Progress Testing – concept, history, and recent developments

Arno Muijtjens

Dept. of Educational Development & Research,
Faculty of Health, Medicine, and Life Sciences,
University of Maastricht, The Netherlands

a.muijtjens@maastrichtuniversity.nl

Overview

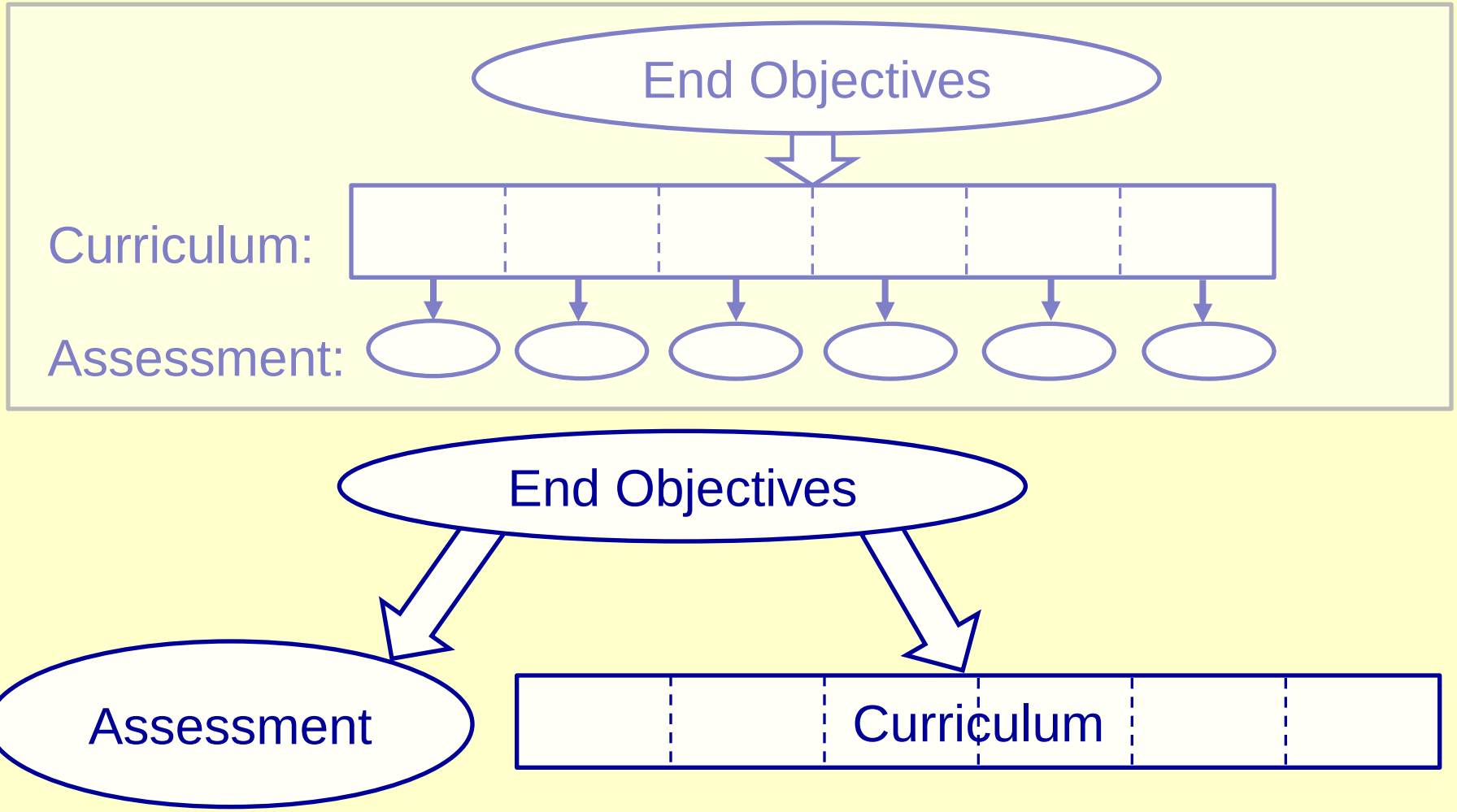
Progress Testing (PT)

- Why PT?
- What is it?
- What can it do for you?
- What do you need for PT?
- Issues, How to improve PT

Why Progress Testing

- 1974 Maastricht Medical school, Problem Based Learning (PBL)
- Educational aims  Assessment
- PBL self-directed, discovery learning integrated, not discipline oriented
- End-of-unit tests → test-directed learning discouraged individual learning trajectories, stimulated rote memorization instead of insight and understanding

- Solution (Wynand Wijnen): remove direct connection between Curriculum and Assessment



- Assess complete knowledge domain (end objectives)
- Like final exam, but taken several times a year by all students
- Assessing long term, functional knowledge

What is Progress Testing

- Comprehensive written test of 200 MCQs (single best answer + don’t know option)
- Sample across all areas of undergraduate training program (organ systems, basic, behavioral, clinical disciplines)
- Blueprint representing end objectives of undergraduate medical training
- All students from all training levels (all classes) are submitted to the same test at the same time
- Four newly constructed tests per year
- Students may keep their test booklet and all questions

Question format (clinical)

You are a general practitioner. At the end of your morning surgery your assistant tells you that mrs. Rhines (24 years old) has come to your surgery. She is very worried about a loss of vision. On further history taking she tells you that it is not actually a loss of vision but a more blurred vision and flickering circles before the eyes. She has never had this before. In addition she has a headache above her eyes without nausea. The headache lasted for some hours, but is gone now. On examination you find a normal vision and a sharp papilla on fundoscopy on both sides.

The most probable diagnosis is:

A: sinusitis.

B: migraine.

C: arteriitis temporalis.

D: acuut glaucoma

E: ablatio retinae (retinal detachment)

Question format (Basic Science)

The diaphragm consists of a central tendon plate and a muscular part. Which of the structures below passes through the tendon plate?

A. Aorta.

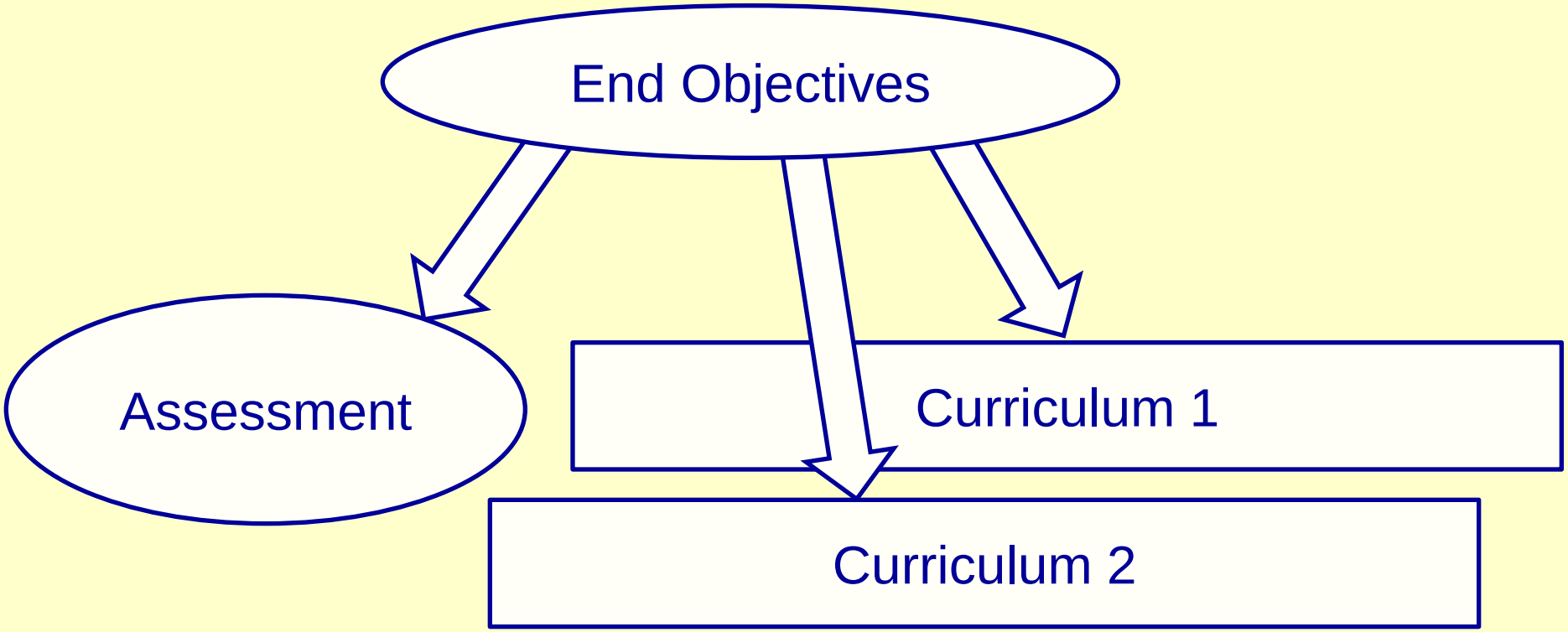
B. Oesophagus.

