

Extending Open edX to support blended learning at MIT

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Shelly Upton | May 25, 2017



OFFICE OF
DIGITAL LEARNING

Residential MITx

Between

30 to 50

on-campus courses use Residential MITx each semester.

More than

90

MIT faculty
& instructors

have experimented
with the Residential
MITx platform.

4060

undergraduates at MIT use MITx
in their classes.



of MIT undergraduate
students have used
Residential MITx for
coursework.

Supporting blended learning

- Course provisioning
- Studio and XML authoring workflows
- QA upgrade
- Content transfer

Welcome to MITx!

MITx is designed for the MIT community and runs on Open edX



MITx
8.13

Experimental Physics I

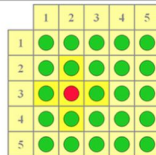
Starts: Feb 06, 2017



MIT
3.085J

Venture Engineering

Starts: Feb 06, 2017



MIT
15.053

Optimization Methods in Business Analytics

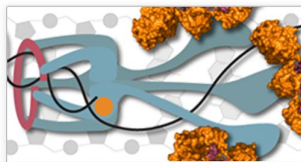
Starts: Feb 06, 2017



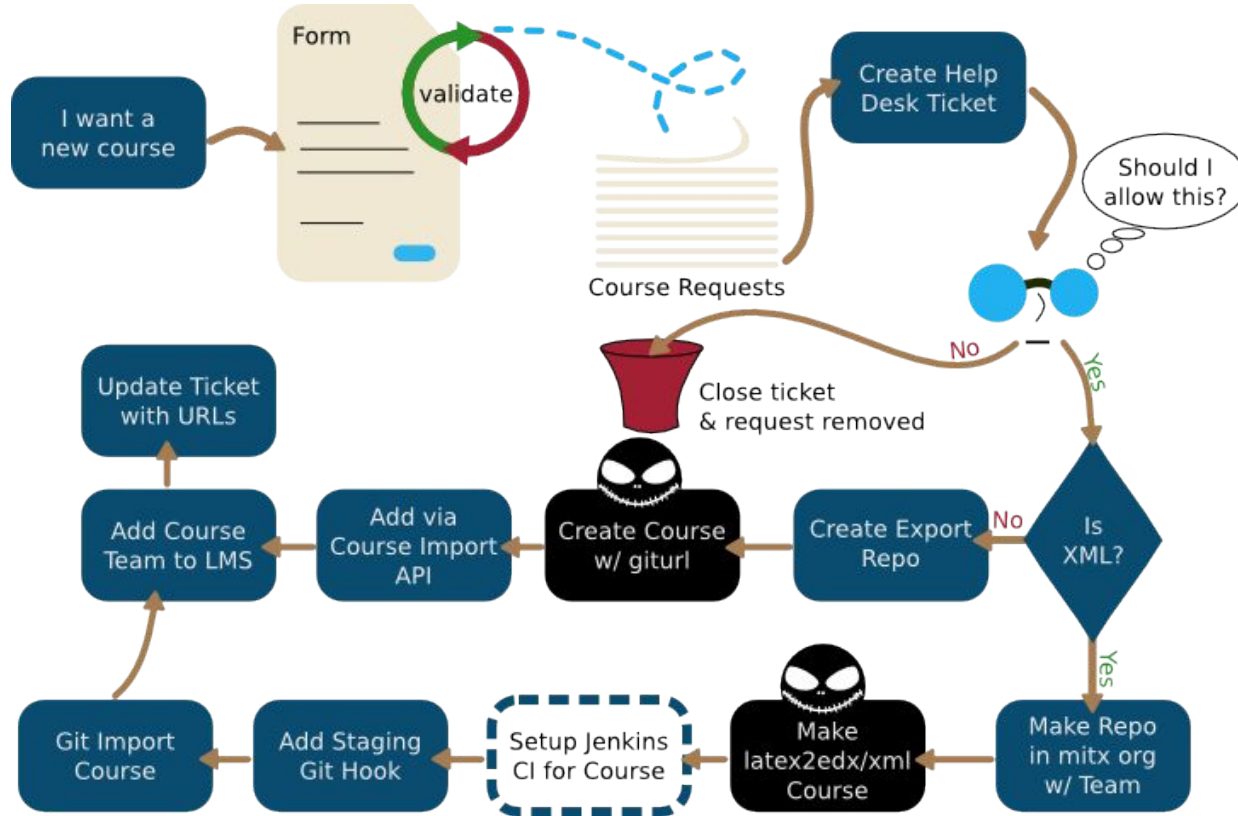
MIT
15.071

The Analytics Edge (Section C)

