Large Scale Assessment (LSA) and Technoloy-Based Assessment (TBA) activities at DIPF

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Frank Goldhammer, Heiko Rölke

LSA activities at DIPF (1)

- DIPF leads, coordinates and implements national and international LSA studies

- Studies aim at the investigation of the quality and outcome of educational processes at school and classroom level

- Major fields: Measuring and modeling competencies, technology-based assessment, school and classroom context

LSA activities at DIPF (2)

- Programme for International Student Assessment (PISA)
  - PISA 2009
  - PISA 2012
  - PISA 2015
- Programme for the International Assessment of Adult Competencies (PIAAC)
- National Educational Panel Study (NEPS)
- Center for International Large Scale Assessment (ZIB)
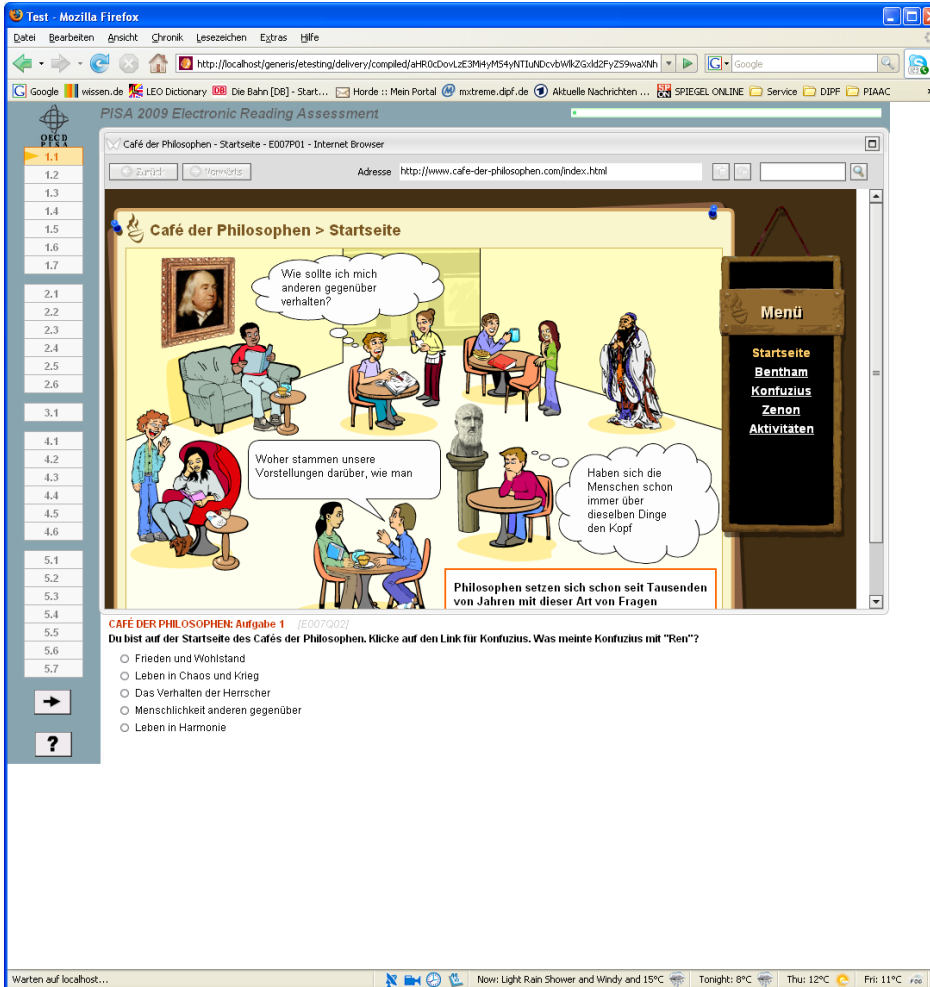
PISA 2009 – national level

- Implementation of the PISA study in Germany

- National extension of the PISA study for research purposes (e.g., to validate the Electronic Reading Assessment, ERA)
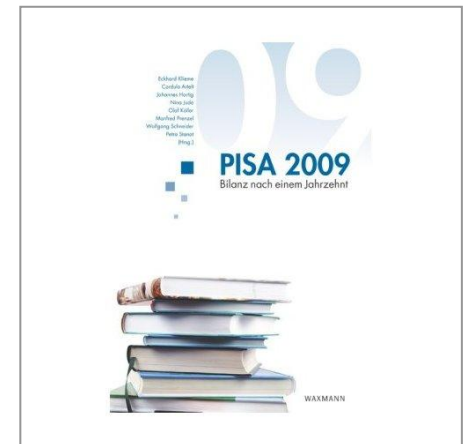
PISA 2009 – international level

- Membership of the international expert group for the Electronic Reading Assessment (ERA), i.e., contribution to framework and and test develompment, data analysis and reporting (Vol. VI)

- Provision of technology for the development and delivery of ERA items (TBA group: Hypertext Builder, delivery system using CD ROMs)

PISA 2009 – ERA sample task

Task 1: You are at the Philosophers' Café Home page. Click on the link for Confucius.

