

# Advances in metadata systems

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# Agenda

- Introduction
- Metadata in the educational sciences
- PIAAC as an example for an educational survey
- Results from the first survey
- Meaning of the results for DDI
- Q&A

# Introduction

- Survey is part of my dissertation process at the University of Szeged (Hungary)
- Research was done during a sabbatical from August 2014 – February 2015
- Goals of the dissertation
  - Improve the metadata handling in computer-based assessment, especially in large-scale studies
  - Use the results to improve open source computer-based assessment platforms and item banks
  - Focus only on computer-based assessment (not qualitative data)


## Metadata in the educational sciences

- Research process in the educational sciences is very similar to the social sciences
- Models like the Generic Longitudinal Business Process Model (GLBPM) can also be applied here
- Most large-scale studies (e.g. PISA, PIAAC, PIRLS, TIMMS) use a mix of questionnaires and cognitive items
- Shift from paper-based assessment towards computer-based assessment
- Metadata standards (e.g. QTI, SCORM) exist, but only for very specific parts of the research process

## Metadata in the educational sciences

- Specific challenges in computer-based assessment
- Layout and screen size must be fixed to avoid changes in item difficulty
- Scoring rules have to be implemented (and documented)
- Very complex item types (e.g. simulations)
- Mode effects (e.g. paper to computer, computer to tablet)
- Use of logfile data analysis e.g. for diagnostic assessment
- Statistical parameters (e.g. Cronbach's Alpha) have to be stored to support adaptive testing
- Items are usually highly confidential (e.g. SAT, GMAT)

# PIAAC Literacy Item



Look at the list of preschool rules.  
Highlight information in the list to  
answer the question below.

What are the two rules about taking  
medicine to the preschool?

## Preschool Rules

Welcome to our Preschool! We are looking forward to a great year of fun, learning and getting to know each other. Please take a moment to review our preschool rules.

- Please have your child here by 9:00 am.
- Bring a small blanket or pillow and/or a small soft toy for naptime.
- Dress your child comfortably and bring a change of clothing.
- Please no jewelry or candy. If your child has a birthday please talk to your child's teacher about a special snack for the children.
- Please bring your child fully dressed, no pajamas.
- Please sign in with your full signature. This is a licensing regulation. Thank you.
- Breakfast will be served until 7:30 am.
- Medications have to be in original, labeled containers and must be signed into the medication sheet located in each classroom.
- If you have any questions, please talk to your classroom teacher or to Ms. Marlene or Ms. Tree.

# PIAAC Problem Solving Item

Education and Skills Online

Unit 6

You ordered a desk lamp from KE-Lamps.com.

The desk lamp arrived, but it was not the color you ordered.

Using the company's website, arrange to exchange the lamp you received for the one you ordered.

Once you have finished, click Next to go on.

Web

File Edit Bookmark Help

URL: <http://www.KE-Lamps.com>

**KE-Lamps.com**  
*The best way to light your life*

Bedroom Lamps

Desk Lamps

Floor Lamps

Table Lamps

New Arrivals

SALE!

[Customer Comments](#) [Customer Service](#) [Employment Opportunities](#) [About Us](#)

Web Email(1)

## CBA Itembuilder MicroFIN item

### INSTRUCTIONS

Set the clock of the mobile phone to summer time.



