



**LUT**  
**University**

# Sustainable ICT

*Are the HEIs teaching it?*

# Why do we develop new IT systems?

[the need for sustainable ICT]

»» AirBnB – why?

To help people find private accommodation on holidays	Why?
To simplify and lower the costs of traveling, and help people make money on renting apartments	Why?
To stimulate traveling	Why?
To help people find stimulating experiences in life	Why?
Because!	

But what if our **ASSUMPTIONS** about  
the **EFFECTS** do **NOT** hold **TRUE**?

## 1. Airbnb could be illegal in the city you're visiting

This is a pretty surprising and very important point. Just because there are listings for a destination **doesn't mean the host and Airbnb are abiding by the local laws**. For instance, here are some facts that might make us think twice about using Airbnb and similar services in the below major cities.

### Airbnb problems in New York City, United States

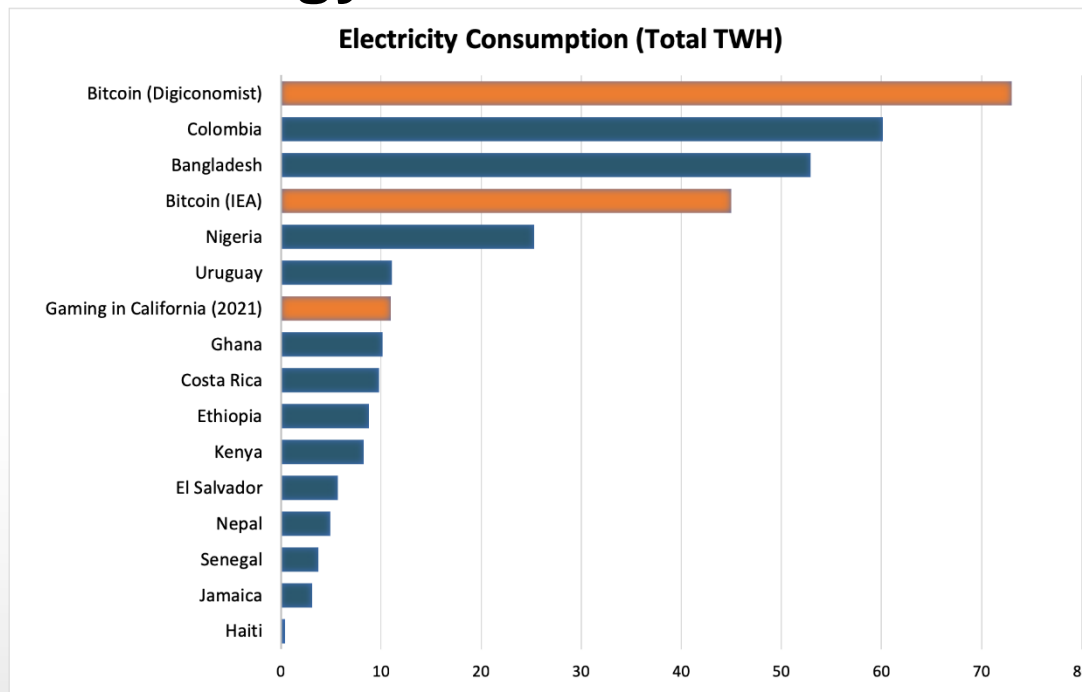
Did you know in 2014 that 72% of reservations made in New York City were illegal?

### Airbnb problems in Paris, France

In 2015, 44% of advertised properties on Airbnb were permanently available for rental, despite laws in France's capital stating that holiday rentals are capped at only being available for 120 days of the year.

<https://www.theinvisibletourist.com/why-you-shouldnt-use-airbnb-issues-you-didnt-know/>

# Bitcoin and energy



<https://energyforgrowth.org/article/bitcoin-gaming-and-the-chasm-of-global-energy-inequality/>

**News** | Opinion | Sport | Culture | Lifestyle


World UK Science Cities Global development Football Tech Business Environment

**Facebook**

## How social media filter bubbles and algorithms influence the election

With Facebook becoming a key electoral battleground, researchers are studying how automated accounts are used to alter political debate online

- **Revealed: Facebook's internal rules on sex, terrorism and violence**




## NEWS

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### Facebook-Cambridge Analytica scandal

18:28 18 Feb

#### Facebook security app used to 'spy'




A cross-party group used its Onavo app to spy on competitors.

[Read more >](#)

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10:22 18 Feb

#### MPs give Big Tech a hammering



Amol Rajan  
Media editor

A select committee of Facebook and Twitter.

