

Semantic Tagging in edX

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Overview

- XBlock Asides
- Example Use Cases
- OLI and MIT Use Cases
- Demo
- Next Steps for Asides

XBlock Asides

- An Aside is an XBlock “Decorator” that allows association of metadata with the XBlock
- Pluggable using the same extension mechanism as XBlocks themselves
- Multiple Asides can decorate a given XBlock

Use Case: Difficulty Tagging

Dependence on angle of attack ▼ Difficulty -- Low EDIT 👁️ 📄 🗑️ ⋮

DEPENDENCE ON ANGLE OF ATTACK (5 points possible)

We'll learn in the future that, for small values of α , the pressure difference is proportional to α for small α .

What then is the dependence of C_L on α ?

?

What about the dependence of C_D on α ?

?

You have used 0 of 2 submissions

Use Case: Upvoting/Downvoting

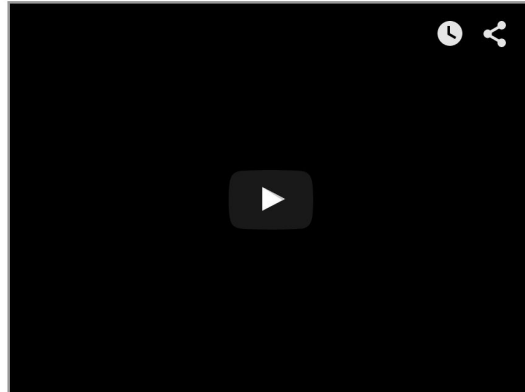


average and instantaneous acceleration

Average and Instantaneous acceleration.

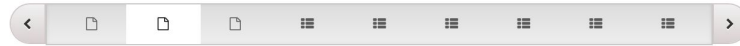
Note: Many notations are used in different books to represent the time average of a variable. Prof. Lewin uses a bar at the top of the variable, in this case the acceleration. Other common notations are a_{avg} and $\langle a \rangle$.

Definition of the average acceleration



[Click here to download this video.](#)

Use Case: Social Media



Simulation: Projectile Motion

Exploring Projectile Motion with PhET Interactive Simulations

The screenshot shows the PhET Projectile Motion simulation interface. At the top left is the PhET logo and text: "Simulation courtesy PhET Interactive Simulations at the University of Colorado http://phet.colorado.edu". Below this is an "About..." button and three input fields for "range(m)", "height(m)", and "time(s)", each with a "0" value. The main simulation area features a cannon on a green field, a person standing nearby, and a target on the ground. A yellow arrow indicates the projectile's path, with a distance of "10.56 m" shown below it. On the right side, a control panel includes a "user choice" dropdown menu (set to "tankshell"), input fields for "angle(degrees)" (80), "initial speed(m/s)" (18), "mass(kg)" (2), and "diameter(m)" (0.1). There are checkboxes for "Air Resistance" and "Sound", and "Fire" and "Erase" buttons.

Asides Becomes an Enabler for Tagging...

- Difficulty level of a problem (easy/medium/hard)
- Learning objective for a component
- Metadata needed for more advanced analytics
- Large reusable problem banks
- Adaptive learning experiences
- Authorship and copyright/licensing information
- Improved content management
- New, more granular pedagogical research

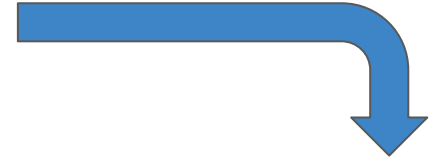
Use Case: Open Learning Initiative (OLI) at Stanford

- Goal: “Outcome-based” analytics
- Model student’s knowledge state to predict level of mastery by learning objective/outcome
- Inputs to model:
 - Student performance on problems (using log data)
 - Association map of problems to learning objectives/outcomes (using Asides!)

