e-assessment community

UPDATES / DEVELOPMENTS

Thursday, June 6th 16:00-17:30

Friday, June 7th 09:00-10:30

Objectives

- Updates about the recent technical developments within FLIP+ e-assessment community
- Sharing future projects
- Identifying needs from countries/institutions

⇒ Time for more discussions during the *Sharing open session* on Friday

FLIP+ Requirements List

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…

Agenda

Thursday 16:00 - 17:30

- Technology-enhanced items
- Sharing systems
- Delivery

Friday 9:00 - 10:30

- Delivery cntd.
- Tools/Integration

Any time!

- Questions, comments

1. Technology-Enhanced Items

Technology-enhanced items (TEIs)

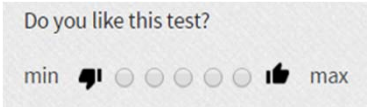
- *"… are computer-delivered items that include specialized interactions for collecting response data. These include interactions and responses beyond traditional selected-response or constructed-response."*
- To enrich "traditional subjects" assessments and to explore "new" competences (e.g. 21st century skills)

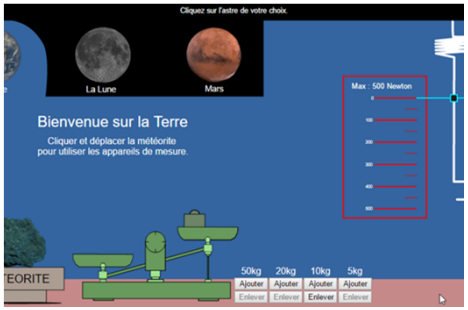
- Considerations:
  - Hard(er) to analyze
  - More expensive to develop: use IMS PCI specification to allow for portability & sharing

Portable Custom Interaction (PCI)

- *"… defines a standard way for TEIs or custom interaction types to be represented as part of the QTI specification"*

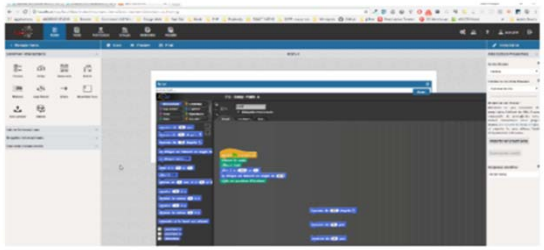
- PCI ~ item-type
  - Can be configured by parameters
  - Combined with other interactions
- One-off vs. Generic types
  - One-item type, e.g. very specific simulation
  - Generic type, e.g. Likert





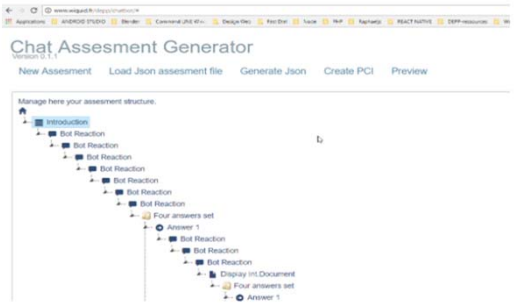
21st Century Skills PCIs

- Computational thinking tool - Snap
- File explorer simulator + generator
- Chatbot + generator
- Creativity and collaboration (“Glips”)

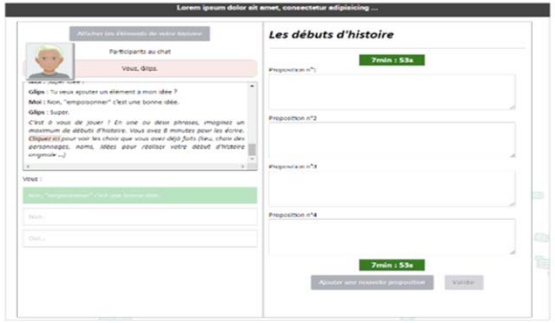


Snap for TAO

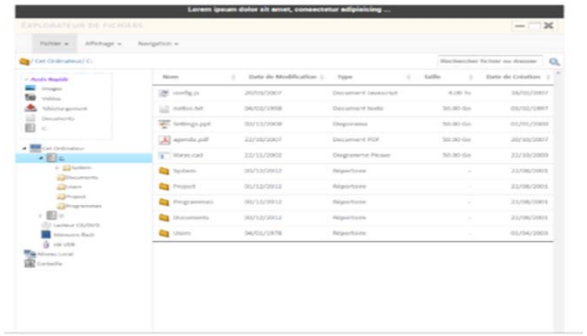
Generate fake configuration for Explorer PCI



ChatBot generator



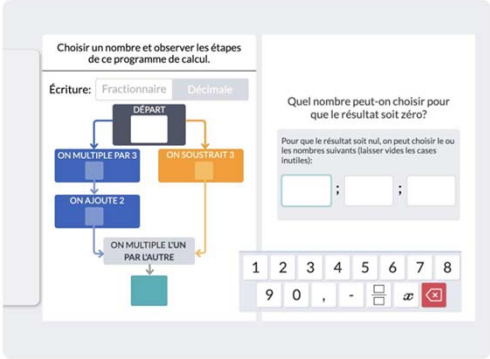
Collaborative creation with Glips

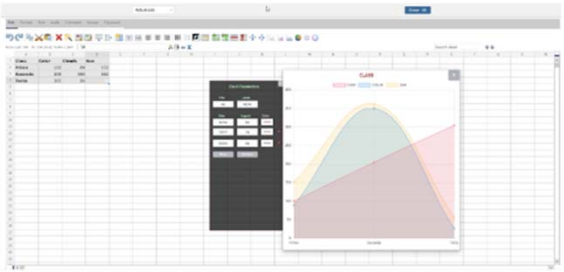


File explorer simulator

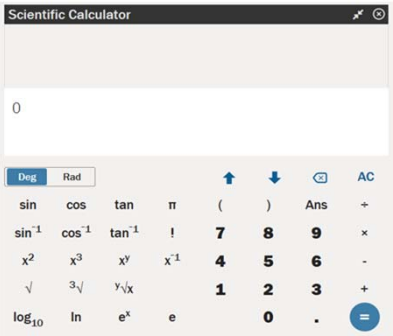
Math PCIs and Tools

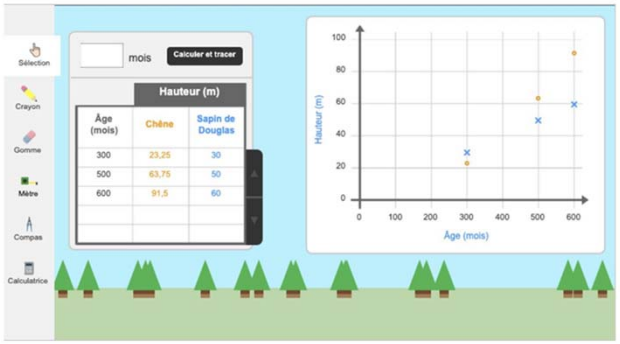
- EtherCalc PCI (Wiquid)
- MathemaTIC PCIs (Vretta)
- Invited presentation: Numworx



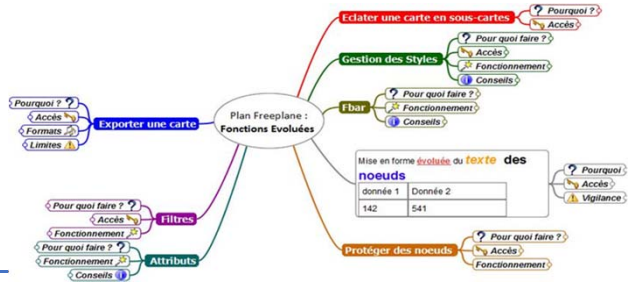


Full functionnal EtherCalc spreadsheet + charts





Future Developments

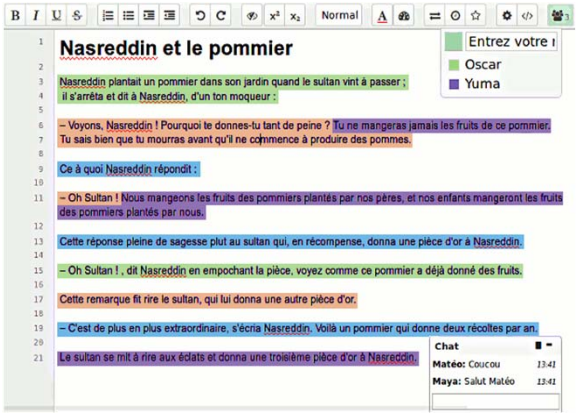


Mind map

Sketch ideas and concepts, set colour schème, insert emojis, create or modify a pre-configured mind map

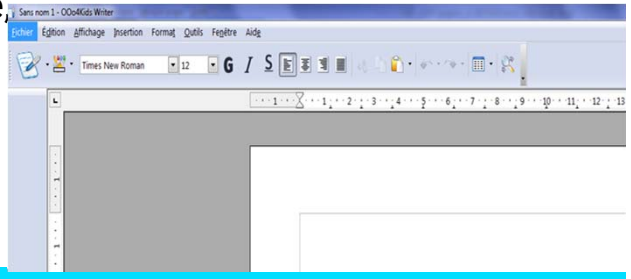
Collaborative pad

Read text written by other students (simulated?), enter text, time slider, chat?...



Text editor

Change layout, margins, insert images, bullet points, copy/paste, edit pre-inserted text, reset button...



Web pages

Integrate a mini web-page as stimulus, collect navigation data...

...

2. Sharing Systems

Assessment Systems

Item Creation Work Flow (Portal, TAO and Moodle)

Fluency Assessment (Portal, App)

Item Creation Work Flow

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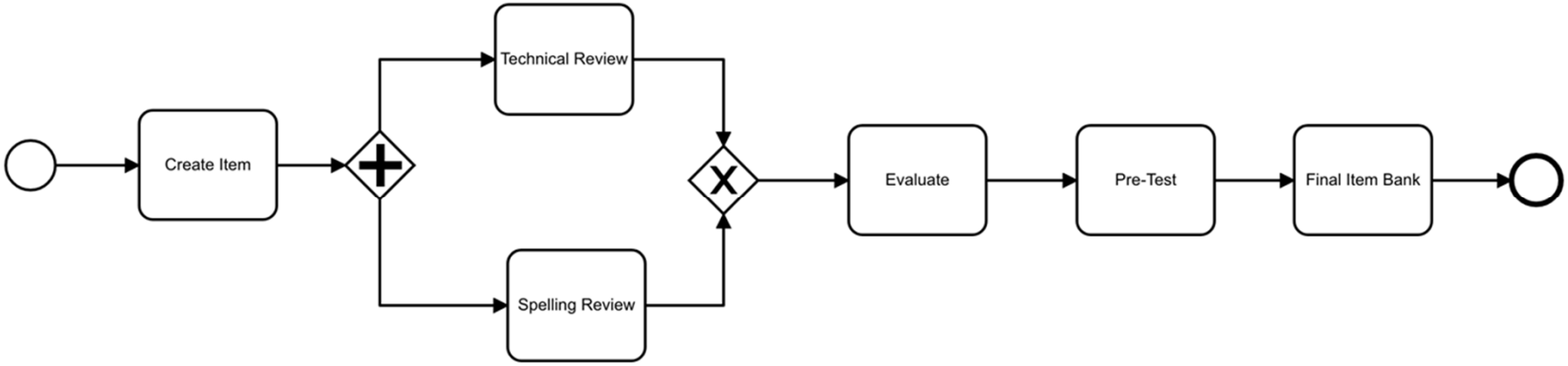
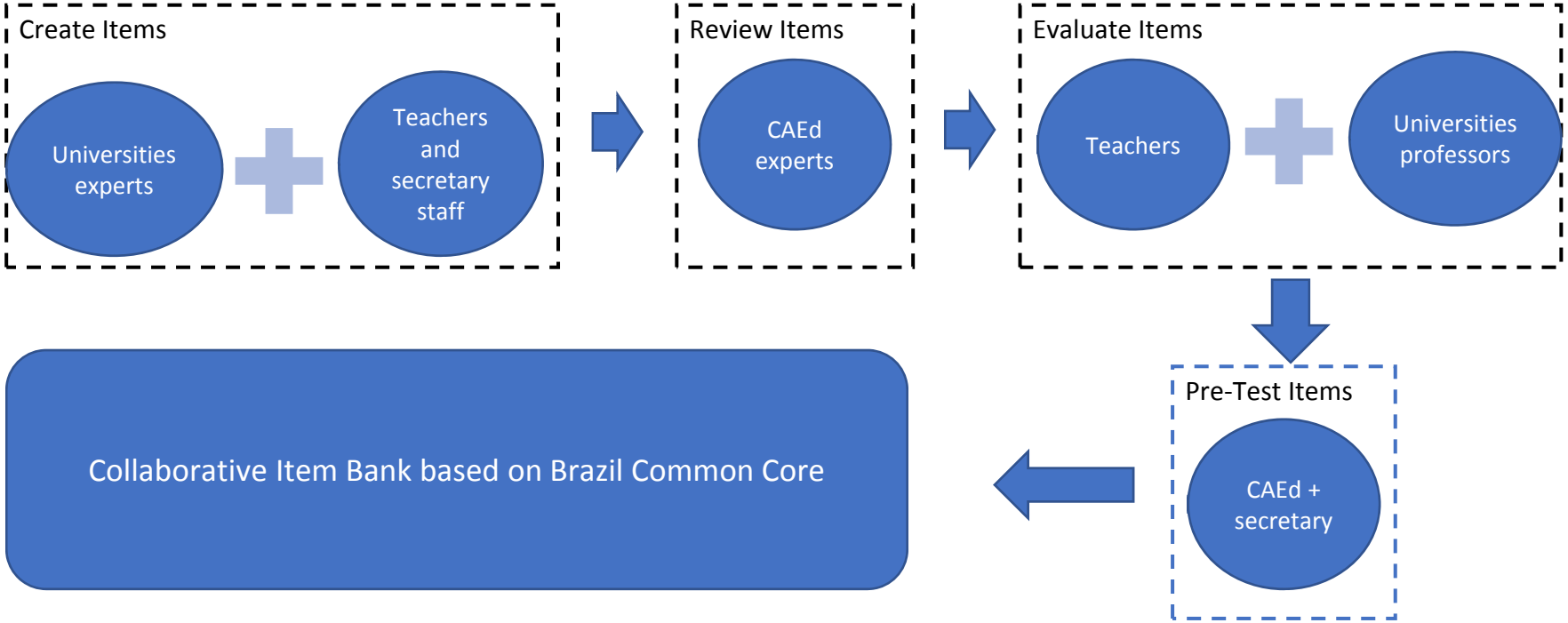
Item Creation Basic Work Flow

