# Sustainability

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# On sustainability



What?

Why?

# Short survey before the course

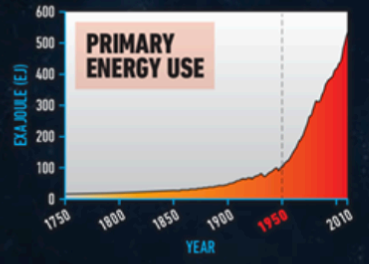
bit.ly/2PdOVtm

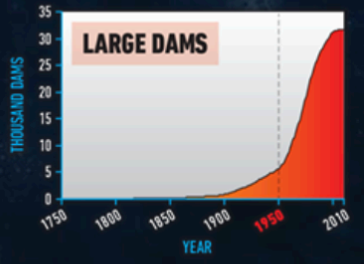
"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

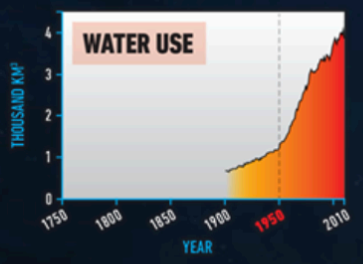
– Brundtland Commission, Our Common Future: Report of the World Commission on Environment and Development (1987)

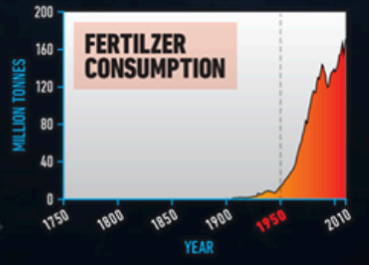
# SOCIO-ECONOMIC TRENDS

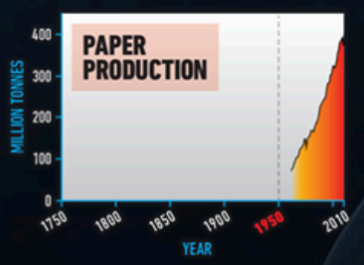


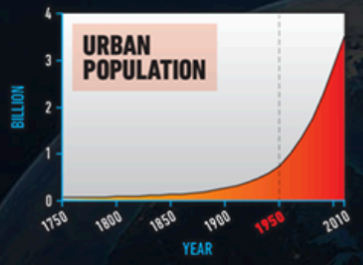



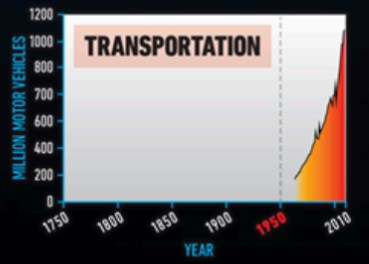



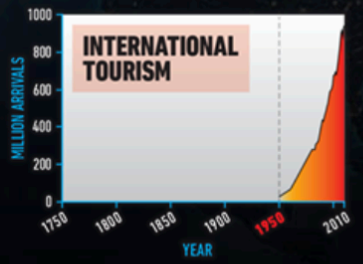



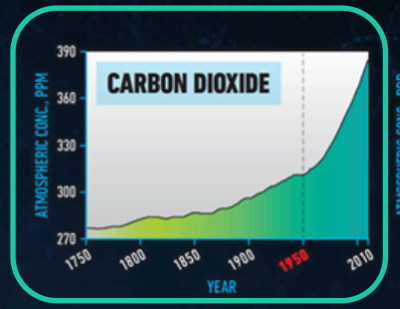



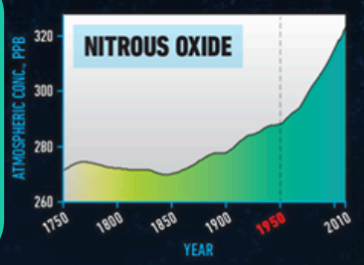



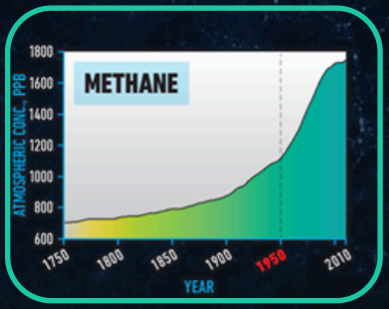


