Science and technology education – intentions and reality

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Earlier study

• Earlier research 1991-1993
  – *Status and future of science education in compulsory schools in Iceland in the 1990s*
  – funded by the Science Council

• Reports
  – Development of the curriculum
  – Teacher education
  – Materials
  – Science in schools
  – Intentions and realities
Research question

• This follow-up study will address the following key research question:
  – What is the nature of the gap between the intended curriculum and the actual curriculum – the intentions and the reality?

• Subsidiary questions include:
  – What are the main features of the national curriculum in science in Iceland from 1999?
  – What resources are available for science teaching and learning (particularly ICT) and what is their role?
  – What learning and teaching practices are typically found in schools?
  – What influences student choice with regard to science and technology in secondary, further and/or higher education?

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Project group

- **Project leader**
  - Allyson Macdonald, science/physics education, curriculum and evaluation studies

- **Project researchers**
  - Meyvant Þórolfsson, M.Ed., curriculum and evaluation specialist, doctoral student
  - Kristján Ketill Stefánsson, B.Ed., master’s student
  - Björg Petursdóttir, M.S., master’s student
  - Elín Bergmann Kristmansdóttir, B.Ed., master’s student

- **Associates**
  - Sif Einarsdóttir, guidance counsellor
  - Hafþór Guðjónsson, chemistry education/teacher education
  - Hrefna Sigurjónsdóttir, biology education (HS)
  - Eggert Lárusson, geology/geography education
  - Haukur Arason, physics education
  - Hrefna Sigurjónsdóttir, chairman of teaching committee, biology education
  - Stefan Bergmann, graduate studies in biology, biology/environmental education
Methodology

• Mixed methods
  – interviews
  – questionnaires
  – observations
  – statistical surveys
  – textual analysis
Theory

• Curriculum theory
  – official and recontextualised discourse, classification and framing (Bernstein)
  – deliberation: decision-making (Reid)

• Cultural-historical activity theory theory CHAT (Engeström)

• Learning – self-efficacy, engagement, demands
What are the main features of the national curriculum in science?

- Analysis of the curriculum as a text
- Analysis of the curriculum as policy
  - Views of science and technology
  - Views of education
- Comparison with Sweden and Denmark
- School curriculum
What resources are available for science teaching and learning (particularly ICT) and what is their role?

- Review of resources
  - availability and nature of printed materials
  - ICT resources – language and software/hardware
  - other resources inside and outside the classroom
- Views of teachers
  - on the role of materials in teaching and learning
- Relationship to the national curriculum
- Relationship to conditions in schools
What learning and teaching practices are typically found in schools?

• The school curriculum
  – the (official) school curriculum
  – teaching plans

• Observations
  – of classroom situations
  – of other types of learning situations
  – of teacher activity and learner activity

• School self-evaluation (SCIQ) – intrinsic and extrinsic factors
What influences student choice with regard to science and technology in secondary, further and/or higher education?

- Listening to students
  - interest, engagement, predisposition
  - risk and protective factors
- Interest inventory
- PISA studies – definition of scientific literacy
- Patterns of enrollment and choice
- Images of science and technology
What is the nature of the gap between the intended curriculum and the actual curriculum – the intentions and the reality?

- **Intentions**
  - what kind of science and technology is promoted in official discourse?
  - what is the (stated) purpose of science and technology education?
  - what kind of society is reflected in this discourse?

- **Reality**
  - what kind of learning is encouraged in society?
  - what kind of science learning is encouraged in schools/classrooms and at an individual level?
  - what choices are available?
  - what do students learn?