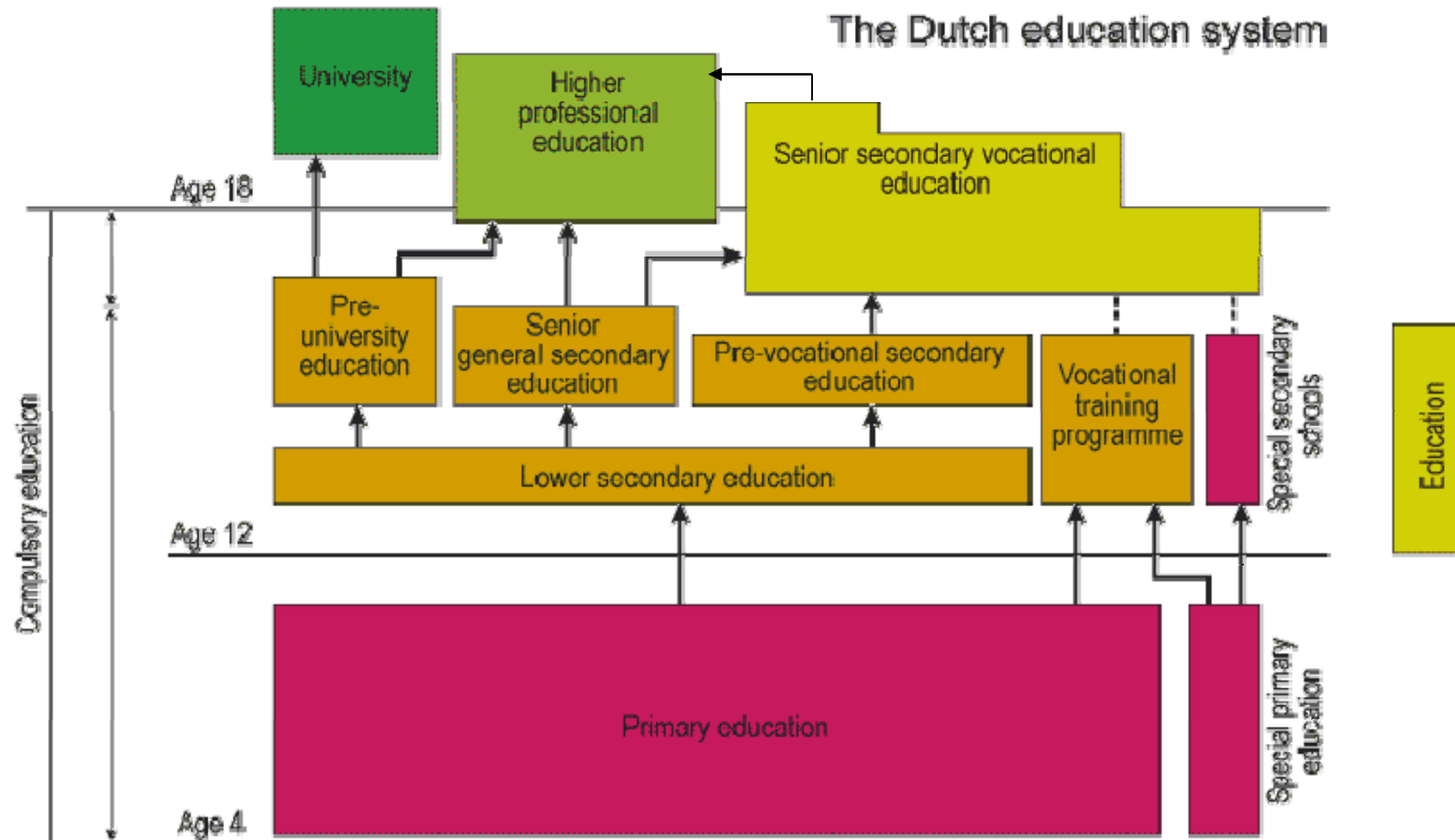


The Dutch education system



This presentation

1. The problem
2. The solution
3. Why CAT?
4. Design of WISCAT-pabo
5. Measurement quality
6. First operational results
7. First student experiences



now you know

1. The problem



now you know

1.1 Prerequisites for successful teaching

- Pedagogical-didactical skills
- Subject-matter knowledge



now you know

1.2 Shocking news

Half of first-year TTC-students lack arithmetic skills

de Volkskrant Dinsdag 3 januari 2006

Helft eerstejaars pabo rekent slecht

Nieuwe toets selecteert studenten: wie niet kan rekenen, moet weg

Van onze verslaggeefster
AMSTERDAM

De helft van de eerstejaars pabo-studenten beheerst het rekenen onvoldoende. Dit blijkt uit een nieuwe rekentoets die de Cito-groep heeft ontwikkeld om pabo-studenten te testen.

