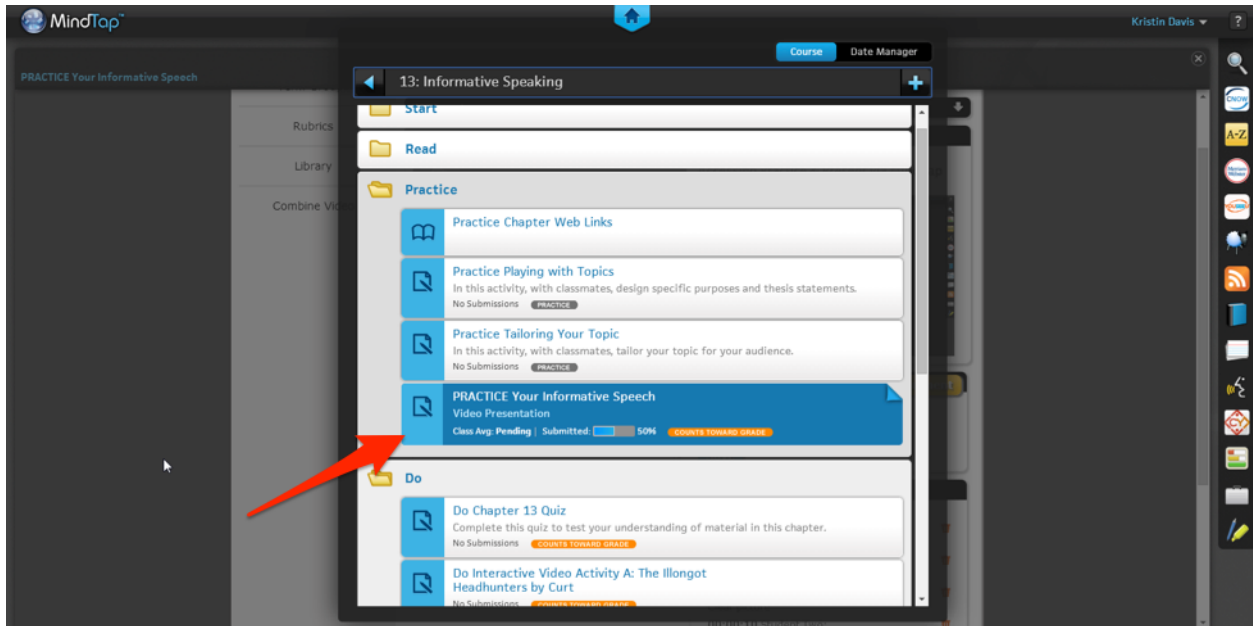
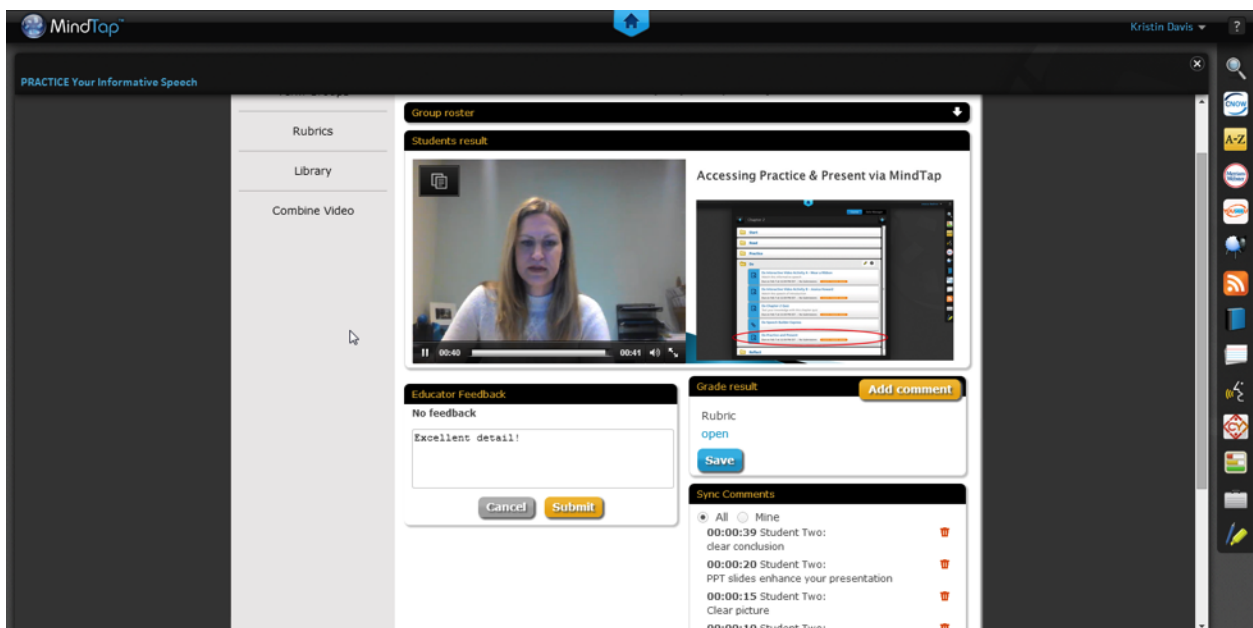