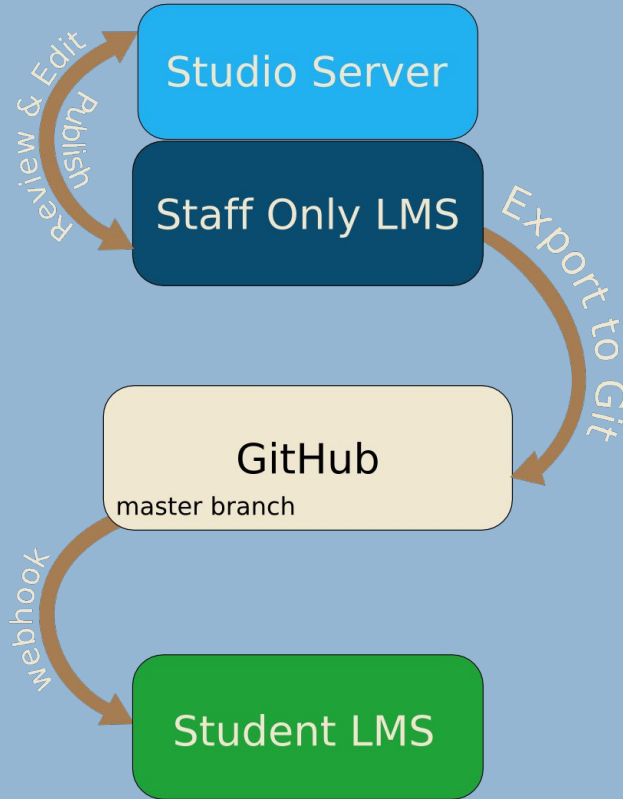
Starts: Feb 06, 2017



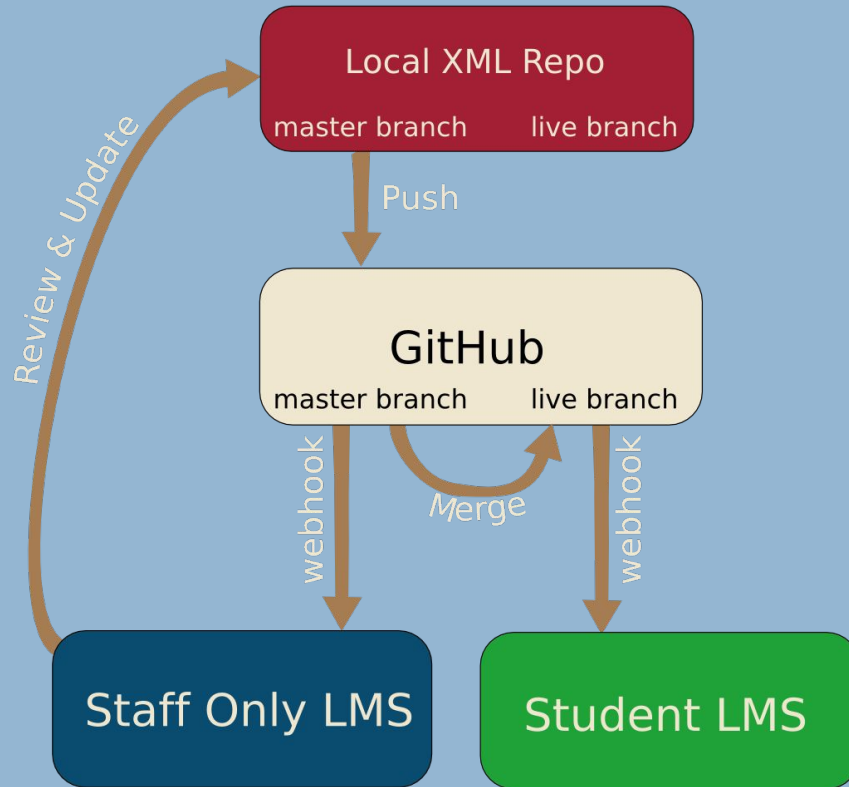
Course provisioning



Studio workflow



XML workflow



Supporting blended learning

- Course provisioning
- Studio and XML authoring workflows
- **QA upgrade**
- Content transfer