Item Bank creation process



Roles and Actors



How will we do this?

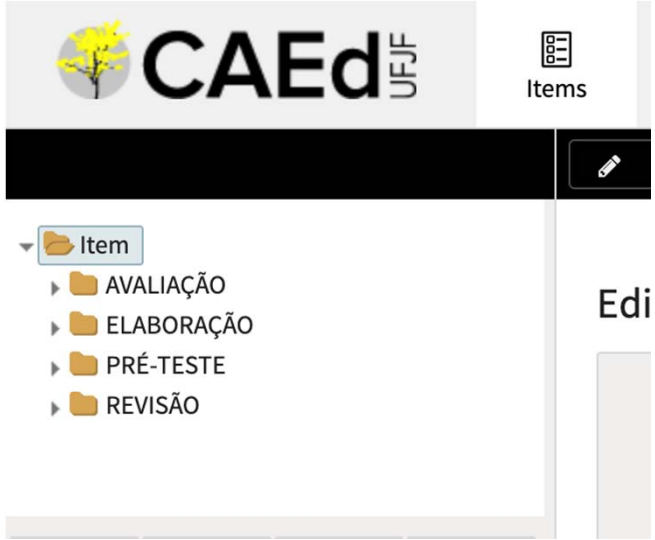
Use Portal to manage actions in TAO Platform and monitoring KPIs of actors.

Use TAO Platform to manage Item Creation Workflow from scratch to final item bank

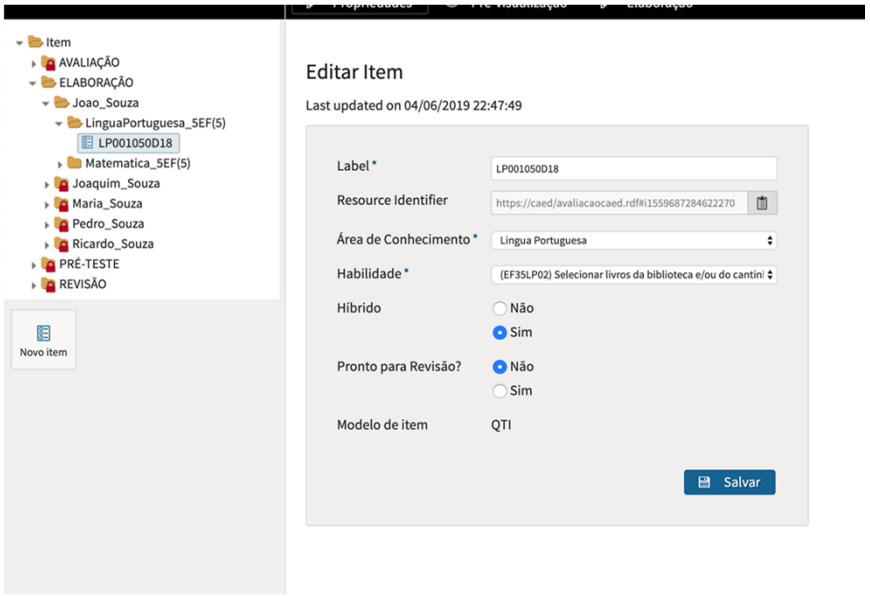
Use Moodle to give support for all activities in the process.

Web PORTAL/App	TAO Platform	Moodle
Manage Users	Item Creating	Professional development
Create requests	Item Reviewing	Forum to discuss with experts
Addressing requests	Item Evaluating	Educational resources
Monitoring Work Flow	Work flow setup	
Monitoring KPI’s	Pre-Test	
Publish results	Final item bank	

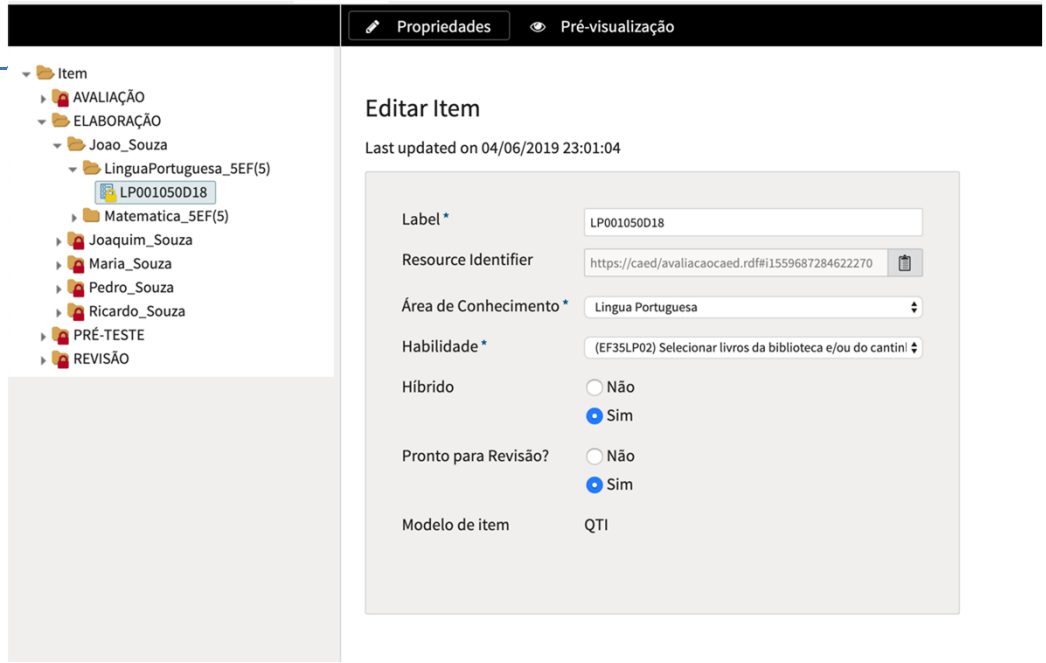
TAO Features - Structure



TAO Features – Role Item Creator



TAO Features send to review



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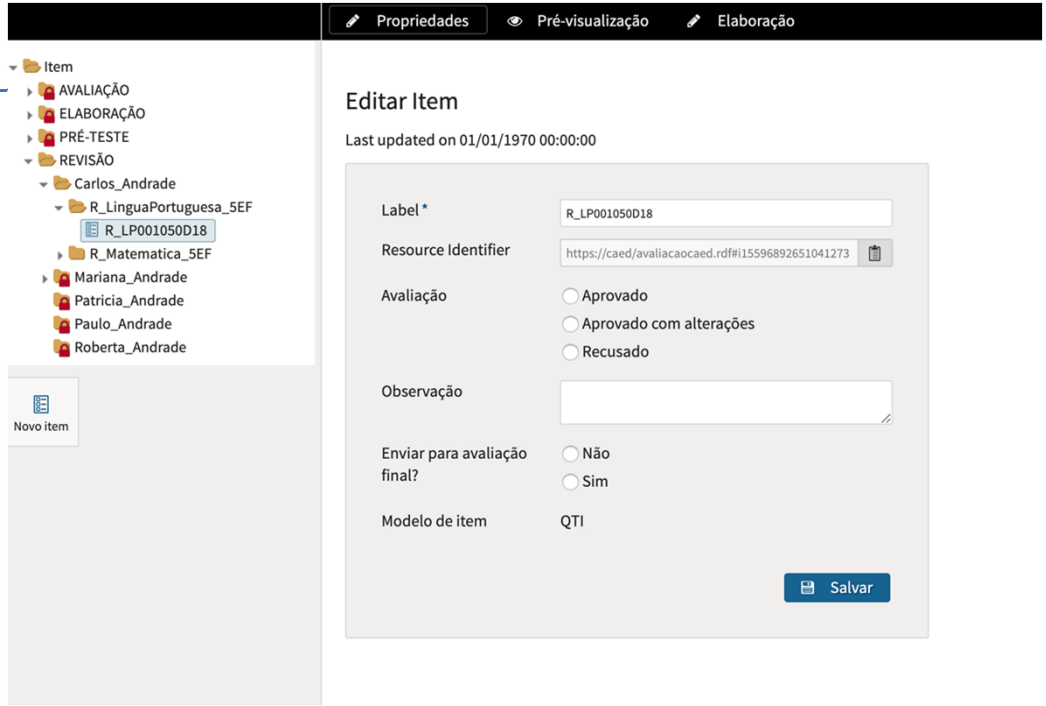
TAO Features reviewer role



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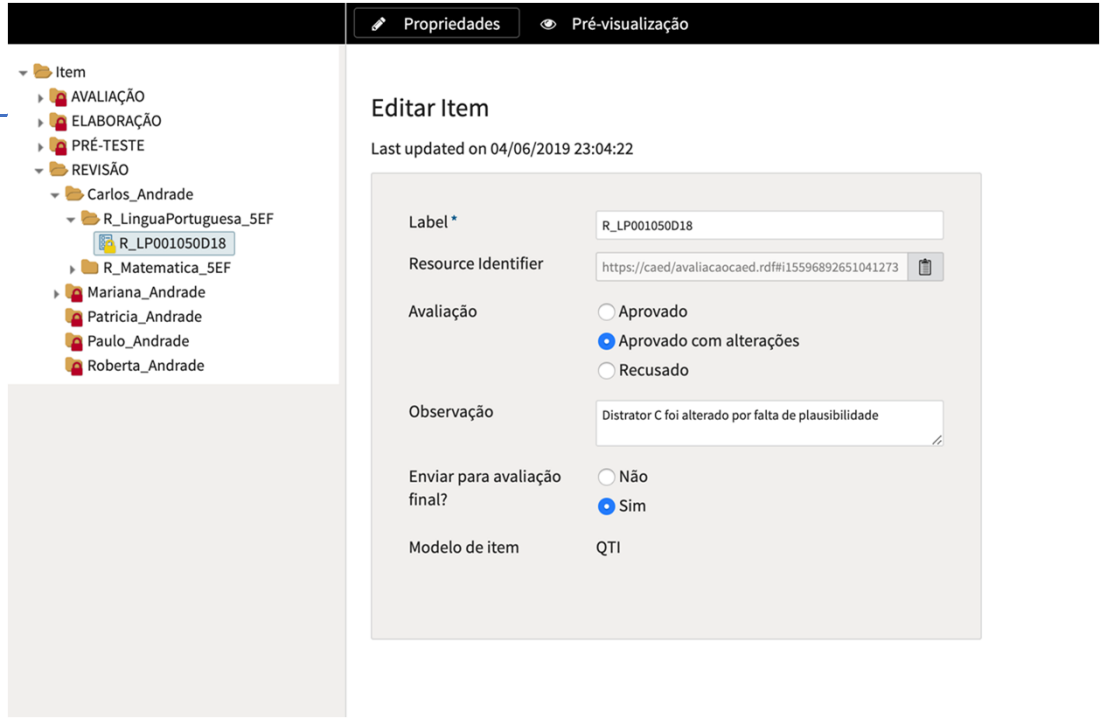
TAO Features send to evaluate



