

# Educating Youth for Non-Existent / Not Yet Existing Professions

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Research Centre for Learning, Teaching and Technology



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# Your attention please...



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*“It's tough to make predictions, especially about the future.”*

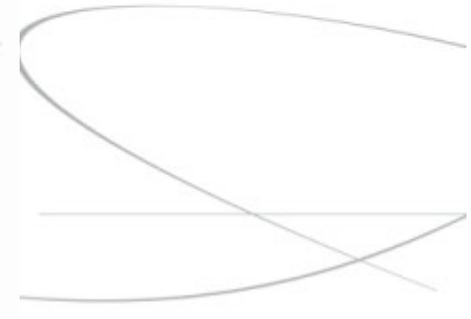
Yogi Berra

*“Results from the past are not a guarantee for the future.”*

Reclame Code Commissie







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## What's it all about?

In many industries and countries, the most in-demand occupations or specialties did not exist 10 or even five years ago

The pace of change is set to accelerate.

By one popular estimate, 65% of children entering primary school today will ultimately end up working in completely new job types that don't yet exist.

Opening van *The Future of Jobs: Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution* (2016) van de World Economic Forum



## On the way out?

- Mailman
- Telephone receptionist
- Receptionist
- Travel agent
- Factory worker
- Farmer



# How much longer?

- Telemarketer
- Taxi chauffeur
- Bus driver
- Supermarket cashier
- Accountant



## Amazon said to plan 3,000 cashierless stores by 2021



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*Investment: The challenge to Amazon's plan is the cost of opening a location. The original AmazonGo in Seattle required over \$1m in hardware alone*

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## In numbers

Benedikt Frey and Osborne (2013): combination of big-data and machine learning can mean that many typical administrative jobs will disappear in the short term

Estimation: >97% (a bit exaggerated) of these jobs can be computerised

NL: 14.8% of the 475.000 vocational high school students in 2016 study 'Hospitality' ( $\pm$  70.000 students)



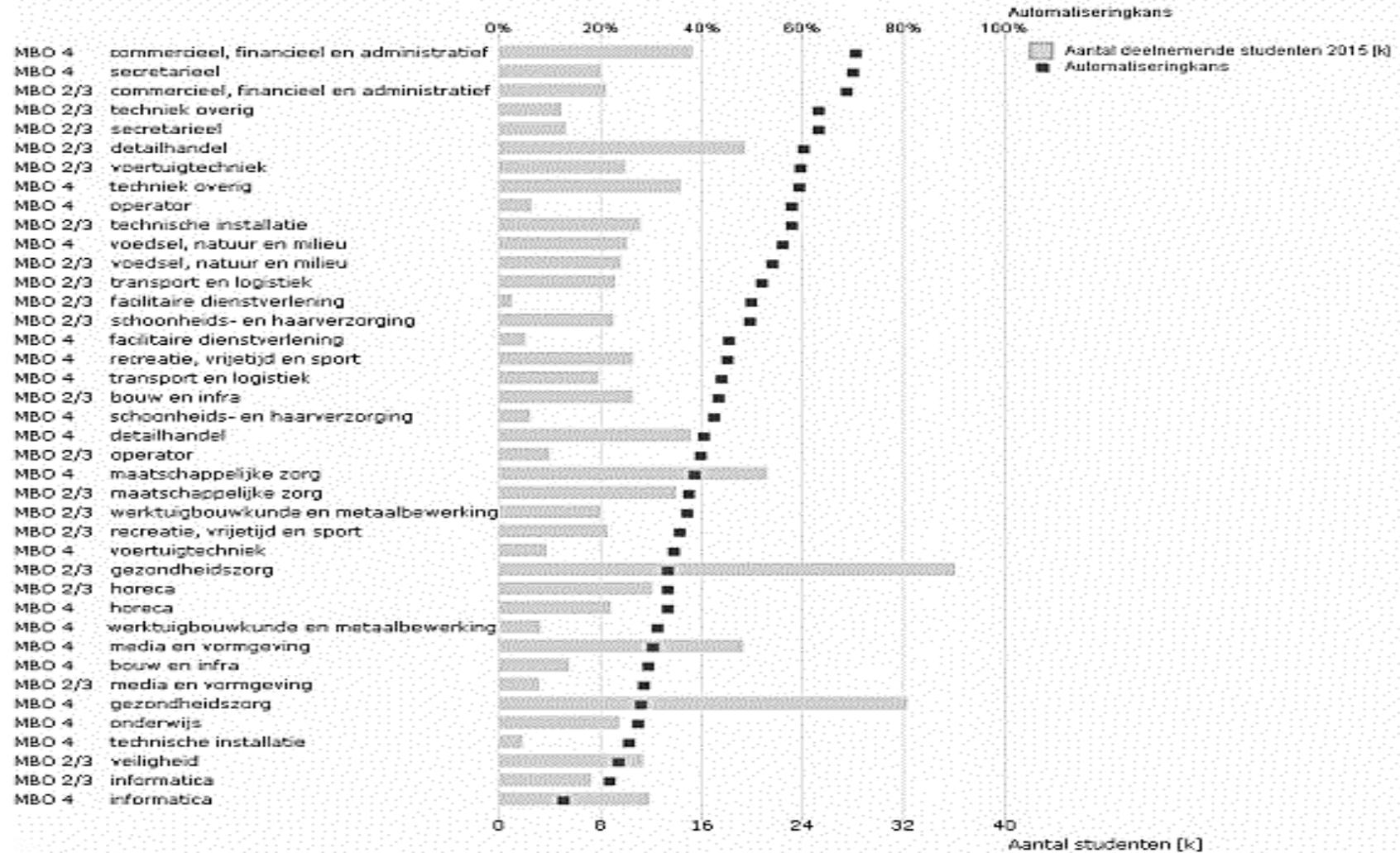
## In numbers

Roberto Azevêdo - Director-General W.T.O.

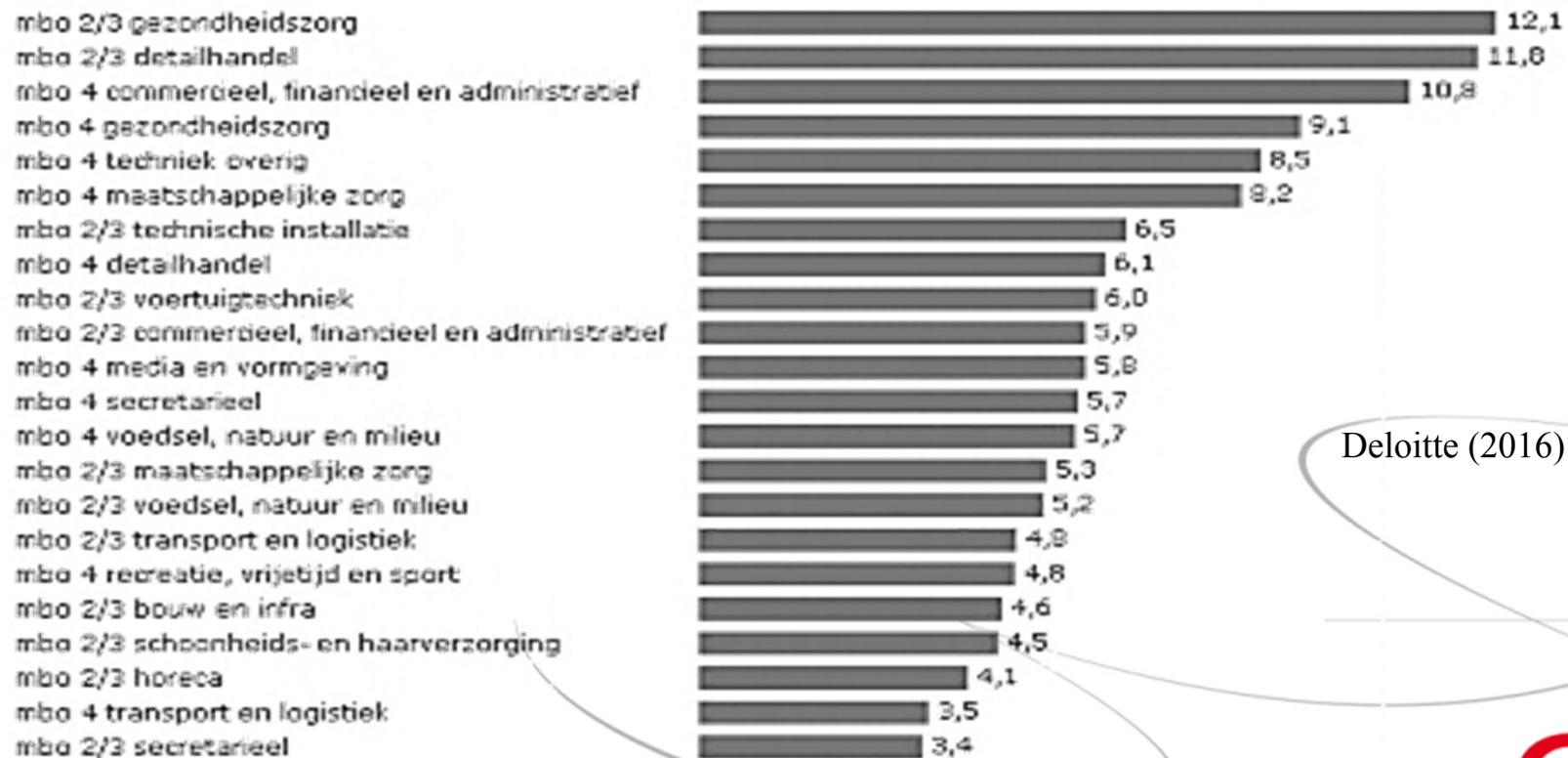
80% of the jobs lost are lost to new technologies