Use Case: Open Learning Initiative (OLI) at Stanford



Predictive Statistical Algorithm



Dashboard displays that predict mastery by learning objective

Student Performance Data

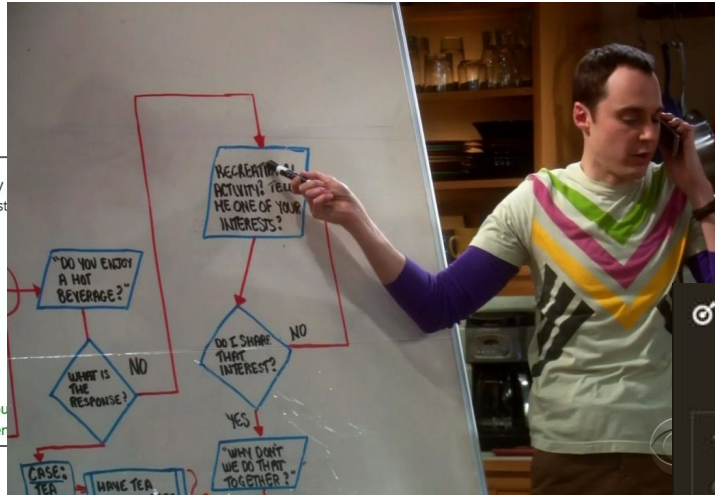
A family plans to have 3 children. For each birth, assume that the probability of a boy the same as the probability of a girl. What is the probability that they will have at least one boy and at least one girl?

- 0.5
- 0.125
- 0.75 ✓
- 0.875

Correct:

The outcomes are equally likely, so the easiest way to work this problem is to write out the 8 outcomes in this sample space. In two outcomes the gender of all three children the same

```
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  <resource id="arithmetic_p3_q1">
    <skills>
      <skill idref="arithmetic_operations_commutative"/>
      <skill idref="arithmetic_operations_decimal"/>
      <skill idref="arithmetic_operations_divide"/>
    </skills>
  </resource>
  <resource id="arithmetic_p3_q2">
    <skills>
      <skill idref="arithmetic_operations_commutative"/>
      <skill idref="arithmetic_operations_whole"/>
      <skill idref="arithmetic_operations_add"/>
    </skills>
  </resource>
</resources>
```



Map of Learning Objectives to Resource IDs



MODULE 2 LEARNING OBJECTIVES

collapse

- Classify a data analysis situation (involving two variables) according to the "role-type classification," and state the appropriate display and/or numerical measures that should be used in order to summarize the data.
- Compare and contrast distributions (of quantitative data) from two or more groups, and produce a brief summary, interpreting your findings in context.
- Produce a two-way table, and interpret the information stored in it about the association between two categorical variables by comparing conditional percentages.

MIT Backstage Use Case -- Modularity & Pathways

▶ 1: Newton's Laws of Motion

- ☑ Released: May 29, 2014 at 14:00 UTC
- ✓ Due: Jun 22, 2014 at 23:59 UTC

▶ 2: Interactions and Forces

- ☑ Released: May 29, 2014 at 14:00 UTC
- ✓ Due: Jun 22, 2014 at 23:59 UTC

▶ Homework for Units 1 and 2: Newtons Laws...

- ☑ Released: May 29, 2014 at 14:00 UTC
- ✓ Due: Jun 22, 2014 at 23:59 UTC

▶ Aircraft Performance

- ☑ Released: Sep 24, 2013 at 14:00 UTC
- ✓ Not Graded Due: Oct 03, 2013 at 21:00 UTC

▶ Quiz 1 and 2

- ☑ Released: May 29, 2014 at 14:00 UTC
- ✓ Due: Jun 22, 2014 at 23:59 UTC

▶ Control Volume Analysis of Mass and Mome...