C. Vagus nerve.

D. Vena cava.

Blueprint categories

- Respiratory system (16 questions)
- Hormones and Metabolism (10 questions)
- Preventive Healh Care (7 questions)

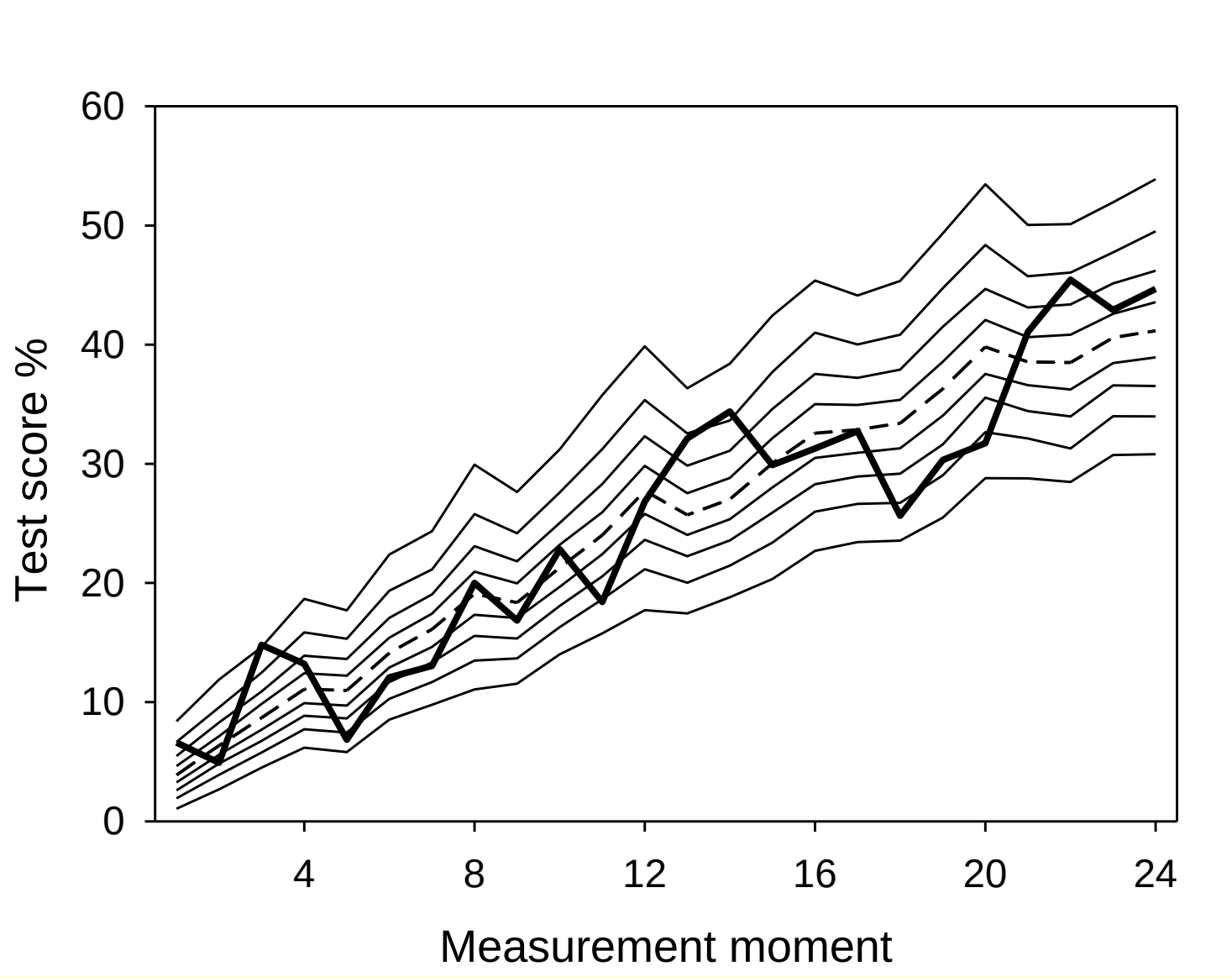


- Institutions share same end objectives (not the same curriculum)
  →cooperative progress test possible

Netherlands
Interuniversity progress test in Medicine

- 4x per year, 200 MCQ's taken by students of 5 medical schools in The Netherlands
- Joint construction, administration at same time, same standards, same rules and regulations
- 6 year undergraduate curriculum,
  24 measurement moments

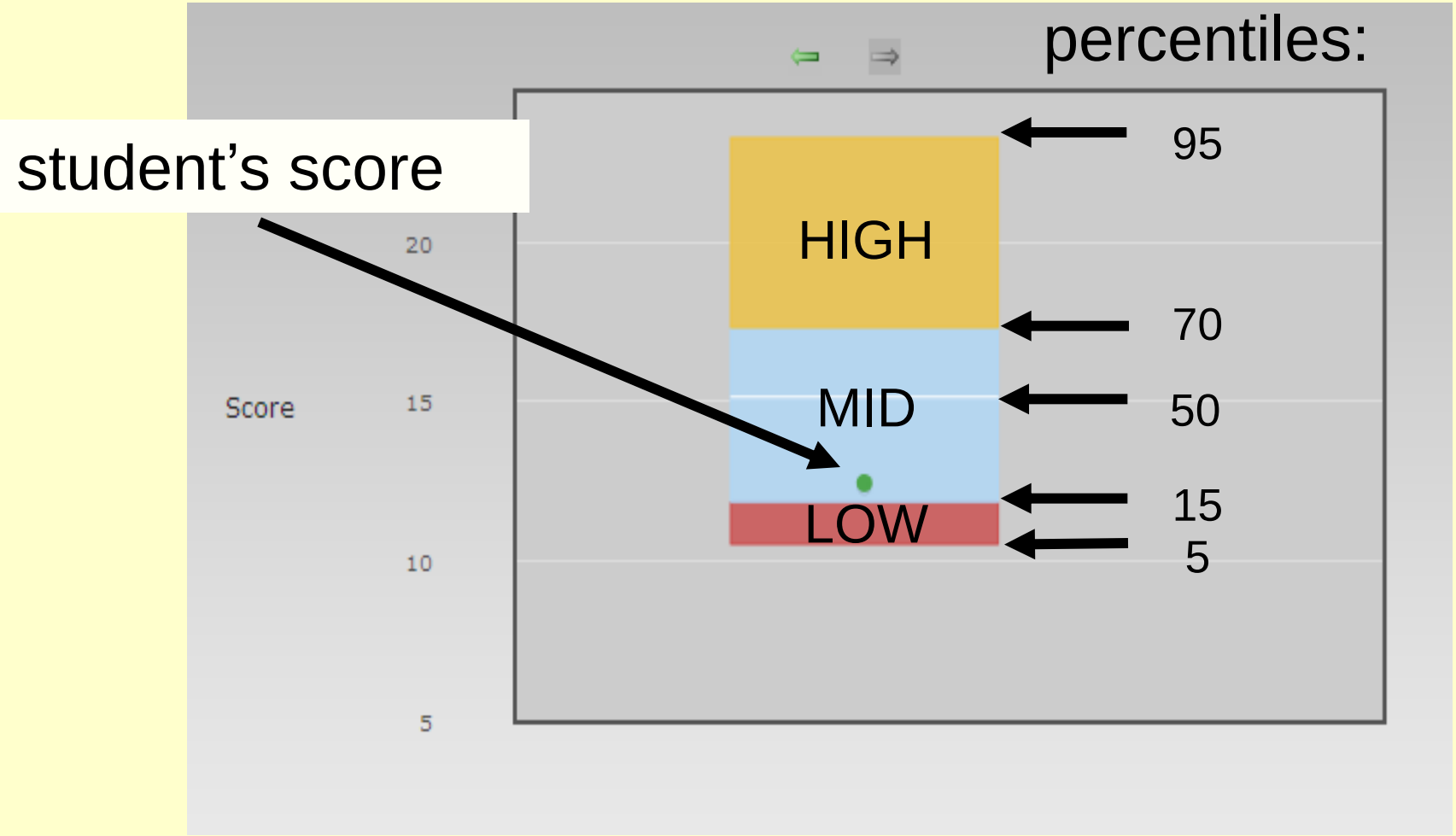
Scores of UM students (n=1600) in 7 academic years (2005-2011)