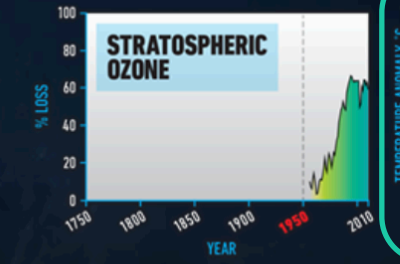


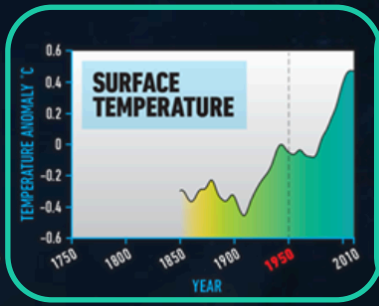

# EARTH SYSTEM TRENDS

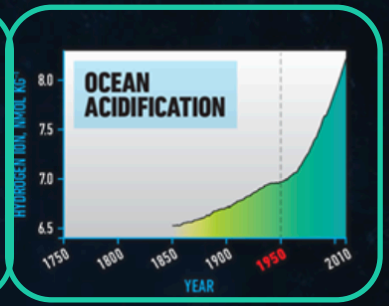


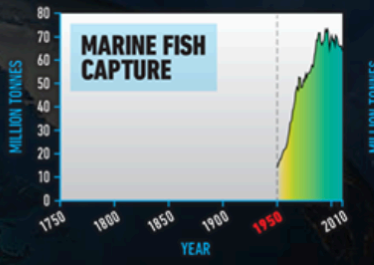



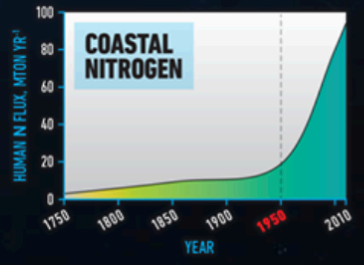



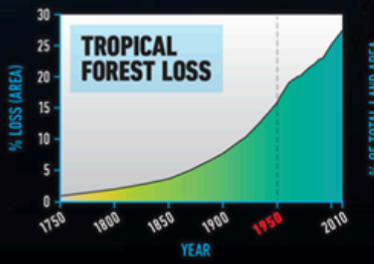



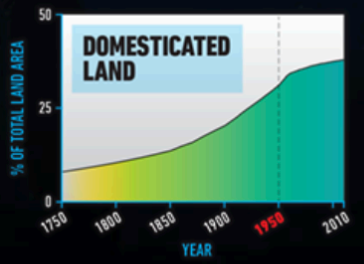



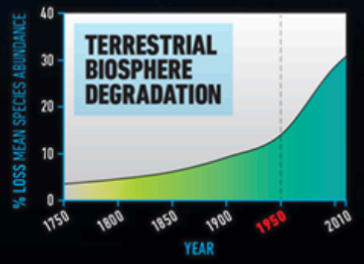





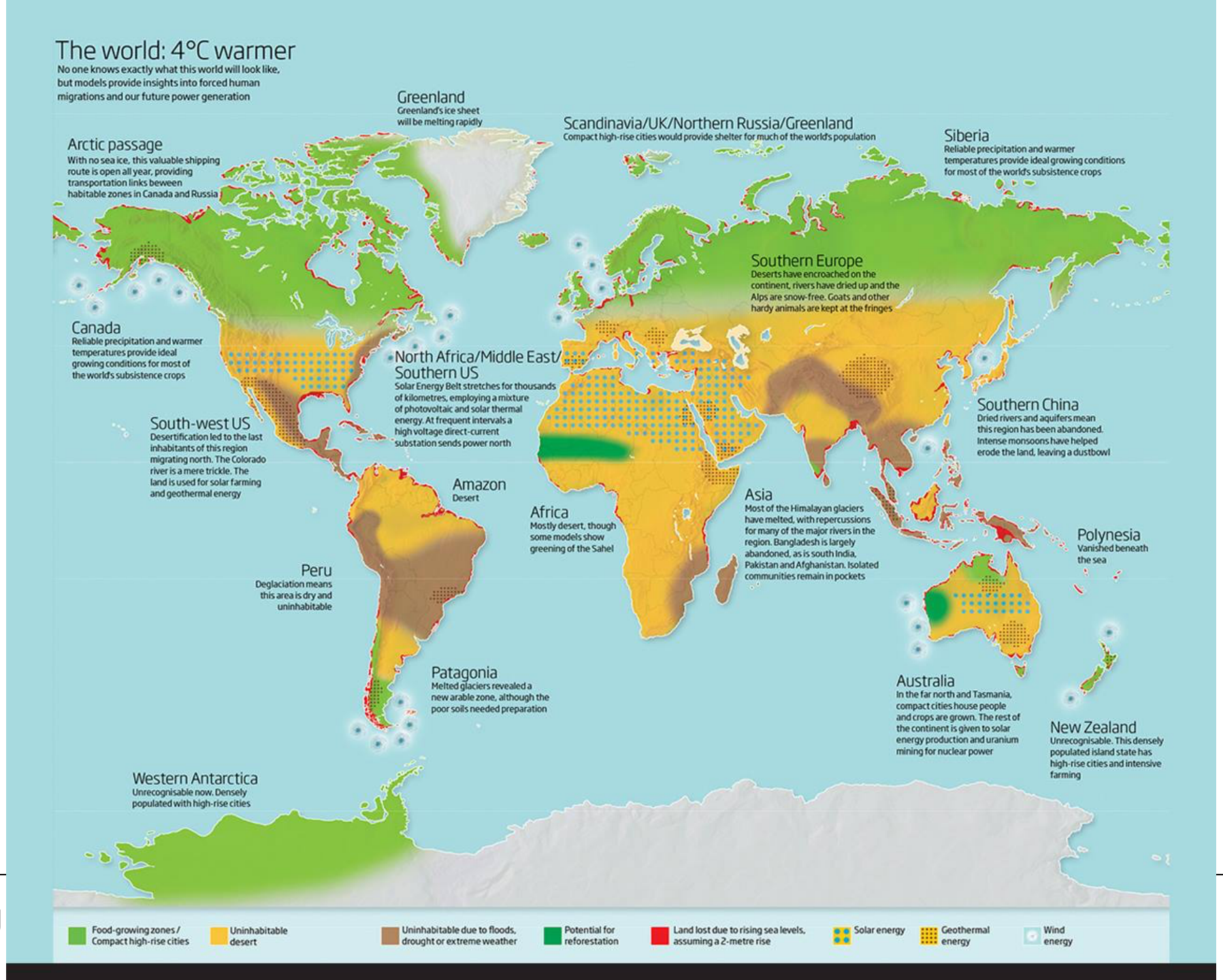



http://www.anthropocene.info/great-acceleration.php




Source: New Scientist, September 30, 2009

# SUSTAINABLE DEVELOPMENT GOALS

## 17 GOALS TO TRANSFORM OUR WORLD

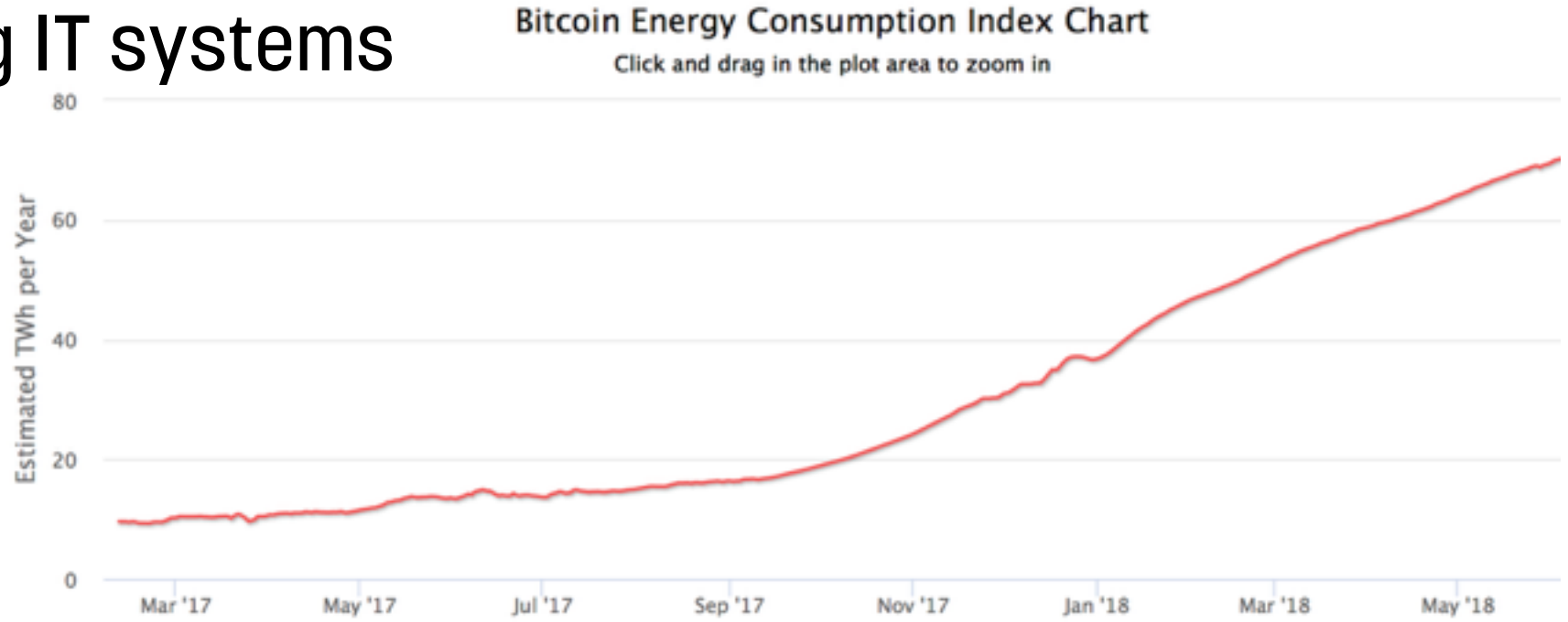


# The relationship between IT and economic growth

- Creating more & more complex IT systems motivated to support economic growth