### Automatiseringskans per opleidingstype



## Impact — verwachte aantal kwetsbare studenten [k]

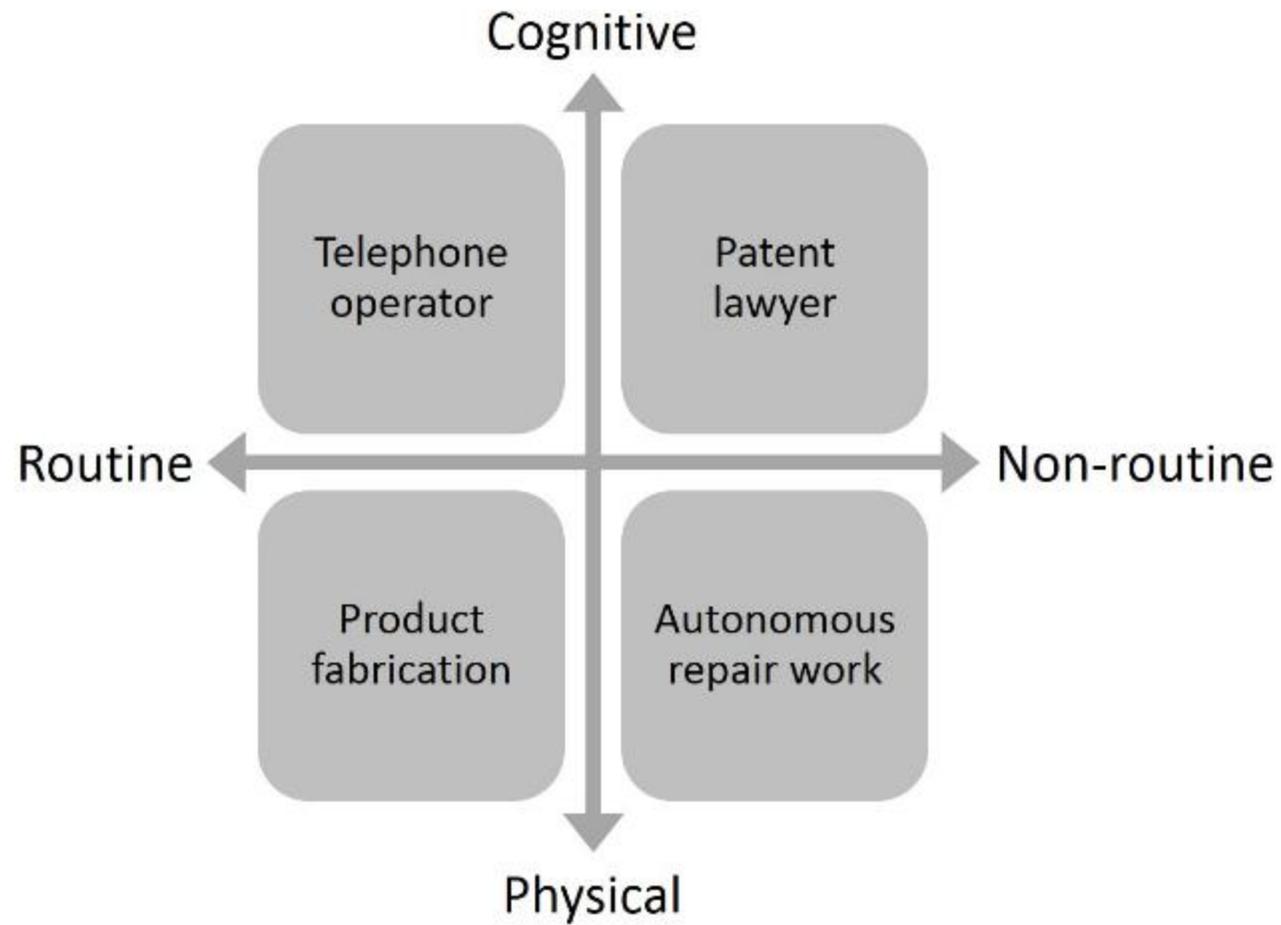


Deloitte (2016)

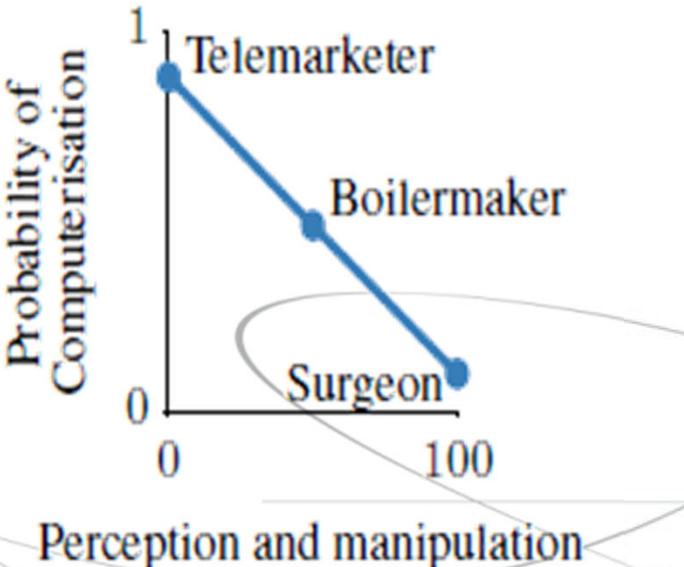
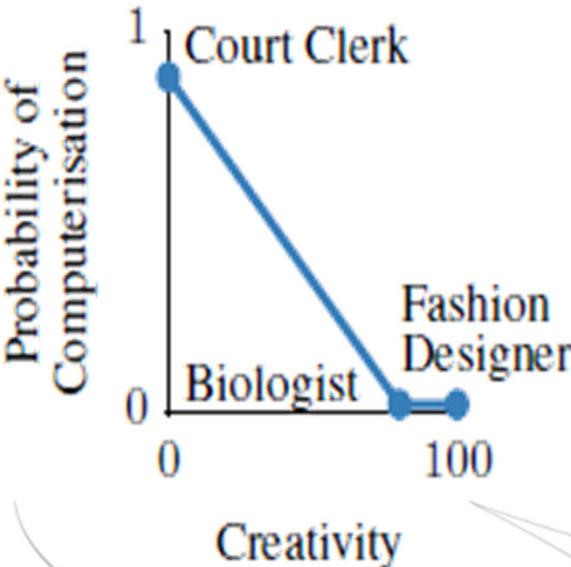
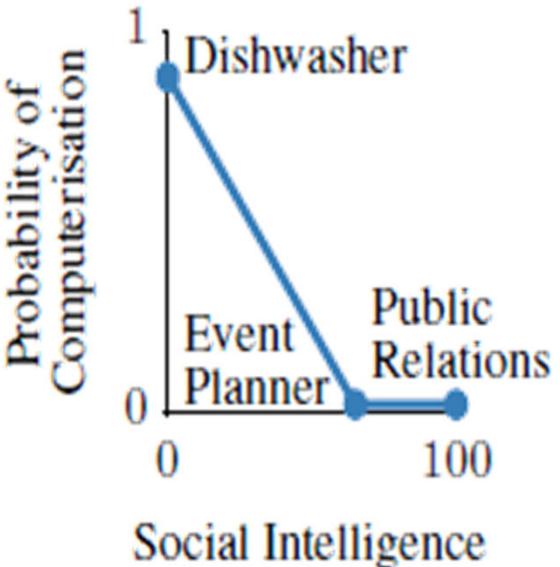


