FLIP+ 2020
3rd annual "sharing" event

Let's talk e-assessment

Online event
11-12th June 2020

https://flip-plus.org/

Facilitator: Amina AFIF (Luxembourg)

Welcome from the President of FLIP+

Azerbaijan
Belgium
Brazil
Canada
Chile
Croatia
Denmark
France
Georgia
Germany
Ireland
Italy
Japan
Lithuania
Luxembourg
Netherlands
Norway
Poland
Portugal
South Africa
Spain
Sweden
The Netherlands
United Kingdom
United States

105 participants from **50** institutions in **24** countries

- Ministry, department, national agency of education
- Testing company and examination centre
- University or research centre
- Technology company
- International educational organisation

FLIP
e-assessment community

FLIP+ Sharing content

Item Library: A proposal for Contents and Framework for Maths

e-assessment community

https://flip-plus.org/

Webinar for members
12th June 2020

Presenter: Charles Philippe
Ministry of education-DEPP, France

FLIP+ Sharing

Knowledge and experience

Implementation of e-assessment

Success stories

Lessons learnt

Research (UX, process data)

Data & analysis

Impact on learning

Technology solutions

Technology-enhanced items

Systems

Tools + Delivery mode

Content

Item Library content

Item Library platform

Item Library organization

FLIP+ Sharing

Knowledge and experience

- Implementation of e-assessment
- Success stories
- Lessons learnt

- Research (UX, process data)
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Technology solutions

- Technology-enhanced items
- Systems

- Tools + Delivery mode

Content

- Item Library content
- Item Library platform
- Item Library organization

FLIP+ Content: Item Library

- Reflection on the creation of content for the FLIP+ item library

- "How do we make effective use of the pool of expertise and experience of existing members?"

- Creation of 3 Work Packages to plan work for the item library:

  I.   content [as a public good]

  II. platform and technology solutions

  III. general organization

FLIP+ Item Library – work in progress

1. Content

   Goal: build a scheme of item classification and characteristics

   [collect items, identification of common meta data, meta tags, identification of formats, links to framework, level of use, traceability, etc]

KEY TAKEAWAYS

- The **Item Library**   ⇨ Start with Maths!

  - Underlying reflections: the FLIP+ e-assessment item library

  - Draft content domains and subdomains

  - Proposed work for cognitive domains

- Your feedback and our next steps

Item Library: start small and simple

Step 1

+ sharing of frameworks
+ sharing of released items
+ provide a list of characteristics for each shared item
+ provide link between shared items and curricula
+ translation aspects

Item Library: scope of current work

+ Frameworks: national guidelines / curriculums

+ Released items: 4-5 items related to Grades 6 to 9

+ Item characteristics:

  • didactic: domains, sub-domains, skills, cognitive aspects, difficulty, complexity, …

  • non-didactic: grade, format, other metadata, support format …

+ Link between shared items and curricula

+ Translation: original language and English

Item Library: where do items come from?

+ BRA, FRA, GEO, IRE, ITA and LIT

+ 30 items classified by country and content domain

Item Library: item example Brazil

Statement →

Observe a sequence of natural numbers below. This sequence can be defined by an algebraic expression, which relates the value of each term to its position

position	1	2	3	4	5	6	7	...
terms	-4	-1	4	11	20	31	44	...

What is the algebraic expression that determines the order term n of this sequence?

A) $n^2 - 5$
B) $n - 5$
C) $4n$
D) $- 4n$

Distractors →

Characteristics →

Compulsory characteristics	
Country	Brazil
Scholar grade	9th
Content domain	Algebra
Item type	Paper & Pencil
Correct answer	A
Optional characteristics	
Goal for competence development (National Guidelines)	Identify the algebraic expression that expresses a regularity observed in sequence of numbers or figures (patterns).

Item Library: item example France

Domain : Organization and data management, functions

Source of the document :
MEN-SG-DEPP

Sub-domain : Understanding and using the concept of function.

Response format :
MCQ

f is a linear function verifying $f(40) = 120$.

What is the image of 10 under f ?

○ The image of 10 under f is 480.

○ The image of 10 under f is 30.