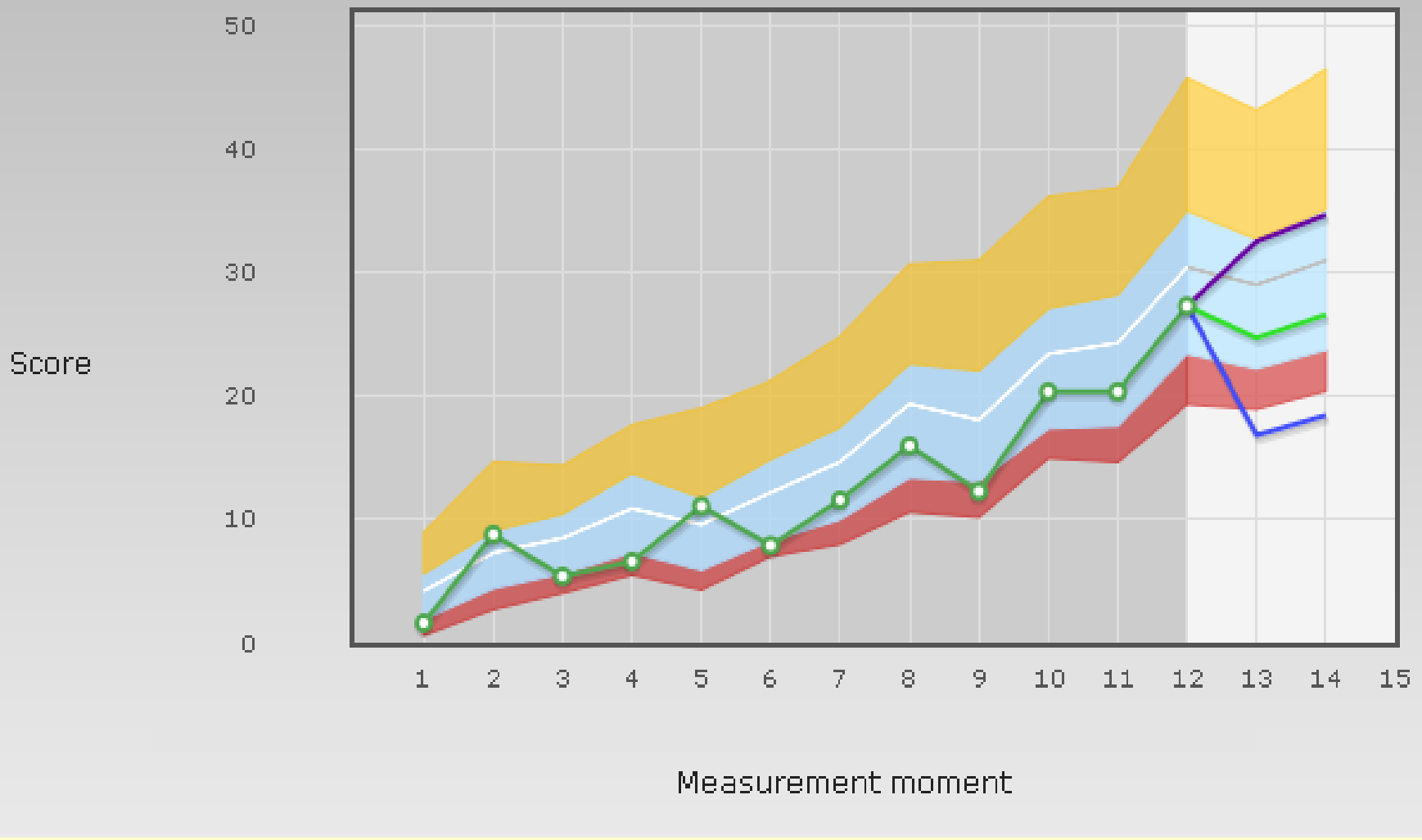
What can Progress Testing do for you

- Repeated measurement of all medical knowledge
- Monitor knowledge growth
  Progress to end objectives
- Total and for each subdomain

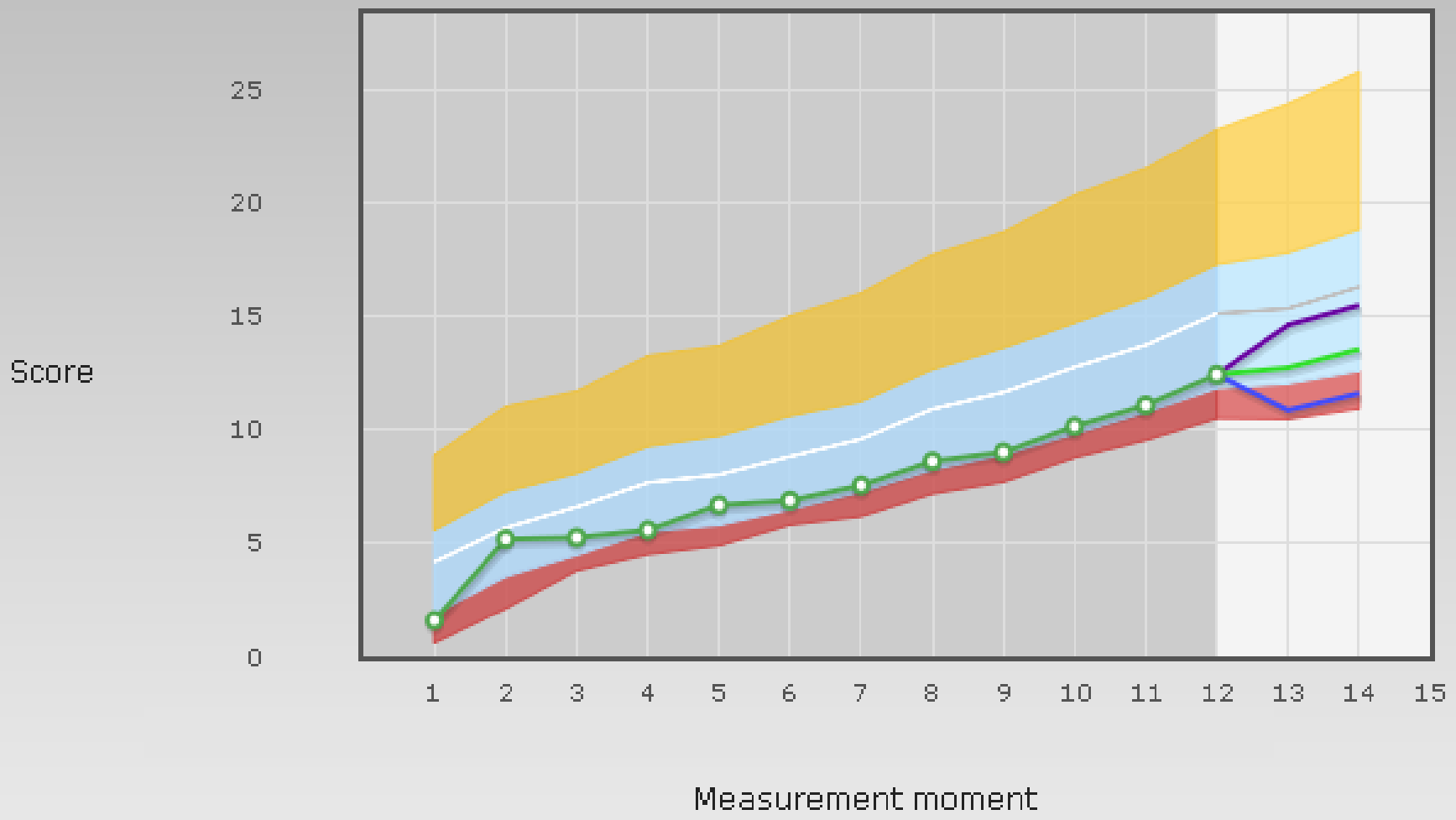
Reference:
distribution of scores in a peer group



