>	Safety in the digital world	Interacting and creating with digital technology	Networks	The Digital Citizen	Participation in a platform economy
Digital Data	Privacy in the digital world	Controlling and creating with digital technology	Digital Communication	Digital identity	Digital Marketing
<p>Here robotics may fit in ...</p>			<p>Digital Collaboration</p> <p>... and here as well</p>		



## More information & questions

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[Allard Strijker - a.strijker@slo.nl](mailto:a.strijker@slo.nl)

[Victor Schmidt – v.schmidt@slo.nl](mailto:v.schmidt@slo.nl)

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