<ol style="list-style-type: none"> <li>1. Body Part Maker</li> <li>2. Nano-Medic</li> <li>3. Pharmer of Genetically Engineered Crops and Livestock</li> <li>4. Old Age Wellness Manager / Consultant Specialists</li> <li>5. Memory Augmentation Surgeon</li> <li>6. New Science' Ethicist</li> <li>7. Space Pilots, Architects and Tour Guides</li> <li>8. Vertical Farmers</li> <li>9. Climate Change Reversal Specialist</li> <li>10. Quarantine Enforcer</li> </ol>	<ol style="list-style-type: none"> <li>11. Weather Modification Police</li> <li>12. Virtual Lawyer</li> <li>13. Avatar Manager / Devotees - Virtual Teachers</li> <li>14. Alternative Vehicle Developers</li> <li>15. Narrowcasters</li> <li>16. Waste Data Handler</li> <li>17. Virtual Clutter Organizer</li> <li>18. Time Broker / Time Bank Trader</li> <li>19. Social 'Networking' Worker</li> <li>20. Personal Branders</li> </ol>
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# Probability of computerisation



## Another factor: Obsolescence

Type of obsolescence	Depreciation of human capital by::
<b>Technical</b>	Once available physical or mental skills that have not been kept up or that naturally decrease
<b>Physical wear</b>	Wear of skills due to natural ageing process, illness, or injury
<b>Atrophy</b>	Atrophy due to unemployment, career interruptions or specialisation
<b>Economic</b>	Once (very) relevant qualities that have become less relevant or irrelevant
<b>Job specific</b>	New skill requirements due to technological and organizational developments
<b>Market specific</b>	Shrinking employment in occupation or economic sector
<b>Firm specific</b>	Displacement in sectors with stable employment
<b>Perspectivistic</b>	Once typical ideas, points of view, beliefs, and convictions have become / are seen as old-fashioned and out-of-date
<b>Outmoded</b>	Dissatisfaction, discontent, burn-out, loss of appreciation

De Grip (2004); Thijssen (2006)

## How to proceed?

- Unclear: what knowledge, which skills, and what attitudes are needed to prepare youth for this problem and its repercussions
- Clear: students need to be equipped with a solid knowledge and skills basis to learn in a future-proof way.



## Can the school do this?

According to many sources, NO because...

- schools react too slowly
- schools aren't well-equipped
- ICT-use is not well integrated in education
- teachers lack the necessary knowledge and skills



**imho YES: Their job is to ensure the**

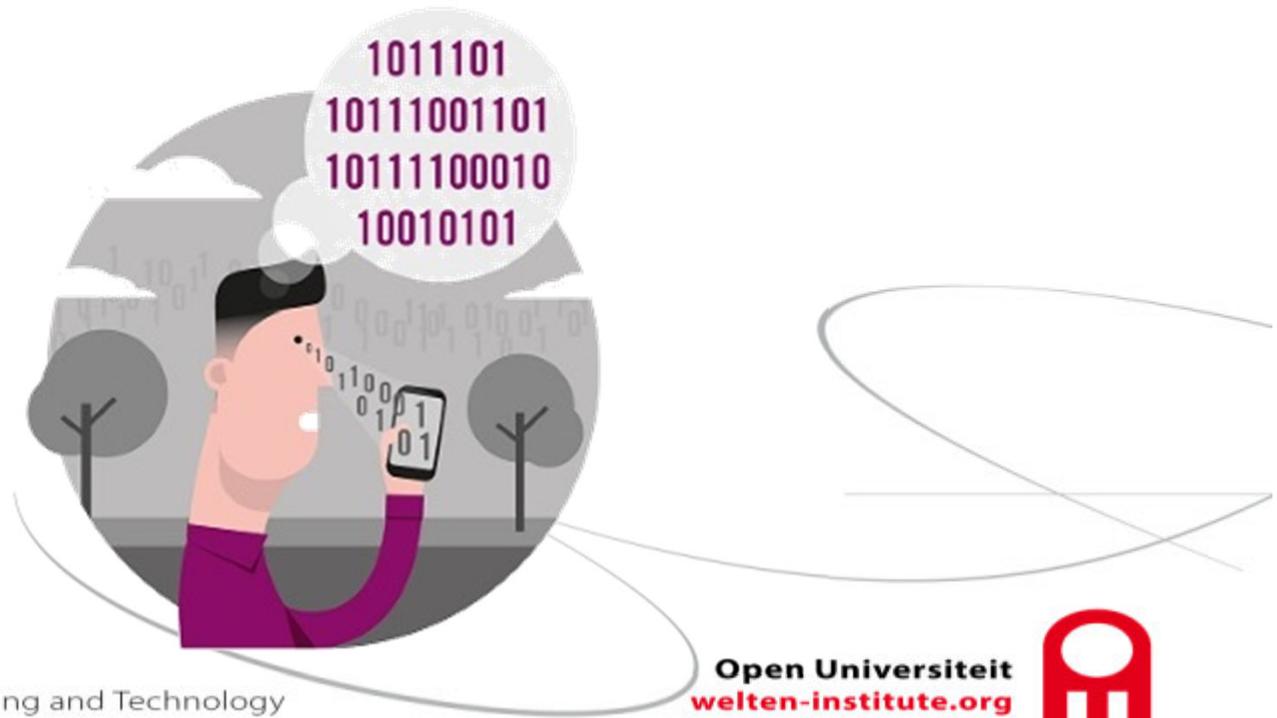
acquisition of a range of **(information)skills**

