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DEVELOPMENT RESEARCH

in / on

Educational Development

by

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Faculty of Educational Science and Technology (FEST)

- NOT teacher education
- educating professionals in the field of education
- for formal, non-formal and corporate education

Subdomains FEST:

- curriculum
- instructional technology
- educational administration and management
- instrumentation technology
- educational measurement

University of Twente:

- founded in 1962 as school of engineering
- FEST was expected to demonstrate a mix of social sciences and engineering thinking

Engineering approach:

the way engineers work/tackle on problems

- engineers 'make' something, a product
- in education and training also working like engineers
- then 'product' can be: course, piece of instruction, multimedia product
- but *not* always tangible,
e.g. an organisational structure
a procedure, a policy, a set of rules

SO: question is
'how to design and develop a solution that is effective'

for that: **design methodology**

equivalents:

- educational technology
- educational design, development & evaluation
- instructional systems design
- engineering approach
- design & development methodology
- ...

Design methodology:

from different *perspectives* :

- student: learner/beginning professional,
accountable to lecturer, focus on process
- professional: accountable to client, focus on product
- design/developmental researcher:
accountable to (i) scientific forum
(ii) often also: client

In our work as scientists:

problems may result =>

from a need to:

- *know*
- *choose*
- *make, develop*

scientific

activity:

- Research
- Evaluation
- Design/Development

Development research:

research related to scientific need to 'make, develop'