- ☑ Released: Sep 24, 2013 at 14:00 UTC

▶ 3: Applying Newton's La

- ☑ Released: May 29, 2014 at 14:00 UTC
- ✓ Due: Jun 29, 2014 at 00:01 UTC

▶ Conservation of Energy and Quasi-1D Flow

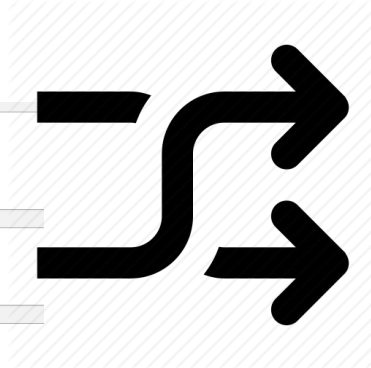
- ☑ Released: Sep 24, 2013 at 14:00 UTC

▶ Entrance Survey

- ☑ Released: Oct 02, 2013 at 14:00 UTC
- ✓ Not Graded Due: Oct 17, 2013 at 21:00 UTC

▶ Differential Forms of Compressible Flow Eq...

- ☑ Released: Oct 02, 2013 at 14:00 UTC
- ✓ Not Graded Due: Oct 17, 2013 at 21:00 UTC



▶ 1: Newton's Laws of Motion

- ☑ Released: May 29, 2014 at 14:00 UTC
- ✓ Due: Jun 22, 2014 at 23:59 UTC

▶ 2: Interactions and Forces

- ☑ Released: May 29, 2014 at 14:00 UTC
- ✓ Due: Jun 22, 2014 at 23:59 UTC

▶ 3: Applying Newton's Laws

- ☑ Released: May 29, 2014 at 14:00 UTC
- ✓ Due: Jun 29, 2014 at 00:01 UTC

▶ Aircraft Performance

- ☑ Released: Sep 24, 2013 at 14:00 UTC
- ✓ Not Graded Due: Oct 03, 2013 at 21:00 UTC

MIT Backstage Use Case -- Crosslinks

Crosslinks
By MIT students, for MIT students

Main Page

All Topics

All Edits

Add a Topic

About Crosslinks

Team

FAQs

Search topics

Account

Logged in as cjshaw

Read Edit View History

Chain rule

The chain rule is a formula for computing the derivative of the composition of two or more functions:

$$\frac{dz}{dx} = \frac{dz}{dy} \cdot \frac{dy}{dx}$$

--- 18.01 lecture notes

Wikipedia: Chain rule Wolfram MathWorld: Chain rule

Chain rule Derivative

Prepare Derivative

Topics that are prerequisites

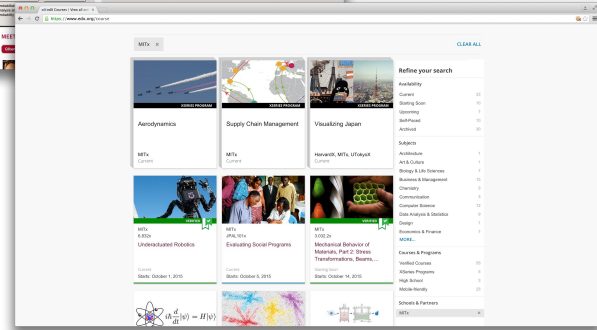
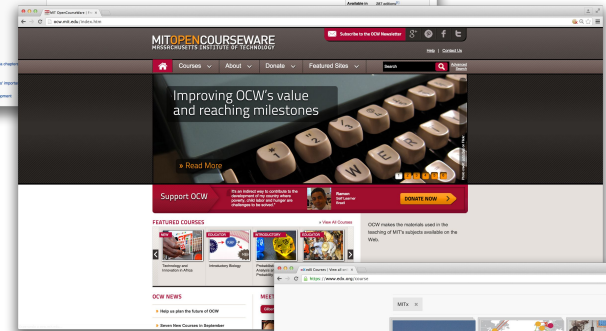
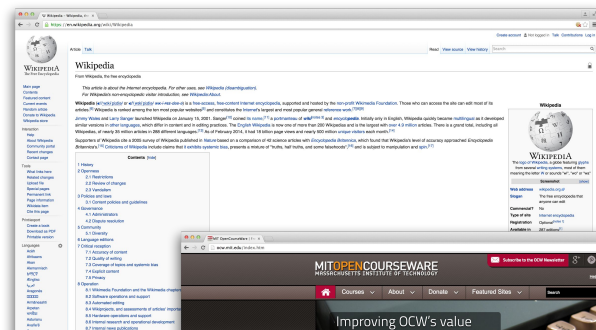
Learn