## The survey

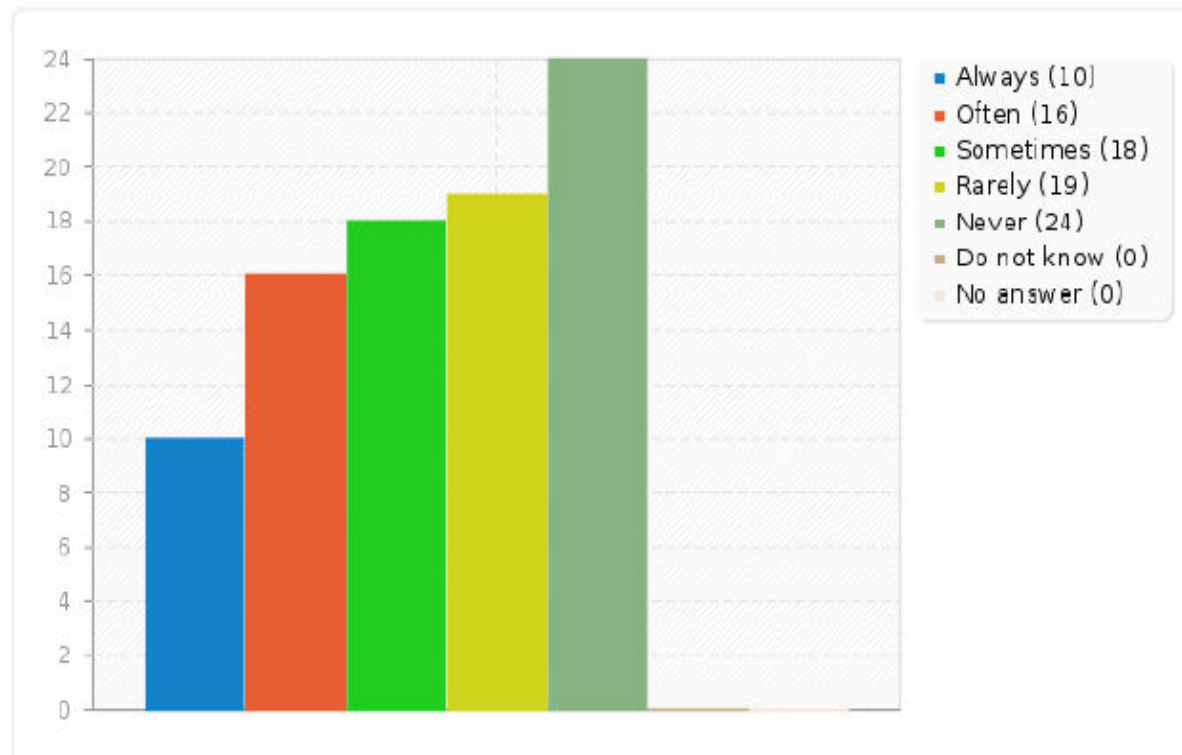
- Target group – researchers working in the fields of educational sciences and social sciences
- Questionnaire on data management and metadata standards
- Web survey using 45 questions in 30-35 minutes with complex branching (e.g. separate data users from data producers)
- Tool: Limesurvey V2.05 with SkeletonQuest responsive design template (optimization for tablets and mobiles)
- Data collection from November to December 2014
- Collection of 221 interviews with 120 fully completes (not sufficient)
- Second data collection was conducted between April 2015 and July 2015
- Bigger sample – 405 interviews with 295 completes
- No changes in result

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## Field summary for RO02

How often do you have to provide a data management plan (i.e. a plan that describes how to document or store the data for later usage)?

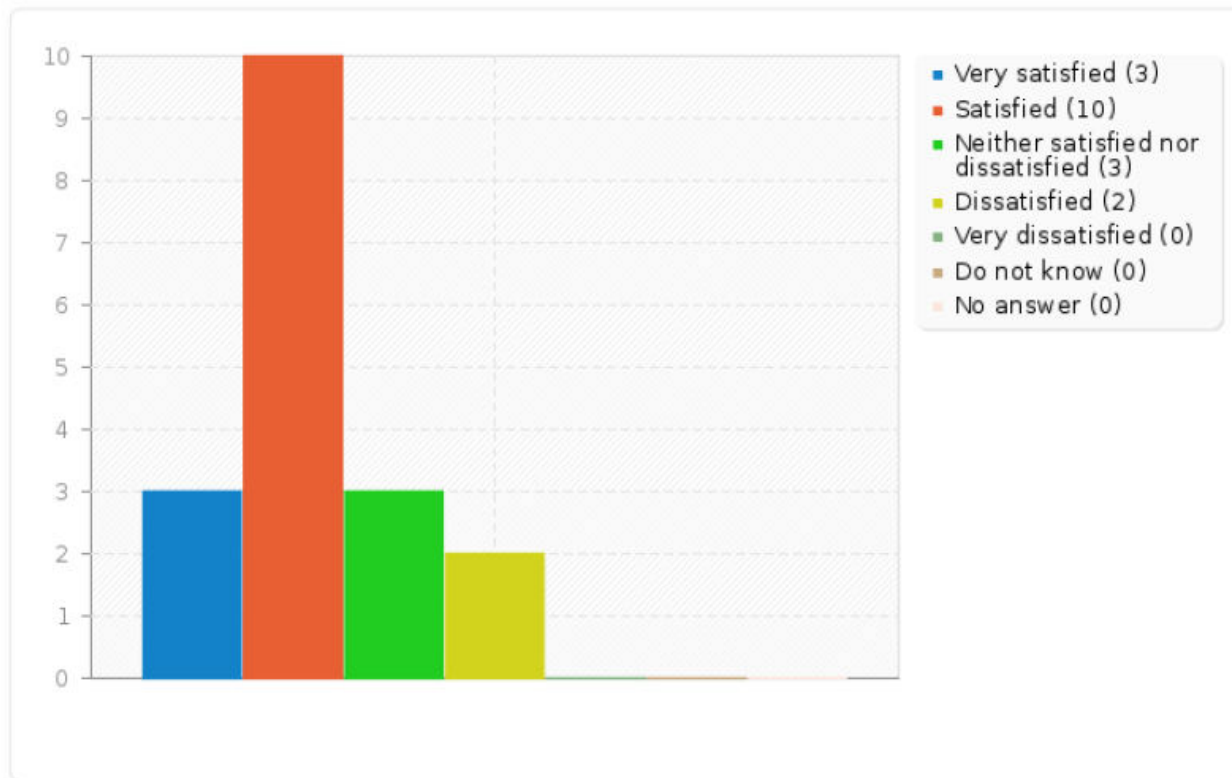
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Rank	Standard	Usage “often”	Usage “rarely”
1	Data Documentation Initiative (DDI)	18	12
2	Dublin Core	9	13
3	Questionnaire and Text Interoperability (QTI)	5	3
4	Machine Readable Cataloguing (MARC)	3	7
5	Statistical Data and Metadata Exchange (SDMX)	2	5
6	Learning and Test Interoperability (LTI)	2	1
7	Learning Object Model (LOM)	1	4
8	Shareable Content Object Reference Model (SCORM)	0	8
9	Metadata Encoding and Transmission Standard (METS)	0	4
9	Text Encoding Initiative (TEI)	0	4
11	QueDex	0	0