that are **transferrable** to multiple areas and domains

based on a **solid knowledge base!**



# What do people think it's about?

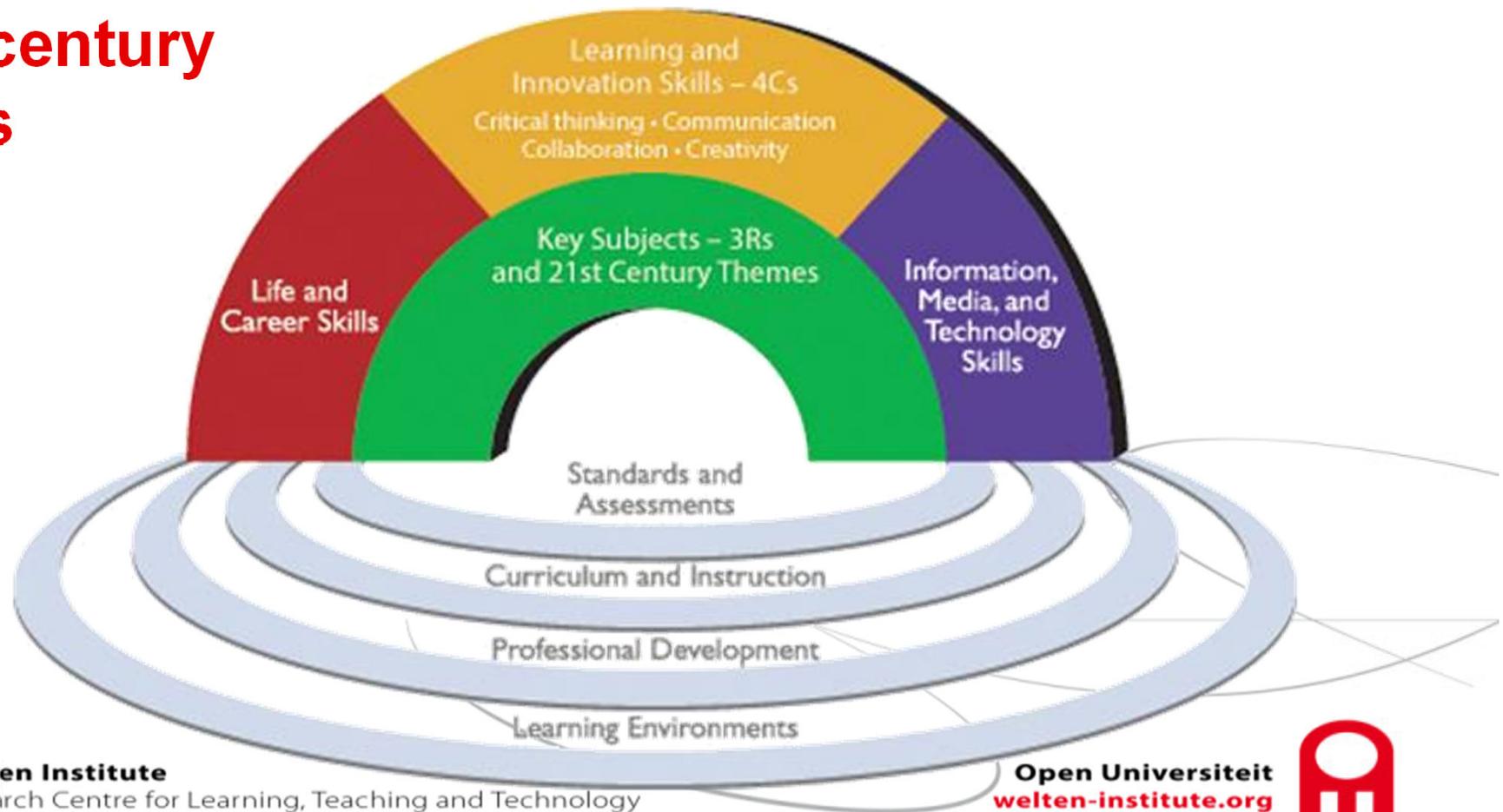


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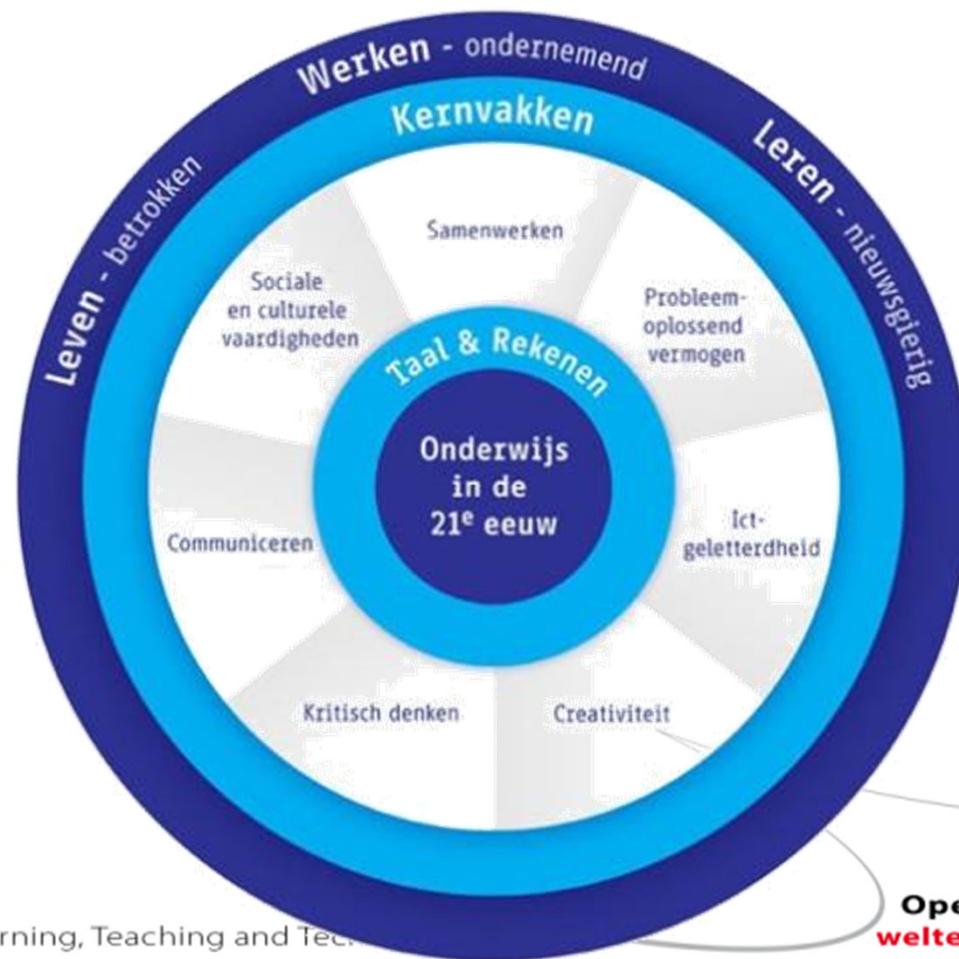
# 21<sup>st</sup> century skills



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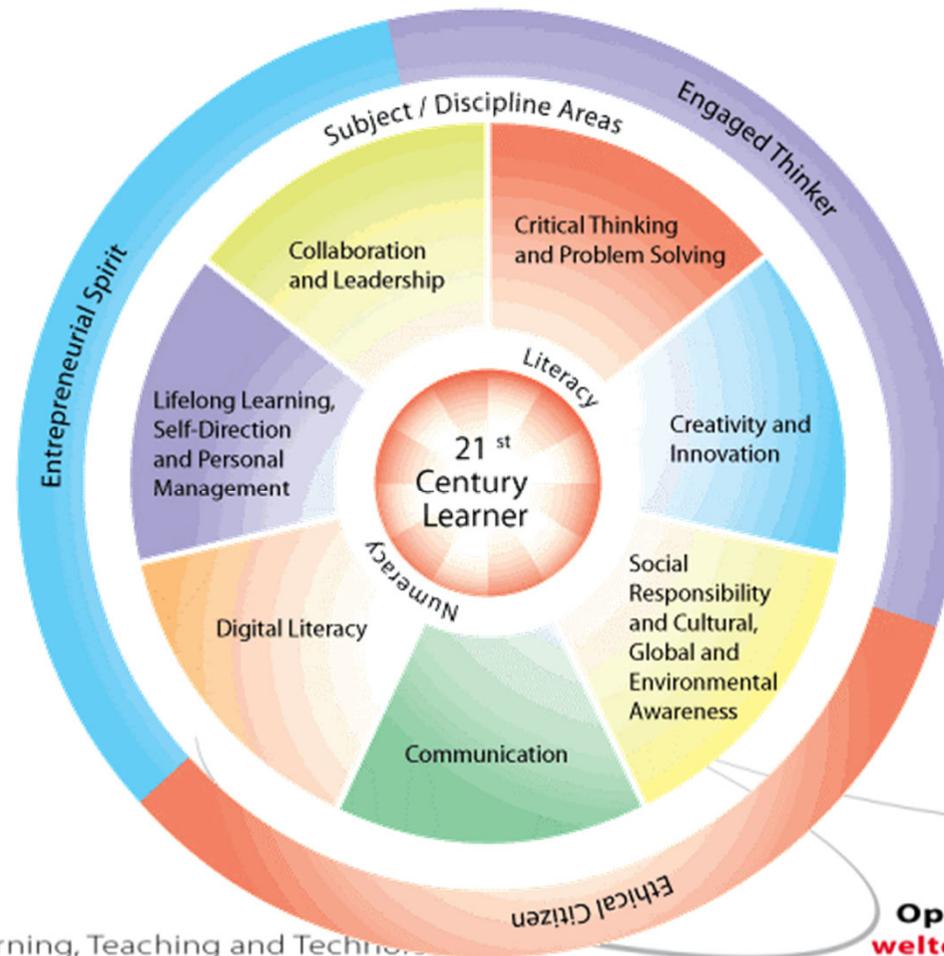
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- 2015 need for defining 21st century skills for education
  - Creative thinking
  - Critical thinking
  - Problem solving
  - Communication
  - Collaboration
  - Digital literacy
    - ICT basic skills
    - Computational thinking
    - Media literacy
    - Information literacy
  - Social and cultural skills
  - Self regulation





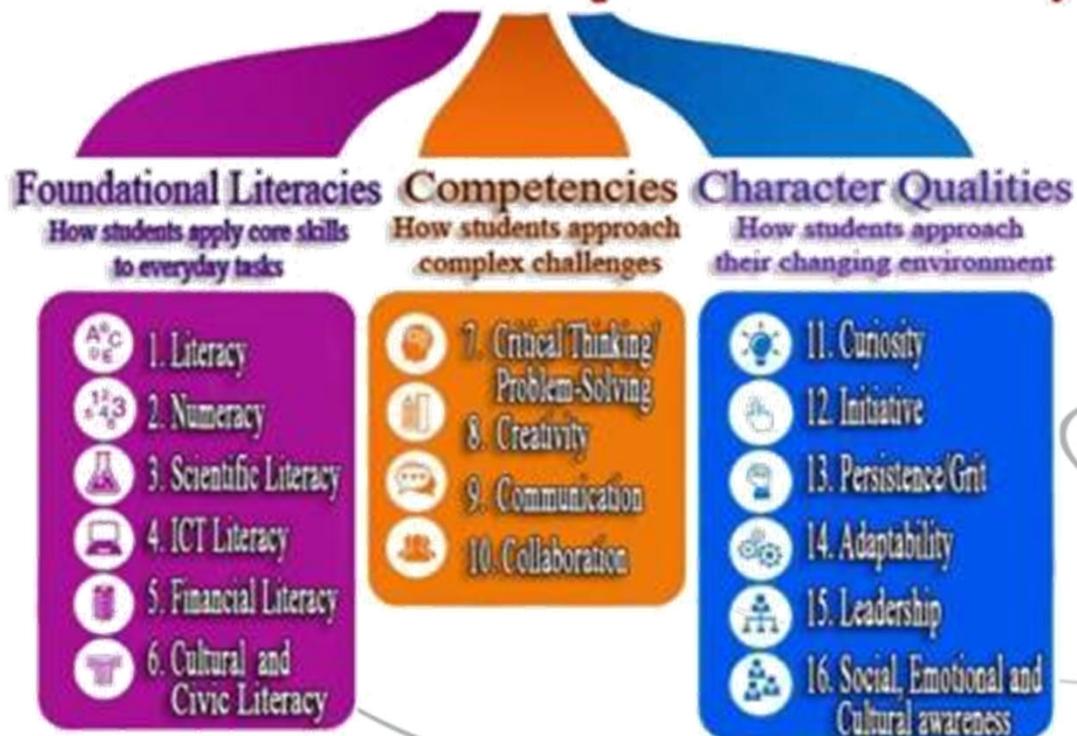
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# Sixteen Skills Students Must Espouse for the 21st Century