De nieuwe, onafhankelijke rekentoets wordt volgend schooljaar

rol. Van de vwo'ers zakt een kwart. Van de studenten met een mbo-diploma haalt driekwart de toets het niet.

De taal- en rekenprestaties van pabo-studenten zijn al jaren zorgelijk. Op last van minister Van der Hoeven van Onderwijs moeten pabo-studenten vanaf komend studiejaar worden afgerekend op hun taal- en rekenprestaties. De

eind van het eerste studiejaar hoger liggen dan aan het begin.'

De gemiddelde pabo-student heeft echter weinig tijd om zich verder te bekwamen in breuken, procenten en oppervlakteberekeningen. Er staan veertien contacturen (lesuren) op het weekrooster voor in totaal zeventien schoolvakken. Op veel pabo wordt een uur rekenen per week



now you know

2. The solution

- Qualitative performance standard for arithmetic skills

TTC students must be able to do arithmetic by the end of their first year of study as well as a good pupil in the final year of primary school.



now you know

2. The solution

- Qualitative performance standard for arithmetic skills
- Nation-wide obligatory entrance test

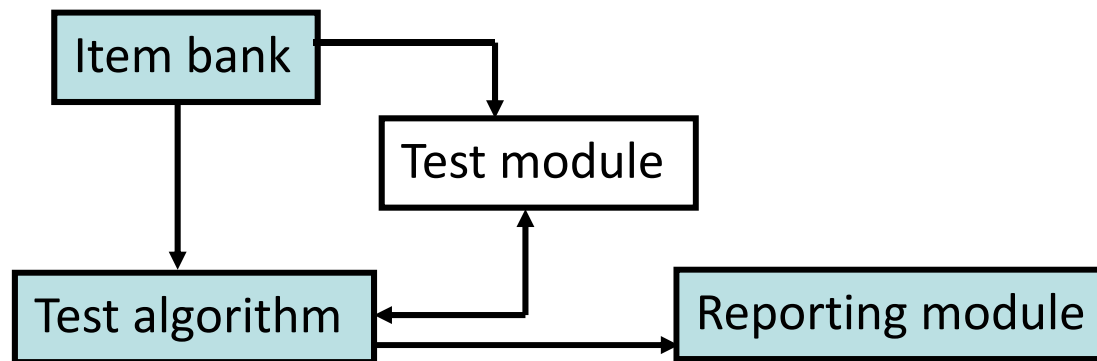
3. Why CAT?

- Secrecy problem
(students are tested successively)
- Large variations in arithmetic skills