YouSeeU and MindTap: achieving deep integration using IMS Standards



YouSeeU application integrated into the MindTap Learning Path as a practice activity.



YouSeeU sample of uploaded student practice speech with corresponding

Overview

This document is a technical case study on how IMS Standards were used to add YouSeeU Subjective Assessment to MindTap. We hope by seeing the IMS Standards in Action you can learn something of interest in how you could apply those in your own applications. But before to enter the technical aspect of the integration, let's review the why of this effort:

YouSeeU, integrated into the MindTap platform for both Speech Communication and Business Communication courses, allows for synchronous (live capture) and asynchronous speech video delivery, recording and grading. YouSeeU

- Offers robust grading tools, including rubrics
- Facilitates in-depth instructor & peer evaluation
- Allows instructors and peers to annotate and synchronize comments to videos
- Gives students the ability to synchronize visual aids to videos
- Provides group presentation functionality

MindTap, available across Cengage Learning disciplines, offers relevant assignments that enable students to analyze, apply, and improve thinking and communication skills (specific to Speech Communication and Business Communication course areas). It combines a user's learning materials—readings, multimedia, activities and assessments—into a singular Learning Path. MindTap provides instructors the opportunity to customize according to course goals, promoting better outcomes. For students, all of the resources they need to succeed in the course are found in one place.

The challenges

As with other MindApps, the YouSeeU application had to feel totally integrated with the MindTap experience. This includes:

- a seamless authoring environment for Cengage Content Editors to prepare the MindTap Course Masters with pre-populated Subjective Assessments
- once a Course instance is created, the same authoring environment needed to be offered to the instructor to further customize (adding, editing, removing) assessments from their MindTap Course Learning Path.
- and a full gradebook integration, including the ability to open up submissions right from the grade book

In addition, this project was under tight schedule constraints, having to be made available for the Spring semester. Very early on, we committed on doing as much as we could leveraging standards, even if we had to do internal development since our LTI support at that time was experimental. We felt that using a lingua franca with YouSeeU would help bootstrap the integration. The fact that YouSeeU was already supporting LTI due to prior effort to integrate with Learning Management System also meant we could bootstrap the integration, and focus our

effort on the specific requirements around a MindTap integration.

So let's review from a feature standpoints how that plan worked out, where the standards helped, and where we needed to fill the gap.

Standards at play

Launching a YouSeeU Subjective Assessment

What are the requirements?

From the MindTap Learning Path (the Course Table of Content), a student can launch the YouSeeU subjective assessment. The YouSeeU opens up in MindTap in an Activity IFrame. MindTap is in charge of the IFrame management (show/hide depending on user interaction).