Supporting blended learning

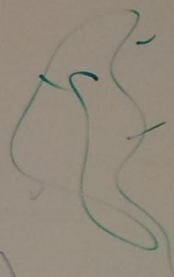
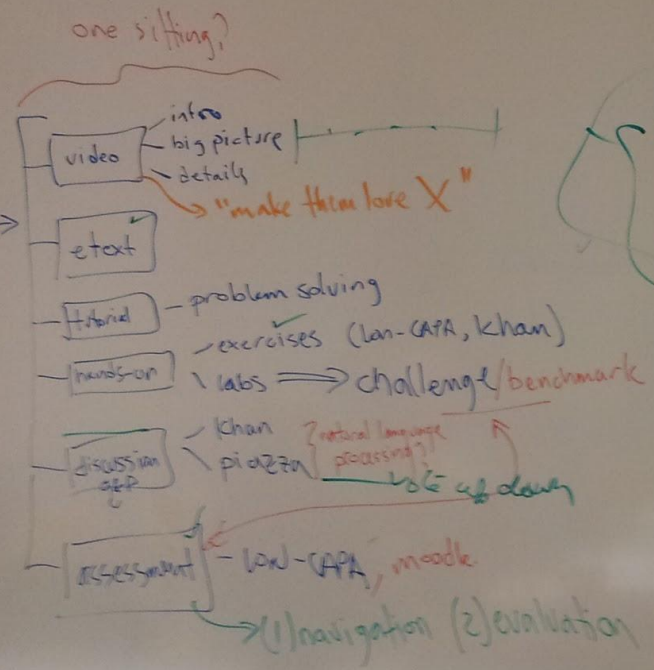
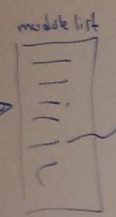
- Course provisioning
- Studio and XML authoring workflows
- QA upgrade
- **Content transfer**

More!



- latex2edx
- Authentication: Touchstone
- LMS interface: Stellar
- Analytics
- Individual due dates

UNITS



Differentiation?

- UI (Med in Lab)
 - Pedagogy
 - concept material
 - activities, hands-on
 - Content (insights/min)
 - community?
 - getting explanations
 - getting help
 - expanding on material
- instill passion for a topic
- "be able to do something"

latex2edx

build passing coverage 86% downloads 0/month pypi v1.5.1 license AGPv3

This is version 1.5 of the open-source latex2edx compiler for generating interactive MITx / edX courses from LaTeX



Running edX Locally



Benjamin Weeks

September 01, 2015 18:22

Prerequisites

You will need to install Vagrant and VirtualBox to run

- [Vagrant](#)
- [VirtualBox](#)

You will also want a machine with at least 10GB of disk space available.

Installation

On your computer, open a command prompt and run

```
mkdir mitxstack
cd mitxstack
curl -O http://public.mitx.mit.edu/vagrant
mkdir courses
vagrant plugin install vagrant-hostsupervisor
vagrant up
```

This organization Search Pull requests Issues Gist

mitx News Feed Pull Requests Issues View mitx

5 minutes ago
iains pushed to **master** at **mitx/content-mit-8851**
5a8aafb add branch to mine
23a627b edit index
[View comparison for these 2 commits »](#)

5 hours ago
iains pushed to **master** at **mitx/content-mit-8851**
937e3d5 edit verify and peer review files to add youtube links

a day ago
srayyan pushed to **saif** at **mitx/content-mit-8851**
1c73f8c adding problems to sequentials

a day ago
srayyan pushed to **master** at **mitx/content-mit-8851**
fcc1298 Merge pull request #464 from mitx/saif
286c11c adding templates for the rest of content groups
[View comparison for these 2 commits »](#)