○ The image of 10 under f is 90.

○ It is not possible to know the image of 10 under this function.

Expected response	The image of 10 under f is 30.
Description of the task	Knowing how to use the proportionality linked to a linear function.
Type of task	Flash question
Mathematical skill(s)	Calculating
Context of the situation	Intra mathematical

# Item Library: item example Georgia

It took 17 hours to get from point A to point B and back. From point A to point B the car was traveling at a constant speed of 90 km / h, from B to A at a constant speed of 80 km / h. Find the distance between points A and B.

Country	Georgia
Grade	8
Format	Pencil and paper
Assessment purpose	National assessment
Cognitive process	Reasoning
Content domain	Patterns and Algebra
Item type	Open-ended
Correct answer	720 km
Difficulty IRT	2.16
Discrimination	1.81

Item Library: item example Ireland

What number goes in the box?
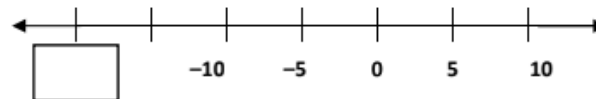
Item information	
Country	Ireland
Grade	6 (final year of primary school)
Age	11-13
Format	Paper & pencil
Item purpose	National Assessment (last used 2014)
Item type	Short-answer open ended
Calculator allowed	No
Correct answer	-20
Content strand	Algebra
Content strand unit	Directed numbers
Curriculum objective	Identify positive and negative numbers on the number line
Process classification	Understand & Recall

Item Library: item example Italy

1_Original item	English translation (homemade)
Osserva il parallelogramma ABCD in figura. M è il punto medio del lato AB. L'area del triangolo MBC misura 8 cm². Quanto misura l'area del parallelogramma? *Digita la risposta alla domanda.* Risposta: ☐ cm²	Look at the ABCD parallelogram. M is the midpoint of side AB. The area of the triangle MBC is 8 cm². What's the area of the parallelogram? Answer: ☐ cm²

Compulsory characteristics	
Country	Italy
Scholar grade	08th
Content domain	Space and figures
Item type	Short-answer open-ended
TAO interaction	Block+text entry
Correct answer	32
Optional characteristics	
Cognitive process	1 - Knowing
Goal for competence development (National Guidelines)	2 - The student recognizes and denominates the shapes of the plane and space, their representations and grasps the relationships between their

Item Library: item example Lithuania

A standard six-walled dice is rolled once to see how many dice have fallen. Which of the four options is the least likely.

- bigger than 5
- bigger than 4
- divisible by 3
- divisible by 2

Description/definition	Explanation
Year of studies (VBE) or grade (NMPP, PUPP)	NMPP
Question/assignment type	Closed;
Instruction for the coding and/or assessment of the question/assessment	bigger than 5
Weight of the question (in points)	1 point
Activity/content area	Stochastics
Activity/content area subscale	Describing experimental outcomes and events; comparing them in terms of probability.
Abilities area	Applying
Abilities area subscale	Applying procedures in a standard situation.
Impact level	Basic level
Statistical task/question/assignment difficulty	0,5319
Discrimination /statistical	0,4335
Use of the question (year, sessions, task codes/references to the time when the question was used in tasks)	2019

Item Library: comparing the items

Step 2

+ Examine all 30 items collected

+ Compare their characteristics and metadata

+ Evaluate the representativeness of content domains

+ Reflect on how to produce a common document

Item Library: common characteristics

Step 2

+ Compulsory metadata

- grade, content domain, item format, modality (paper and pencil or computer-based)

+ Optional metadata

- correct answers, purpose of assessment, cognitive skills keywords, sub-domains, assessment task, context of situation, level, discrimination, tools allowed, curriculum objectives, …

Item Library: towards a common framework

+ Collect more items from other countries

+ Ensure a broader representation of all the maths content areas

+ Continue to examine the item characteristics and decide which ones to keep in the FLIP+ Item Library

+ Work towards creating a common framework for FLIP+

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e-assessment community

Item Library: questions about the framework

Step 3

+ use existing international frameworks or create one for FLIP+?

+ how many dimensions would it contain?