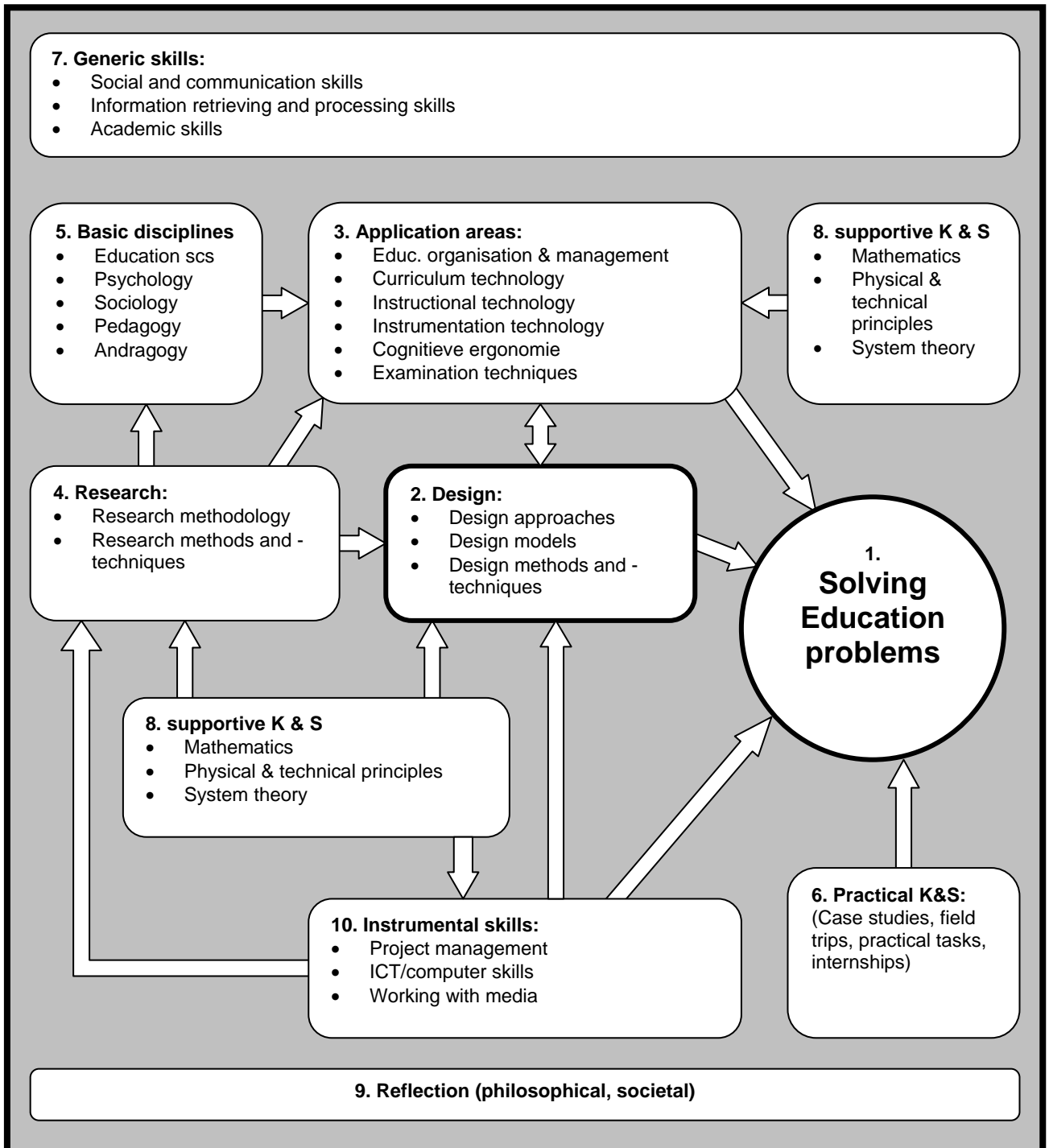
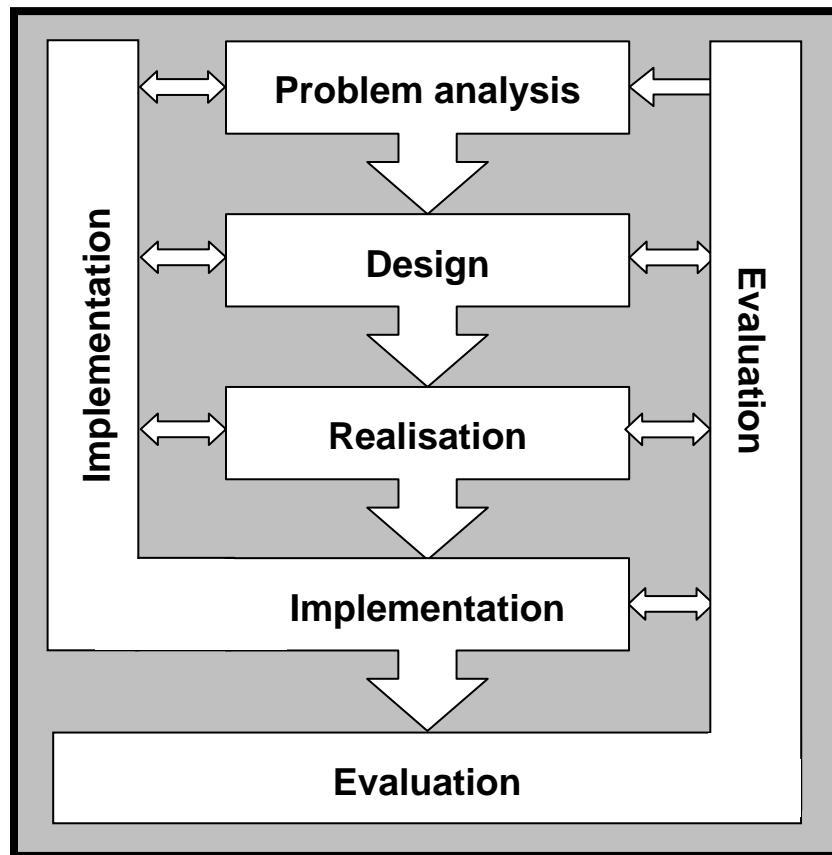


Figure 4: Building blocks of the curriculum of the Faculty of Educational Science and Technology as of 1999
(Verhagen, Kuiper & Plomp, 1999)



Generic model for educational design
(Fac. Educ. Science & Technology,
University of Twente)

Summary based on Van den Akker (1999)