- Economic growth linked to growing ecological pressures
- A different kind of development is required

# The effects of using IT systems

## Bitcoin Energy Consumption Index




| | |
|---|---|
| Electricity consumed per transaction (KWh) | 1,049 |
| Number of U.S. households that could be powered by Bitcoin | 6,585,585 |
| Number of U.S. households powered for 1 day by the electricity consumed for a single transaction | 35.45 |
| Bitcoin's electricity consumption as a percentage of the world's electricity consumption | 0.32% |
| Annual carbon footprint (kt of CO2) | 34,851 |
| Carbon footprint per transaction (kg of CO2) | 514.05 |

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

**Chris Mines**
Senior Vice President, Research Director

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WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

Executive Summary

# The Future of Jobs

## Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution

# Top skills required according to WEF:



**Critical thinking**: What do I believe will happen when I create IT systems? What are the anticipated long-term effects of IT systems that we build?

**Emotional intelligence**: What do I value? Am I acting as an individual and computer scientist in accordance to my values? What do other people value? Are there conflicting values?

**Complex problem solving, creativity**: How can I as an IT professional work with others to enable more sustainable futures? What are the options available to me in doing so?

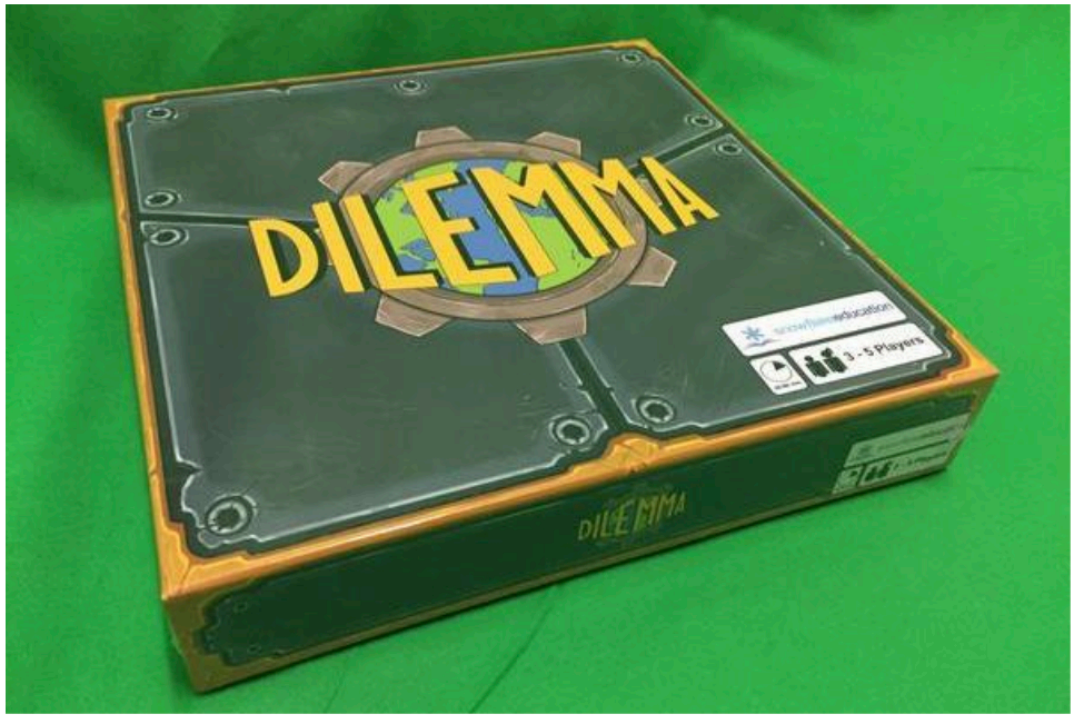
Having answers to these questions is part of what it means to be