Repositories 44 New repository

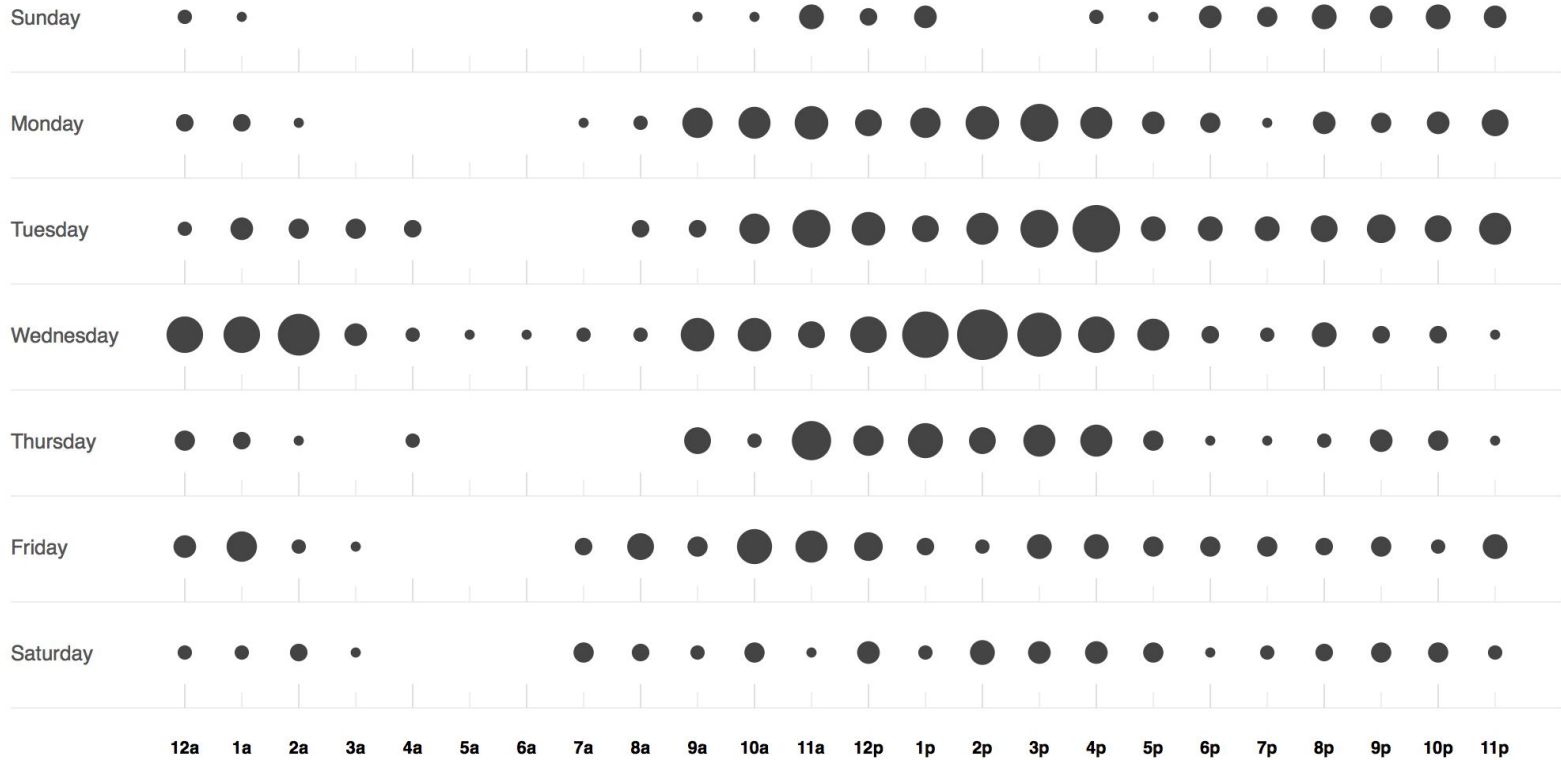
Find a repository...