- clarify the content domains and subdomains and keywords?

- how do we address the cognitive domains?

Item Library: comparing content domains

Countries	Brazil	France	Ireland	Italy	Lithuania
Content domains (number of items)	- Algebra (x5)	- Numbers and calculations (x2) - Space and geometry (x3) -Measurement and quantities (x2) - Organization and data management, functions (x2)	- Number (x1) - Algebra (x1) - Measures (x1) - Shape and space (x2)	- Space and figures (x2) - Numbers (x2) - Data and forecast (x1) - Relationships and function (x1)	- Numbers and calculations (x1) - Expressions, equations, inequalities, relationships and functions (x2) - Geometry (x1) - Stochastics (x1)

Item Library: comparing content domains

+ Algebra: *x6*

+ Measurement and quantities, Measures: *x3*

+ Relationships and function, Expressions, equations, inequalities, relationships and functions: *x3*

+ Numbers and calculation, Number, Numbers: *x6*

+ Space and geometry, Shape and space, Space and figures: *x7*

+ Organization and data management, functions, Data and forecast, Stochastics: *x4*

Item Library: Proposal 1 of content domains

+ Numbers and Calculations

+ Measurement and Geometry

+ Data and Probability

+ Algorithmic and programming

Item Library: Proposal 2 of content domains

+ Numbers (or numbers and calculation)

+ Measurement and Geometry

+ Algebra and functions

+ Data and probability

Item Library: Is Proposal 2 suitable for all?

Step 4

+ Each national group will try to assign their existing items in the defined content domains

  - Is it possible to assign all the national items in these classification?

  - Is it easy to translate from my national labels to the proposed classification labels?

Item Library: **Defining content *sub-domains***

Step 5

+ Divide the content domains into sub-domains using key words

+ Assign selected items to those sub-domains (or vice versa)

+ Keep the classification flexible to allow for the diversity of national items

Item Library: List 1 of content sub -domains

Domains	Numbers (and calculations ?)	Measurement and Geometry	Data and Probability	Algebra and Functions
Key-word list of sub-domains	_ Integers and decimals _ Rational numbers _ Powers, square root _ Operations, comparison _ Order of magnitude _ Divisibility _ Calculation programs, mental calculation _ Arithmetic method of solving a problem/task ? _ Weight and time measures ? _ ...	_ Measurable quantities, units, conversions _ Paths on squared planes _ Lengths and perimeters ; areas, volumes and capacities _ Proportionality, ratios? _ Angles _ Space solids or three dimensional figures _ Models, patterns _ Parallelism, perpendicularity _ Plane shapes or polygons and their properties, circles _ Thales Theorem and Pythagoras's theorem _ Trigonometric lines in the right-angled triangle _ Isometric transformations _ Cartesian plane _ Figure building programs _ Similarity _ ...	_ Organization and data management and representations _ Reading and interpretations of graphs and tables _ Samples _ Mean values, statistics ? _ Variability measurements _ Percentages _ Probabilities _ ...	_ Direct and inverse _ Literal calculation _ Functions (linear, inverse proportionality, quadratic, ...) _ Ratios, rates, proportionality? _ Equations and inequalities of first degree _ Linear systems _ Algebric method of problem solving ? _ ...

Item Library: List 2 of content sub -domains

Domains	Numbers and Calculations	Measurement and Geometry	Data and Probability	Algebra and Functions
Keyword list of sub-domains	- Natural numbers - Rational numbers - Integer numbers - Irrational numbers - Fractions and operations - Different representations of rational numbers: fraction, decimal, percentage - Decimal numbering system and its properties - Addition, subtraction, multiplication and division - Divisibility - Multiples and divisors of a natural number - Prime and compound numbers - Number line - Scientific notation - Potentiation and radication - Periodic tithe	- Cartesian plane - Space solids, their elements (faces, edges, vertices) and their flat patterns - Plane shapes and their elements (sides, angles and vertices) - Angles - Perpendicularity and parallelism - Similarity - Measurements of length, mass, time, temperature, area, capacity and volume - Perimeter and area - Isometric transformations - Congruence of triangles - Relations between arcs and angles on the circumference of a circle - Similarity of triangles - Trigonometric lines in the right-angled triangle - Pythagoras' theorem - Thales Theorem - Distance between points in the cartesian plane	- Probability - Reading, construction and interpretation of tables and graphs - Central tendency measures (average, mode and median) - Dispersion measures (amplitude, deviation, variance and standard deviation) - Random experiments - Organization and data management	- Algebraic language - Directly proportional quantities and inversely proportional quantities - Polynomial equation of first degree -Literal calculation - Numeric value of algebraic expression - Association of a linear equation of first degree to a line in the cartesian plane - System of first degree polynomial equations Second degree polynomial equation – Functions - Ratio and proportion - Algebraic expressions - Linear systems