## Field summary for MS02

How satisfied are you with the metadata standard Data Documentation Initiative (DDI)?

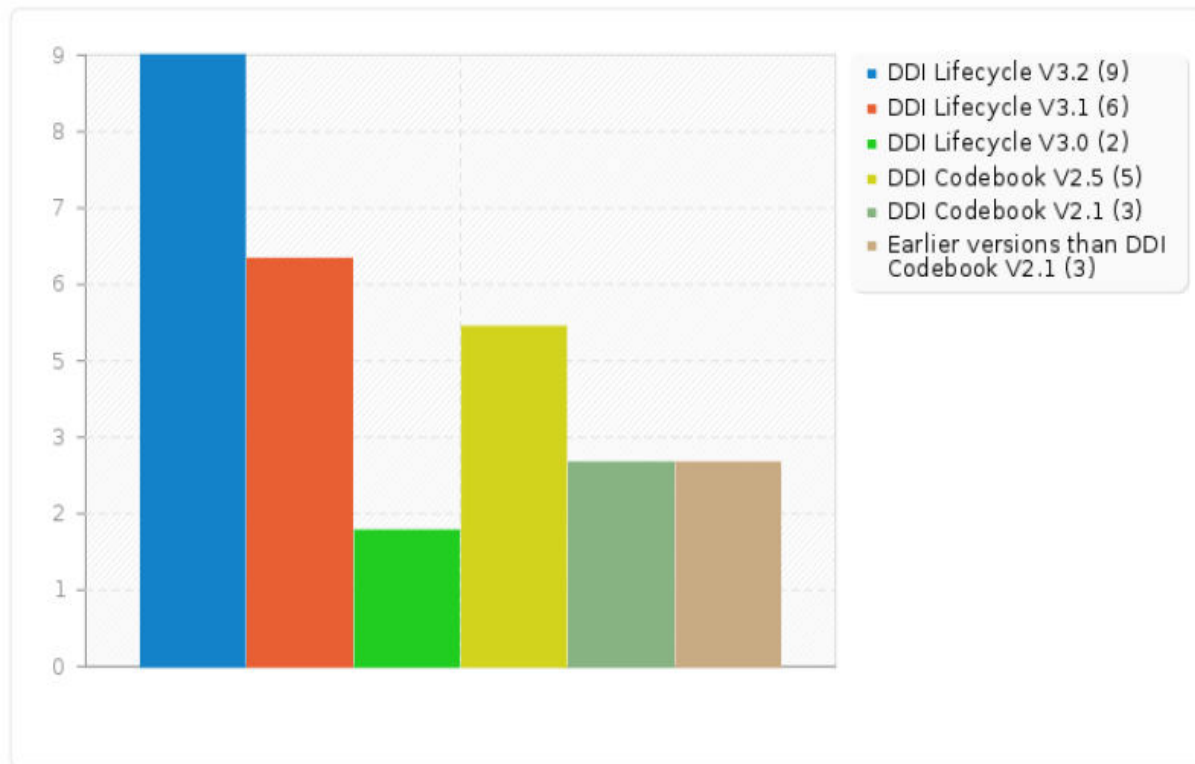


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## Field summary for MS03

Which versions of DDI are you using?