[Read more >](#)



# IT For Sustainability Will Drive The Next Wave Of Corporate Evolution



**Christopher Mines**

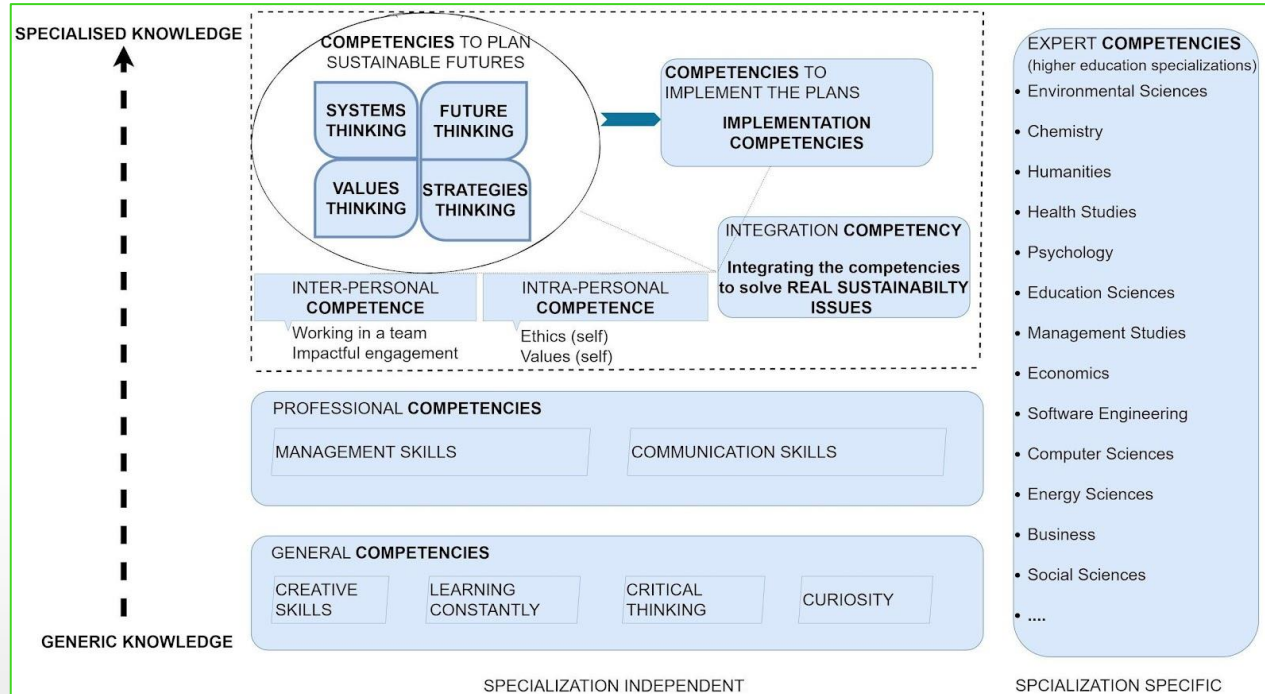
Senior VP and Research Director  
Forrester Research

What are the skills and competencies needed?  
[what education is needed]

# Skills and competencies for Sustainability

Framework	Competencies
Wiek et al. [1, 2]	1. Systems thinking, 2. Anticipatory/futures-thinking, 3. Normative/values-thinking, 4. Strategic-thinking, 5. Interpersonal/collaborative. 6. Integrated problem-solving (added in Wiek et al. [2]).
Brundiars et al. [3]	Wiek et al. [1,2] + 1. Implementation 2. Intra-personal/self-awareness.
Redman and Wiek [4]	Brundiars et al. [3] + 1. Generic competencies taught in higher education, 2. Disciplinary competencies taught in higher education, 3. Other professional skills.