Item Library: Assign items to domains and sub-domains

DOMAIN: NUMBERS

GEORGIA

GRADE: 8
SUB-DOMAIN: Property of operations

What number must we divide by 7 to get 13 with the remainder 5?

a) 92   b) 98   c) 94   d) 96

Country	Georgia
Grade	8
Format	Pencil and paper
Assessment purpose	National assessment
Cognitive process	Application
Content domain	Numbers and operations on numbers
Correct answer	96
Item type	Multiple-choice
Difficulty IRT	−0.38
Discrimination	1.69

Item Library: the cognitive domains (1)

Step 6

+ start with a minimum definition which is common to FLIP

+ propose 2 or 3 existing models of cognitive processes and determine to what extent they fit within national frameworks and items

+ create a classification: flexible enough to accommodate the diversity of national items and allow this to grow over time

Item Library: the cognitive domains (2)

Step 6

+ create guidelines to assist the FLIP team and national teams to classify items in a coherent manner;

+ attach to the classifications, content examples or TIMSS descriptors to facilitate the exercise;

+ define a proper workflow to be developed into the item library platform

Item Library: work in progress … join us!

Moving forward:

+ Agree on a proposal of content sub-domains keywords

+ Agree on a selection of item characteristics we want to keep

+ Create a minimum definition of cognitive domains common to FLIP+

+ Categorize existing items into content and cognitive domains

+ Collect more items from other FLIP+ member countries

+ Upload these items and characteristics in the FLIP+ item library platform

LET'S START SHARING!

info@flip-plus.org

THANK YOU!

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https://flip-plus.org/
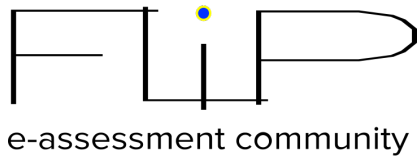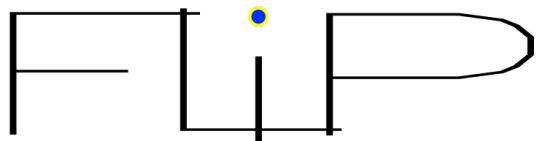
FLIP+ Item Library Platform Development

https://flip-plus.org/

Presenters: Saskia Keskpaik, Guillaume Rue
Institution: DEPP

Sharing technology development

- the technology-enhanced items and student tools

- the building of sharing systems

- enhancing the delivery of the e-assessment

- creating a more integrated system

FLIP+ technology requirements

TECHNOLOGY-ENHANCED ITEMS « 21st century skills » Math and science tools	SHARING SYSTEMS Items, plugins, ideas, technical experience
DELIVERY Offline/app solution, accessibility, UX, other functionalities	TOOLS/INTEGRATION Marking, reporting, data analytics…

The FLIP+ DEV group

Brazil
Denmark
France
Georgia
Ireland
Italy

FLIP+ Requirements List

| TECHNOLOGY ENHANCED ITEMS |
| --- |
| **21st century skills assessment** |
| Chat simulator PCI |
| Computational thinking tool (SNAP) |
| File explorer PCI |
| Text editor PCI |
| Collaborative pad (collaborative writing) |
| Mind mapping |
| Scratch pad (student tool) |
| "Collaborative wall" (cf. Padlet) |
| Sound/video editor PCI |
| Photo editor PCI |
| Presentation tool/PCI (~ppt) |