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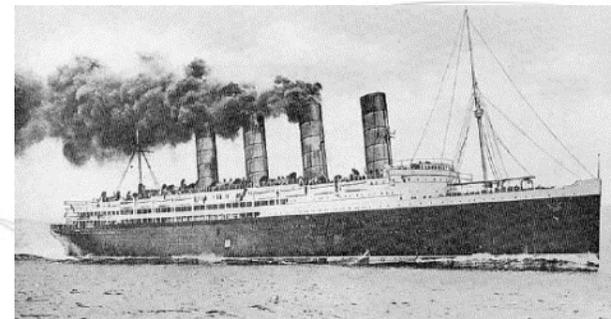
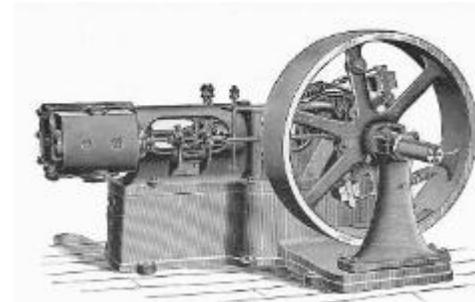
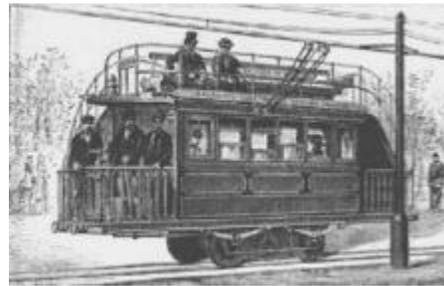
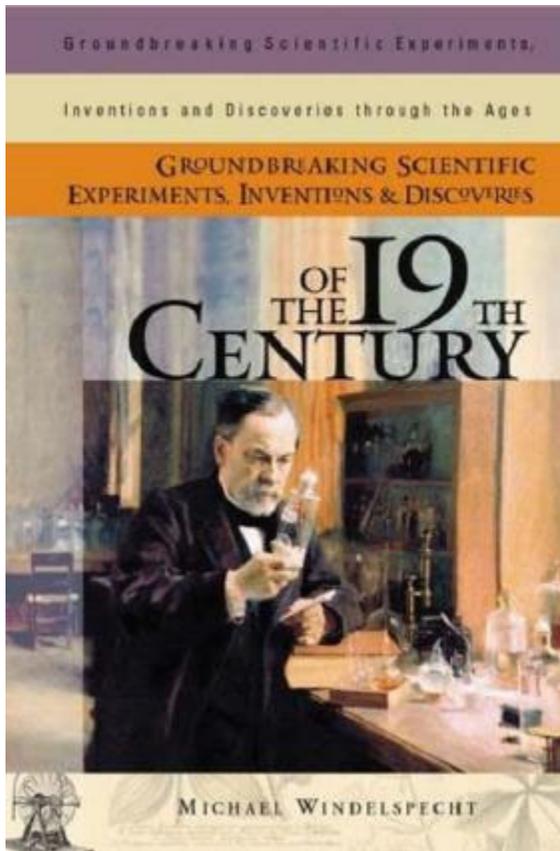
ADAPTED FROM: WORLD ECONOMIC FORUM ([www.weforum.org](http://www.weforum.org))

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# ...but 21<sup>st</sup> century skills are so 19<sup>th</sup> century



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## ...or earlier: Mesopotamia – 6000 bce



Communities, Professions, Governments,  
Writing, Tools, ...



## Only real 21<sup>st</sup> century skills

- *Information literacy*: including searching for identifying, evaluating (the quality and reliability of information sources), and effectively using the information that has been obtained
- *Information management*: the ability to capture, curate, and share information



**The future is unclear, thus...**

**We must make education and  
learning *future-proof***

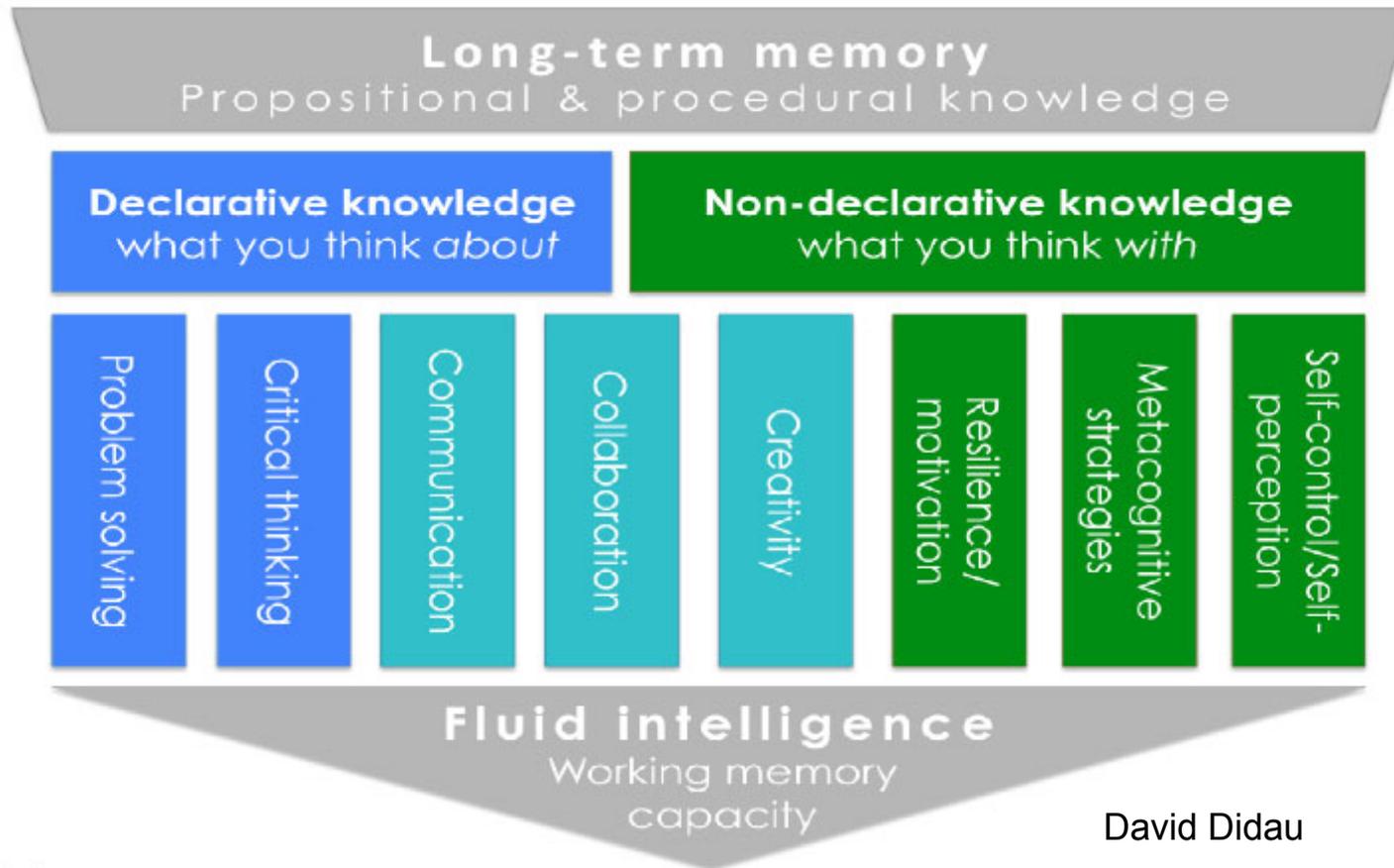


# Toekomstbestendig Leren

The acquisition of knowledge, skills, and attitudes necessary to continue to learn in a stable and enduring way in a rapidly changing world (Kirschner, 2017; Walma van der Molen & Kirschner, 2017)