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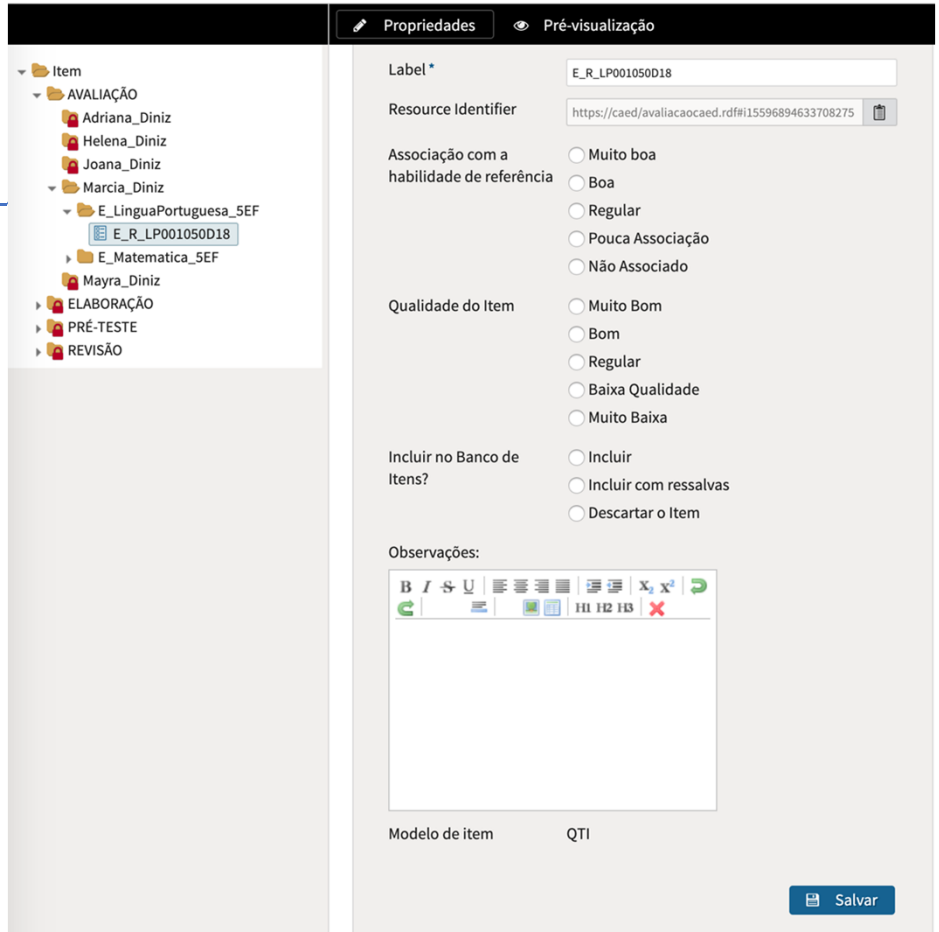
TAO Features evaluator role



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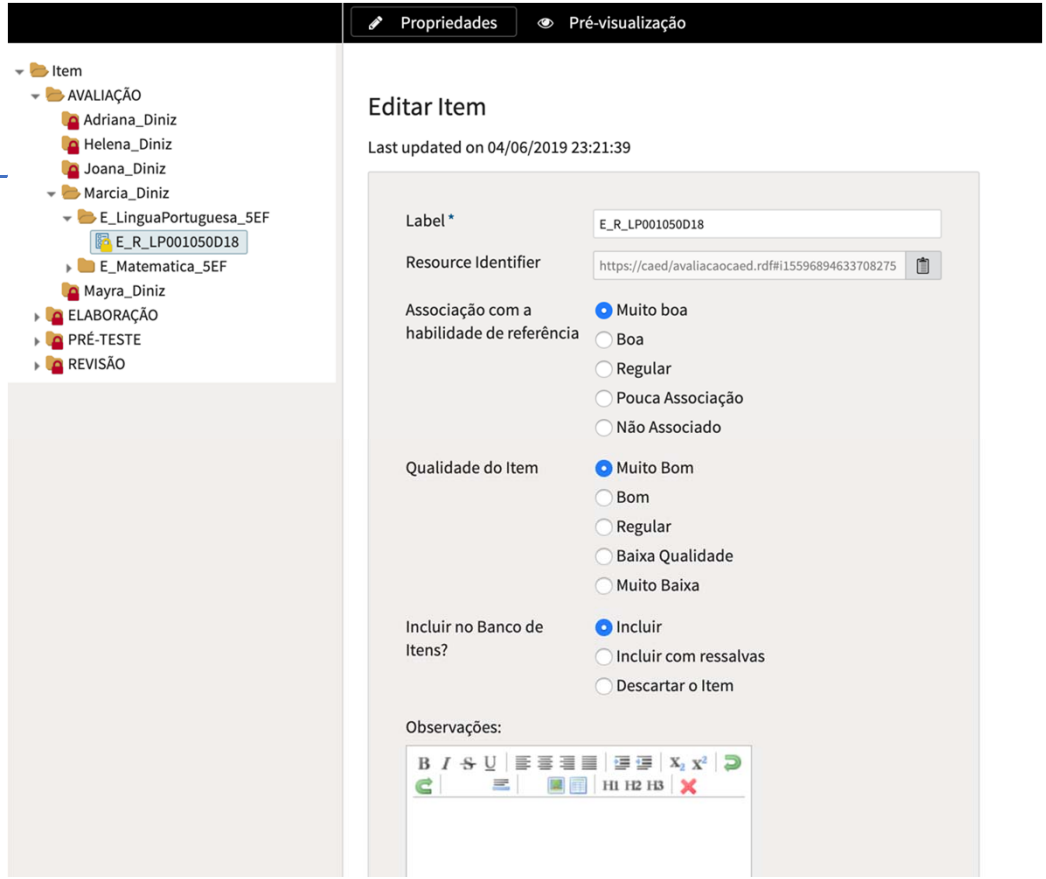
TAO Features send to Pre-test



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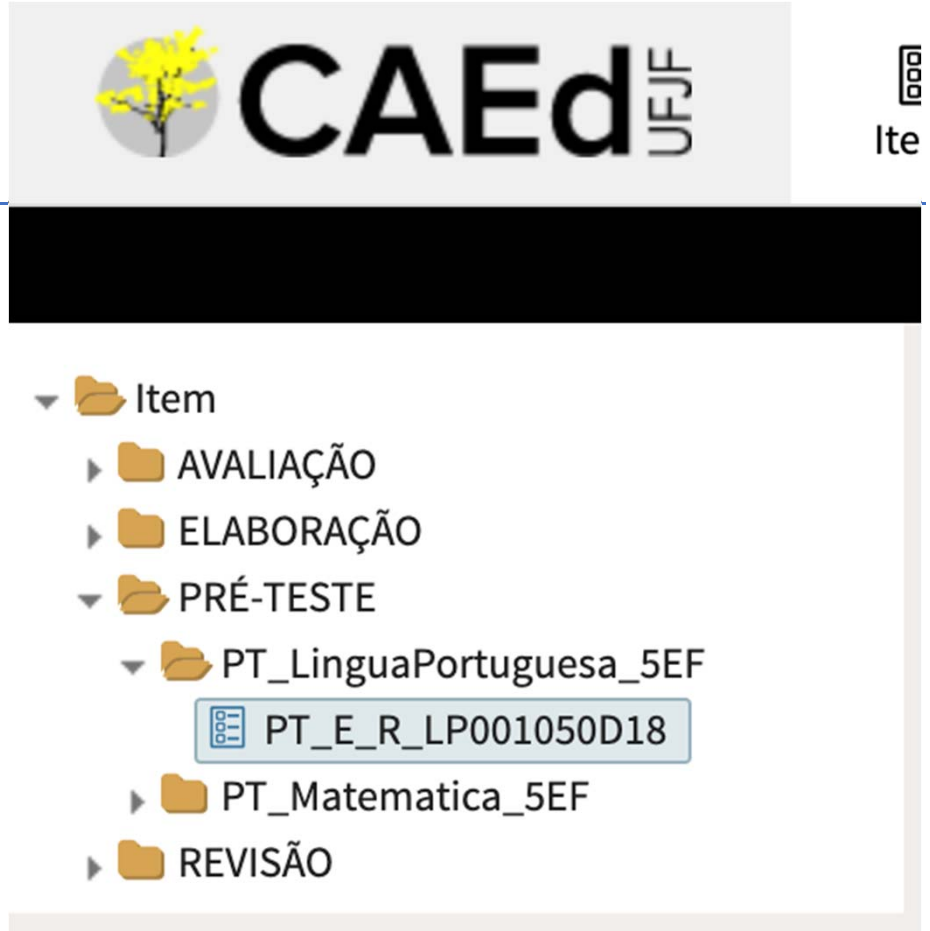
TAO Features
Pre-test

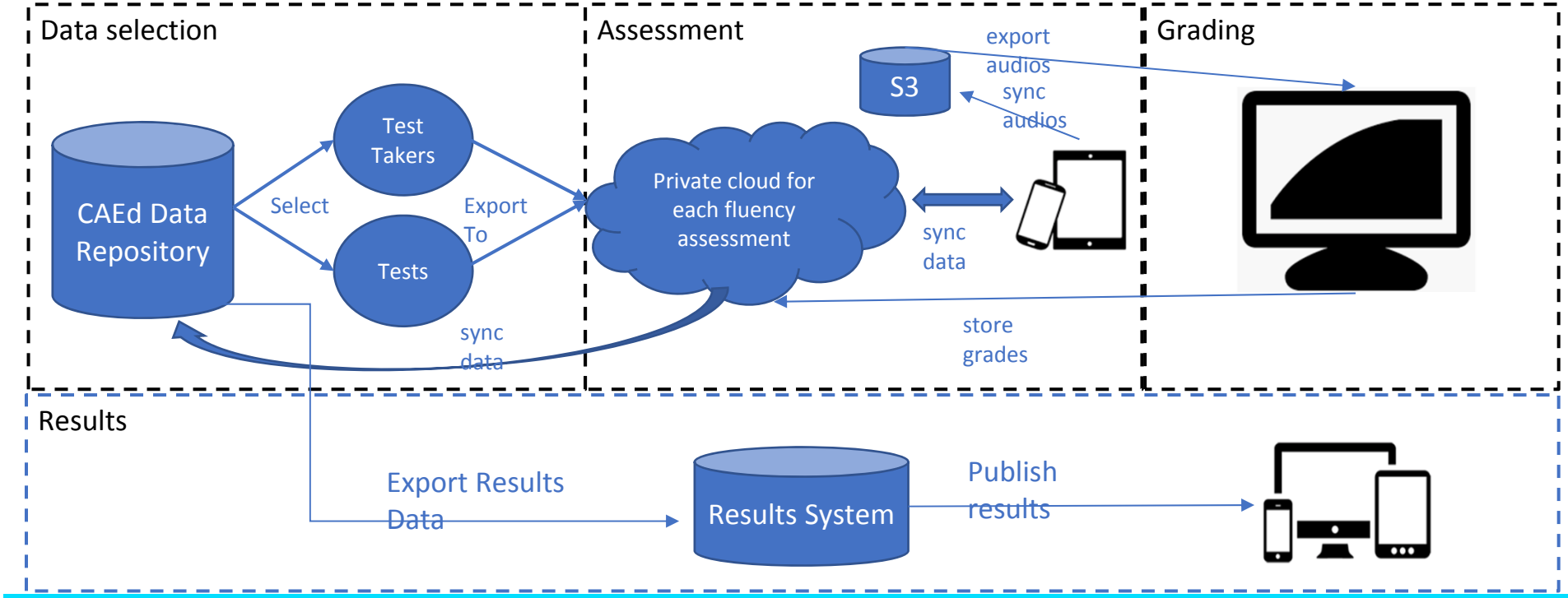


Fluency Assessment

Fluency Assessment

- Applied on first, second and third years of elementary school.
- Start in 2017 in state of Espirito Santo
- In 2018 we applied on more than 140.000 students in all regions of Brazil.