All Forks Sources Private Public

- mitx/content-mit-8851
- mitx/content-mit-802r_3-2017_Spring
- mitx/content-mit-1803r_5-2017_Spring
- mitx/content-mit-801-2016_Fall
- mitx/content-mit-8S05r_2-2017_Spring
- mitx/content-mit-804r-2016_Spring
- mitx/content-mit-8-01r_3-2016_Fall
- mitx/content-mit-8-421-1x
- mitx/content-mit-805x
- mitx/content-mit-8-05r_1-2016_Fall

Show 34 more repositories

Contributors Commits Code frequency Punch card Network Members



Digital Learning Lab

- Combine : discipline knowledge, education research, fluency in educational technology, understanding of the MIT culture.

Results: Drive innovation in digital learning, with strong emphasis on blended learning at MIT.

MIT Professors: Why MOOCs?

1- Improve MIT students learning and experience.

2- Outreach to the world.

Results: MOOCs are aligned with residential courses and curriculum. All MOOC content is used on Campus.

Examples from Physics

Models of using the platform:

- 1- Primary: main method for learning for (mostly) online delivery. Examples: Quantum Mechanics and Graduate courses.
- 2- Blended: Activities integrated in class and out of class. Course on MITx is main 'portal' for all resources and Activities. Example: Intro Physics (8.01,8.02).
- 3- Supplementary: Homework and other learning resources.

- When Wolfgang Ketterle used online material in his residential course *8.421 Atomic and Optical Physics* the results were transformative for him as a teacher. His class was the most interactive he'd ever had. Hear Ketterle speak more about his experience:



https://www.youtube.com/watch?v=ckksmfc_fic

Immediate Feedback



Students spend time solving problems

Introductory Physics

Number of viewers	894
Total time on system per user (hours - viewers)	78.34
Time doing problems, per user (hours - viewers)	45.98
Time accessing video, per user (hours - viewers)	4.24
Time on forum, per user (hours - viewers)	0.00

Quantum Mechanics

Number of viewers	24
Total time on system per user (hours - viewers)	71.83
Time doing problems, per user (hours - viewers)	39.54
Time accessing video, per user (hours - viewers)	27.38
Time on forum, per user (hours - viewers)	0.00

Example: 8.01 TEAL+x



Weekly Activities in TEAL

Monday	Wednesday	Friday 9AM	Friday	Tuesday 9 PM
2 hours in TEAL: Introduction to concepts	2 hours in TEAL: Introduce problem solving pieces		1 hour in TEAL: Group Problem Solving	Written Homework is Due
		Prepset is due To prepare for group problem solving	Online checker for Group Problem Solving	Online Checker for Written homework

Type of blended activities in TEAL

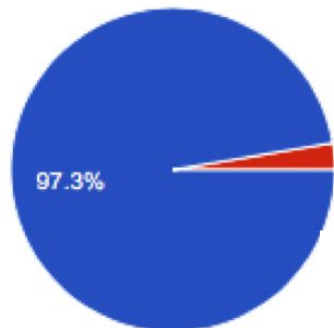
- Online Homework: Preclass – and Prepsets
- Online Checker for Written Homework
- Group Submission System for Labs (LTI)
- Online Checker for Group Problem Solving , exam preparation.
- Videos
- Instructor tools and Analytics



All resources in one place!

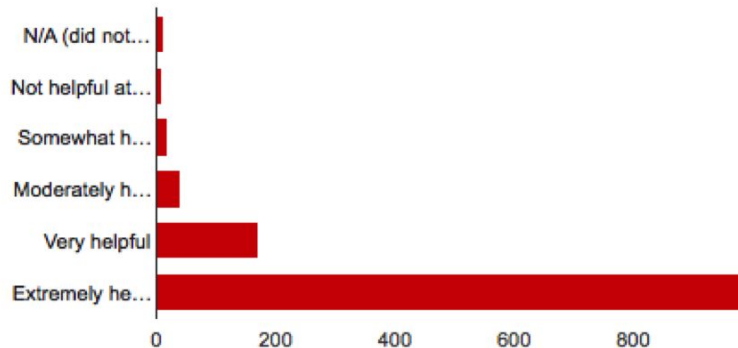
Student feedback

Should 8.02 continue to use MITx?