Learning for a sustainable future

# During the course

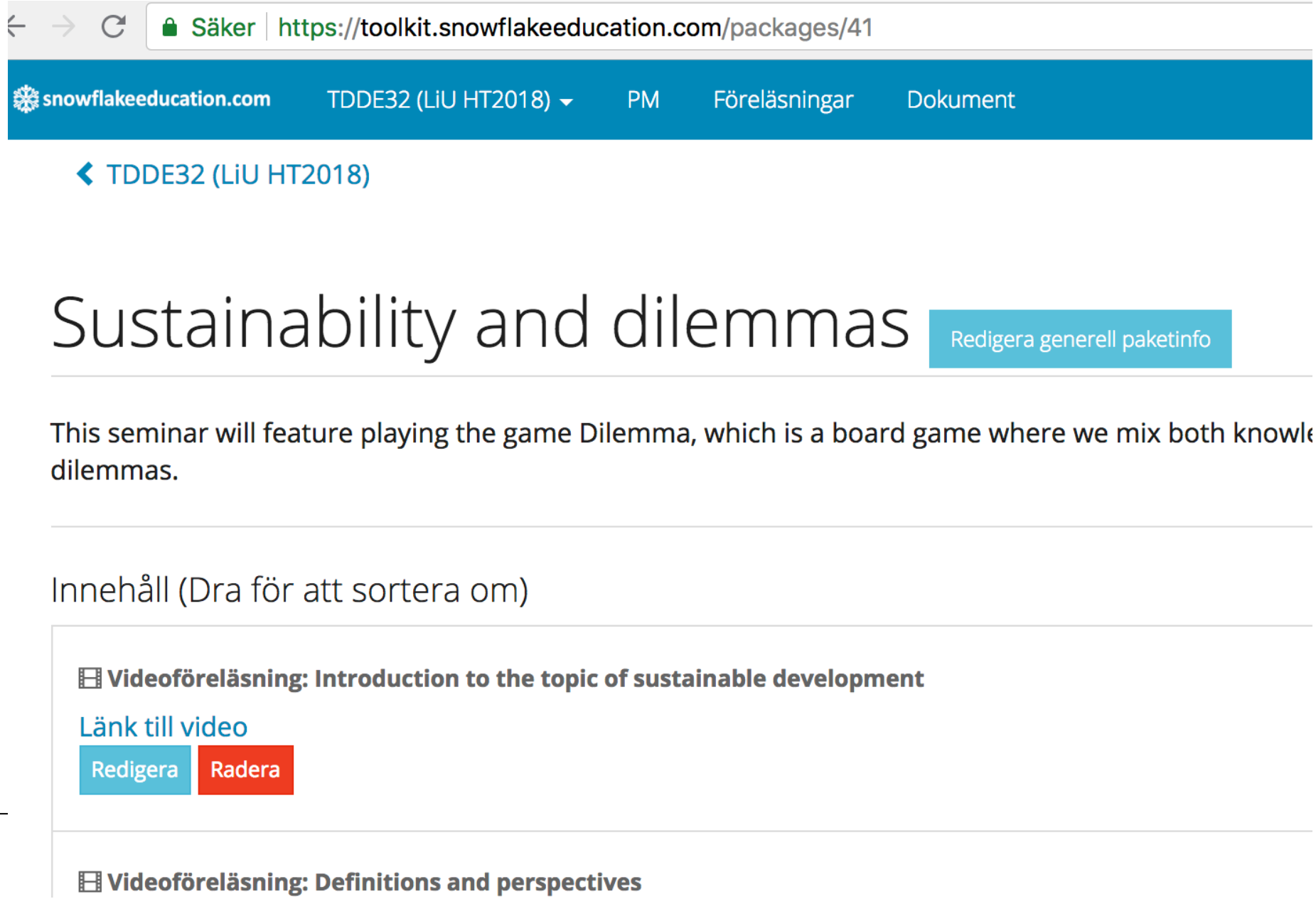


- Seminar: Sustainability and dilemmas 1, 4h
  - Making preparations (watching videos)
  - Submissions of summaries
  - Playing Dilemma
  - Debriefing
  - Writing section of essay
- Seminar: Dilemmas in IT, 4h
  - Making preparations (reading)
  - Submission of cards
  - Playing Dilemma with your own cards
  - Debriefing
  - Writing section of essay