# A unified framework of competencies (based on [4])

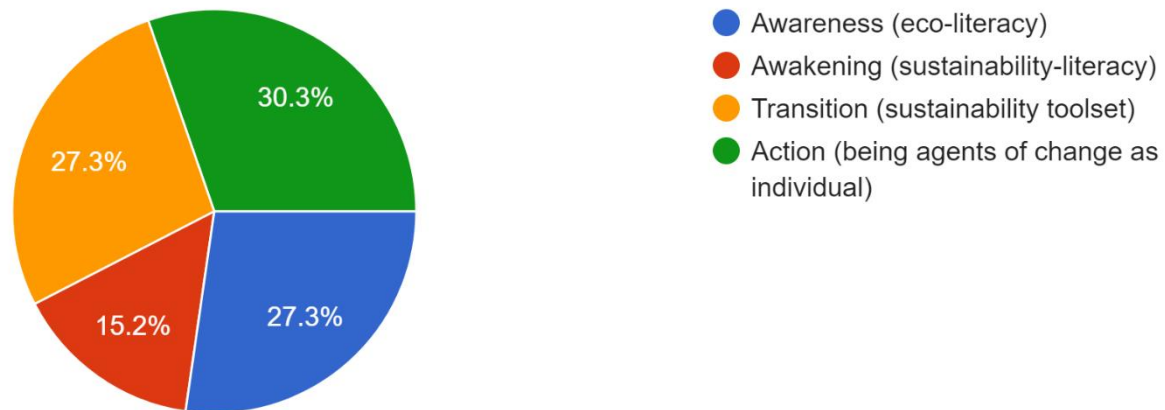


# What do the students think?

(Master's course Software and Application Innovation @LUT)

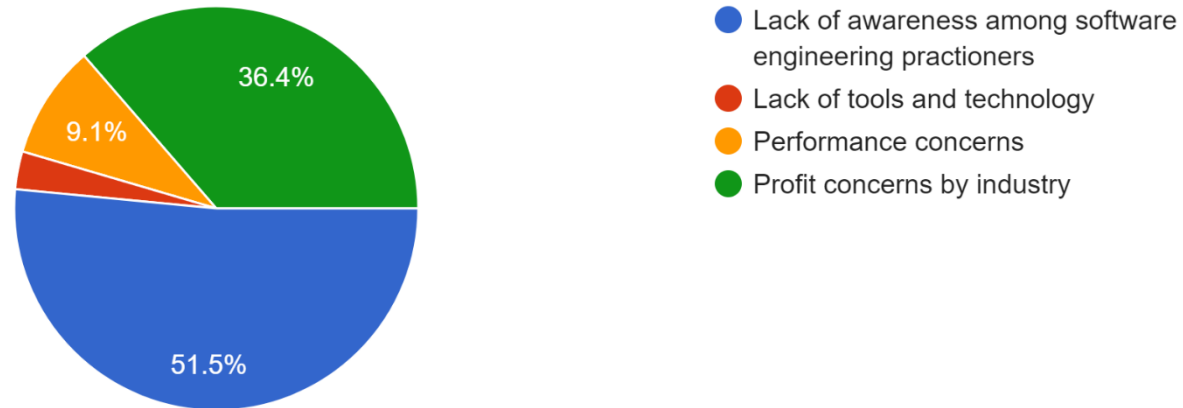
Which do you think is most important area when it comes to sustainability

33 responses



## What do you think is the biggest challenge to adopting sustainability in software engineering?

33 responses

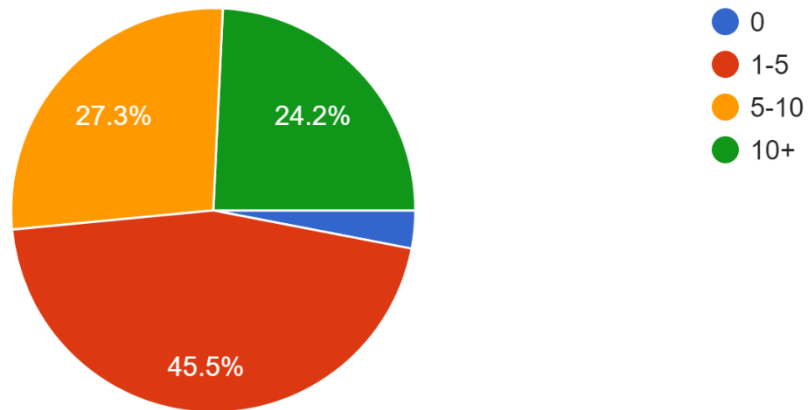


# Sustainability competency framework for engineering education

		Sustainability Mindset			Realizing Mindset
SUSTAINABILITY AREA		Awareness (Eco-literacy)	Awakening (Sustainability literacy)	Transition (Sustainability toolset)	Action (Agents of change)
COMPETENCIES		<ul style="list-style-type: none"> <li>• Sustainability               <ul style="list-style-type: none"> <li>◦ Planetary boundaries</li> <li>◦ Finite resources</li> <li>◦ SDGs</li> <li>◦ Challenges</li> </ul> </li> <li>• Context Awareness               <ul style="list-style-type: none"> <li>◦ Socio-ecological</li> <li>◦ Econo-economical</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Learning from collective</li> <li>• Vision for the future</li> <li>• Desire to change</li> <li>• Adapting</li> <li>• Values and ethics</li> <li>• Responsibility and fairness</li> </ul>	<ul style="list-style-type: none"> <li>• Systems thinking</li> <li>• Critical thinking</li> <li>• Problem framing</li> <li>• Design thinking</li> <li>• Knowledge management</li> <li>• Innovation &amp; entrepreneurial thinking</li> <li>• Value creation</li> <li>• Sustainable MVP</li> <li>• Scalable design</li> </ul>	<ul style="list-style-type: none"> <li>• Courage to take lead</li> <li>• Growth mindset</li> <li>• Collective action</li> <li>• Political agency</li> <li>• Impact assessment</li> </ul>