What did Confucius
mean by "Ren"?

○   Peace and prosperity.
○   Living in chaos and war.
○   The behaviour of rulers.
○   Kindness to other people.
○   Living in harmony.

PISA 2012 – national level

- National extension of the PISA study for research purposes (e.g., to validate CBA components)

PISA 2012 – international level

- Chair of the international PISA Questionnaire expert group and responsibility for the analytical framework

- Technological support of translation workflow; delivery system for CBA components (USB stick)

PISA 2015 – international level

- Successful bid for Core 6 module („Context Questionnaire and framework development")
  covering the development of the context questionnaires for PISA 2015 and their conceptual framework
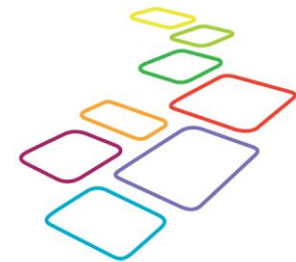
PIAAC – international level

- Programme for the International Assessment of Adult Competencies

- Initiated by OECD

- Target population: 16 – 65 years

- DIPF: Technology for item and test development, translation, delivery, technical support

NEPS

- National Educational Panel Study
- Funded by Federal Ministry of Education and Science (BMBF)
- Investigates educational processes in Germany, from early childhood to advanced age

- DIPF: Data Warehouse, Mode Effect Studies (CBA vs. PBA)

ZIB

- Center for International Large Scale Assessment (ZIB)

IPN - Institute for Science and Mathematics Education

IQB - Institute for quality development in education
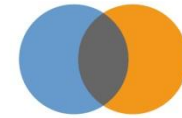
DIPF

TUM – Technical University Munich, School of Education

ZIB

- Center for International Large Scale Assessment (ZIB)
- Goals
  - o national implementation of PISA
  - o research on international comparative studies in education

- DIPF: Research on educational assessment using technology

Some more LSA activities at DIPF

- Deutsch Englisch Schülerleistungen International (DESI) [German English Student Assessment International]

- Building a European Bank of Anchor Items for Foreign Language Skills (EBAFLS)

- Teaching and Learning International Survey (TALIS)

Large Scale Assessment (LSA) and

Technoloy-Based Assessment (TBA) activities at DIPF

Heiko Rölke, Frank Goldhammer

TBA: Mission Statement

- Support national and international assessments
- Develop innovative assessment instruments
  and methods
- Perform assessment-related research,
  both in psychology and computer science

TBA: Background

Basic research | Pre-school | School | Voca-tional Training | University | Quali-fication | LLL | Other Insti-tutions

Requirements (Research and Practice)