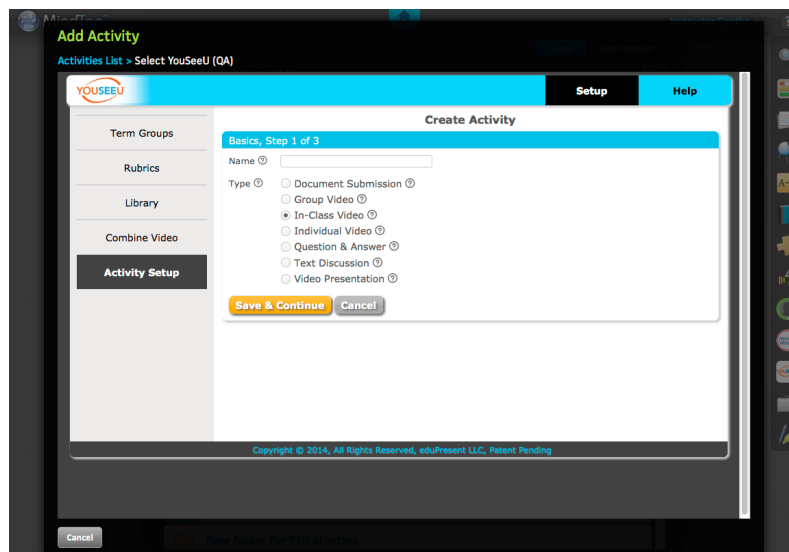
How the standards played out?

This is the core Basic LTI launch 1.0 was aimed to solving, a perfect fit: the launch contains all the contextual parameters needed for YouSeeU to render the dashboard:

- Course Information
- User and Role Information
- You See Activity Reference ID: this is the glue, the assessment identifier that YouSeeU uses to load the proper activity on launch

A note on the infamous third party cookie on IFrame: we solved it by having YouSeeU domain DNS aliased to a cengage.com subdomain.

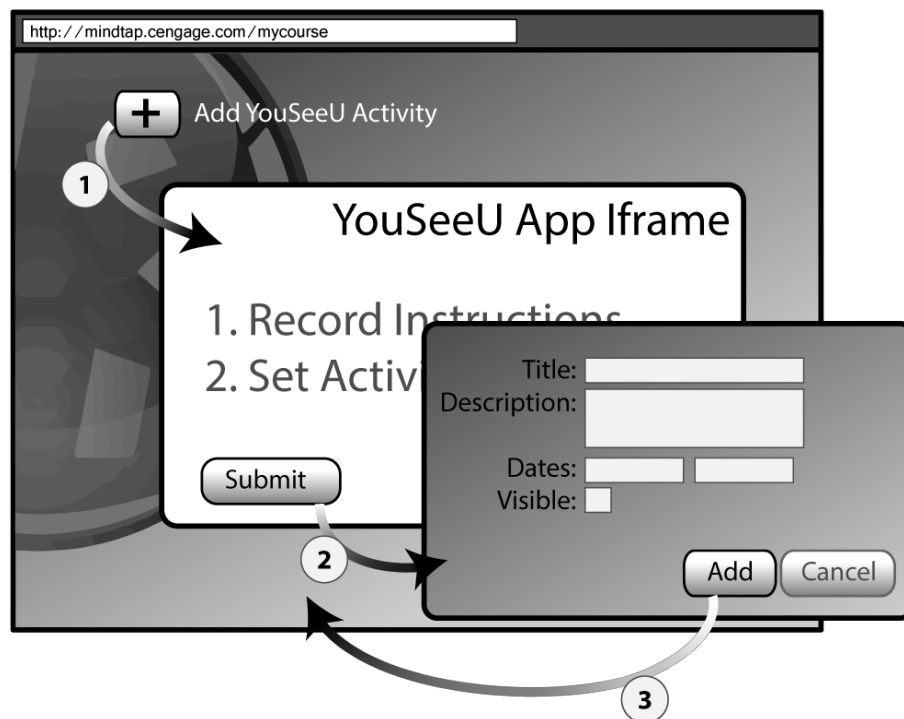
Authoring a YouSeeU Activity



What are the requirements?