Resources for studying

- MIT 18.01 Fall 2006 Lecture Notes: Chain Rule Definition, Derivation, Notations, and Examples
- MIT 18.01 Single Variable Calculus: Video Lecture
- Arkansas Tech University Calculus I: Chain Rule in finding derivatives of logarithmic and inverse trigonometric functions
- UC Davis Practice Problems on the Chain Rule
- Khan Academy Chain Rule: The basics (definition, examples, visual representations) until Chain Rule with Triple Composition

Assess Test yourself on simple exercises

Correction: The Assess item below had a typo. We have updated the solution to be consistent: the

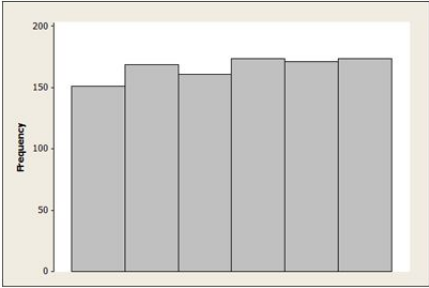


How can we integrate this into Studio workflow?

Did I Get This

DID I GET THIS (1 point possible)

Choose the best description of the data used to generate this histogram (note that the horizontal axis has no scale, so you will make your choice based solely upon the histogram's shape):



| Bar Index | Frequency |
|-----------|-----------|
| 1 | 150 |
| 2 | 170 |
| 3 | 160 |
| 4 | 175 |
| 5 | 170 |
| 6 | 175 |

SAT Math scores of 1,000 future engineers and scientists.

Results of rolling a six-sided die 1,000 times.

Cholesterol levels of 1,000 adults.

Shoe sizes of 1,000 men and women.

Prices of 1,000 California homes.

Submit Hint

Publish

Discard Changes

Previously published

Unit Location

LOCATION ID

histogram3selfassess_02

Use this ID when you create links to this unit from other course content. You enter the ID in the URL field.

LOCATION IN COURSE OUTLINE

EDA: Examining Distributions

One Quantitative Variable: Graphs

One Quantitative Variable

Graphs

Histogram (1 of 3)

Histogram

Histogram (2 of 3)

Histogram (3 of 3)