Psychometrics/Methods

Technology/Transfer

Technical Innovations
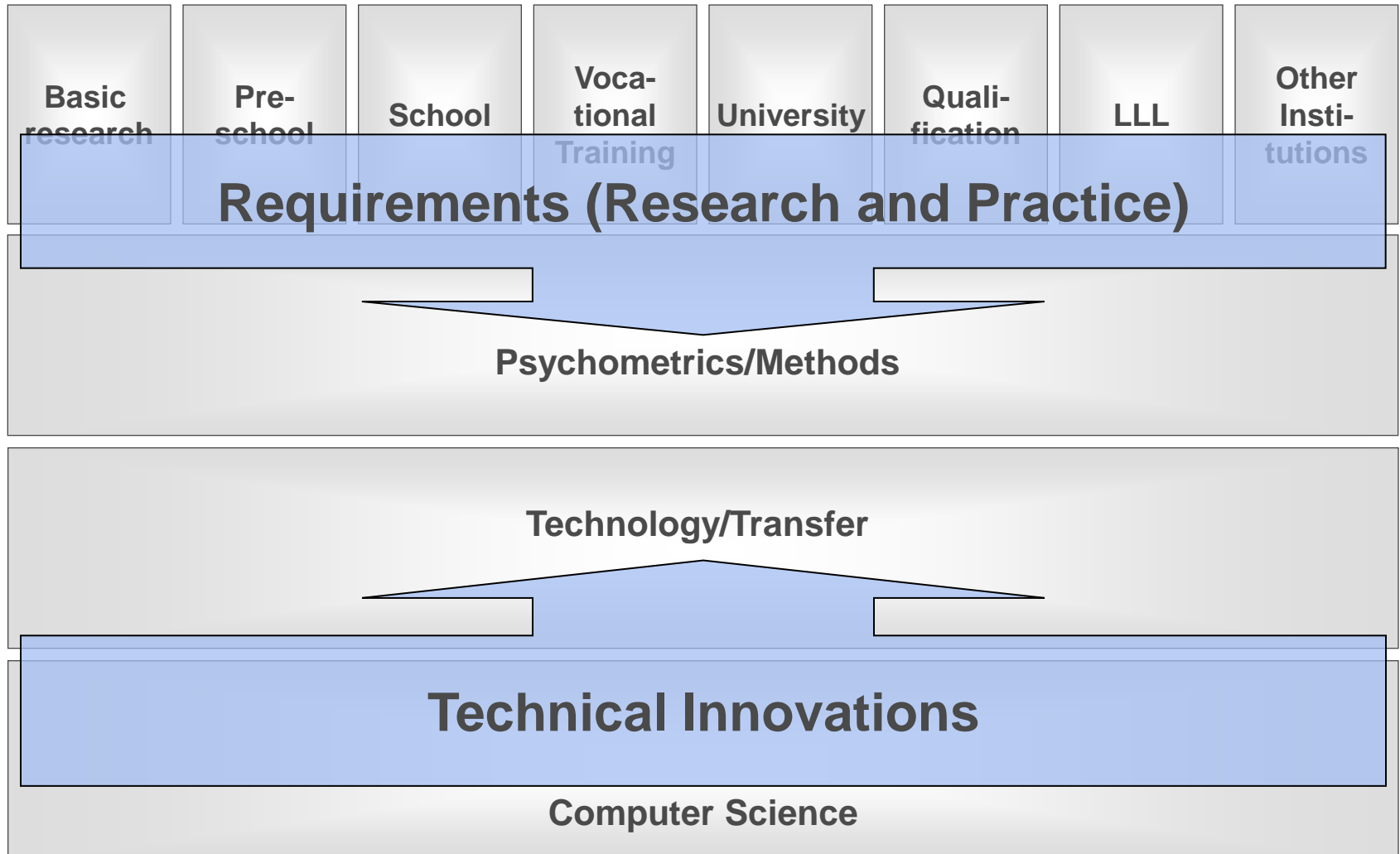
Computer Science

TBA: Group Structure

Main Idea:

Innovations and sustainable development

requires work of equal partners

- Psychology
- Computer Science

TBA: Key Ideas

- Empower users,

    hide complexity

- Integrated workflow support

- Rapid prototyping of ideas: instruments, methods, …

- Re-use instead of re-invention

TBA: Technology Chain

Data Management and Storage

Item Development

Data Processing

Item Adaptation

Data Capture

Item Banking

Test

Test Management
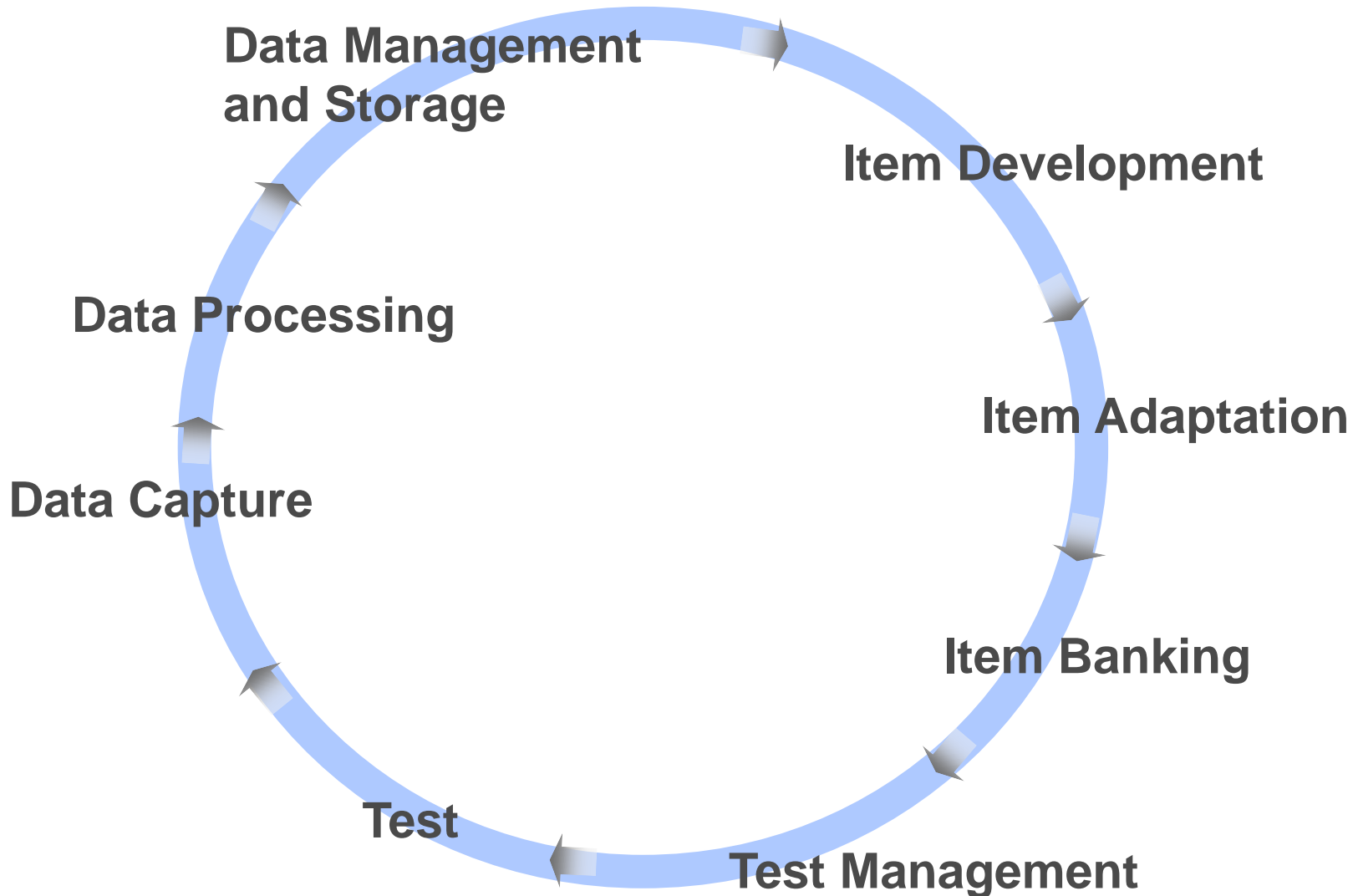
Example: CBA ItemBuilder

- Idea:

  Enable domain experts to design/implement complex items

- Concept:

  - Graphical GUI design in a (near) WYSIWYG-manner
  - Authoring system, intelligent templates
  - Generation of item descriptions, run-time interpretation

- Implementation:

  - Based on open-source and freely available software
  - Model-driven architecture

CBA IB: Guiding Principles/Strategy

- Graphical Development

- Emphasis on Complex Items

- Modular development: Features

  - Restricted versions, e.g. Adaptation

- Modular development: Delivery

  - TAO

  - CBA-EE

  - TBA-Tools

  - …

From HypertextBuilder to CBA ItemBuilder

1. PISA 2009 - ERA

2. Intermediate Development:

   „Dynamis"

3. PIAAC

   • Interaction modes

   • Fine-grained graphics control, rich text fields

4. New Development:

   Finite Automata

Browser Simulation:
Portal of the German Rail (Deutsche Bahn)

DIPF
Educational Research
and Educational Information

PISA 2009 – ERA: Language Support

PIAAC: New Features

- Rich text fields, advanced text layout

- Images, Multi-media player

- Dynamic Links

- Configurable Size

- Execution Environment

- New Response Modes

  - Clickable Areas (Text, Images)

  - Multiple Marking (highlight)