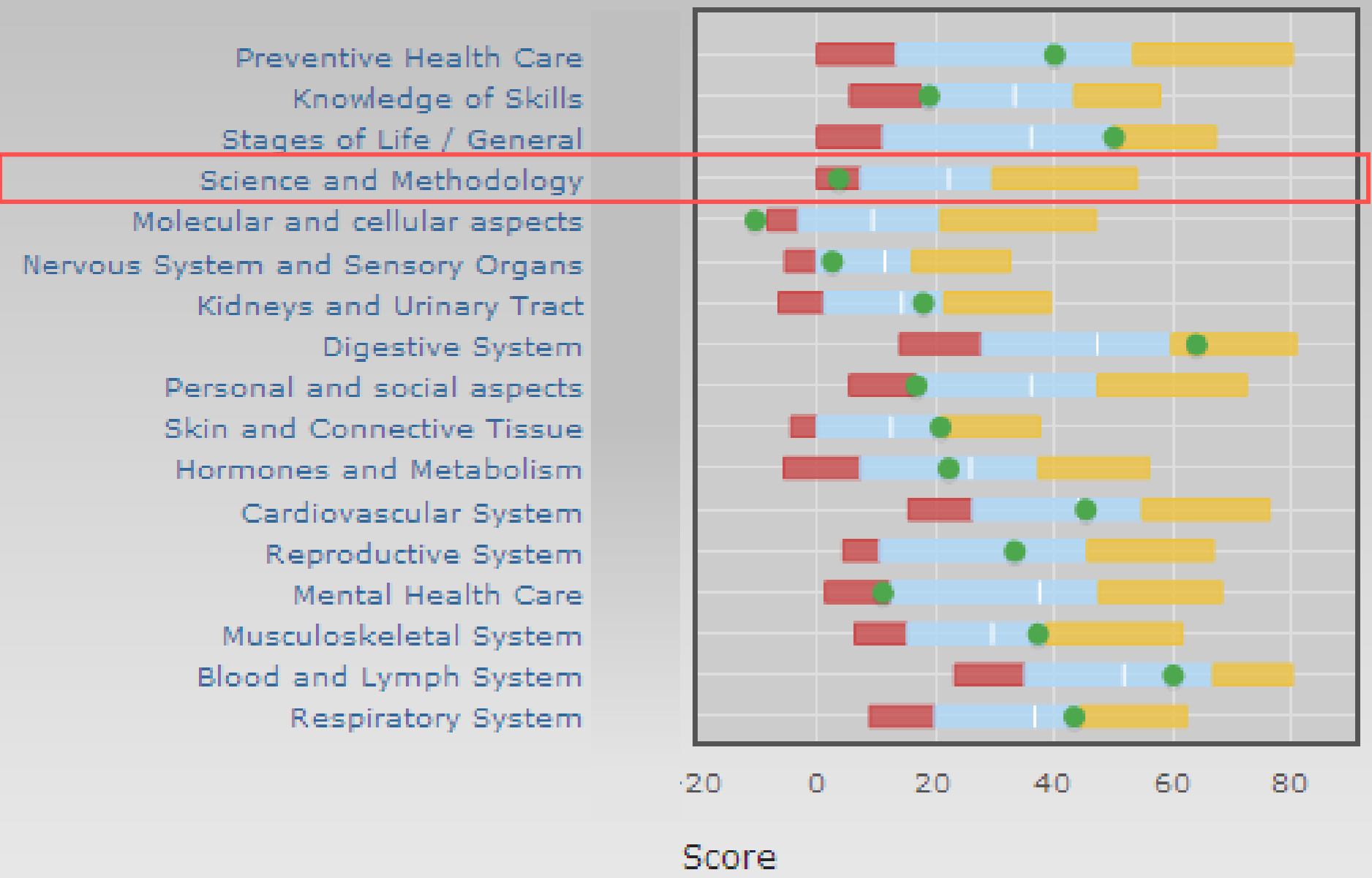
Longitudinal representation



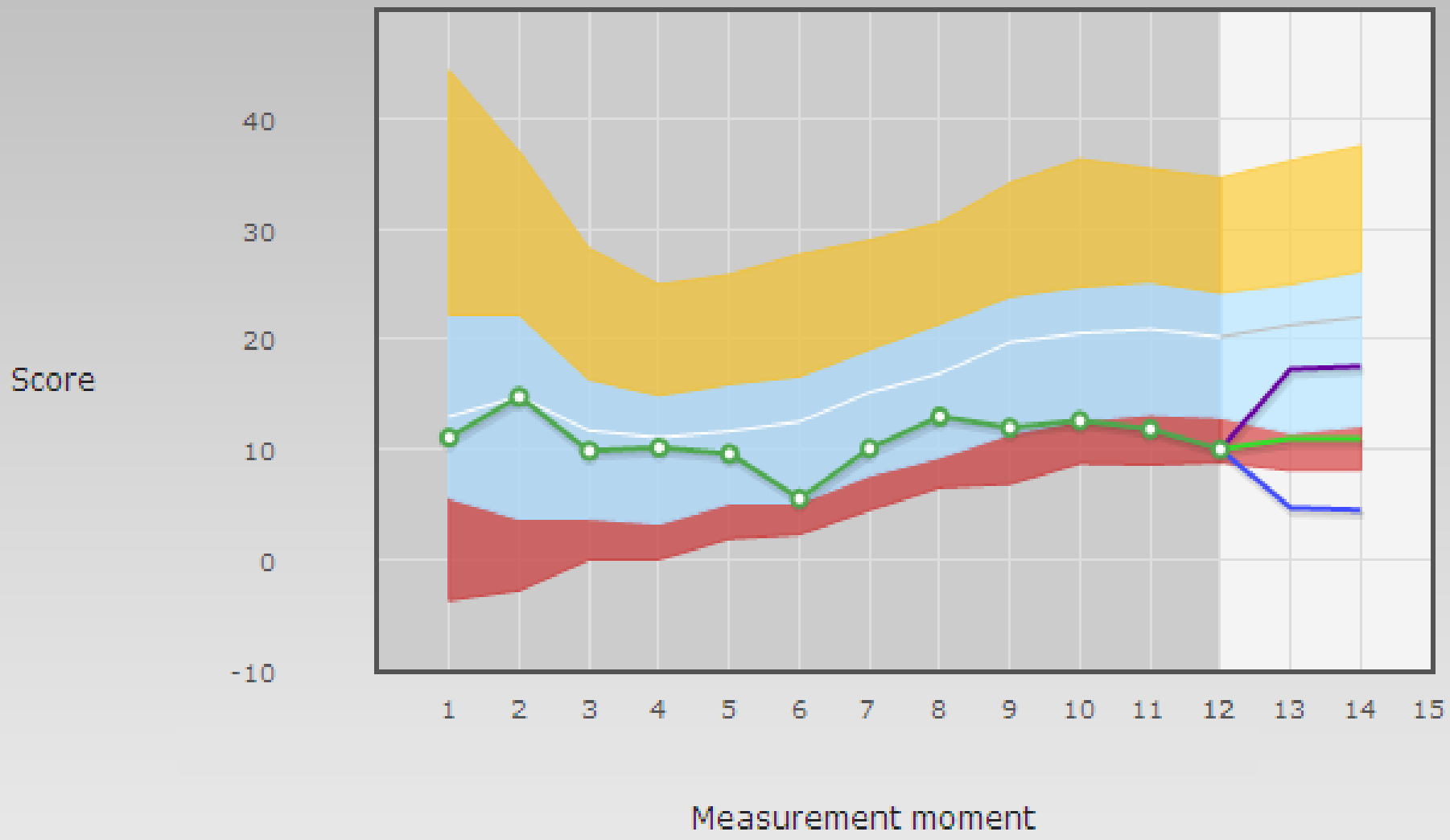
Cumulated score – noise reduction

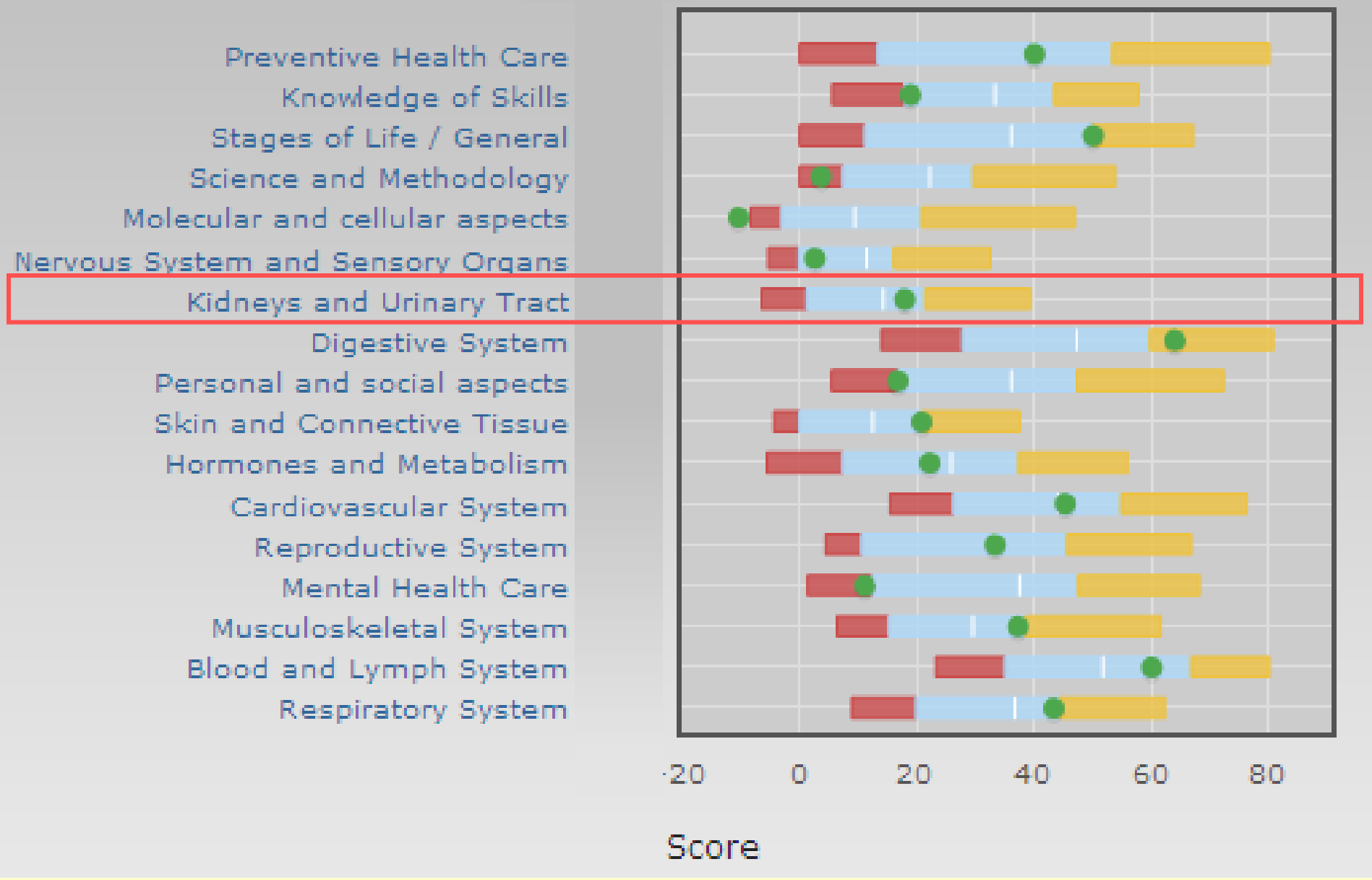


inspect results recent test

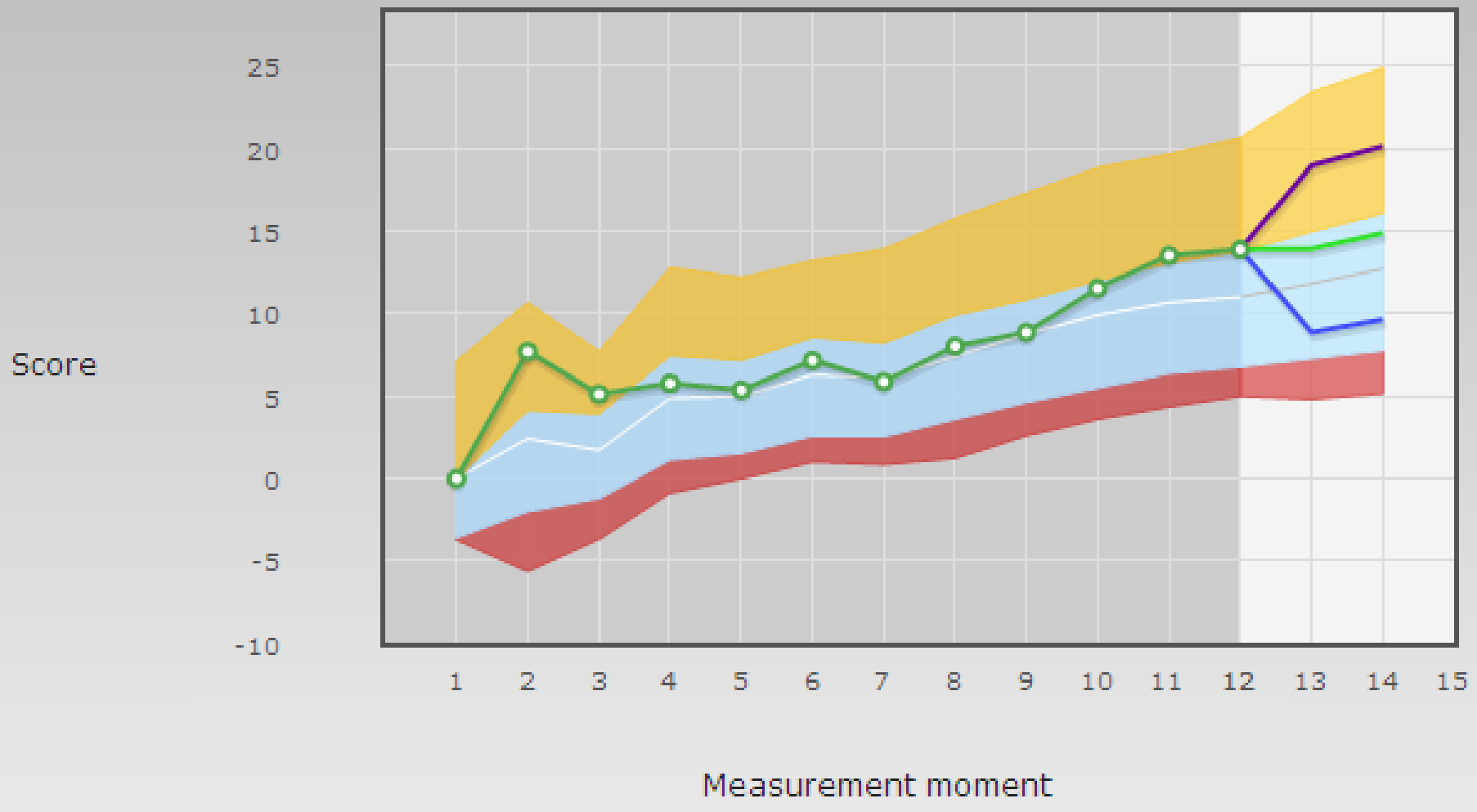


Science and Methodology

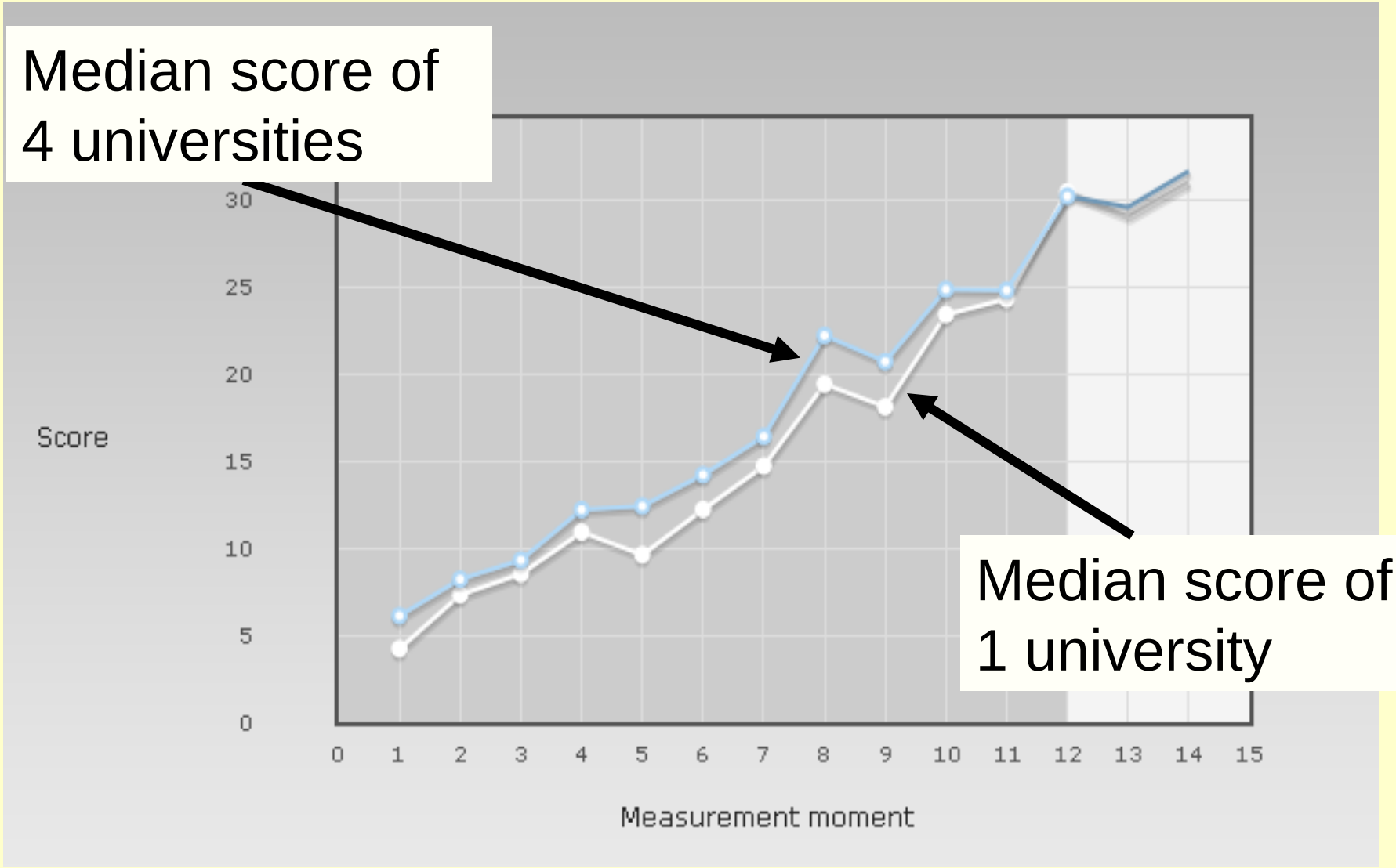



Preventive Health Care
Knowledge of Skills
Stages of Life / General
Science and Methodology
Molecular and cellular aspects
Nervous System and Sensory Organs
Kidneys and Urinary Tract
Digestive System
Personal and social aspects
Skin and Connective Tissue
Hormones and Metabolism
Cardiovascular System
Reproductive System
Mental Health Care
Musculoskeletal System
Blood and Lymph System
Respiratory System
-20
0
20
40
60
80
Score