# ...and for the rest?

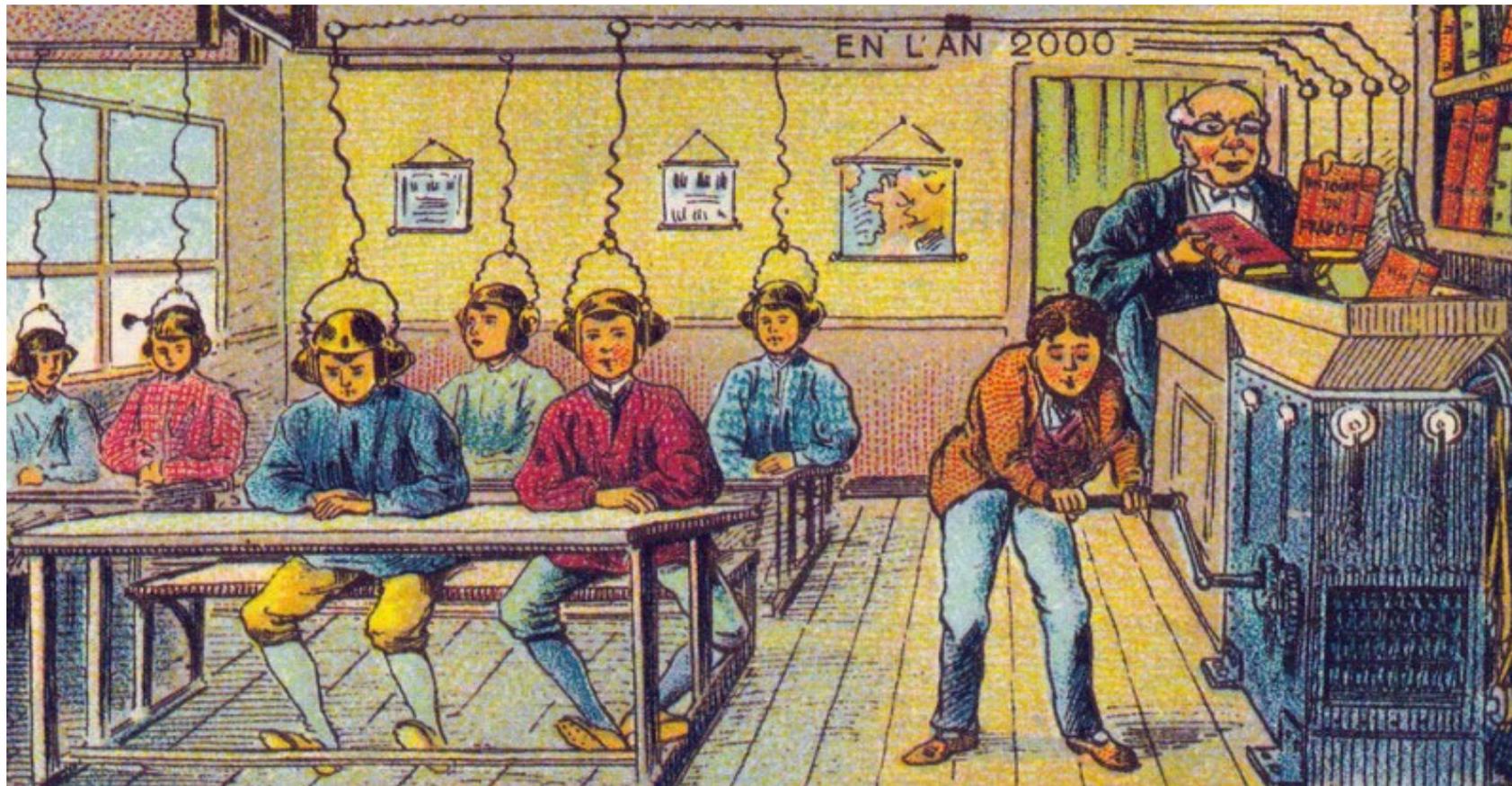


Welt  
Resea

David Didau



# Does education need to be radically different?



## No, but...

- teach kids to deal with insecurities and lack of clarity of today
- prepare kids for the insecurities and lack of clarity of tomorrow



## The research

How can we best prepare our youth so that they can cope with the insecurity of the future and avoid obsolescence



## Set-up

- Group Concept Mapping procedure
- Trigger statement
- Analysis
- Ladder: Importance versus Feasibility



# Group Concept Mapping

- Recruiting participants
- Generation of statements
- Sorting statements
- Rating of statements
  - Importance
  - Feasibility



## Trigger statement

“One specific way to prepare youth to make effective and efficient use of information skills to optimally function in tomorrow’s labour market is...”

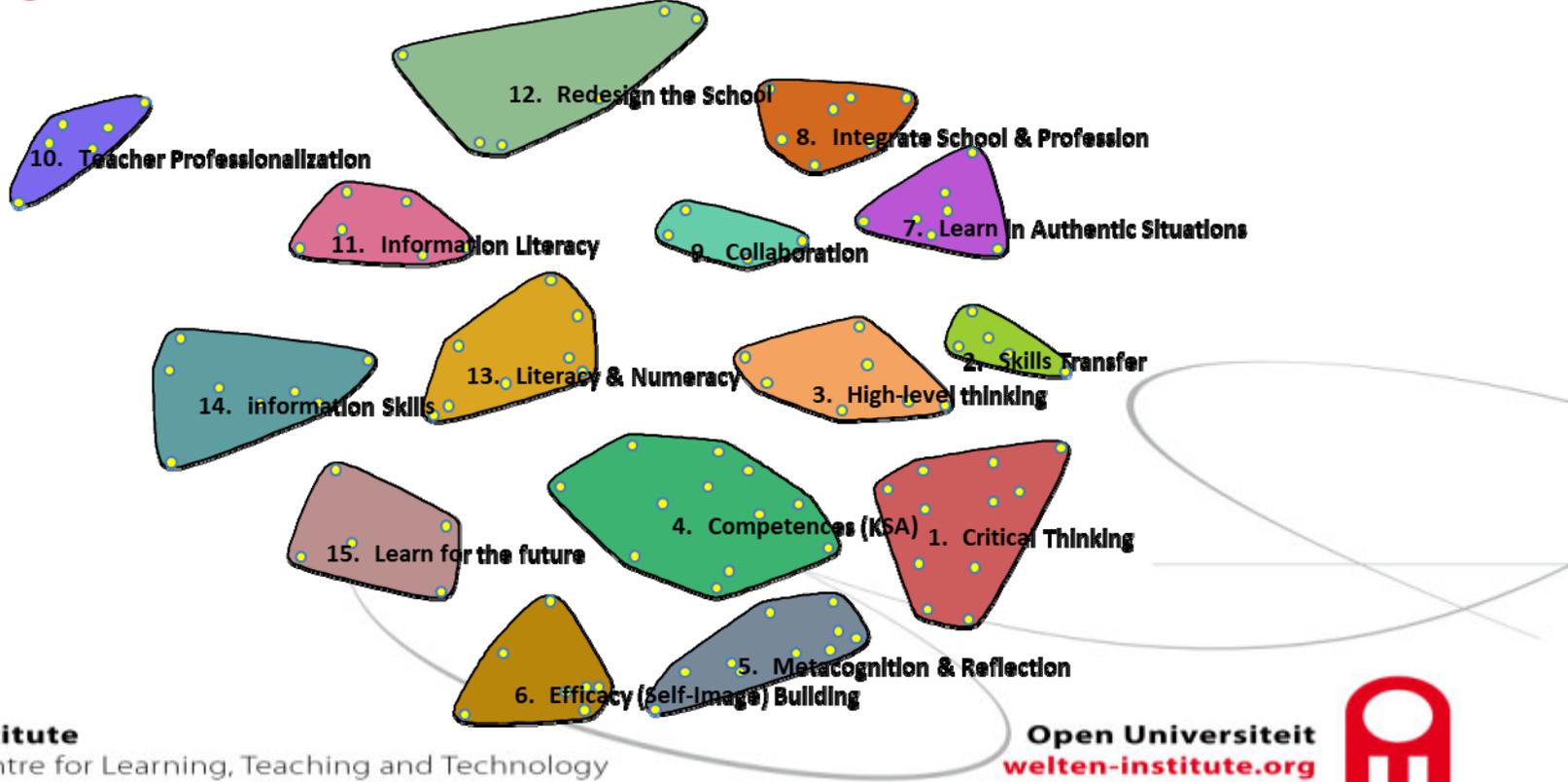


# Generation

- 254 statements
- 214 unique statements
- clean-up with 3 experts
- 109 statements for sorting and rating