  - Click boxes, Buttons, Text entry, Tables,…
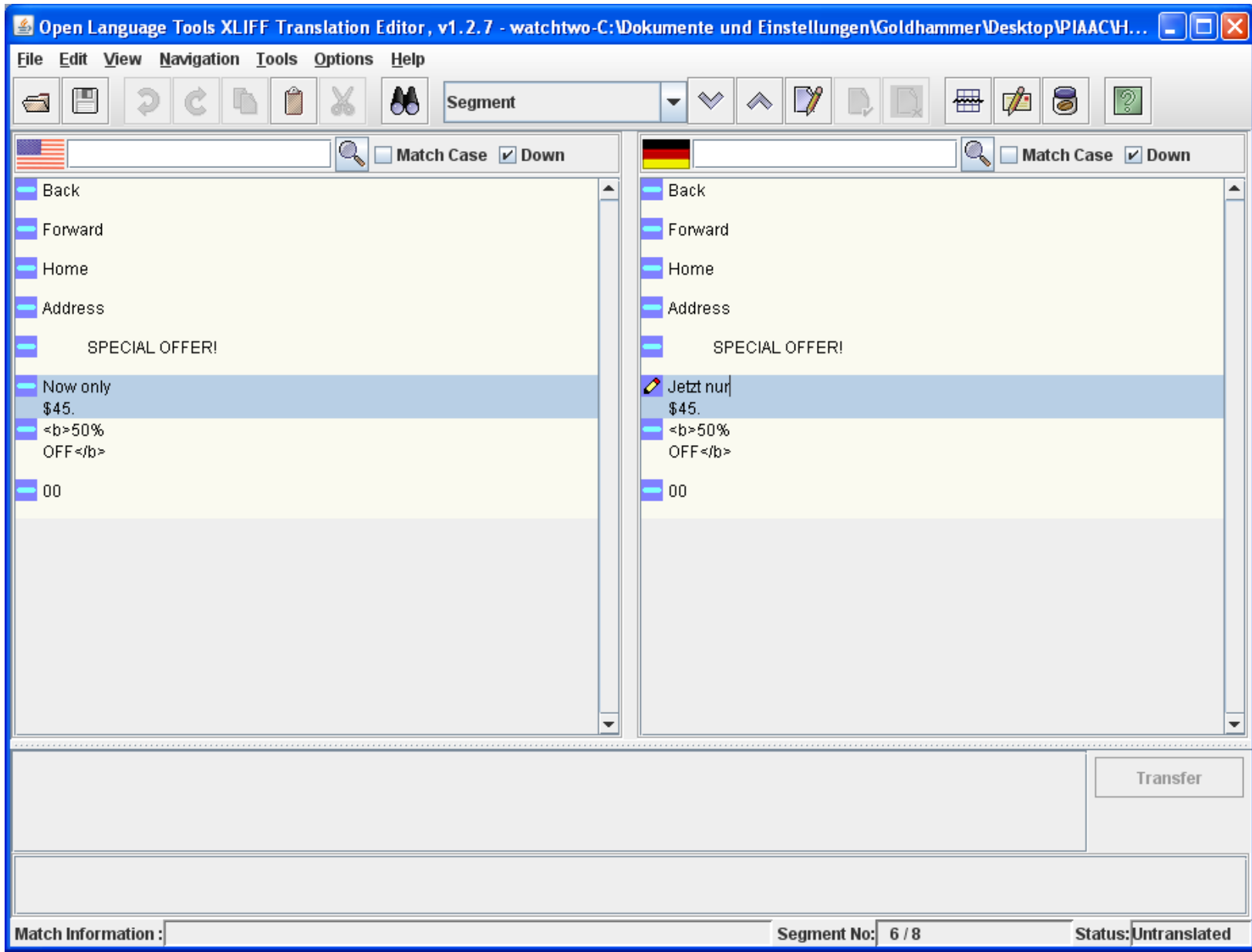
- Automatic Scoring

New: MicroDYN, MicroFIN

- For complex problem solving and advanced simulation items
- Finite Automata to
    1. Control Item behaviour
    2. Serve as a basis for Problem solving

1. Realistic behaviour for complex items
    - GUI simulation
    - Complex settings like science education
2. Basis for items, to be discovered by testee

Translation Features

ItemBuilder exports all text and text properties

- XLIFF

  - standard file format for translation

  - source language, target languages

  - supported by all major translation tools

- OLT

  - free (open source) translation tool

  - used for PISA and PIAAC

Translation: Example

Conclusions

- Challenges related to TBA
  - Technical requirements (Hardware, Software, Staff)
  - Test equivalence (cross mode)
  - Test fairness

- Benefits from TBA
  - Standardized delivery and scoring
  - More valid item formats (e.g., simulations)
  - Measurement efficiency (adaptive testing)
  - Economical data collection and analysis

TBA Offers and Services

TBA has experience and expertise in all areas of
   assessments

- Consultancy
- Tools and workflows
- Tailored solutions
- Assessment services