Fluency Assessment Flow



Fluency Assessment Technologies

- Applied using native application developed for Android devices compatible at least api 15 (Android 4.0.3)
- Completely off-line on applying assessment
- Synchronization on-demand using SyncAccounts/SyncAdapter
- Use of S3 for audio storage and share with revision system.
- Revision system developed in Angular/React and deployed on private clouds

3. Delivery

Fluency Assessment App

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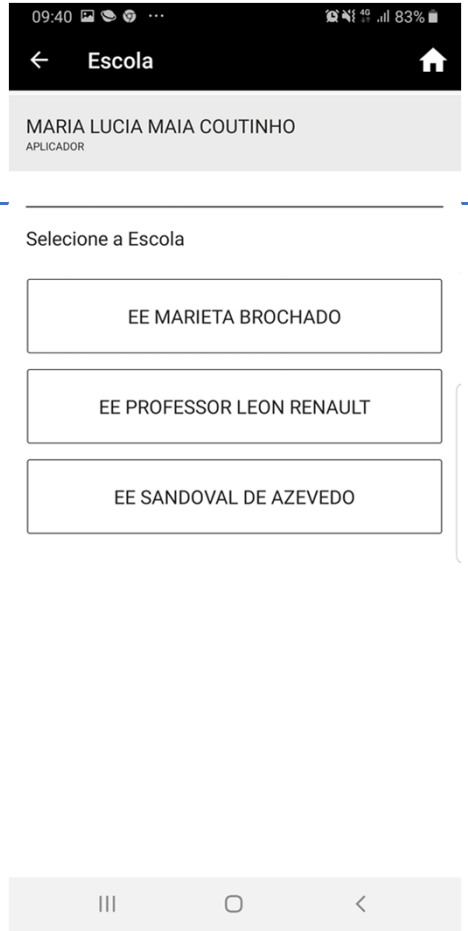
Main UI

09:40
83%
CAEd Fluência-DEV
MARIA LUCIA MAIA COUTINHO
APLICADOR
Iniciar
Teste Microfone
Configurações
Sobre

School Selection



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Group Selection

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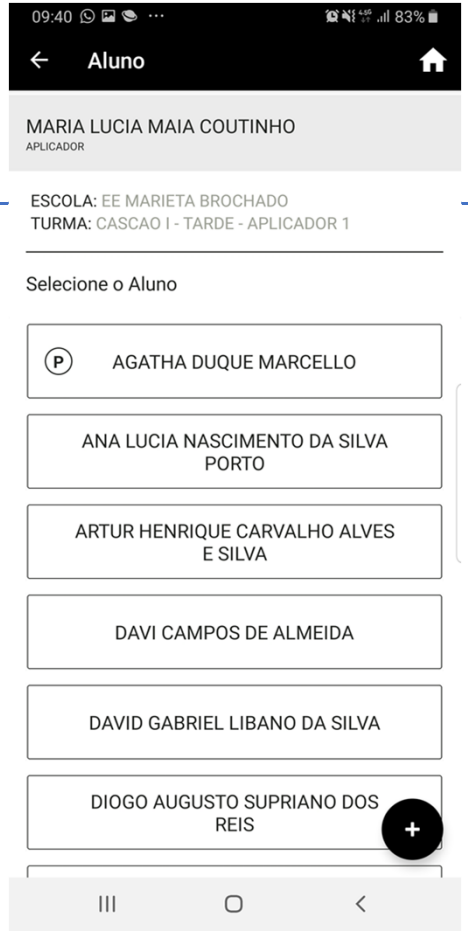
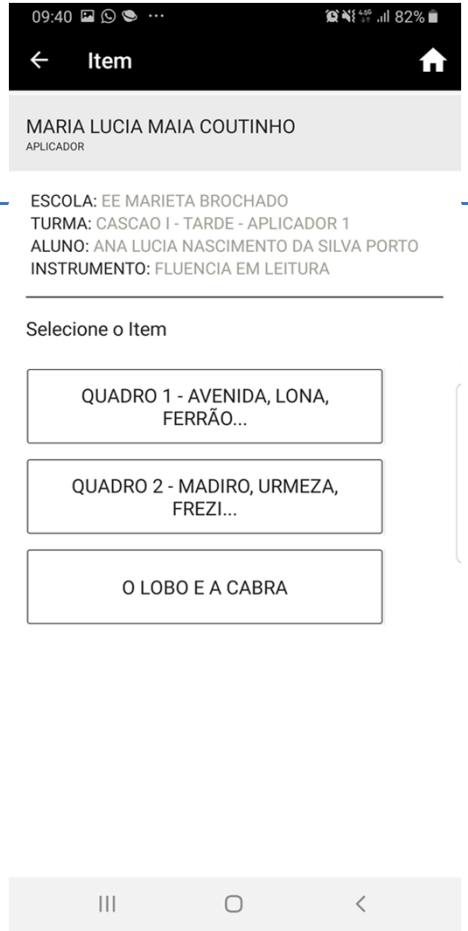
Test Taker selection



Test Selection

Item Selection



Ready for record Item

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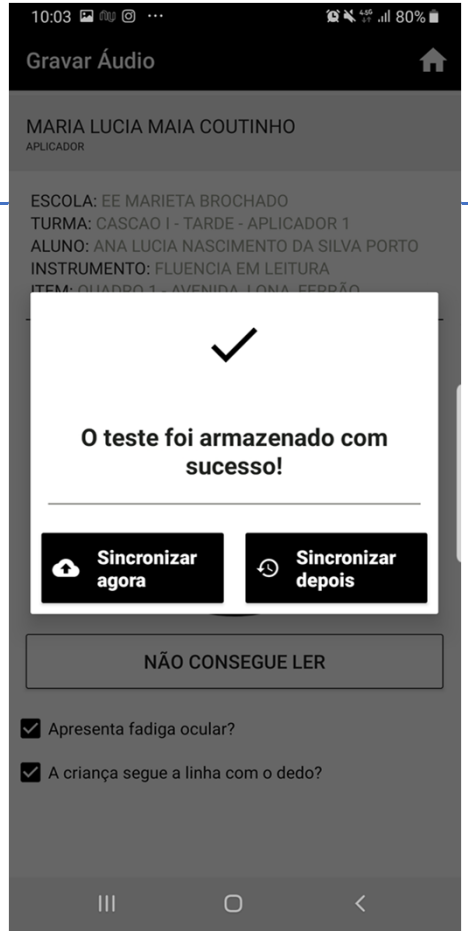
Recording Item

Item finished and ready for sync



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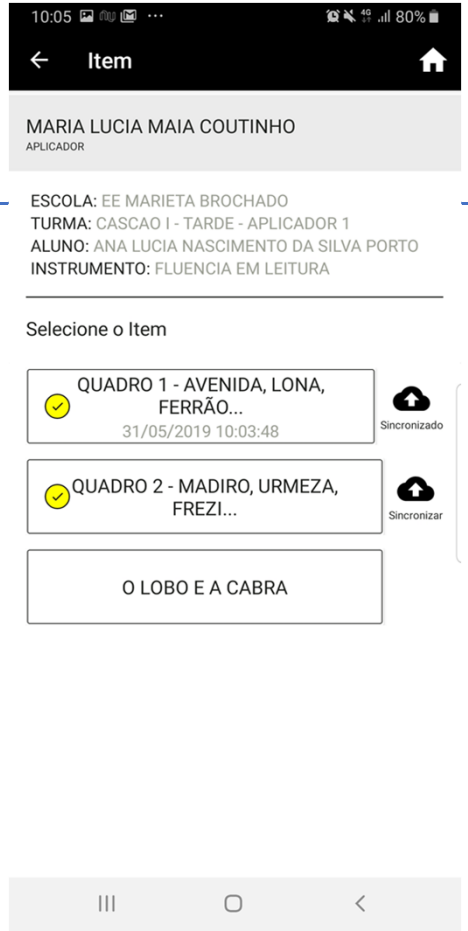
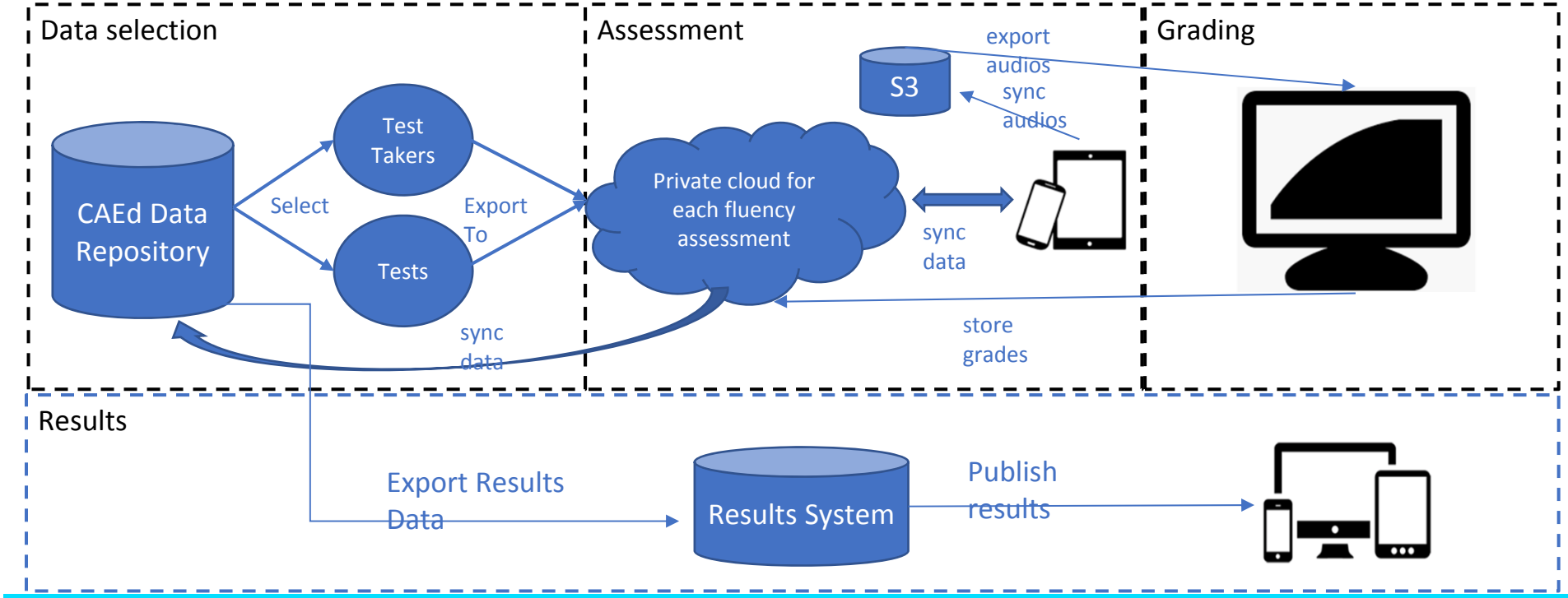
Items status



Audio samples

Fluency Assessment Flow



Grading System

Fluência
Minas Gerais

Home

MINHA PÁGINA

Mariana Fonseca

Minha Página > **Correções Disponíves**

Correções Disponíveis

Nesta página, você tem acesso ao conjunto de itens que deverão ser corrigidos por você. Eles estão apresentados na tabela abaixo a qual contém: o número da solicitação, o item a ser corrigido, o código de referência e as ações a serem realizadas. Para iniciar a correção, selecione o item que deseja corrigir e clique no ícone presente na coluna "*Ações*".

Número da Solicitação	Item	Código de Referência	Ações
1900000838	D020003H6	58600008730147	
1900000838	D020003H6	58600008590114	
1900000838	D020003H6	58600008440140	
1900000838	D020003H6	58600008210141	
1900000838	D020003H6	58600008100126	

Grading System

Por fim, indique se o estudante utilizou menos de 62 segundos para realizar a leitura do item. Quando concluir, clique em " *Salvar*". Se desejar reservar o item para corrigi-lo em outro momento, clique em " *Reservar*". Clique em " *Sair*" para retornar à MINHA PÁGINA.