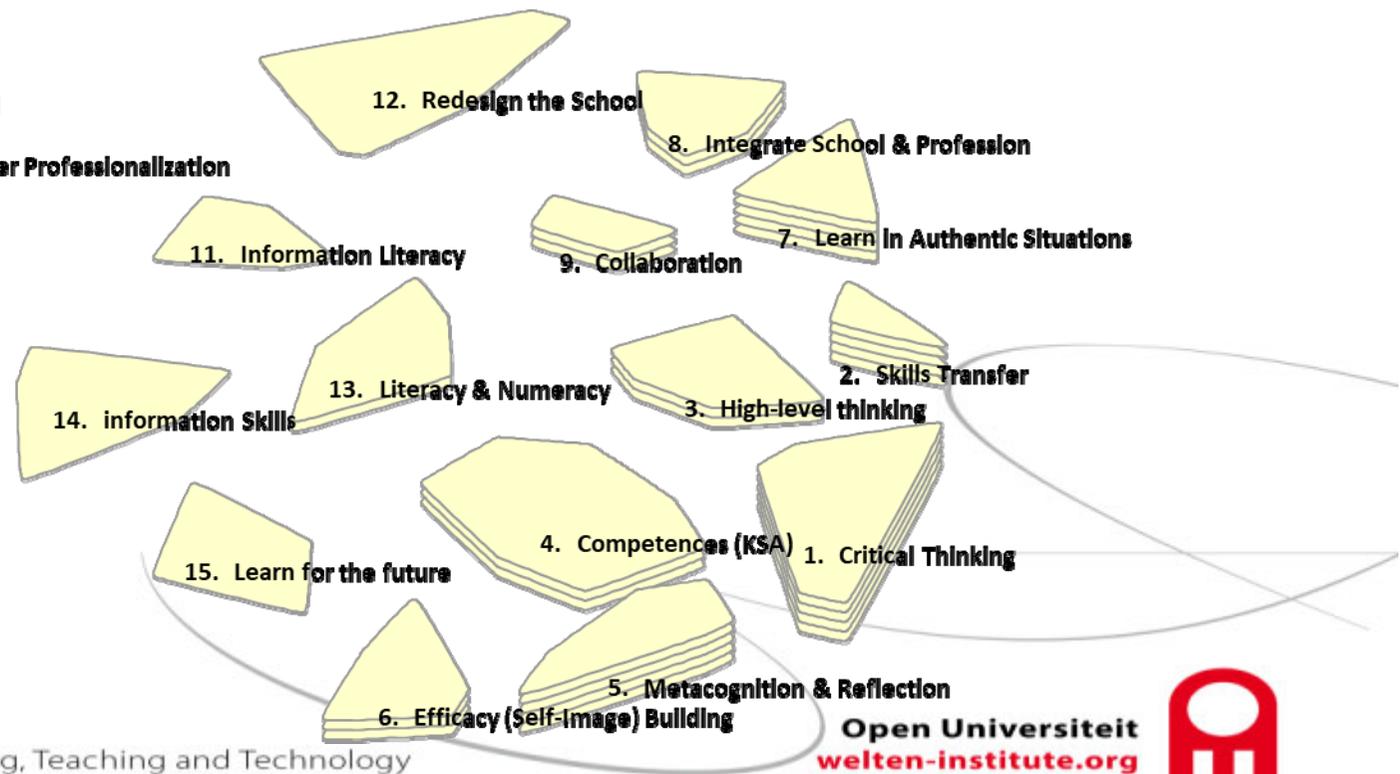
# Sorting: Optimum = 15 clusters



# Importance

## Cluster Legend

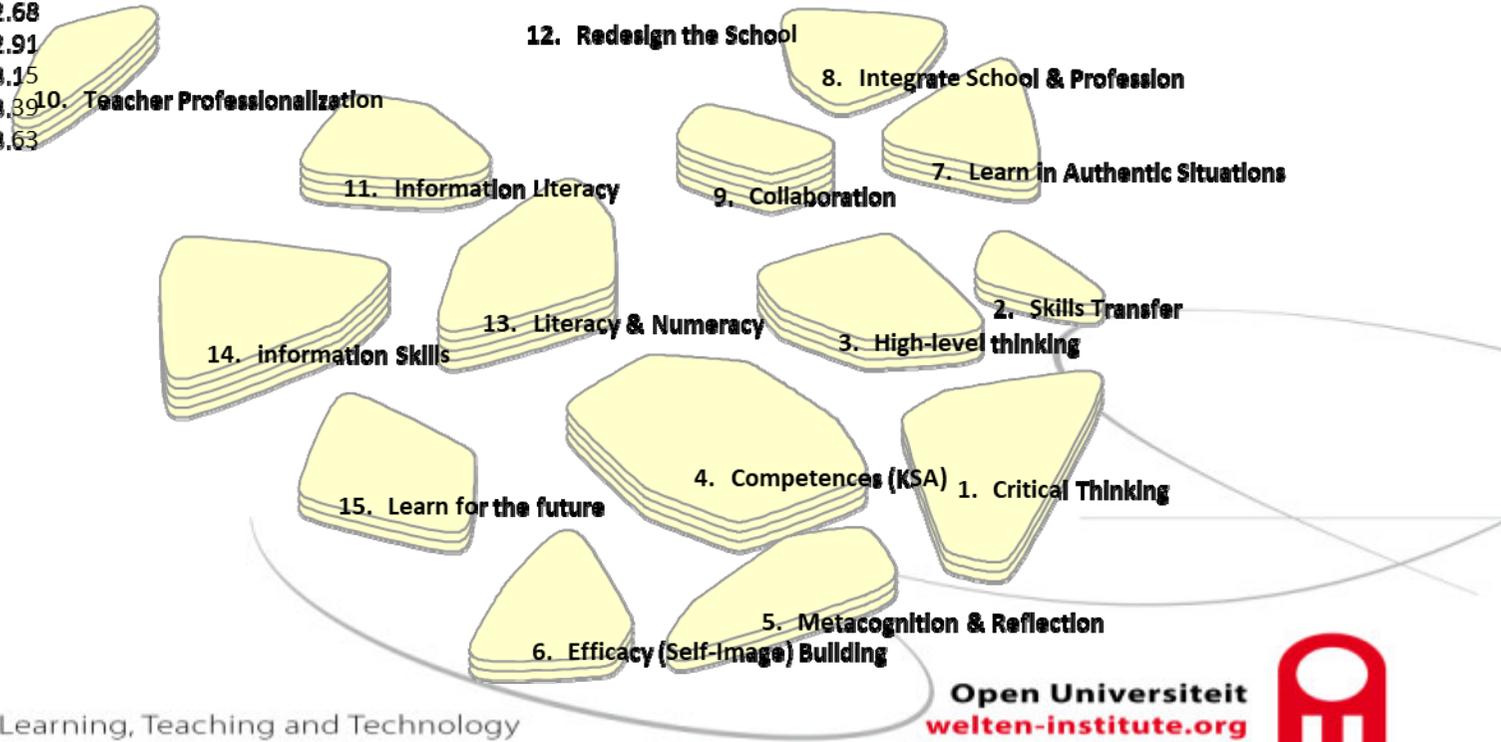
Layer	Value
1	3.07 to 3.28
2	3.28 to 3.48
3	3.48 to 3.69
4	3.69 to 3.90
5	3.90 to 4.11