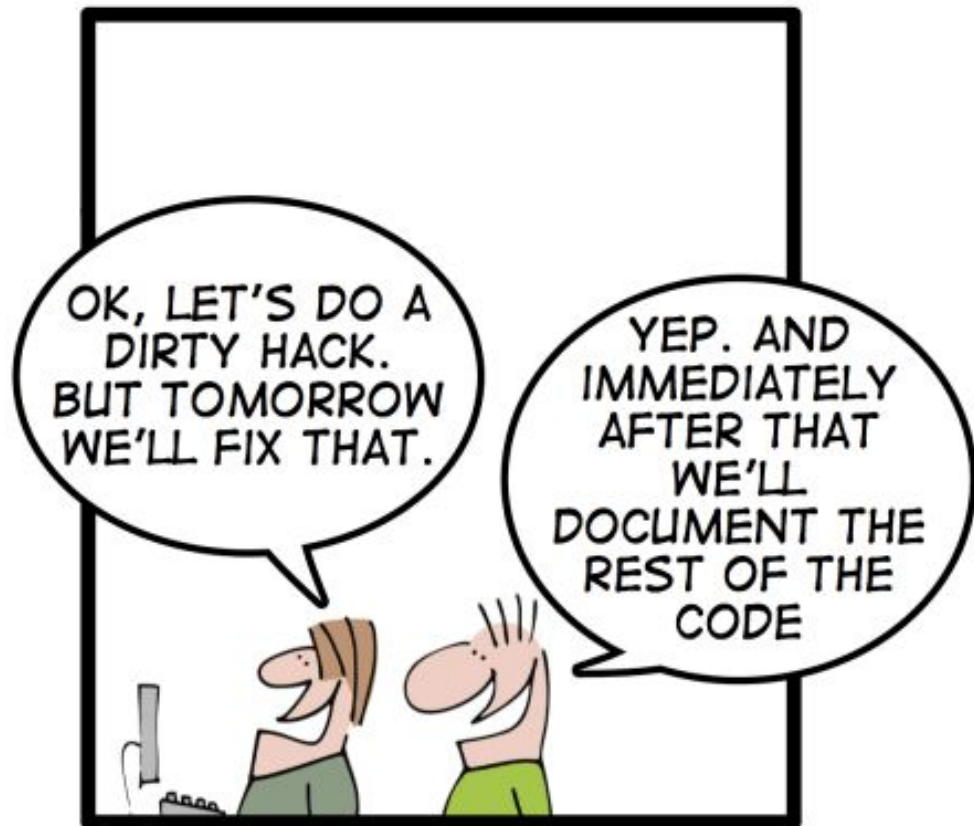
Learn By Doing

Extra Problems

Demo

Let's see a Tagging Aside
in action -- in Studio

Warning: currently a bit of
a hack!



Demo

MeX 101
aside-test

Content ▾ Settings ▾ Tools ▾

Help staff ▾

Chapter 1 / Subsection

Unit ✎

View Live Version Preview Changes

Multiple Choice SKILLS EDIT

MULTIPLE CHOICE (1 point possible)

Multiple choice problems allow learners to select only one option. Learners can see all the options along with the problem text.

When you add the problem, be sure to select **Settings** to specify a **Display Name** and other values that apply.

You can use the following example problem as a model.

Which of the following countries has the largest population?

- Brazil
- Germany
- Indonesia
- Russia

Check Show Answer

Add New Component

Draft (Never published)

Draft saved on May 07, 2015 at 14:46 UTC by staff

RELEASE:
Unscheduled

WILL BE VISIBLE TO:
Staff and Students
 Hide from students

Publish

Discard Changes

Never published

Unit Location

LOCATION ID
76342746b424401b94f9ff313024a5e3
Use this ID when you create links to this unit from other course content. You enter the ID in the URL field.

LOCATION IN COURSE OUTLINE

Chapter 1 / Subsection

Unit

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Preview Changes

Multiple Choice

SKILLS

EDIT



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Select learning outcome

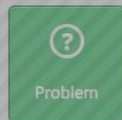
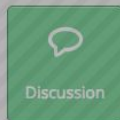
- apply_standard_deviation_rule (Apply the standard deviation r...
- classify_role_type (Classify a data analysis situation (involving ...
- compare_quantitative_distributions (Compare and contrast di...
- explain_simpsons_paradox (Recognize and explain the pheno...
- graph_quantitative_variables (Graphically display the relations...
- interpret_correlation_coefficient (Interpret the value of the co...

Skills applied to this resource

→

←

Search skills Add new objective Edit objectives and skills Add new skill Search skills



LOCATION IN COURSE OUTLINE

Chapter 1

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Chapter 1 / Subsection

Unit 

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Preview Changes

Multiple Choice

SKILLS

 EDIT









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classify_role_type (Classify a data analysis situation (invo... ▾)

catvsquant (Categorical vs quantitative)
expvsresp (Explanatory vs response variable)
selectdisplay (Select appropriate display)
selectnummeas (Select appropriate numerical ...