Adding and Editing YouSeeU Subjective Assessment has to feel an integrated part of the authoring and customization of the MindTap Course. This feature is important for Cengage Product team when building up the MindTap Template, but also important for the Course Instructor who needs to be able to modify or add YouSeeU activities. Adding a YouSeeU activity had to be done in exactly the same way any other activity is added in MindTap, by directly adding on the Learning Path, the LTI mechanic had to be totally hidden.

How the standards played out?



We were able to leverage the Content Item Selection interaction which was being worked on in the IMS LTI working group as this integration was being implemented. The Content Item interaction fit almost perfectly our needs: it hides the complexity of setting up manually LTI Links (title, description, custom parameters) by offering a new flow to automatically provision links through a 'pick/create' flow:

1. Clicking Add YouSeeU activity in MindTap launches a Content Item LTI Request to YouSeeU
2. User creates the activity in YouSeeU. When the user finalizes the activity creation, YouSeeU posts back to MindTap using the Content Item Return URL with a title and description, an activity identifier and parameters about grading (maximum score, practice)
3. MindTap shows a confirmation screen where user can revisit some attributes, and set

some internal MindTap options

There are 2 key elements that the specs did not cover and we had to use either proprietary extensions:

1. **No Gradable attribute in Content Item definition:** we introduced an internal vocabulary to add to the Content Item definition to cover the key gradable attributes we need to insert a gradable activity in MindTap (such as maximum score, practice or not, ...)
2. **No confirmation event:** while the activity creation occurs in YouSeeU, the user is sent back on MindTap on a final confirmation page where the activity addition may still be canceled. It was important to provide a way to notify YouSeeU the addition did really occur, and for that we had to rely on our pre-existing notification mechanics.
3. **No edit flow:** we just mostly re-used the content item flow, but now passing the activity id.

Outcomes and Attempts

What are the requirements?

YouSeeU only allows a single submission, and all grading is manual, either by instructor or by student peers. While grading can use rubrics, only the final activity grade is pushed in MindTap. MindTap thus just needs to follow 4 states, and this is tracked at the (student, activity) level:

- Not Started
- In Progress
- Submitted
- Graded

How the Standards played out?

YouSeeU already supports IMS LTI 1.1 Basic Outcome Service which allows to support basic normalized (0 to 1) grade exchange. We decided to re-use that integration as it covered most of what we needed. Here are the heuristics we used to map with the required states:

- On 1st launch, we mark the activity in progress on our side, and pass in the result pointer on launch (LIS Result Source ID is our internal attempt Identifier)
- When the student submits, YouSeeU posts an empty POX ReplaceResult. This is out of spec and a little hack we used to capture the submission event.
- State is transitioned to Graded as expected when we receive a ReplaceResult with a

normalized grade; we rescale using the points possible stored on the MindTap side.

So the Basic Outcome with a bit of tweaking allowed us to cover our needs, but we realize that it will not be enough when we will need support for example for multiple attempts, more complex grading schemes or lifecycle transitions.