Informações do item

Solicitação	Item	Código Identificador
1900000837	D020001H6 - QUADRO 1 - AVENIDA, LONA, FERRÃO...	

10 segundos

Pausar

Situação *	NORMAL · RUÍDO · VAZIO · INTERFERÊNCIA · DEFEITO
AVENIDA *	NÃO LIDA · CERTO · ERRADO
LONA *	NÃO LIDA · CERTO · ERRADO
FERRÃO *	NÃO LIDA · CERTO · ERRADO
CABELO *	NÃO LIDA · CERTO · ERRADO
RIO *	NÃO LIDA · CERTO · ERRADO
BOLADA *	NÃO LIDA · CERTO · ERRADO

Fluency Assessment Results

1º Ano do Ensino Fundamental	2º Ano do Ensino Fundamental	3º Ano do Ensino Fundamental
PRÉ-LEITOR	LEITOR INICIANTE	LEITOR FLUENTE
8,0% dos estudantes são caracterizados como Pré-Leitores	44,0% dos estudantes são Leitores Iniciantes	48,0% dos estudantes são Leitores Fluentes
Nº de estudantes caracterizados como pré-leitores: 2	Nº de estudantes leitores iniciantes: 11	Nº de estudantes leitores fluentes: 12

Fluency Assessment Results

Resultados de turmas

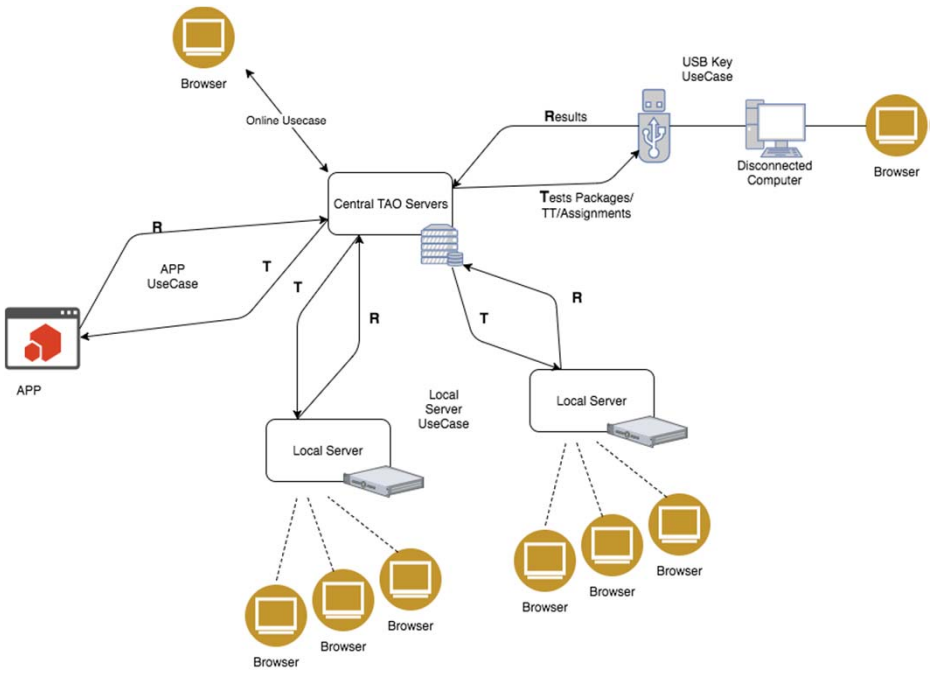
Na tabela abaixo, é apresentado o número absoluto de estudantes de cada turma que se encontra em cada perfil de leitor, de acordo com os resultados da avaliação da fluência. Para saber os resultados dos estudantes individualmente, clique no nome da turma, dentro da tabela.

1º Ano do Ensino Fundamental | 2º Ano do Ensino Fundamental | 3º Ano do Ensino Fundamental

TURMA	PRÉ LEITOR	LEITOR INICIANTE	LEITOR FLUENTE
3ºANO A	2	10	12
3ºANO B	0	1	0

Offline solution

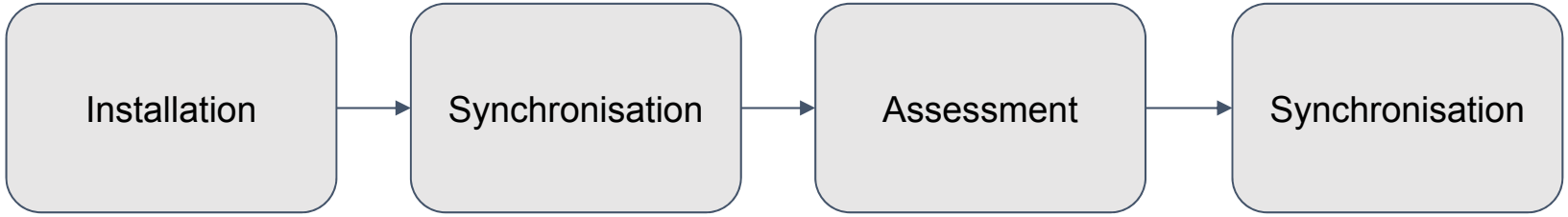
- Context and needs
- Principle
- variations of the solution
  - caching
  - local server & USB
  - apps
- Joint developments
  - reasons
  - benefits



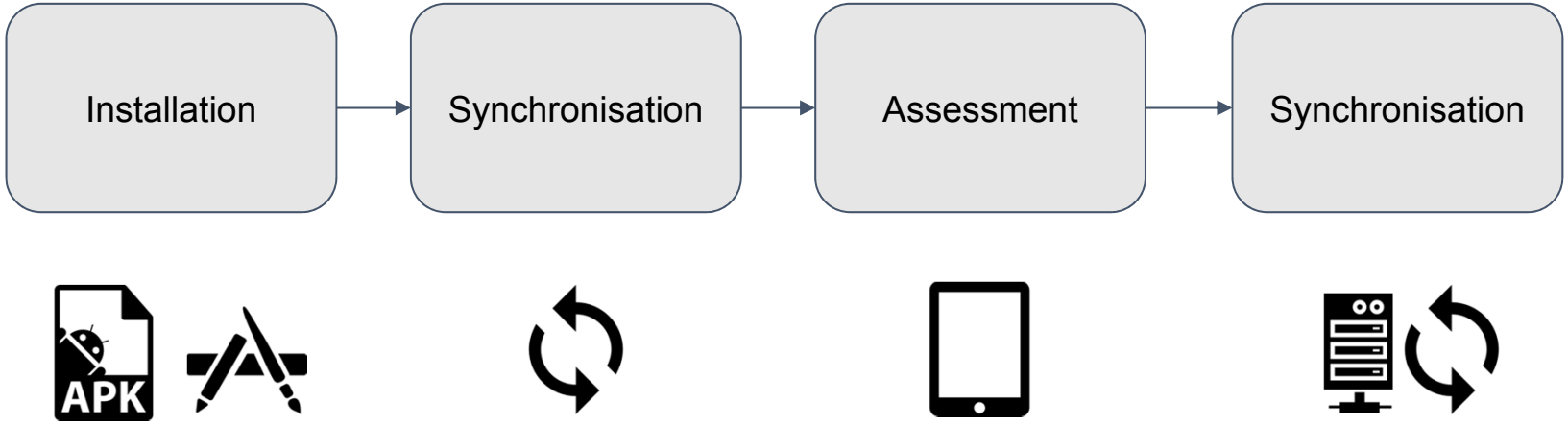
Offline solution - how does it work?

- Virtual server
- TAO instance
- Database

Operating scheme



Offline solution - Mobile Devices BT



Offline - FLIP joint developments

- synchronisation process
- different environments
- UI interface - synchronisation report
- user-friendly interface and reporting method

Accessibility

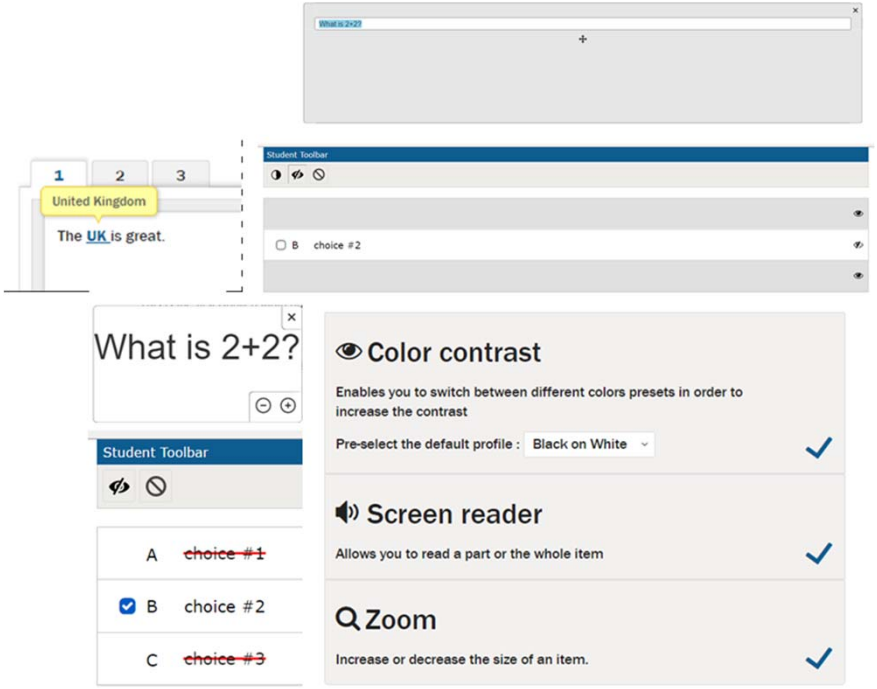
- Context (WCAG, RGAA, A2RNE)
  - Blindness and low vision
  - Deafness and hearing loss
  - Learning disabilities
  - Cognitive limitations
  - Limited movement
  - Speech disabilities
  - Photosensitivity

- Joint development

- Roadmap

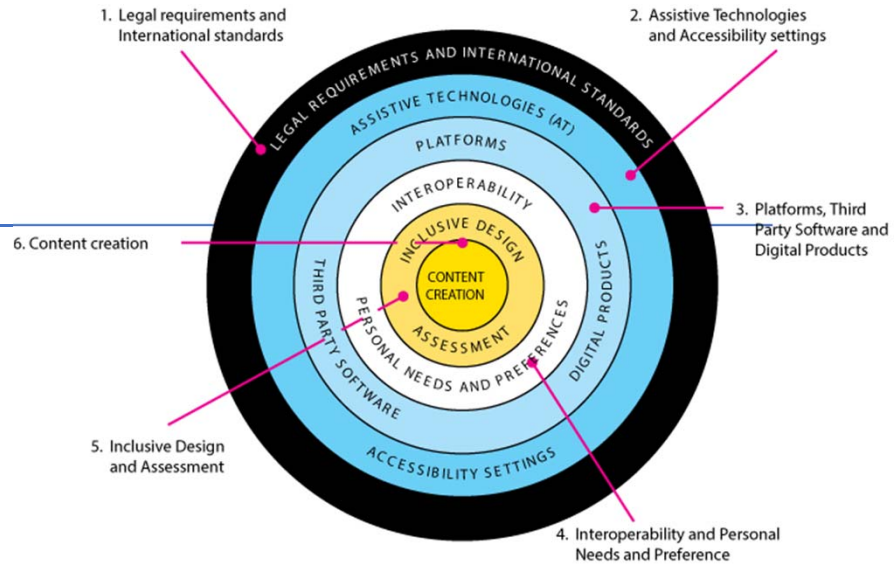
TAO Accessibility Features Today

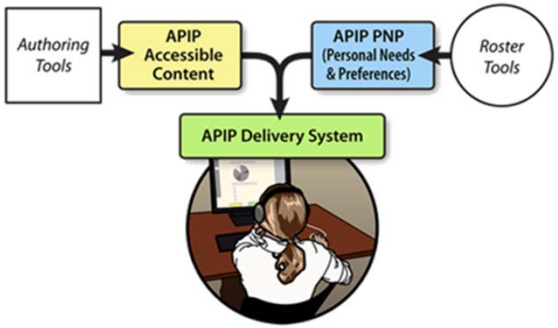
- Accommodations
  - Color contrast
  - Screen reader (by 3rd party integration)
  - Item Level Zoom
  - Magnifying Glass
  - Keyboard Control
  - Highlighter Tool
  - Additional Testing Time
  - Line Reader
- Item level features
  - Answer Eliminator
  - Masking
  - Flash Cards
- By use of QTI/APIP and LTI



