1. Introduction

Self-regulation and learning
Zimmerman (2000):
- Self-regulation: self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals
- Competence-based learning:
  - estimation of difficulty level of task
  - selection of types of support or coaching of task execution
  - assessment or evaluation of results

Risk --- OK --- Risk
Age: 4 years
Psych. dev.: 2 years
Psych. dev.: 7 years
General IQ
Language
Arithmetic
Social behaviour
Emotional-expressive behaviour
Motor behaviour

Prima-cohort: Correlations between class and cognitively gifted pupils (2.5% of n=8,500)

<table>
<thead>
<tr>
<th>Teacher's score of pupil's:</th>
<th>Characteristics of preschool class 2</th>
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<tbody>
<tr>
<td></td>
<td>N pupils</td>
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<tr>
<td>popularity</td>
<td>Neg.</td>
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<tr>
<td>relation teacher</td>
<td>Neg.</td>
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<td>self-assured</td>
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<td>work attitude</td>
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<td>extra-cur. support</td>
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<td>discipline</td>
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<td>underachievem.</td>
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2. Multilevel theory

Optimal education – learning conditions:

A. Three educational contextual dimensions:
   • Differentiation of learning materials and procedures
   • Integration by and use of ICT support
   • Strategies to improve development and learning
B. At individual, small group, class and school level: integration with diagnostic, instructional, managerial, and systemic aspects of learning

Adequate differentiation and provision of learning materials and procedures

1. Identify a pedagogical kernel structure (PDKS) for different domains and subdomains
2. Structure domains of competence in terms of skills, subskills and instructional lines
3. Include criterion-based and normed indicators to evaluate learning progress
4. Organise and match flexible groups of learners and teachers/coaches
5. Use integrated systems for monitoring, evaluation, and administration

Hypothesis

Compared with their learning in traditional education, in optimal education – learning conditions both low and high ability pupils will improve their social, emotional and cognitive learning processes in particular because of the adequate integration of these pupils’ self-regulatory capacities in the instructional designs.

3. Method

Research to develop and check optimal education

• Development of prototype Pedag. Kernel Structure (PDKS)
• Screening of beginning characteristics
• Development of prototype software
• Pilot in preschool / primary school
• Experiment 1 (schools for cognitively gifted pupils)
• Experiment 2 (regular schools)

4. First results

Pedagogical Kernel Structure: competence domains:

- language
- general - cognitive
- social - emotional
- arithmetic / mathematics
- physical - medical
- general - psychological
- motor
Ordering play and learning materials

Pilot in preschool

- screening beginning characteristics of four-year olds
- day care, parents and preschool teachers
- experiences in practice:
  - more collaboration
  - multi-perspective communication about competence levels
  - introduction of appropriate levels of play / learning materials
  - further specific educational support in prosocial small groups

Projects and creativity
Experiment 1: Intervention 2009 - 2013

Hypothesis:
criterion-based and norm-based instructional changes influence the development of cognitive, social and emotional characteristics of gifted pupils

Intervention in 10 Leonardo schools (random):
– Information learning psychology / diagnostics
– Training teachers, internal coaches, principal
– Support educational changes in school


School level:
– Instructional characteristics: diagnostical procedures, learning content and instruction, small groups, evaluation

Pupil level (n pupils=200):
– Teacher’s scores about each pupil’s (under)achievement, (social) behaviour, work attitude, popularity
– Language and math achievement scores on national pupil monitoring system

Intermediate results

Leonardo schools:
– middle and upper grades, developing contents and procedures
– number of pupils, financial and management problems
– growing focus on regular (!) norm-based evaluation to keep pupils in school

Quantitative pupil effects

Experiment 2: Intervention 2010 - 2013

Hypothesis, intervention, assessments: exp. 1

Design: regular schools

Data collection

Intermediate results

5. Discussion

Intermediate conclusions
1. Differentiated instructional and school characteristics, and adequate ICT, can promote self-regulated learning of pupils
2. Age-based instruction and / or norm-based pupil monitoring may block adequate self-regulated learning of pupils
3. School interests to enlarge the number of pupils can block instructional differentiation for, and self-regulation of, pupils

Some project references