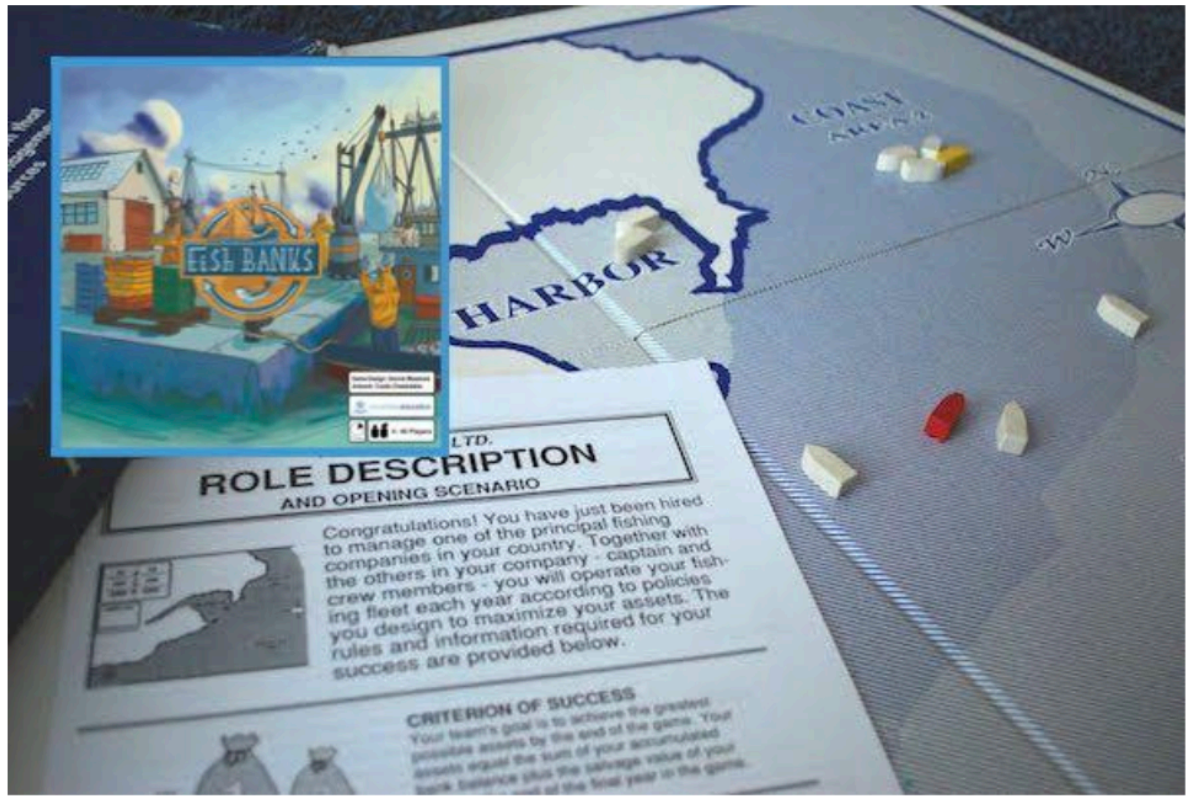
# Snowflake Education





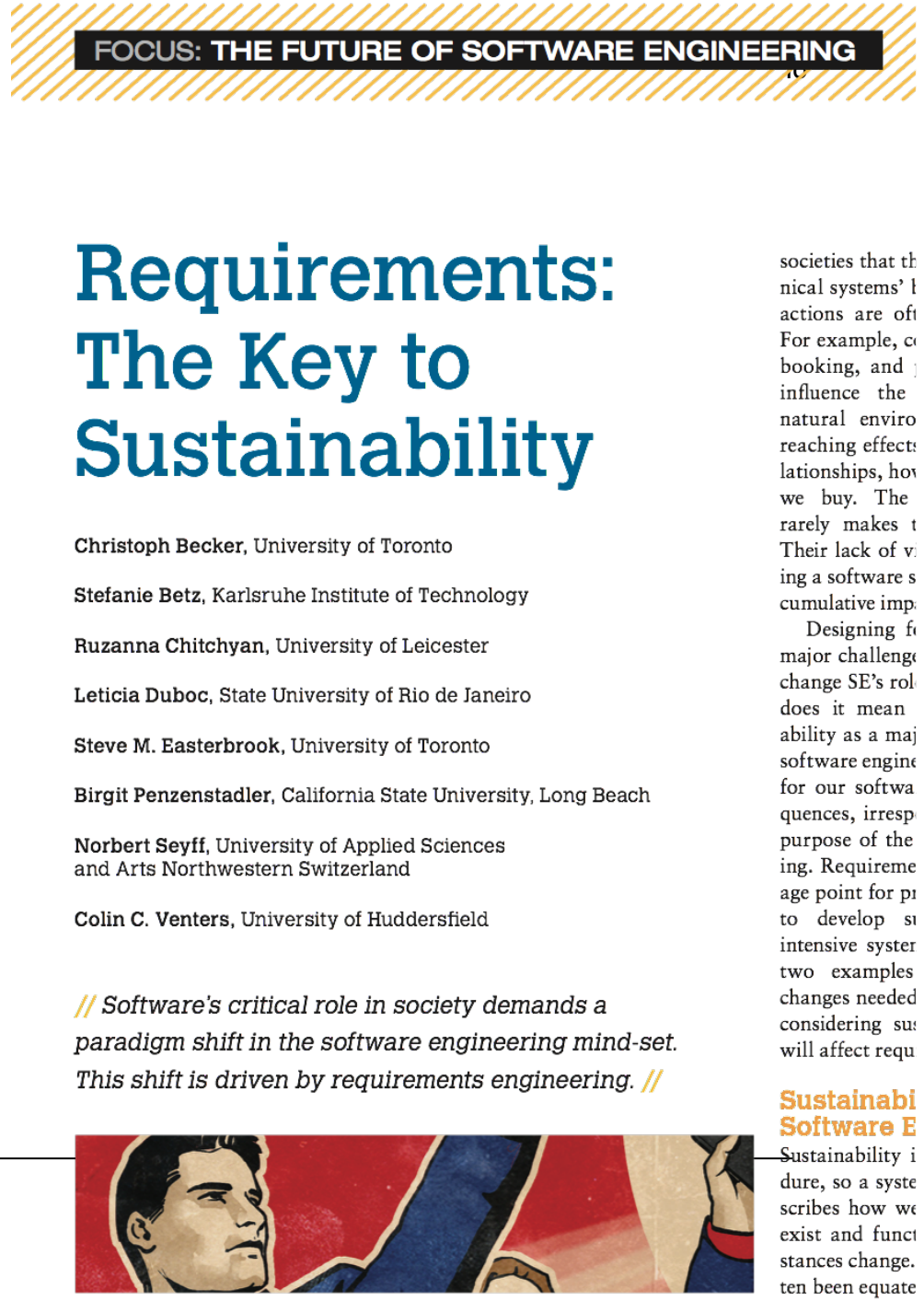
# During the course (2)

- Seminar: System dynamics & Fishbanks, 4h
  - Making preparations (reading, watching)
  - Playing Fishbanks
  - Write about experiences in essay



# During the course (3)

- Seminar 8: SusAD analysis seminar
  - Analyzing the wider effects of an IT system, and the responsibility IT professionals have.
  - Write final section of essay



FOCUS: THE FUTURE OF SOFTWARE ENGINEERING

Requirements: The Key to Sustainability

**Christoph Becker**, University of Toronto

**Stefanie Betz**, Karlsruhe Institute of Technology

**Ruzanna Chitchyan**, University of Leicester

**Leticia Duboc**, State University of Rio de Janeiro

**Steve M. Easterbrook**, University of Toronto

**Birgit Penzenstadler**, California State University, Long Beach

**Norbert Seyff**, University of Applied Sciences and Arts Northwestern Switzerland

**Colin C. Venters**, University of Huddersfield

*// Software's critical role in society demands a paradigm shift in the software engineering mind-set. This shift is driven by requirements engineering. //*

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