Kidneys and Urinary tract



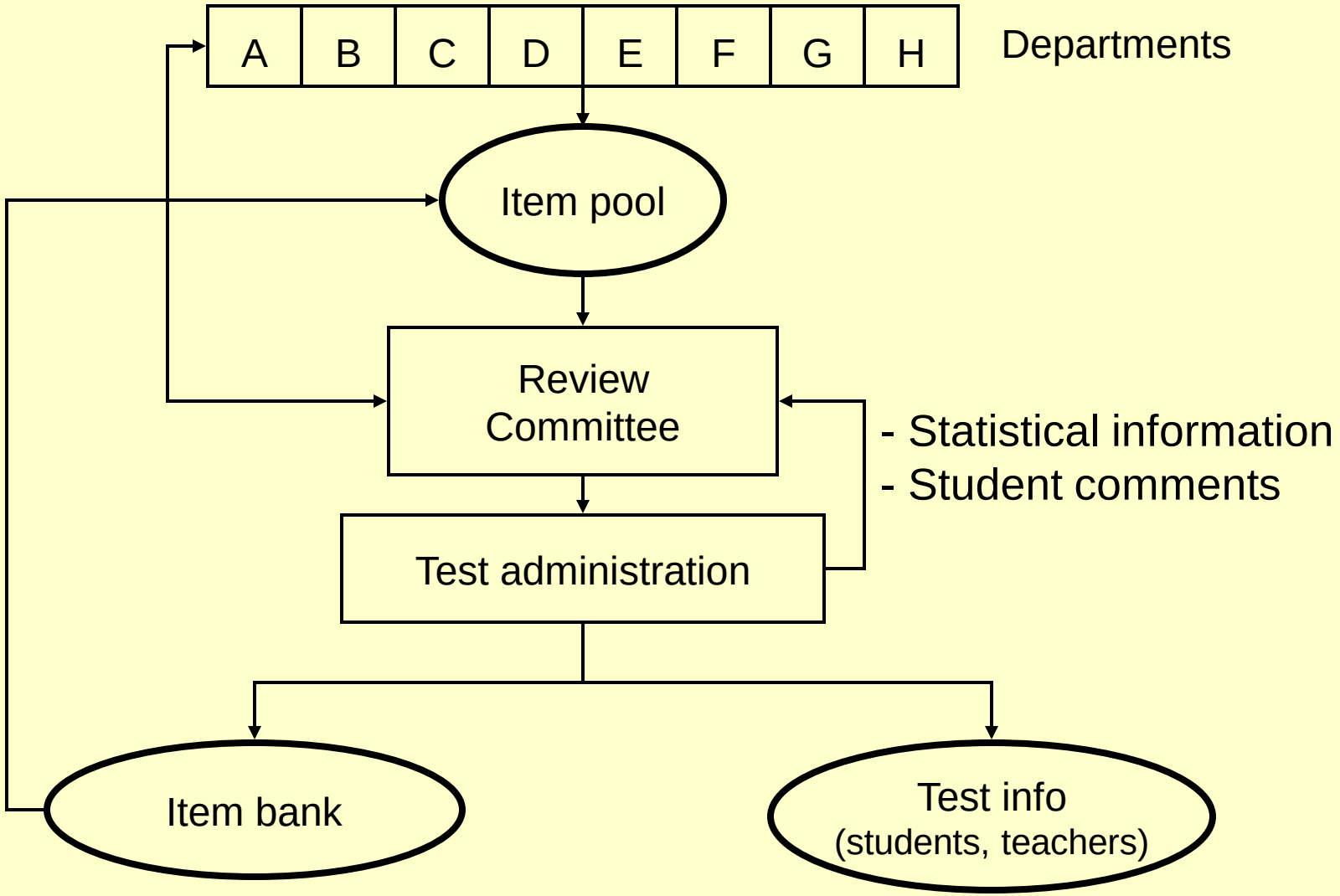
Compare groups to evaluate a curriculum



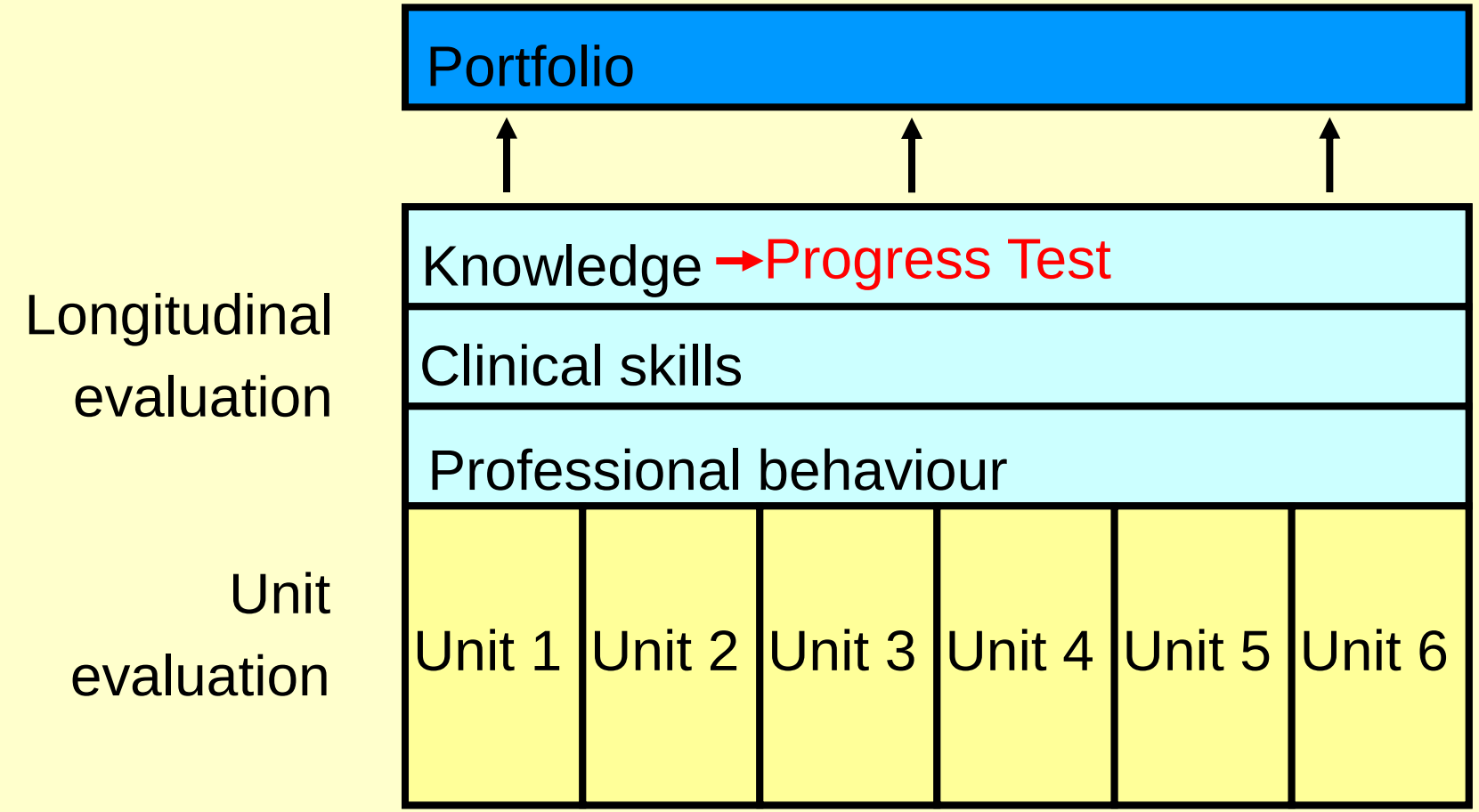
What do you need for PT

- Homogeneous curriculum:
  no distinct (early) specializations
- Central co-ordination and organization
- Acceptence by students and staff

Item review process



Overall assessment programme



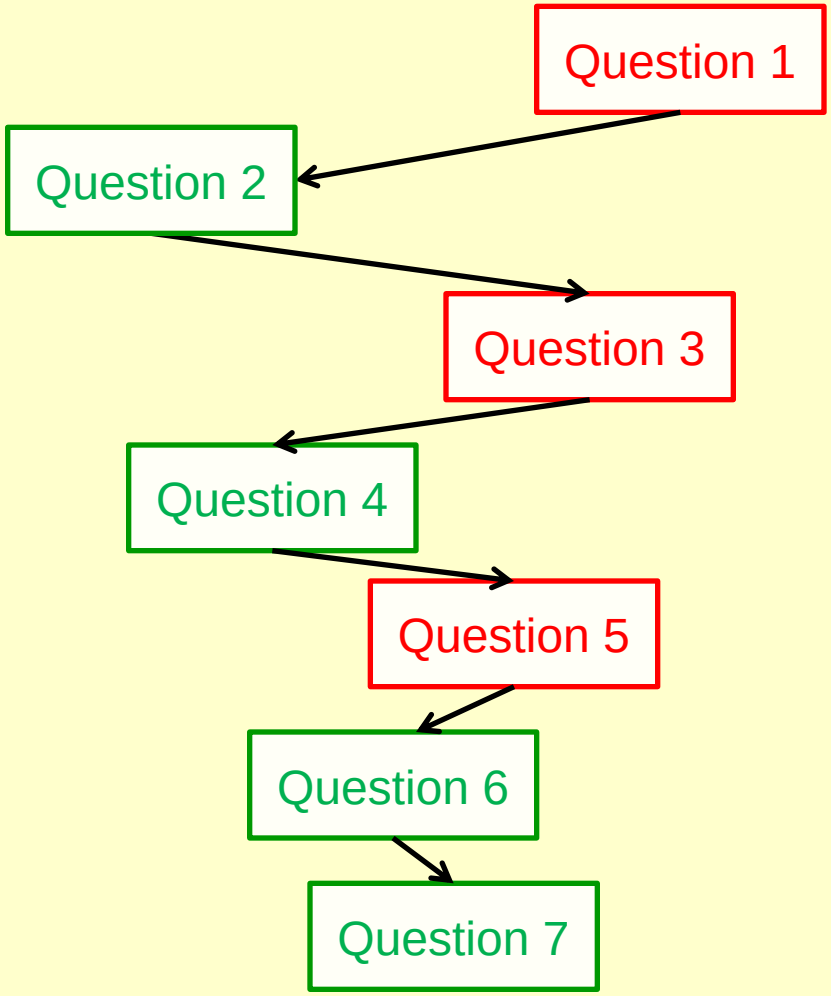
Advantages PT

- prevents a test-driven learning approach
- rewards each individual learning activity
- measures functional knowledge
- repeated measurement of the same domain of knowledge
- resits not needed
- early detection of outliers
- rich source of feedback (students and staff)
- rich research potentials
  cross-sectional and longitudinal design
- joint construction and administration
  benchmarking

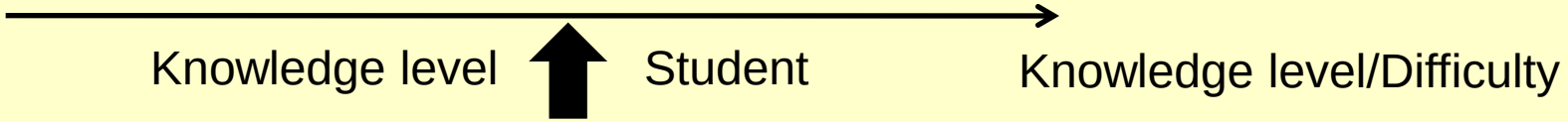
Issues

- Formula scoring (don't know option and penalty for wrong answer)
  Year 1: 85% don't know
- Efficiency of the measurement
- Item relevance
- Standard setting
- Paper and pencil test:
  Logistics
  Lack of flexibility (time,place)
  No multimedia

Adaptive progress test



Student



Exploring adaptive progress test

- Not all PT items appropriate for adaptive testing
  23% “growth-items” (19% fit 2p IRT model)
  Masterphase (years 4-6)
- Growth-items cover blueprint categories
- % growth-items 3.4 times higher with items of high relevance
- Prototype adaptive PT tested later this year
- Exploration of item content characteristics in relation to “relevance” and “growth”

Applications of Progress Testing

- Other progress test networks
  - Germany
  - Sweden
  - UK (with NBME)
- Individual medical schools:
  - Gent, Berlin, Tampere-Finland, Manchester, Peninsula, Liverpool, Pretoria, McMaster Hamilton, Canada
- Psychology
  - Maastricht, Rotterdam
- Postgraduate training (Netherlands)
  - General Practice
  - Pediatrics
  - OBGYN

THANK YOU!