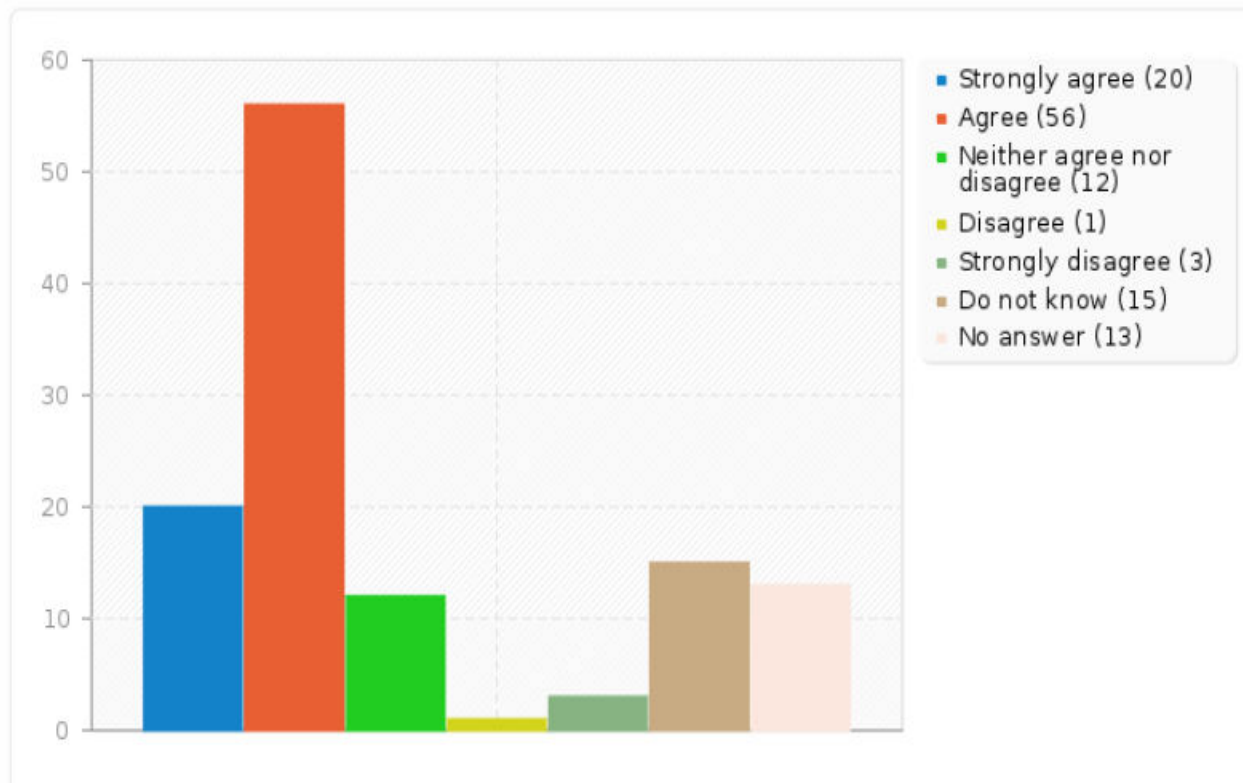
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Rank	Metadata Standard	Usage “Do not know”
1	QueDex	95
2	Learning and Test Interoperability (LTI)	87
3	Shareable Content Object Reference Model (SCORM)	85
3	Text Encoding Initiative (TEI)	85
5	Machine Readable Cataloguing (MARC)	82
5	Metadata Encoding and Transmission Standard (METS)	82
7	Questionnaire and Text Interoperability (QTI)	81
8	Learning Object Model (LOM)	80
9	Statistical Data and Metadata Exchange (SDMX)	78
10	Dublin Core	66
11	Data Documentation Initiative (DDI)	43

## Field summary for MS06(MS603)

How much do you agree on the following statements regarding metadata standards? [There are a lot of benefits in using metadata standards.]