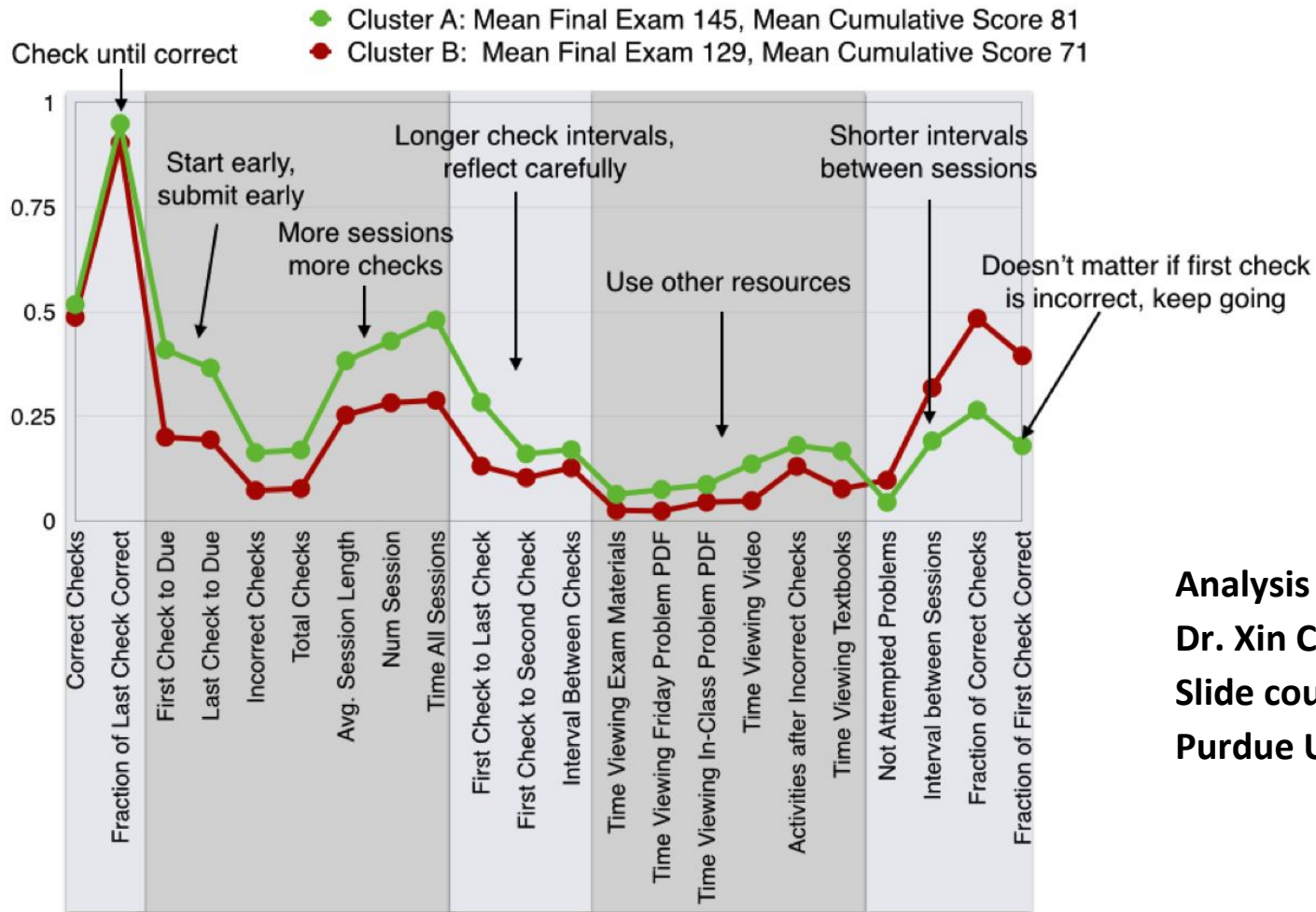


Yes	1206	97.3%
No	33	2.7%

Checkable answers on MITx for written pset problems [null]