now you know

4. Design of WISCAT-pabo



4.1 IRT calibrated item pool

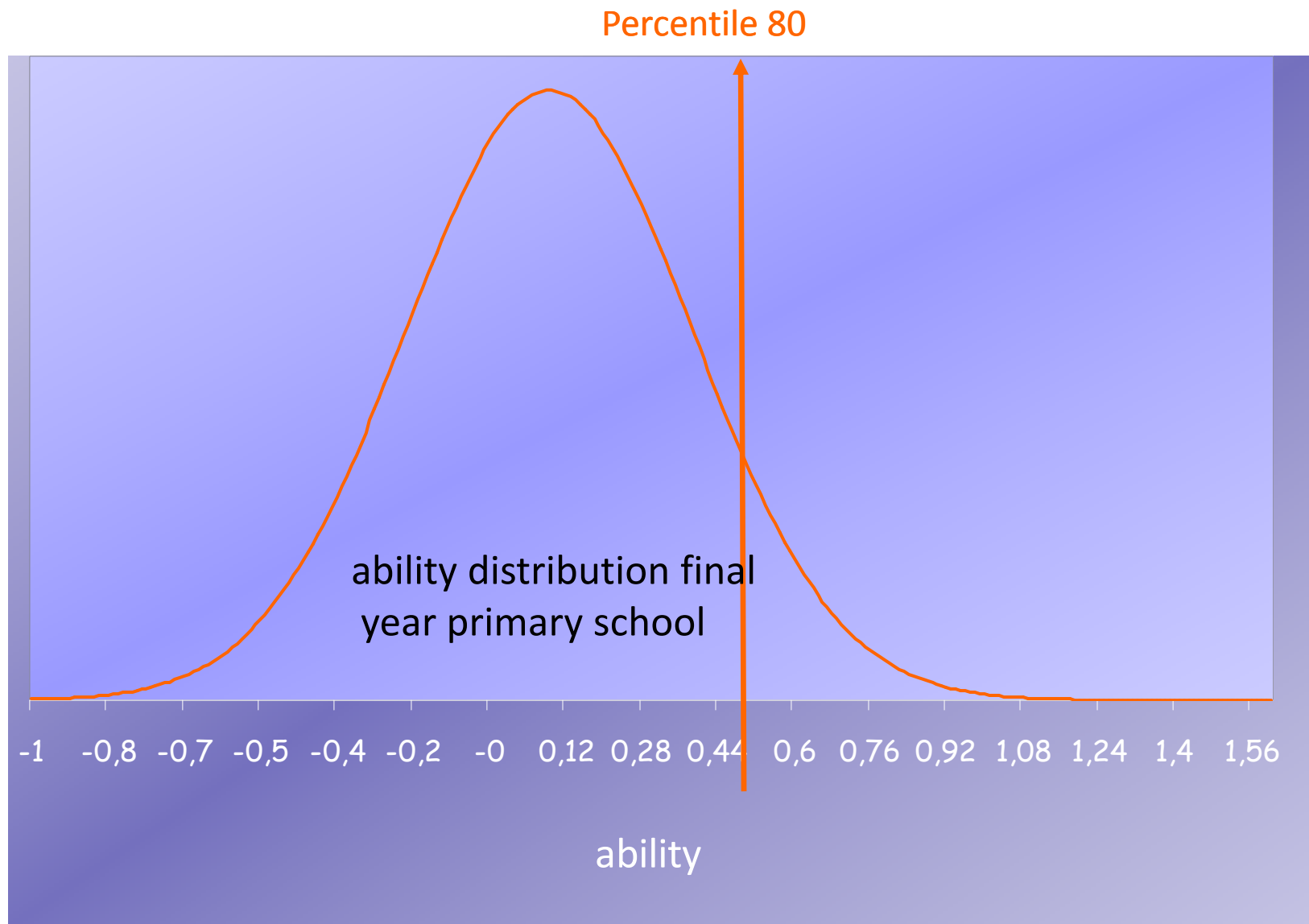
$$p_i(\theta) = P(X_i = 1 | \theta) = \frac{\exp(a_i(\theta - \beta_i))}{1 + \exp(a_i(\theta - \beta_i))}$$

Basic operations	181	from which mental arithmetic	141
Fractions, percentages, ratios	431		152
Measurement	175		23
Geometry	113		
Probability and statistics	33		
Formulas, functions and graphs	51		
TOTAL	966		316



now you know

4.2 The critical score



4.3 The testing algorithm

- The test consists of two parts
 - 15 mental arithmetic items (time constraint: 15 min)
 - 35 'regular' arithmetic items (time constraint: 75 min)
- Item selection method: maximum information

	number of items	from which mental arithmetic
Basic skills	15	7
Fractions, percentages, etc	15	7
Measurement & Geometry	15	1
Other	5	



now you know

4.4 Reporting test performance

Definition of the scale:

Test results of [redacted] nr 3232215

Nationally defined performance standard: 103

attempt date	1 24-09-07	2 12-01-08	3 06-06-08
Test result	88 (o)	97 (o)	105 (v)
Mental arithmetic (15)	96	103	109
Regular arithmetic (35)	91	95	102
Basic skills (20)	95	100	111
Fractions, etc. (15)	84	99	102
Measurement/geometry (15)	69 (*)	72 (*)	99

(*) = significantly lower than overall test result

5 Measurement quality

- Scoring accuracy
reliability 0.91
simulated and operational data
- Decision accuracy



now you know

5.1 Decision accuracy: simulated data

		Estimated ability level	
		fail	pass
Actual ability level	fail	50.6	4.6
	pass	4.2	40.6

6

First operational results academic year 2006-2007

Type prev.educ.	Number of candidates passing	Percentage of candidates passing
Vocat. Educ.	2,614	60.5
Gen. Sec. educ.	4,390	83.5
Gen. Sec. educ. (pre univ.)	1,207	94.9
Unknown	88	68.8
Total	8,299	75.6

7 First student experiences

- Adaptive testing causes stress
- Restricted freedom of responding to the test
- Completely focused on the correct answer at the cost of arithmetical processes



now you know

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now you know