Language descriptors for mathematics and history/civics

PRESENTERS:
MARITA HäRMÄLÄ, THE FINNISH NATIONAL BOARD OF EDUCATION
ELI MOE, UNIVERSITY OF BERGEN, NORWAY
Language descriptors for migrant and minority learners' success in compulsory education

2012-2013


Project report is soon available via the ECML’s web pages.
Project group


Five project members

Eli Moe  University of Bergen, Norway
Marita Härmälä  Finnish National Board of Education, Finland
José Pascoal  University of Lisbon, Portugal
Meilute Ramoniene  Vilnius University, Lithuania
Paula Kristmanson  University of New Brunswick, Canada
Overview of presentation

• Presentation of the project:
  – What and how?
• Discussion of the results:
  – How well do the descriptors mirror the language required in history/civics and mathematics – how valid are they?
  – How reliable are the indicated CEFR level requirements
  – Are the descriptors useful?
Project focus

What level of language competence do migrant/minority pupils need in order to do well in compulsory schooling, i.e. minimal standards?

Subjects: History/civics and mathematics
Age groups: 12/13 and 15/16 year old pupils
Aim

• to indicate one or several CEFR levels of language competence that young migrant or minority learners need to have in the language of schooling in order to do well in mathematics and history/civics
• to raise an awareness of the challenges young language learners meet when learning subject matter contents by means of a language, which is not their first language.
Process

**Developing descriptors**
- The CEFR / research on the lang. of schooling
- Curriculum goals for history/civics and maths (Finland and Norway)
- Feedback from lang. and cont. experts

**Validating the CEFR level of the descriptors**
- Online questionnaire
  - 78 language / CEFR experts assigned 163 descriptors to CEFR levels

**Collecting feedback on required levels**
- Online questionnaire
  - 229 teachers of history/civics and mathematics answered yes/no to whether their students need the skills indicated in each descriptor

**Analysing data, reporting results**
- Summing up results of the two questionnaires.
- Deciding which descriptors to keep.
- Reporting the results.
Outputs

- 144 validated descriptors targeted at levels A2-B2 in six languages (English, Finnish, French, Lithuanian, Norwegian and Portuguese)
- CEFR levels, indicated by teachers, as minimal standards for 12/13 (B1) and 15/16 (B2) year old students in history/civics and mathematics
- Practical examples of how the descriptors could be used.
- Guidelines (and ideas) on how to describe minimal language standards in other subjects and for other age groups
- A project report in English and French (in press)
Challenges

- Are the descriptors valid? Are they tailored to history/civics and mathematics?
- Are the descriptors reliable? Can we trust the results?
- Are the descriptors useful?
Finland: History 6th and 8th grade

Apply historical knowledge
• 6th grade: know how to present an account of matters (speaking-writing/state facts/B1)
• 8th grade: be able to formulate own justified opinions about, and evaluate events and phenomena (speaking/express opinions/evaluate/B2)

Understand historical phenomena
• 6th grade: name characteristic features of societies and eras (speaking/describe/A2-B1)
• 8th grade: know to present reasons for, and consequences of historical events (speaking/explain/B1-B2)
Finland: Mathematics: 5th and 8th grade (1)

Thinking and working skills
- 5th grade: use mathematical concepts by presenting them with pictures, symbols, words, numbers, diagrams (writing/work with tables/A2-B1)

Data processing, statistics, and probability
- 5\textsuperscript{th} grade: - know how to read simple tables and diagrams (reading/work with tables/A2)
Finland: Mathematics: 5th and 8th grade (2)

Probability and statistics
• 8th grade: read various tables and diagrams, and to determine frequencies, average, median, and mode from the given material (reading/work with tables/B1-B2)

Functions
• 8th grade: be able to describe the general rule for a given number sequence verbally (speaking/describe/A2)
Subject matter specific formulations in the Finnish core curriculum:

Acquiring information / history
• 6th grade: know how to distinguish fact from opinion
• how to distinguish a source from an interpretation of that source

Data processing / mathematics
• 5\textsuperscript{th} grade: know how to clarify the number of different events and alternatives, and to judge which is an impossible or certain alternative
Language descriptors - example

**Reading:** Read and analyse graphically represented information in tables, graphs, maps, charts, symbols, as well as photographs, paintings and drawings

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B2</strong></td>
<td>Can analyse tables, graphs, maps and charts and make inferences about the data.</td>
</tr>
<tr>
<td><strong>B1</strong></td>
<td>Can understand specific information and identify facts from tables, graphs, maps and charts.</td>
</tr>
<tr>
<td><strong>A2</strong></td>
<td>Can identify basic information communicated in simple tables, graphs, maps, charts.</td>
</tr>
</tbody>
</table>
Can we trust the results? -1

The results rest on
1. the descriptors developed
2. the data collected in Questionnaire 1 and 2
   a) the level assignments of 78 language experts (Q 1 - mode)
   b) responses from 229 teachers (Q 2)
   c) the rules we used to make decisions on “required levels” (Q 2 - 67%)
**CEFR experts’ vs final assignment of descriptors**

<table>
<thead>
<tr>
<th>Correlation between individual CEFR experts’ level assignment of descriptors and final level assignment</th>
<th>Number of raters</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-0,156)</td>
<td>1</td>
</tr>
<tr>
<td>0,5 – 0,59</td>
<td>1</td>
</tr>
<tr>
<td>0,6 – 0,69</td>
<td>1</td>
</tr>
<tr>
<td>0,7 – 0,79</td>
<td>29</td>
</tr>
<tr>
<td>0,8 – 0,89</td>
<td>24</td>
</tr>
<tr>
<td>Above 0.9</td>
<td>22</td>
</tr>
</tbody>
</table>

Mean correlation: 0,83
## Reliability of level assignment

<table>
<thead>
<tr>
<th></th>
<th>Bootstrap (n=1000)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Original reliability</td>
<td>Mean</td>
<td>Confidence interval</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5%</td>
<td>97.5%</td>
</tr>
<tr>
<td>Listening (25)</td>
<td>0.819</td>
<td>0.803</td>
<td>0.668</td>
</tr>
<tr>
<td>Reading (26)</td>
<td>0.845</td>
<td>0.840</td>
<td>0.775</td>
</tr>
<tr>
<td>Speaking (64)</td>
<td>0.926</td>
<td>0.923</td>
<td>0.882</td>
</tr>
<tr>
<td>Writing (48)</td>
<td>0.936</td>
<td>0.933</td>
<td>0.898</td>
</tr>
</tbody>
</table>
Can we trust the results? -2

- The level requirements are in line with research on the language of schooling (Beacco, Vollmer etc.)
- The level requirements coincide with studies on the language level of textbooks for history and mathematics (12/13 and 15/16 year olds in Norway and Portugal)
- Competence goals in history/civics and mathematics in Finland and Norway mention language functions (and indirectly also CEFR levels) covered by the descriptors developed in this project.
In which ways are «required levels» for the different age groups useful?

Generic descriptors could

• encourage stakeholders to reflect upon necessary language skills (awareness raising)

• encourage teachers to be concrete and prepare students for the kind of language they have to cope with (receptive and productive skills), i.e.
  - assist students in developing their reading and listening strategies
  - assist students in developing their speaking and writing skills, i.e. how to express comparison / arguments etc. when speaking and writing
The future

How can such descriptors be used?

By teachers
• to raise awareness of the language-related aspects of various school subjects and tasks
• to determine language objectives for lessons
• to use as formative assessment criteria
• to use as self-assessment criteria for students

By researchers/teacher trainers / teachers – a starting point for
• developing descriptors for other subjects and age groups
• developing teaching materials