Additional information
and literature references:

www.ivtg.nl

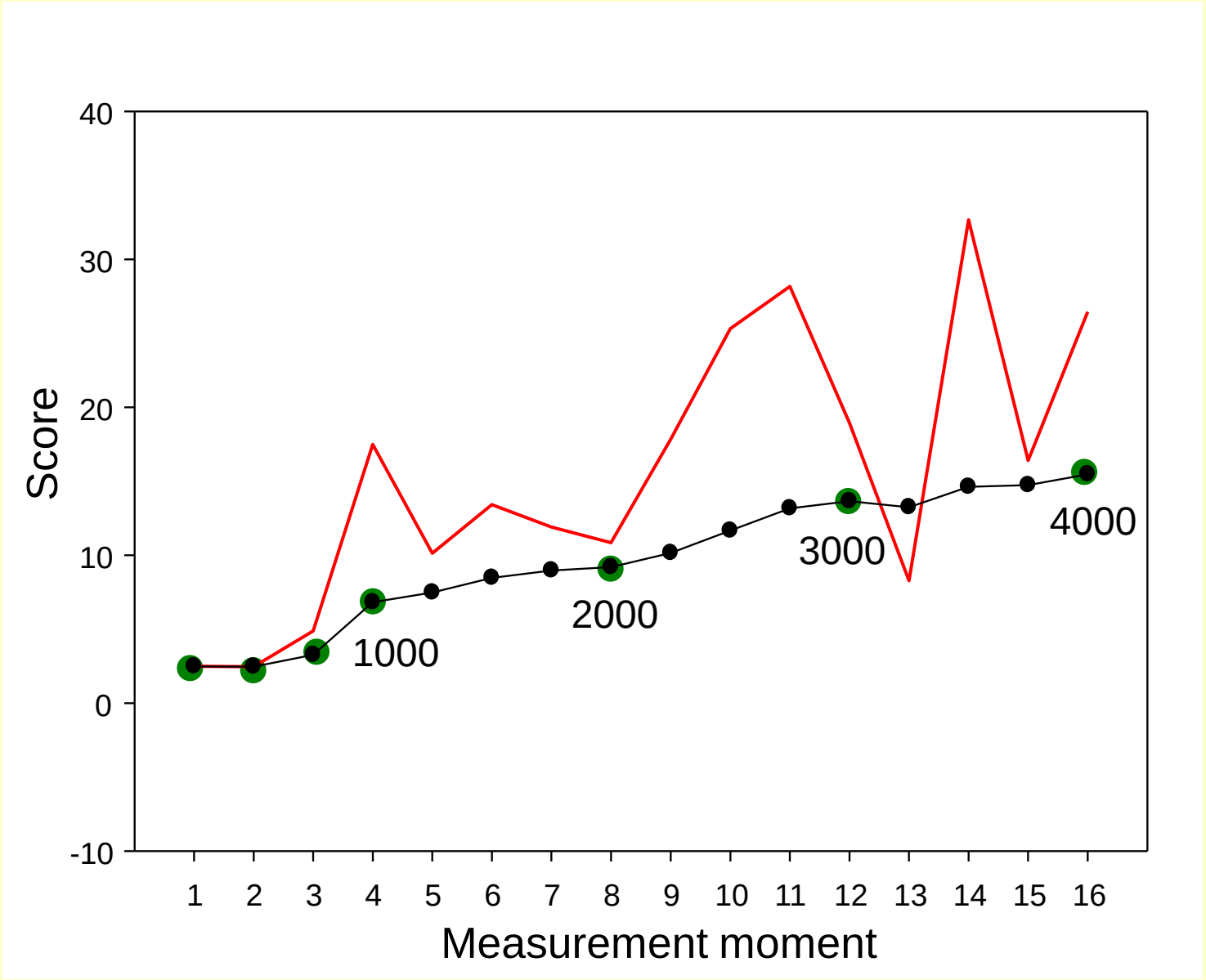
(down left button “English”)

Item Relevance*

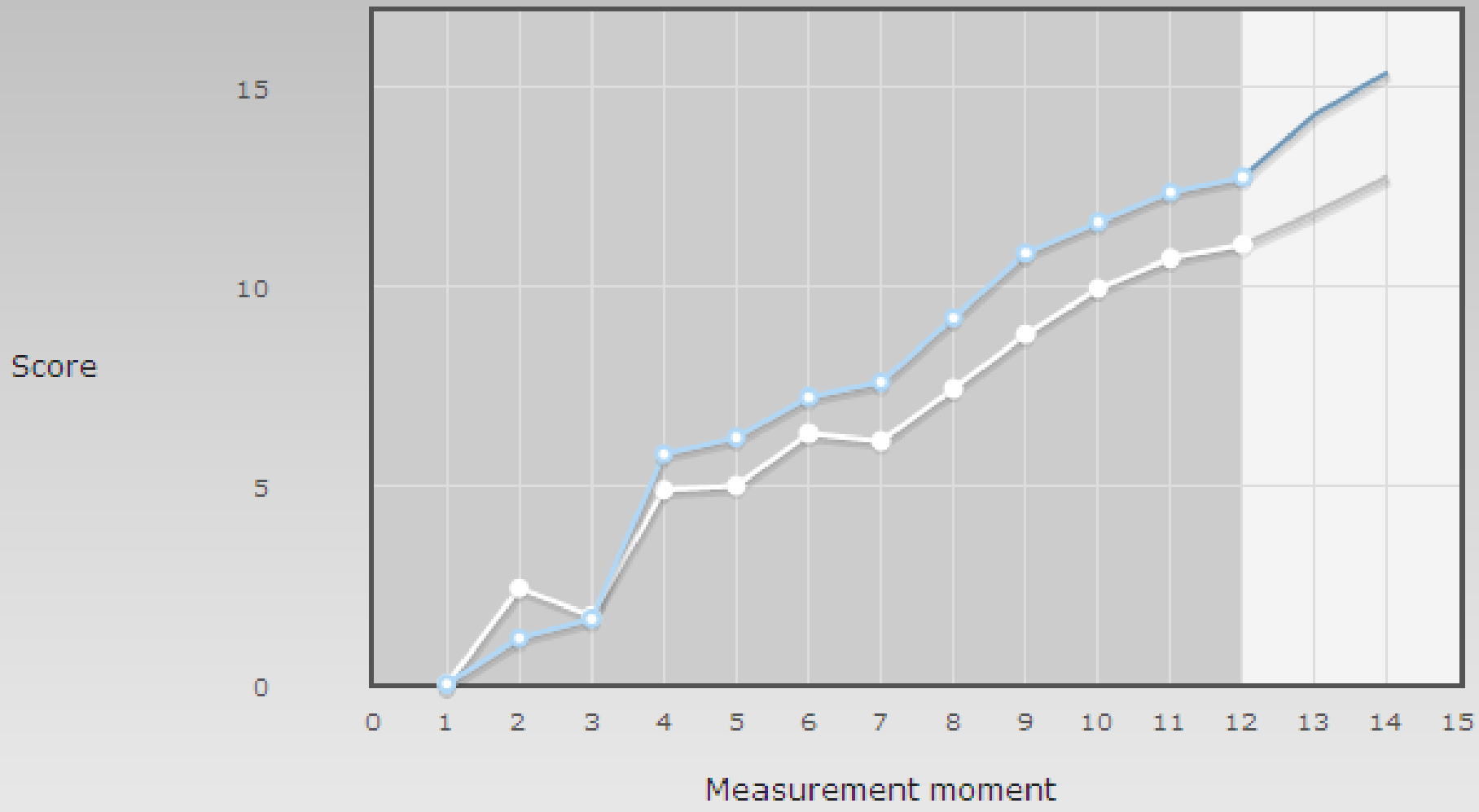
Criterion	Very Relevant
A. Medical Knowledge	requires a thorough study and understanding of the field medicine.
B. Ready Knowledge	needed at the ready at any moment of the day.
C. Incidence in Practice	needed in many medical practical situations
D. Prevalence or High-Risk	essential to manage high prevalence or high risk medical situations.
E. Knowledge Foundations in the Medical Curriculum	forms the basis for one or more concepts and has to remain as explicit knowledge (eg, the Frank-Starling mechanism in the context of congestive heart failure).

*adapted from Schuwirth, L. Personal communication, July 2011.

Cumulative score



Longitudinal series (*cumulated*) of *score* for *the category kidneys and urinary tract* of two peer groups



Longitudinal series (*cumulated*) of *score* for *the category respiratory system* of two peer groups