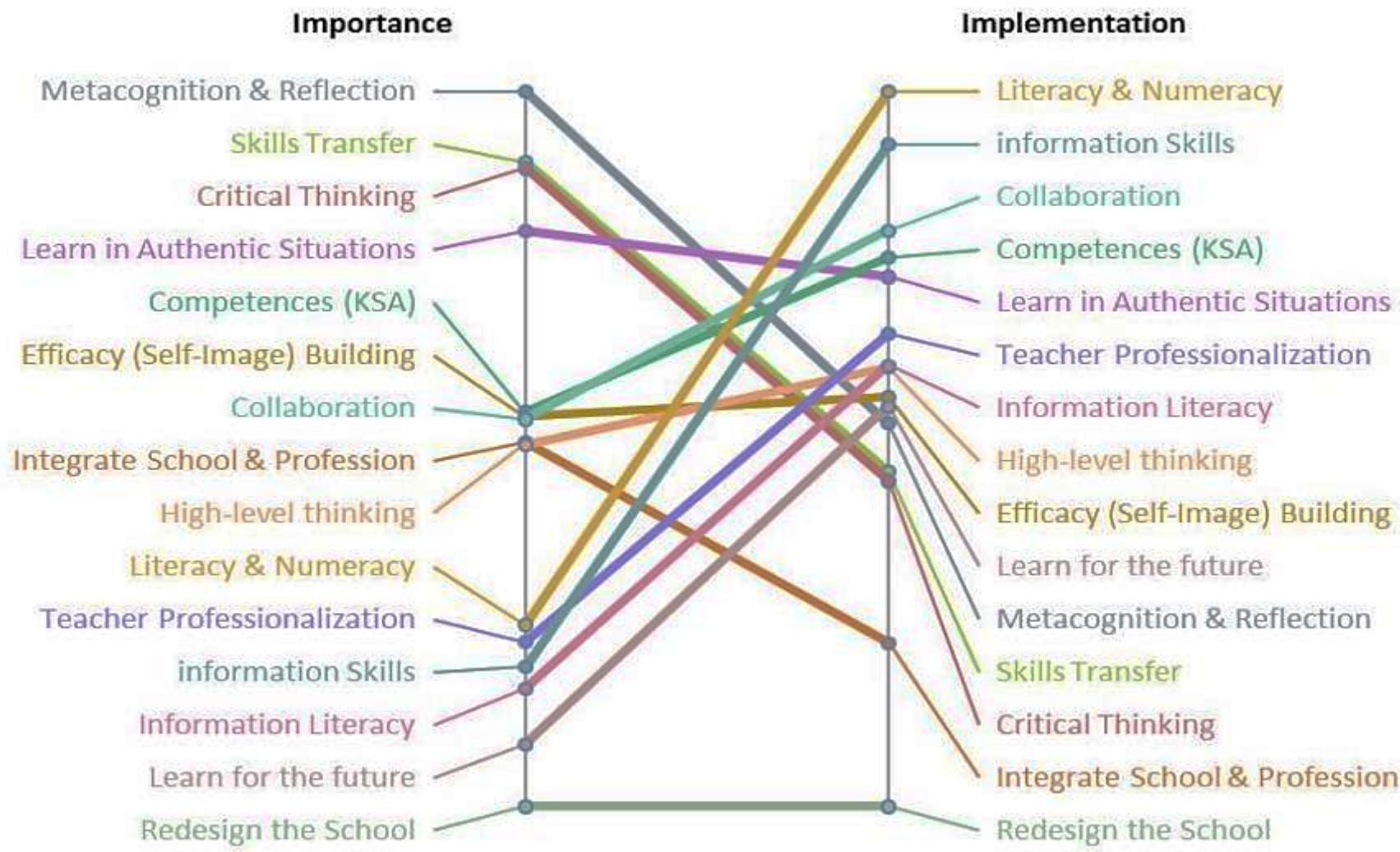


# Feasibility

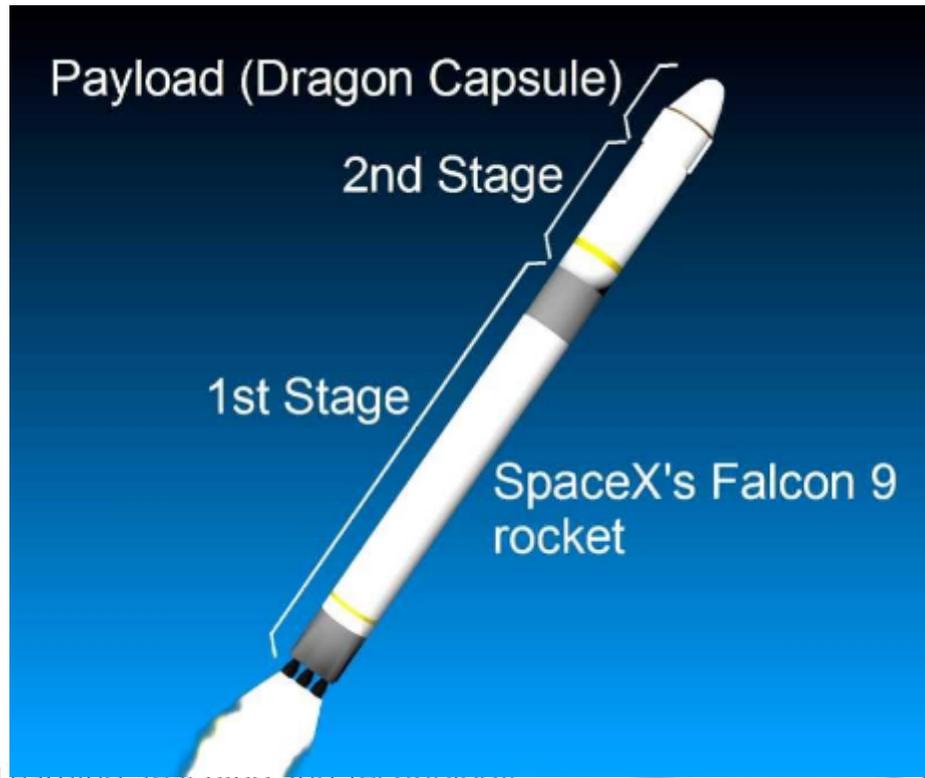
## Cluster Legend

Layer	Value
1	2.44 to 2.68
2	2.68 to 2.91
3	2.91 to 3.15
4	3.15 to 3.39
5	3.39 to 3.63





# Three stage procedure



## De drie trappen

1. Lay a good foundation for the students which will allow them to function in and understand the world around them.
2. Take care that students develop a feeling that they can REALLY do things with what they have learnt (efficacy building) and that they have the knowledge skills and attitudes to continue to learn.
3. Take care that students acquire and develop higher order thinking skills such as metacognition and reflection



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Educational Policy

1-41

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## Abstract

In today's and tomorrow's world, people will be required to work longer. At the same time, their employment future will become increasingly insecure due to technological advances and obsolescence of acquired knowledge and skills.

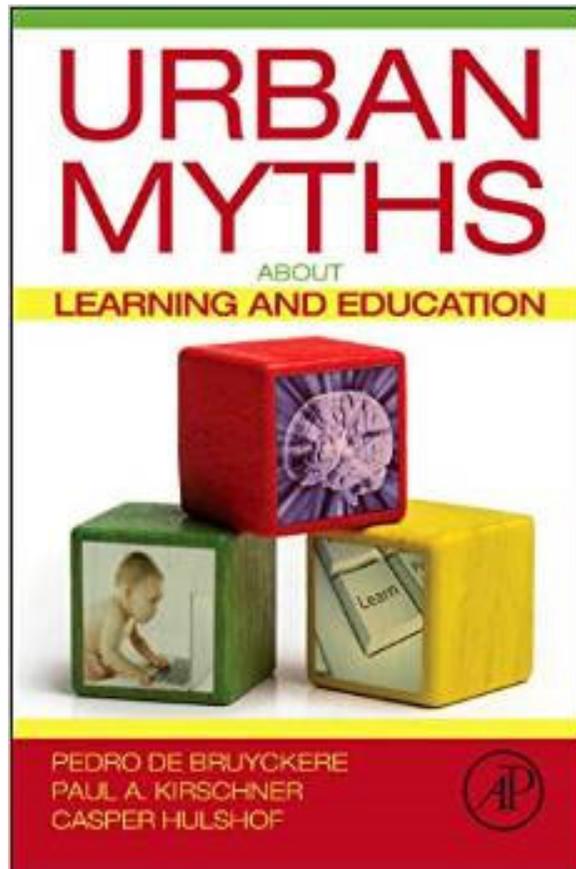
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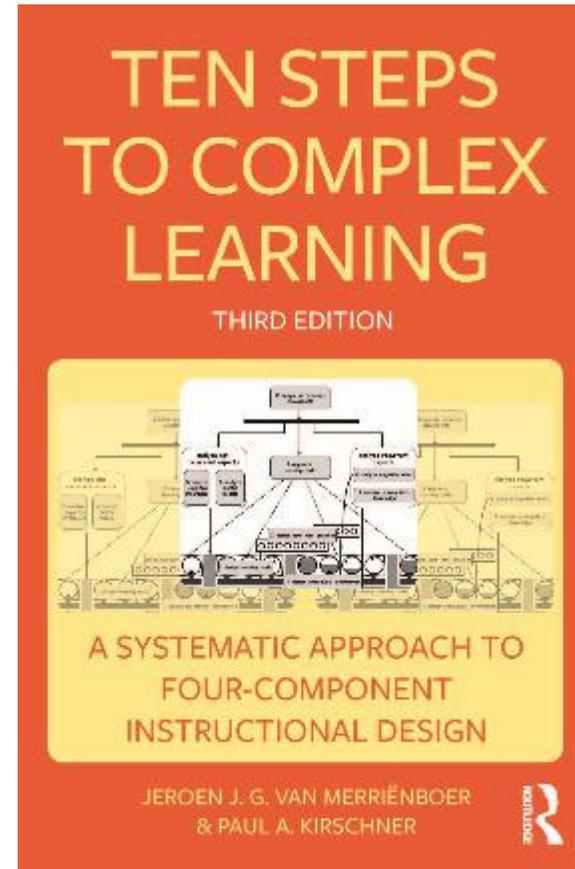
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