## Work experience (years)

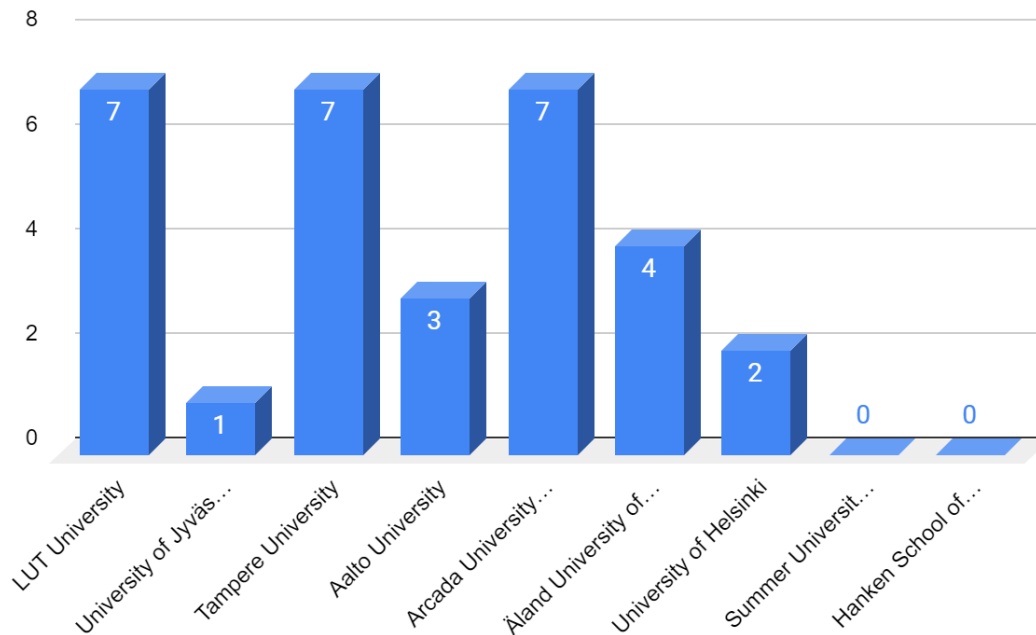
33 responses





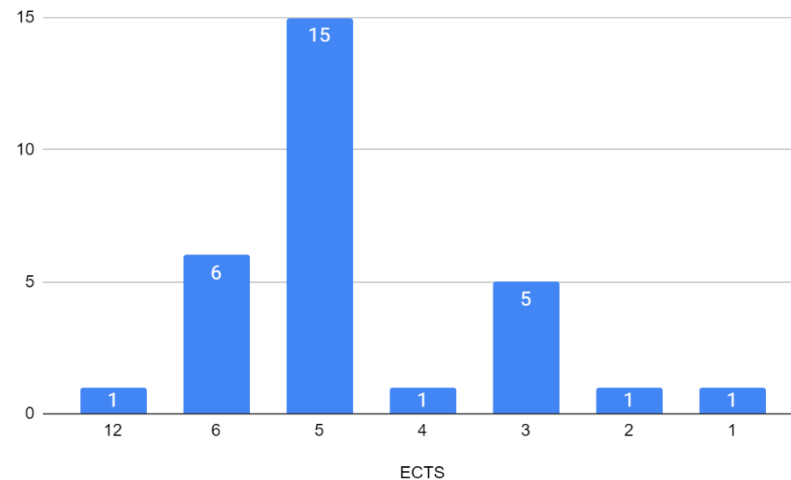
What is happening in the Finnish HEIs space?  
[are we teaching sustainable ICT]

# Via Sisu



# Credits (ECTS)

- Ranges from 1 to 12 ECTS
- 15 courses are for 5 ECTS





# Learning outcomes





Can an education program in software engineering FOCUS on Sustainability?