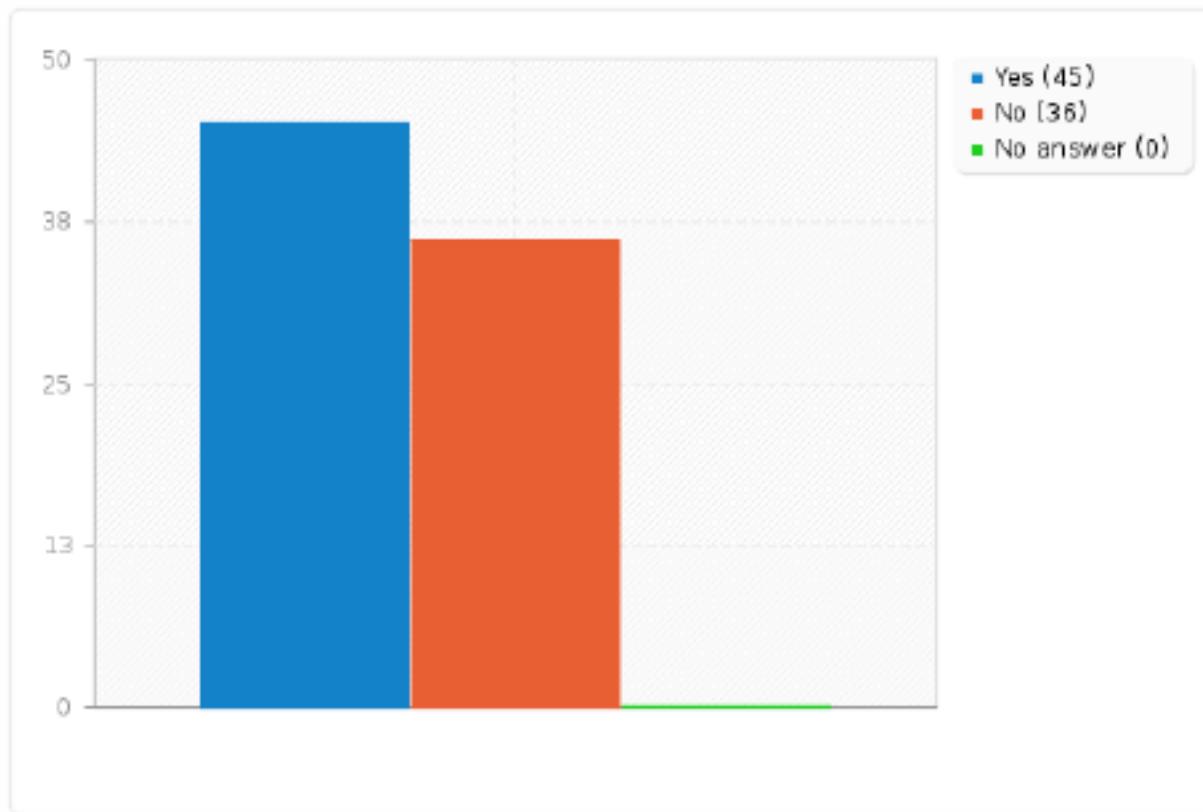


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## Field summary for PU03

Do you share the metadata, paradata or data from your research with others?

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Rank	Opinion	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	No answer
1	Preparation of data needs to much effort	8	15	8	1	2	2
2	I have no resources or support from my employer to hand in the data	8	14	10	2	1	1
3	My organization or I have security concern	5	10	9	4	7	1
4	I do not know where to hand in my data for archiving	3	8	14	4	6	1
5	Somebody could misinterpret my results	3	5	12	7	7	2
6	Somebody could use my data before me	1	14	5	8	6	2

Rank	Category	Very important	Important	Neither important nor unimportant	Not that important	Not at all important	No answer
1	Data is cited as secondary publication	30	34	7	4	2	4
2	Support from the employer	26	31	10	6	4	4
3	Co-authorship in secondary publications based on the data	17	35	12	5	8	4
4	Archive provides list of publications based on the data	15	43	13	2	5	3
5	Archive informs data producer who accessed the data	12	31	24	7	4	3
6	The data producer receives a financial compensation	7	12	28	16	13	5

## Meaning of the results for DDI

- DDI can be extended to support computer-based assessment platforms
- Educational scientists know DDI better than native educational metadata standards like QTI or SCORM
- As expected layout, scoring rules and logfiles have a higher importance for educational scientists than for social scientists
- If the DDI Alliance wants to extend DDI4 for the educational sciences two further modules might be needed in the long run:
  - „Simple cognitive item“ (e.g. hotspot, point&click, multiple choice, cloze test)
  - „Complex cognitive item“ (e.g. simulations, MicroDYN, MicroFIN)

# Thanks for your attention.