Future & Roadmap

- QTI 3
  - Successor to APIP
  - Embedded Web Standards (ARIA)
  - Agreed upon Shared Vocabulary
- PNP
  - Personal Needs & Preferences
  - Part of Access for All
  - Predefined supports
- Updates of IMS Standards to be released this summer

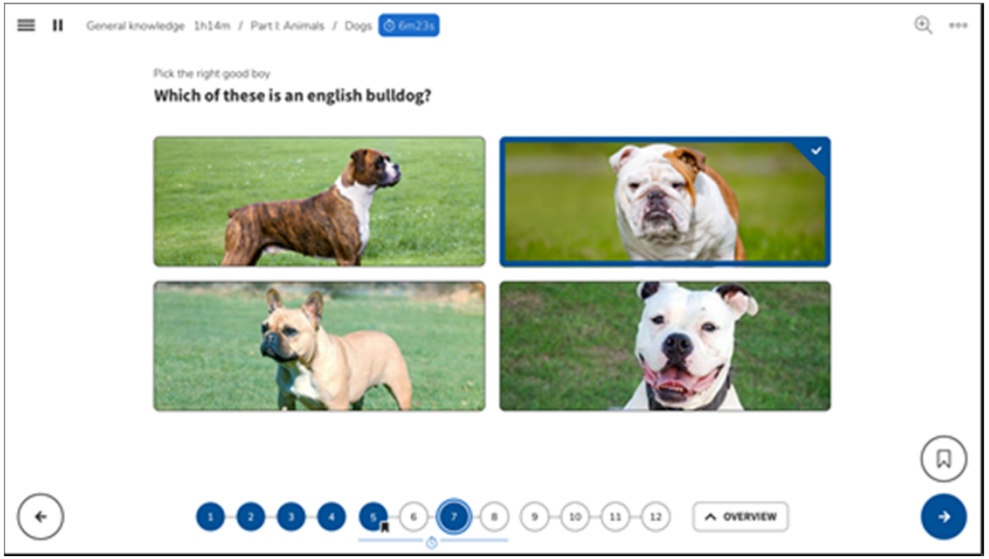




TAO UX Updates

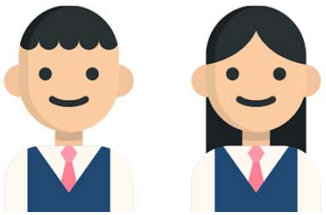
- TAO Deliver
  - Three general modes: Young (6-7), mid (8-12), older (12+) age groups
  - Scaffolding design
  - User Testing underway

- TAO Construct
  - Advanced Workflow
  - Dynamic Passages (QTI Shared Stimulus)
  - Item Sets (QTI Sections)
  - Input welcome!



Adaptive testing

- Principle and goals



starter items → higher items / lower items

Adaptive testing

18EVA2_FR_test.xml UNREGISTERED

18EVA2_FR_test.xml

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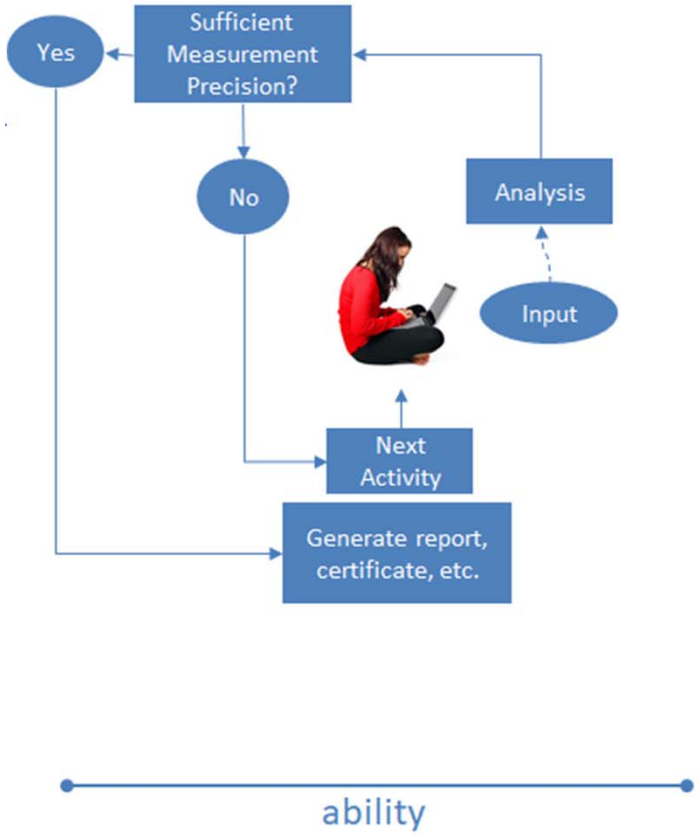
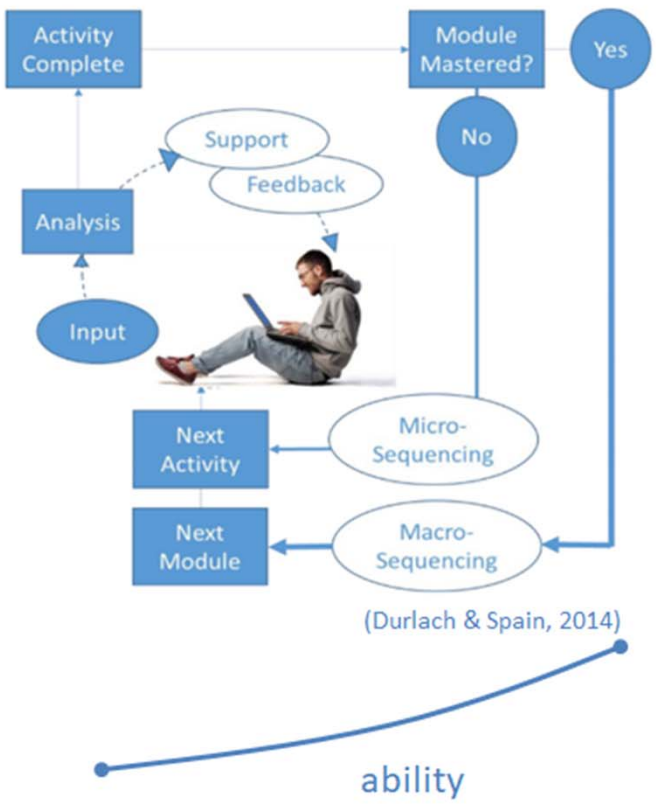
Line 124, Column 40 Tab Size: 4 XML

Testing vs Learning

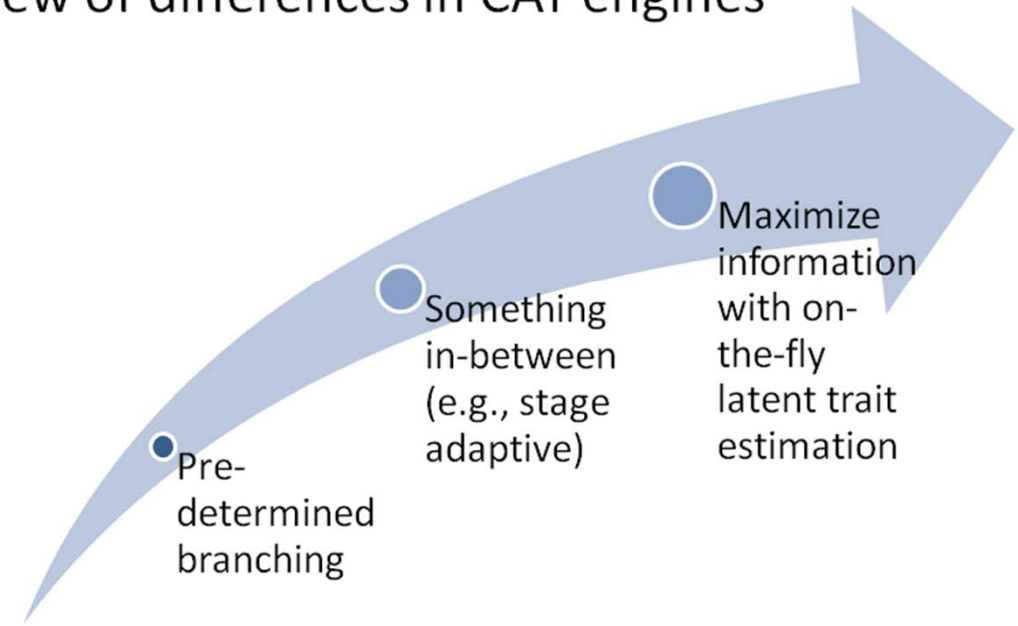




(Durlach & Spain, 2014)

Raining CATS

A simple view of differences in CAT engines



IMS Standard on CAT

Workgroup established May 2016

Elsevier, Pearson, ACT, CITO, OAT, PCG, PARCC

Problem

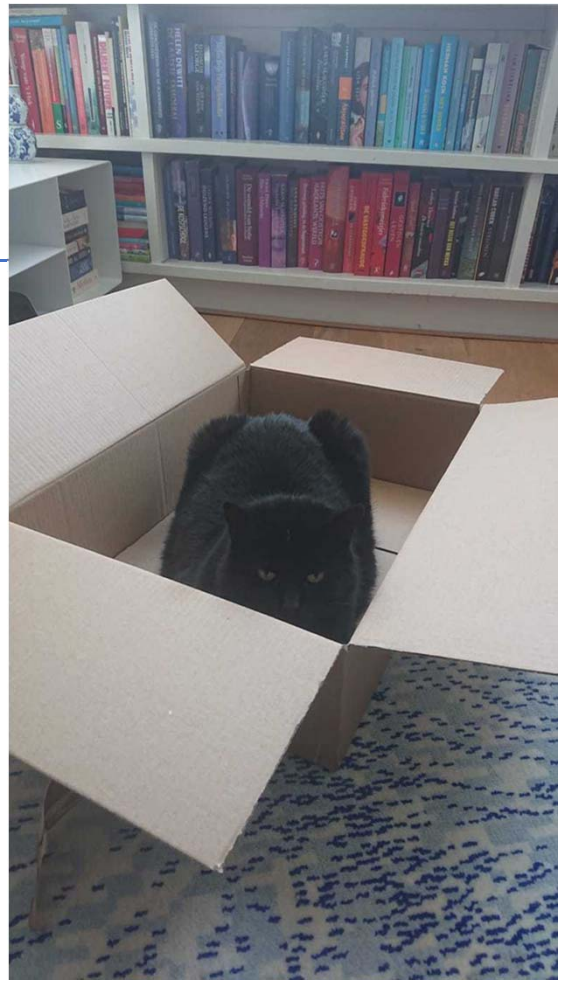
- Delivery and Adaptive Engines implemented as proprietary integrations and are tightly coupled

Goal

- Improved interoperability and broader use of algorithms while protecting intellectual property

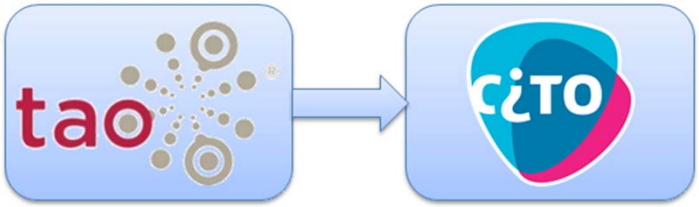
Solution

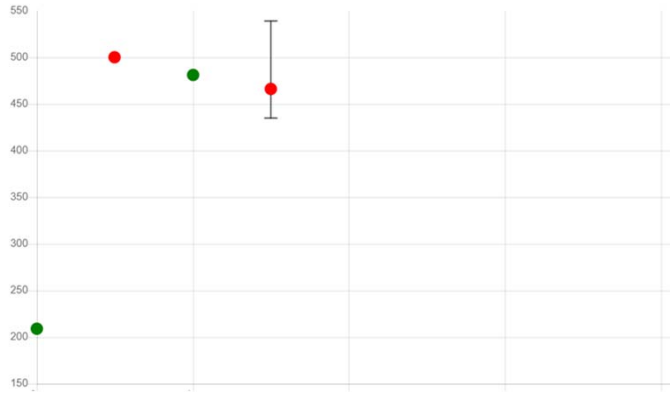
- Treat CAT engine as a “Black Box”
- Clearly describe interface that provides the greatest flexibility
- Define best practices