# Sustainability focused Master's in SE

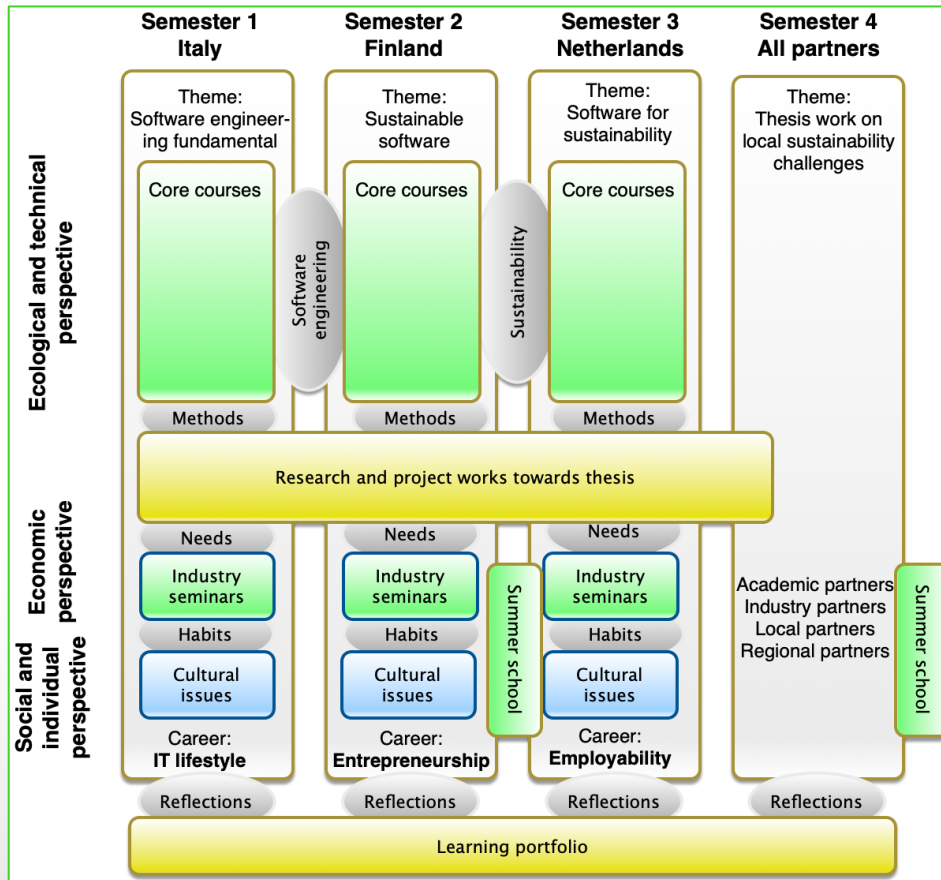
Software Engineers for the Green Deal (SE4GD)

(<https://se4gd.lutsoftware.com/>)

*A truly sustainable future requires us to understand challenges at local to global levels, from farms to industries, and from companies to individuals. We must innovate, design, and implement solutions that enable a green and inclusive transition, ensuring that no one is left behind.*

The **SE4GD program educates** experts to innovate, design, and implement **software-based solutions with sustainability** in mind for both **local and global challenges**. Our graduates will **impact individuals, societies, industries, and governments** by developing systems in new, responsible ways.

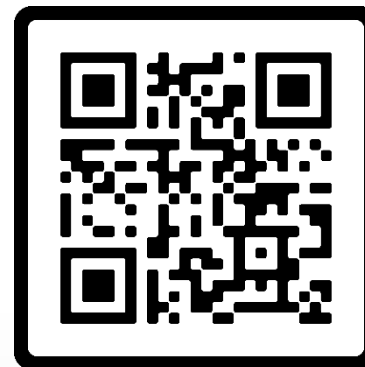




# Connect, collaborate..

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<https://www.linkedin.com/in/ashokaiconsulting/>



## Reference(s)

1. Wiek A, Withycombe L, Redman CL (2011) Key competencies in sustainability: A reference framework for academic program development. *Sustainability Science* 6:203–218
2. Redman A, Wiek A (2021) Competencies for advancing transformations towards Sustainability. *Frontiers in Education*. doi: 10.3389/feduc.2021.785163
3. Brundiers K, Barth M, Cebrián G, et al (2020) Key competencies in sustainability in higher education—toward an agreed-upon reference framework. *Sustainability Science* 16:13–29
4. Redman A, Wiek A (2021) Competencies for advancing transformations towards Sustainability. *Frontiers in Education*. doi: 10.3389/feduc.2021.785163