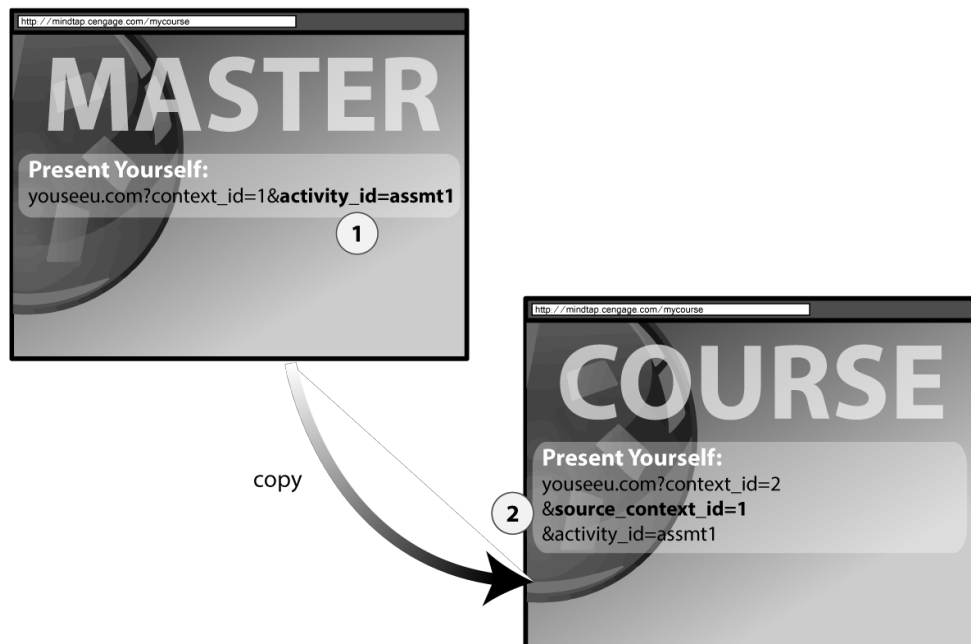
One key missing element is that ***we do not know anything about the user triggering the Basic Outcome call***. As a result, we cannot log in our grade history anything but System ("attempt deleted by System"). Not very helpful! This is already proving an issue in production, and to the minimum we would love a way to introduce the idea of 'on behalf of' http header information. It might be too late to modify the Basic Outcome Service and will probably will do some proprietary improvement around that, but it is something being brought on for the newer set of LTI Services such as the Rich Outcome Service presently in the works.

Templates and Courses

What are the requirements?

MindTap Courses are assembled onto Masters. Each course is a new copy of that Master, so that instructors are able to do any modification they see fit. We need this capability to extend to YouSeeU: YouSeeU activities are pre-created on the master, and copied in the new course instance where the instructor can modify (or even delete) them, and also create new ones.

How the standards played out?



Standards do not really cover that use case (copying contexts), but offers the primitives to handle it: we just added a couple of custom parameters to support it:

1. **Immutable Activity Id:** we actually make no use of the Resource Link Id (which has to be different per link and thus not usable during a copy). We use instead an activity id which remains invariant when the course is copied (note that there is no official activity id parameter, it has to be a custom one).
2. **Source Context Id:** YouSeeU does a lazy copy of the course context; on 1st launch, it will use the source context id custom parameter if present to copy another YouSeeU Course Context. Otherwise a blank YouSeeU course will be created.

Course Roster

What are the requirements?

YouSeeU needs a full Roster information and keep up to date with Roster changes. It is for example used by the instructor to create group activities within YouSeeU.

How the standards played out?

There is no Roster Service Standards available yet but we already had our own. Rather than using a complex eventing scheme to keep rosters in sync, we use a simple polling API. The roster can thus be queried in 2 ways:

- Full Roster query for a context
- Only enrollment changes since... This narrows the changes to only the enrollment changes that happen before a given timestamp.

YouSeeU is then polling on a regular interval for enrollment changes to keep the system in sync. The polling approach really helped decoupled both systems (no chance of missed updates) while keeping the API simple and introducing just a minimum delay (polling interval).

Final words

Embedding YouSeeU subjective assessment in MindTap greatly enriches the students and instructors experience. The decision to follow standards wherever possible and only cover the gaps using proprietary API allowed to deliver a fully integrated experience within an aggressive timeline by:

- leveraging existing integration code in YouSeeU, bootstrapping the basic integration
- focusing our efforts on the missing gaps.

The experience acquired will be leveraged in subsequent integrations by both parties, and we hope to bring back to IMS the lessons learned to carry on advancing the specifications forwards.

To learn more about MindTap, visit www.cengage.com/mindtap. To learn more about YouSeeU, visit www.youseeu.com.