WHY

1. To increase 'practical' relevance of educational research
 - Because ambitious educational reforms require evolutionary, iterative approaches in view of:
 - diversity of problems and needs
 - uncertainty about effectiveness of interventions in broad variation of contexts
 - crucial importance of implementation
 - Because 'traditional' research offers hardly useful solutions for design problems (too narrow views, too artificial contexts)
2. The complex nature of change and reform processes:
 - Problems often ill-specified and effectiveness of proposed interventions mostly unknown beforehand
 - Would profit from more evolutionary approaches (interactive, cyclic, spiral) with integrated research activities to feed the process (both forward and backward)
 - 'successive approximation' of the 'ideals'

WHAT

Definition

Development Research is a problem oriented, interdisciplinary research methodology, aimed at:

- Reducing uncertainty of design decisions
- Generating concrete recommendations for quality improvement
- Testing general design principles
- Stimulating professional development

Related terminology

- Design studies/research/experiments
- Development research studies
- Formative studies/research/inquiry
- Action research
- Engineering research

WHERE

Development Research is employed in domains of:

- Curriculum
- Instrumentation (ICT, Multimedia)
- Learning and Instruction
- Teacher Education

- Distance Education

FOCUS

Types of Development Research

- *Formative research*: research activities performed during the entire development process of a specific intervention, from exploratory studies through (formative and summative) evaluation studies; aimed at optimization of the quality of the intervention, as well as testing design principles.
(Prototypical studies consisting of design, development, and evaluation of a specific product or program, and analysis of conditions that facilitates the use of this specific product or program.)
- *Reconstruction studies*: research activities conducted sometimes during, but oftentimes after the development process of several interventions; focused on generating and specification of design principles.

Further: focus on *Formative research*

HOW

Characteristic activities in formative research (that is: how design and development can become a scientific endeavour):

- *Analysis phase* is 'research': thorough and elaborate problem analysis
- *Theoretical rationale* of the design decisions/choices based upon state-of-the-art scientific knowledge ('content validity')
- *Empirical testing* of both the usability and the effectiveness of the intervention through *formative and summative evaluation*
- *Systematic documentation, analysis and reflection* of the design, development, evaluation and implementation process and their results

Important: *formative evaluation* as key activity

- information richness and efficiency; *triangulation*
- shifting emphasis in quality criteria

RESULTS

Type of knowledge

- Mainly heuristic: "If you want to design intervention X [for the purpose/function Y in context Z], then you are best advised to give that intervention the characteristics A, B, and C [substantive emphasis], and to do that via procedures K, L, and M [procedural emphasis], because of arguments P, Q, and R"
- Knowledge incorporated within the prototype, but also articulated, and empirical proof of viability

Product quality criteria

- Validity:
 - content validity: reflecting state-of-the-art knowledge
 - construct validity: all components of the intervention properly linked to each other (internal consistency)
- Practicality/usability
- Effectiveness

Process quality criteria:

- Systematic approach, i.e. cyclic process of analysis, design, development, evaluation and revision, leading to implementation (internal consistency)
- Relational approach, leading to agreement among stakeholders (external consistency)
- See also under HOW

PROBLEMS AND DILEMMAS

- Tension in role division between development and research
 - Rule of thumb: shift from in early stage a dominance of 'creative designer' perspective, towards in later stages the 'critical researcher' perspective
- Isolating 'critical' variables versus comprehensive and complex design ('design experiments'; upscaling)
- Generalization of findings
 - No 'statistical' but 'analytical' generalization
 - Ecological validity: theoretical articulation of choices and careful description of process and implementation context
 - Exploration of generalization with experts on related contexts
 - Experimental approach if possible (at end of process)

CHALLENGES

- Increasing prominence of prototyping approach:
 - Efficiency of development process?
 - creative versus systematic features of design/development process?
 - closing gap between methodology and practice (can 'theory' keep up with 'practice'?)
- ICT trends
 - tools and environments for learning and teaching
 - tools for designing
 - tools for communication
- Evaluation methodology
 - how to increase information richness?
 - while maintaining efficiency of data collection and analysis
- Cross-fertilization between domains and disciplines