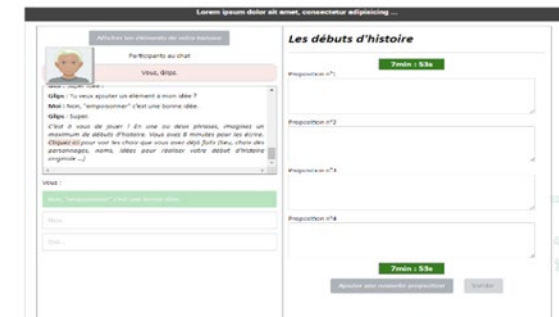| Math and science assessment |
| --- |
| Math and science PCI |
| Geogebra item types (PCI) |
| Geogebra student tools (ex. calculator) |
| Spreadsheet PCI |
| Graphing tool/PCI |
| Geometry PCIs |
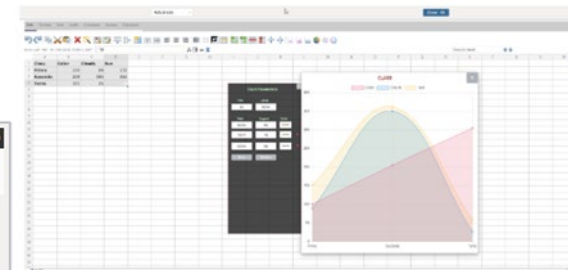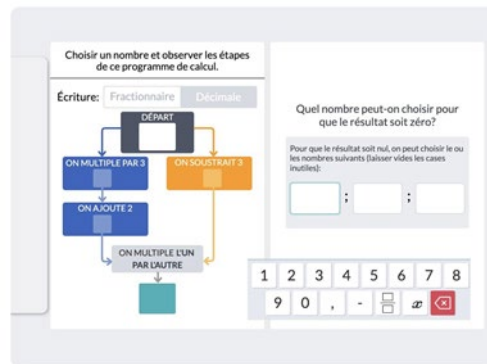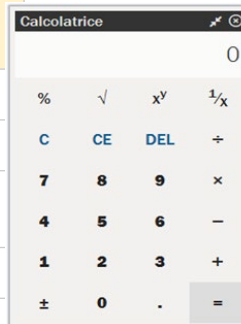
Full functionnal EtherCalc spreadsheet + charts

Collaborative creation with Glips

FLIP+ Requirements List

SHARING SYSTEMS
Sharing Ideas and concepts
Sharing items (item library)
Sharing plugins, extensions
FLIP+ Git?
Sharing technical experience
FLIP+ dev Rocket.Chat
FLIP+ dev Jira instance

DELIVERY
Offline solution
Item caching
Local server support
Offline device
Optimised sync mechanism
App solution
Guest access
Optimised sync mechanism
Accessibility tools
Tools related to colour-blindness
Tools related to dyslexia
Zoom
UX
Improved test assembly
UX for staged adaptive
Improved item workflow
Simplified interface for teachers

TOOLS/INTEGRATION
Marking tools
Marking item response: expert coding tool
Marking logistics
External marking integration (API)
Fluency annotation tool
Automatic coding outside TAO in R
Reporting tools
External reporting tool integration
Data analytics tools
Caliper
xAPI

FLIP+ Item Library

- Collaborative workspaces

Google Classroom

FLIP+ Item Library
Work Package 3: Platform & technolo...
9 élèves

FLIP+ Item Library
Work Package 1: Content
11 élèves

Flip+ Collaboration *Space*

WELCOME TO FLIP+ COLLABORATIVE WORKSPACE   TASKS

FLIP+ Collaboration Space

Welcome to FLIP+ collaborative workspace !

This website is built to help the management of the International item library project. The organization is simple. To follow our work, each identified task will be a post. The discussion on the task will be handled by the comment system under the post.
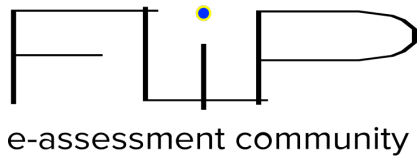
LET'S START SHARING!

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THANK YOU!

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