TAO CAT Demo + CitoLab Monitor

- Test assessment
  - 9 items
  - Item metadata loaded in Cito CAT engine upon publication of the test in TAO.
  - Stage length of 1
  - Initial stage length of 3
  - Stop condition: 3 cons. items above or below 80% bank percentage



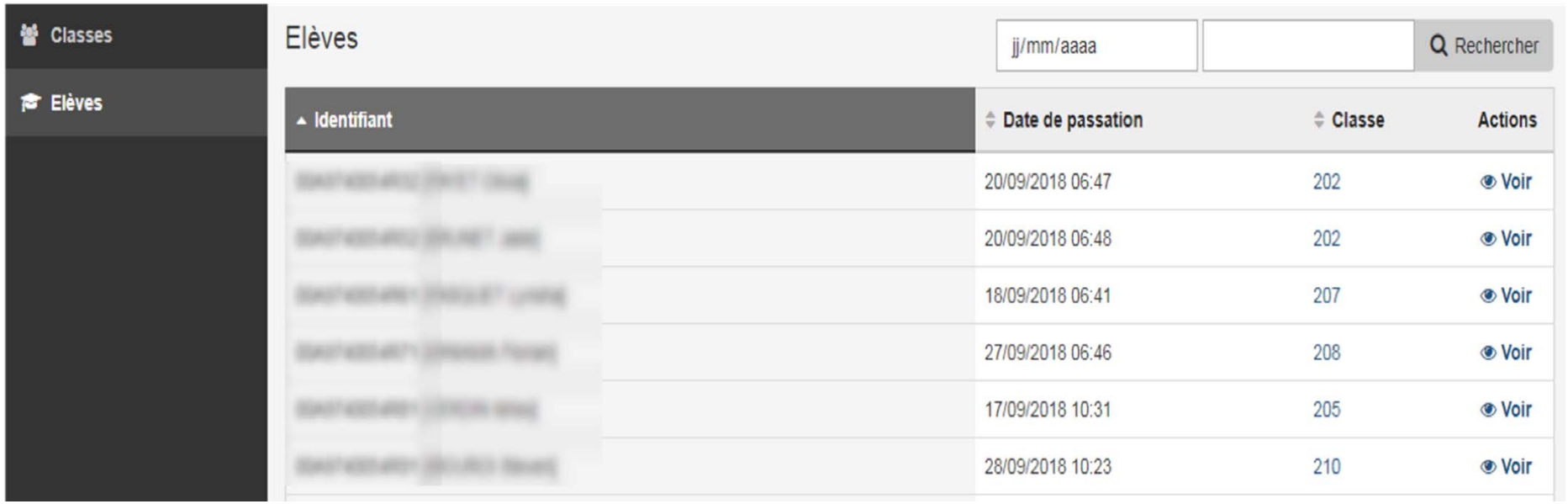


4. Tools/Integration

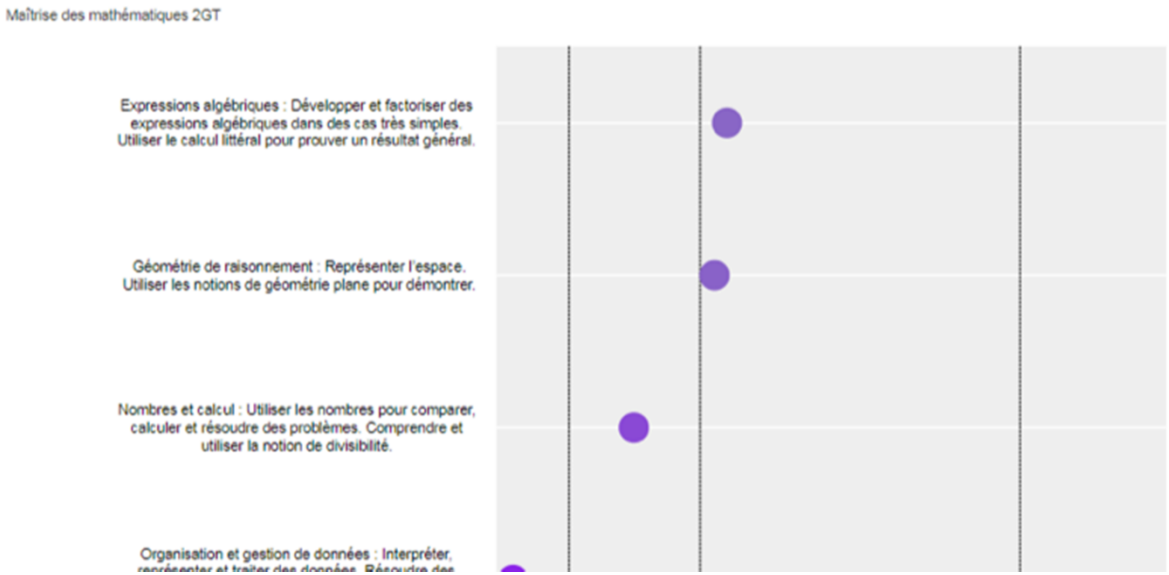
Results portal

- National assessment campaigns
- Picture of pupil’s skill at the beginning of Year 7 (6ème) or Year 11 (2nde)
- Steering indicators for teachers
- Quick provision of results

Results portal



Results portal



Results portal

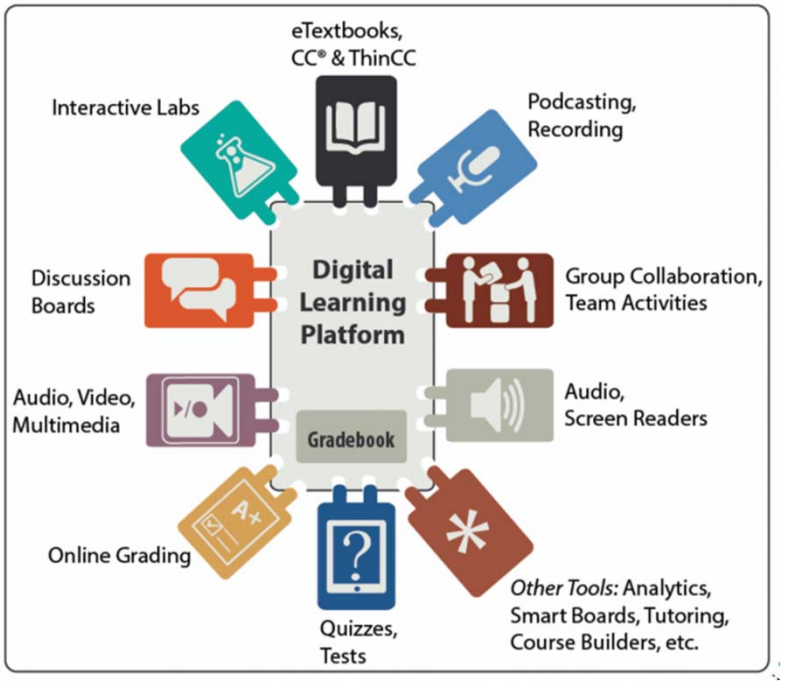
Results portal

Results portal

Date de mise à jour : xx/xx/xx Nombre d'élèves total évalués : xx	Classe	Identifiant	Prénom élève	Nom élève	**Compréhension de l'oral** Ecouter pour comprendre un message oral, un propos, un discours, un texte lu,	**Compréhension de l'écrit** Comprendre un texte littéraire et se l'approprier	**Compréhension de l'écrit** Comprendre des textes, des documents et des images et les interpréter	**Etude de la langue** Identifier les constituants d'une phrase simple, se repérer dans la phrase complexe	**Etude de la langue** Acquérir l'orthographe grammaticale et l'orthographe lexicale	**Etude de la langue** Enrichir le lexique
	6A	login1	Prénom 1	NOM 1	maîtrise satisfaisante 1	maîtrise satisfaisante 2	maîtrise satisfaisante 3	très bonne maîtrise	maîtrise fragile	maîtrise insuffisante
	6A	login2	Prénom 2	NOM 2	très bonne maîtrise	maîtrise satisfaisante 3	très bonne maîtrise	maîtrise satisfaisante 1	très bonne maîtrise	maîtrise satisfaisante 2
	6A	login3	Prénom 3	NOM 3	maîtrise satisfaisante 3	maîtrise satisfaisante P4	maîtrise satisfaisante 1	très bonne maîtrise	maîtrise satisfaisante 2	maîtrise satisfaisante 2
	6A	login4	Prénom 4	NOM 4	maîtrise satisfaisante 1	très bonne maîtrise	maîtrise satisfaisante 1	maîtrise fragile	maîtrise satisfaisante 1	très bonne maîtrise
	6A	login5	Prénom 5	NOM 5	maîtrise satisfaisante 2	très bonne maîtrise	très bonne maîtrise	maîtrise fragile	maîtrise satisfaisante 3	maîtrise satisfaisante 3
	6A	login6	Prénom 6	NOM 6	maîtrise satisfaisante 3	maîtrise satisfaisante 1	maîtrise satisfaisante 2	maîtrise fragile	maîtrise satisfaisante 3	maîtrise satisfaisante 1
	6A	login7	Prénom 7	NOM 7	maîtrise satisfaisante 3	très bonne maîtrise	maîtrise satisfaisante 1	maîtrise satisfaisante 3	très bonne maîtrise	maîtrise satisfaisante 1
	6A	login8	Prénom 8	NOM 8	très bonne maîtrise	maîtrise insuffisante	très bonne maîtrise	maîtrise satisfaisante 3	maîtrise satisfaisante 1	très bonne maîtrise
	6A	login9	Prénom 9	NOM 9	très bonne maîtrise	maîtrise satisfaisante 3	très bonne maîtrise	maîtrise satisfaisante 2	maîtrise satisfaisante 1	maîtrise satisfaisante 3
	6A	login10	Prénom 10	NOM 10	maîtrise satisfaisante 1	maîtrise satisfaisante 3	maîtrise fragile	maîtrise insuffisante	très bonne maîtrise	maîtrise satisfaisante 2
	6A	login11	Prénom 11	NOM 11	maîtrise satisfaisante 3	maîtrise satisfaisante 2	maîtrise fragile	maîtrise satisfaisante 2	maîtrise satisfaisante 2	maîtrise insuffisante
Nombre d'élèves évalués en 6A : xx	6A	login12	Prénom 12	NOM 12	maîtrise satisfaisante 3	très bonne maîtrise	très bonne maîtrise	maîtrise satisfaisante 2	très bonne maîtrise	maîtrise fragile
	6B	login13	Prénom 1	NOM 6	très bonne maîtrise	très bonne maîtrise	maîtrise fragile	maîtrise satisfaisante 1	très bonne maîtrise	maîtrise fragile
	6B	login14	Prénom 2	NOM 2	maîtrise satisfaisante 1	très bonne maîtrise	maîtrise satisfaisante 3	maîtrise fragile	très bonne maîtrise	très bonne maîtrise
	6B	login15	Prénom 3	NOM 3	très bonne maîtrise	maîtrise satisfaisante 1	maîtrise satisfaisante 3	maîtrise satisfaisante 2	maîtrise satisfaisante 1	très bonne maîtrise
	6B	login16	Prénom 4	NOM 4	très bonne maîtrise	maîtrise satisfaisante 1	maîtrise insuffisante	très bonne maîtrise	maîtrise satisfaisante 2	très bonne maîtrise
	6B	login17	Prénom 5	NOM 5	maîtrise insuffisante	très bonne maîtrise	maîtrise insuffisante	maîtrise insuffisante	très bonne maîtrise	maîtrise satisfaisante 3
	6B	login18	Prénom 6	NOM 1	maîtrise insuffisante	maîtrise satisfaisante 2	maîtrise insuffisante	très bonne maîtrise	maîtrise satisfaisante 3	très bonne maîtrise