N/A (did not use)	12	1%
Not helpful at all	9	0.7%
Somewhat helpful	20	1.6%
Moderately helpful	40	3.2%
Very helpful	171	13.7%
Extremely helpful	993	79.8%



Analysis by
Dr. Xin Chen
Slide courtesy of DeBoer Lab,
Purdue University

Wish List

- Formative assessment: e.g. how did students do on a pre-class assignment?
- Reusing content.
- Tool to enable Peer instruction: open source responseware?
- Tool to manage multiple sections without having to make multiple copies of content (cohorts with different start and due dates)
-

MicroMasters

- Online program that can lead to on-campus
- First MIT SCM cohort just finished
- Experiments
 - Student dashboard
 - Enhanced profiles
 - Personalized pricing
 - In-person proctored exams
 - Comprehensive exam

MicroMasters Dashboard

Required Courses

Courses in this program cost **\$150 USD each**. If you want to audit courses for FREE and upgrade later, click Enroll Now then choose the audit option.

Supply Chain Analytics (SC0x)

Paid

76%
edX grade

Passed

Supply Chain Fundamentals (SC1x)

Ended: Apr 5, 2017
Paid

65%
Exam Grade
89%
edX grade

Passed

02/2016 - 05/2016

83%

Passed

09/2014 - 12/2014

Supply Chain Design (SC2x)

Start date: Sep 30, 2015
Paid

90%
edX Progress

In
Progress

Supply Chain Design (SC2x)

Start date: Sep 30, 2015
Paid

90%
edX Progress

In
Progress

08/2016 - 10/2016

90%

Passed

Supply Chain Dynamics (SC3x)

Start date: Jul 25, 2017
Auditing

PAY NOW

Payment due:
Aug 23, 2017

08/2016 - 10/2016

77%

Passed

Supply Chain Technology and Systems (SC4x)

Ended: Apr 4, 2017
Paid

96%
edX grade

Passed

Comprehensive Final Exam (CFx)

Start date: May 19, 2017

ENROLL NOW

Progress



Courses complete

MM Learner Profiles

MITx MicroMasters



Pete
MIT

Education

Master's Or Professional Degree
Harvard Graduate School of Education 06/1996

Bachelor's Degree
Harvard College 06/1994

High School
F.D. Roosevelt 06/1990

Help

Employment

MIT, Associate Director of Engineering, Office of Digital Learning 01/2015 - Current

WGBH, Director of Technology for Interactive 08/1996 - 02/2012

Staff view:



P. Pinch
MIT more recently

About Me

Enabling high-quality education, at scale.

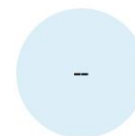
Progress - Supply Chain Management



Courses complete



Average
program grade



Course Price

Supply Chain Analytics (SC0x)

Paid

76%
edX grade

Help

Supply Chain Fundamentals (SC1x)

Ended: Apr 5, 2017

89%
edX grade

MM Learner Search

Filters:

- Course
- Enrollment
- Grade
- Profile data
- More...

Bulk email

The screenshot displays the MM Learner Search interface. On the left, a sidebar contains several filter sections:

- Course**: A histogram titled "Final Grade in Selected Course" with a slider from 0 to 100.
- Payment Status**: A list showing "Auditing" (39) and "Paid" (1269).
- Semester**: A section with a downward arrow.
- # of Courses Passed**: A histogram with a slider from 0 to 6.
- Average Grade in Program**: A histogram with a slider from 0 to 100.
- Country of Birth**: A list showing "United States" (205).

The main content area shows a search bar with "1308 Results" and a search input field. Below the search bar, there are filter tags: "Course: Supply Chain Design (SC2x) X" and "# of Courses Passed: 1 - 6 X", along with a "Clear all filters" link. A table of learner profiles is displayed with the following columns: NAME ▲, RESIDENCE, and PROGRAM GRADE. The table contains several rows of learner information, with some details blurred. A "Help" button is visible in the bottom right corner.

MM Enabling Technologies

- OAuth for authentication
- Enrollment API
- Grades API
- Certificates API

github.com/mitodl/micromasters

MicroMasters future

- More Programs
- Learner messaging learners (any day now)
- MicroMasters forums
- Electives
- Student records

Thank you!