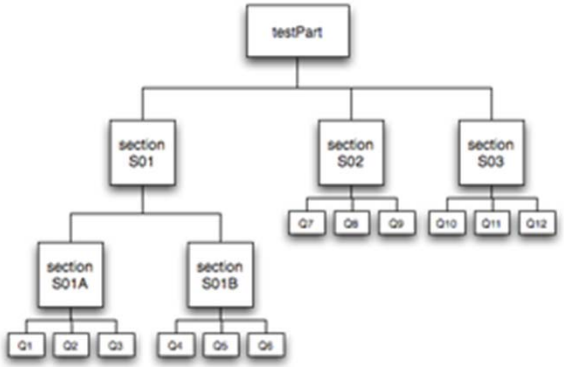
Introduction to IMS Open Standards

- QTI: Question & Test Interoperability
  - PCI: Portable Custom Interaction
  - QTI Results Reporting
  - APIP & QTI 3
  - Standard on CAT
- CASE: Curriculum & Academic Standards Exchange
- LTI: Learning Tools Interoperability
  - Standard on Proctoring
  - LTI Resource Search
- Caliper Learning Analytics



QTI Results Reporting

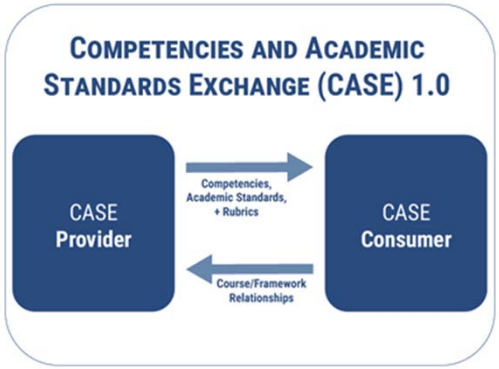
- Information model for QTI Results, closely tied to QTI ASI (Assessment, Section, Item) Model
  - Usually used with XML binding; also JSON available
- Modelling result data on item & test level
  - Response variables, e.g. choice selected, time spent
  - Outcome variables, e.g. score
- Very flexible, can easily be extended by using any custom (outcome) variable
- Used in Standard on CAT and inspired the new Caliper Metric Profile for Assessment

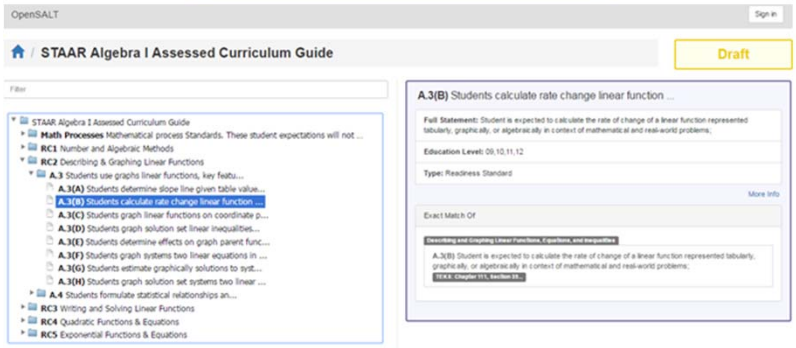



```
<itemResult identifier="Q01" sequenceIndex="1" datestamp="2005-12-02T15:19:20"
    sessionStatus="final">
    <responseVariable identifier="numAttempts" cardinality="single" baseType="integer">
        <candidateResponse>
            <value>1</value>
        </candidateResponse>
    </responseVariable>
    <responseVariable identifier="RESPONSE" cardinality="single" baseType="identifier"
        choiceSequence="D B C A">
        <correctResponse>
            <value>A</value>
        </correctResponse>
        <candidateResponse>
            <value>A</value>
        </candidateResponse>
    </responseVariable>
    <outcomeVariable identifier="completionStatus" cardinality="single" baseType="identifier">
        <value>unknown</value>
    </outcomeVariable>
    <outcomeVariable identifier="SCORE" cardinality="single" baseType="float">
        <value>100</value>
    </outcomeVariable>
</itemResult>
```

CASE: Curriculum & Academic Standards Exchange

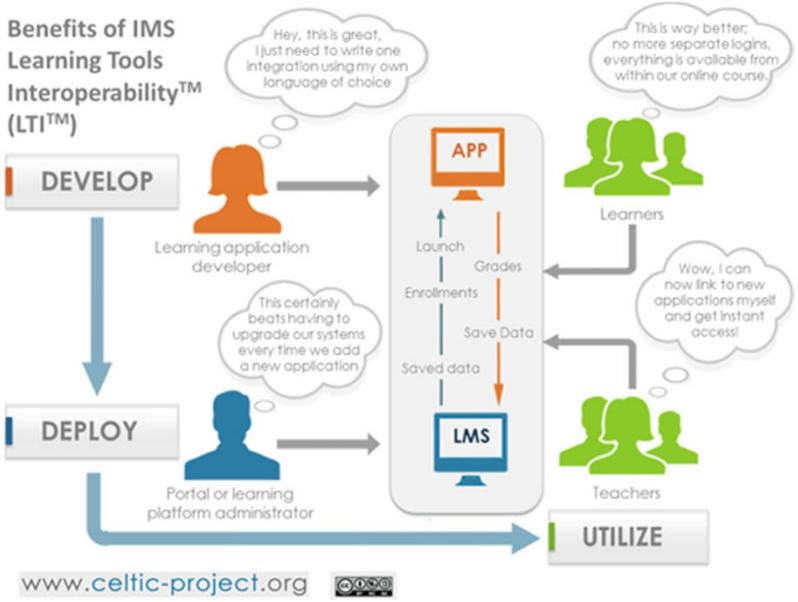
- "The Standard for Standards"
  - US focus: Common Core, State Standards, but standards agnostic
  - To replace PDFs and Excel files...
- Share Metadata Structures
  - On Assessments and Items
  - On Learning Object, e.g. videos, courses
- Exchange by either JSON files or automated by REST API





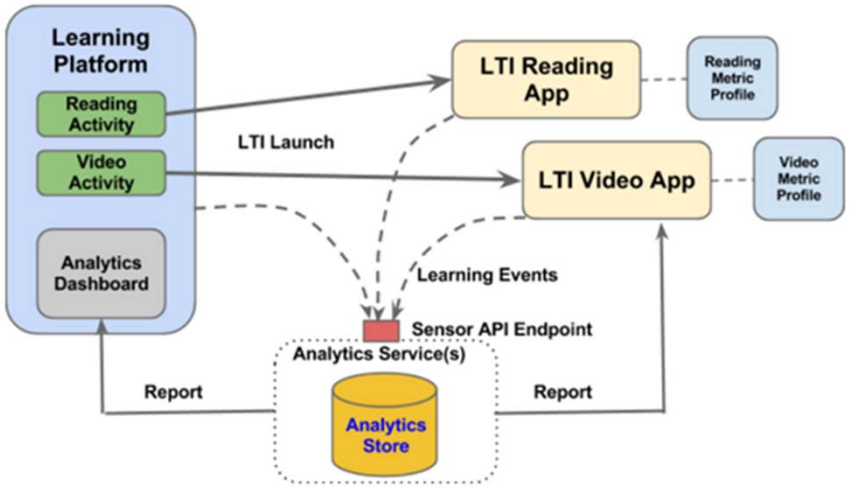
LTI: Learning Tools Interoperability

- Standard for integrating Learning Tools in Learning Platforms (LMS)
  - Most popular IMS standard
  - Single Sign On + Results return
- Standard on Proctoring
  - Best practice on how to integrate remote proctoring solutions with assessment solutions
- LTI Resource Search
  - Query multiple Learning Object Repositories (LORs) for content or LTI tools by grade, CASE id, etc.



Caliper Learning Analytics

- Standard for Capturing Learning Events
  - Process data!
    - Separate from results?
  - Can be used for real-time dashboards
- Predefined Metric Profiles
  - Reading, Annotation, Media, Assessment, etc.
  - New profiles added over time, custom extensions allowed



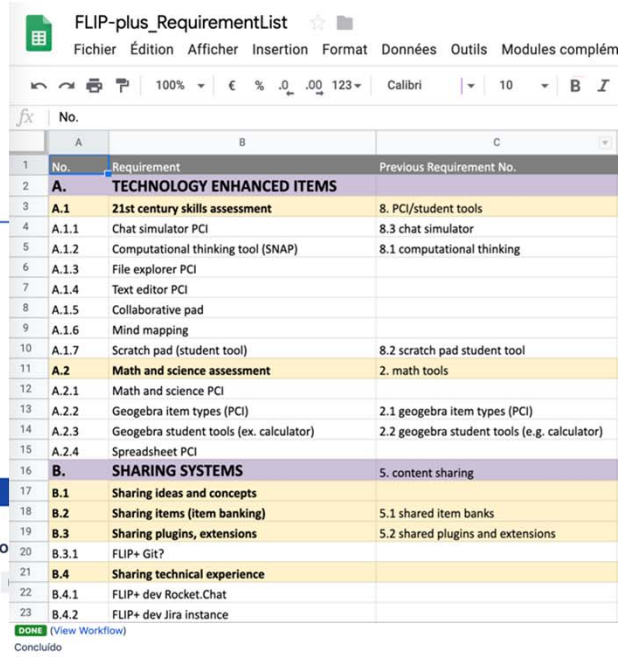
e-assessment community

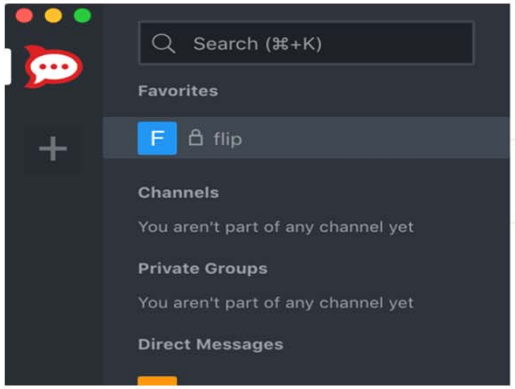
DEVELOPER COMMUNITY SESSION

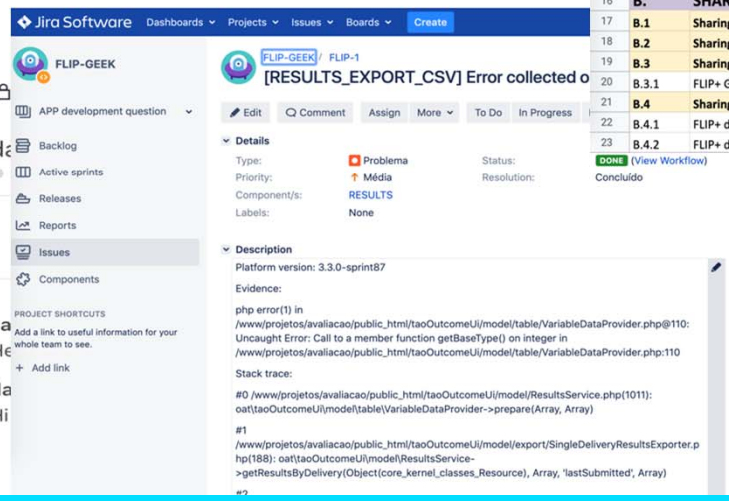
Friday, June 7th 14:00-15:30

Updates

- Communication channels
- Regular meetings
- Requirements list & joint developments







Topics

- TAO installation demo
- Wiquid PCI demos:
  - EtherCalc PCI, Explorer PCI + generator, Chatbot & PCI generator
- W2QTI: item migration
- Technology update from Vretta

e-assessment community

TAO Platform – Installing

Requirements

Hardware requirements:

- 2-4+ cores CPU type Intel(R) Xeon(R) CPU E5-2680 v2 @ 2.80GHz
- RAM min. 2 GB
- Fast magnetic or SSD storage
- Network with high bandwidth

Requirements

Apache modules to be enabled: rewrite, php
It will work with the default MPM (Multi-Processing Modules) Apache module set as prefork...
...but for a more intensive multi-processing, switching to MPM event or worker is recommended
PHP modules: mysql, mysqli, curl, json, gd, zip, spl, dom, mbstring
Improve response times with any PHP opcode caching, PHP 5.6 and 7.x comes with OpCache as default
PHP configuration fine tuning:

- To allow uploading of bigger documents, items or item package, raise in php.ini the values of upload_max_filesize and post_max_size constants – defaults are resp. 2 MB and 6 MB.
- (Optional) Raise the max_execution_time value (default is 30 seconds) in case some processing are known to be time consuming
- Increase /tmp size. It will be used for upload, download and file processing

Downloading

https://www.taotesting.com/get-tao/official-tao-packages/

Discussion

How to enhance sharing technical knowledge and experience within FLIP+ e-assessment community?

- Expand existing channels
- Git
- Other platforms, solutions...