Skills applied to this resource

idcase (Identifying case C->C, C->Q, Q->Q)

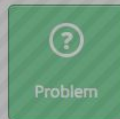
 Search skills

Add new objective

Edit objectives and skills

Add new skill

 Search skills



LOCATION IN COURSE OUTLINE

Chapter 1

Subsection

Chapter 1 / Subsection

Unit

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[Preview Changes](#)

Multiple Choice

SKILLS     

Draft (Never published)

Draft saved on May 07, 2015 at 14:46 UTC by staff

→

←

Skills applied to this resource

- idcase (Identifying case C->C, C->Q, Q->Q)
- idsimpsons (Recognizing Simpson's Paradox)

[Add new objective](#) [Edit objectives and skills](#) [Add new skill](#)

[Discussion](#) [HTML](#) [Problem](#) [Video](#)

LOCATION IN COURSE OUTLINE

[Chapter 1](#)

[Subsection](#)

Chapter 1 / Subsection

Unit

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Preview Changes

Multiple Choice

SKILLS

EDIT



Draft (Never published)

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summarize_categorical_distribution (Summarize and desc... ▾

interpcatchchart (Interpreting categorical displav)

Skills applied to this resource

idcase (Identifying case C->C, C->Q, Q->Q)
Paradox)

Add a new objective

My new objective

For my AP students

Cancel

Save

Search skills

Add new objective

Edit objectives and skills

Add new skill

Search skills



THE URL field:

LOCATION IN COURSE OUTLINE

Chapter 1

Subsection

Chapter 1 / Subsection

Unit

View Live Version

Preview Changes

Multiple Choice

SKILLS EDIT

Draft (Never published)

Created on May 07, 2015 at 14:46 UTC by

Add a new skill to objective My new objective (For my AP students)

Understanding Newton's Laws

Can state Newton's Laws

Or Choose From Existing Skills

- assocvscaus (Recognize association vs causation)
- catvsquant (Categorical vs quantitative)
- compare2 (Comparing 2 boxplots)
- computecondprob (Compute conditional probability)
- computemean (Compute mean)
- computemedian (Compute median)
- computeoutlier (Identify outlier)
- define_mode (Definition of mode)
- estimator (Estimating r)
- expvsresp (Explanatory vs response variable)
- goalofdm (Identify exploratory analysis goal)

Search skills

Search skills

Search skills

Cancel

Save

Discussion

HTML

Problem

Video

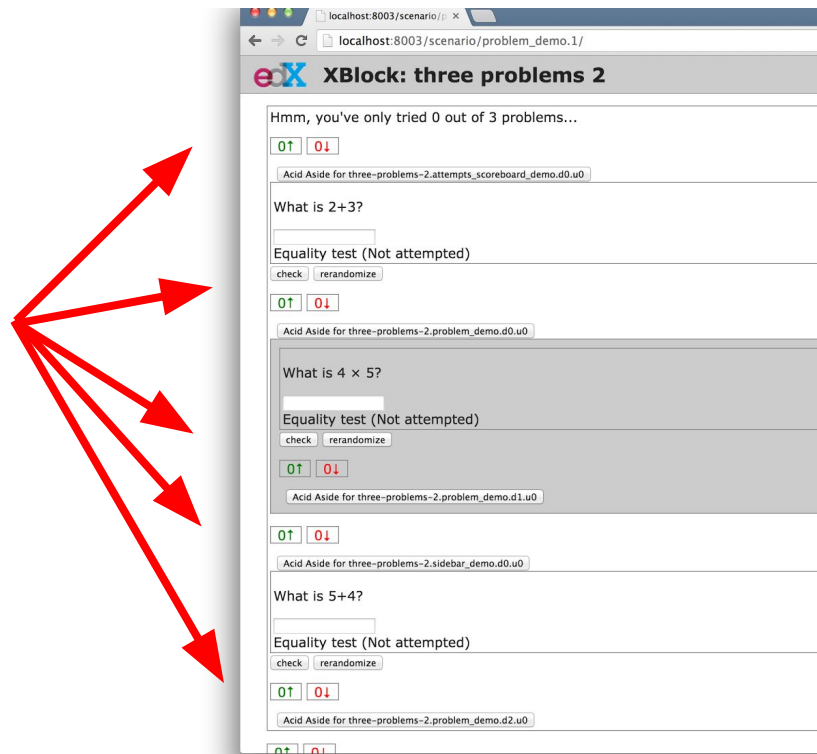
LOCATION IN COURSE OUTLINE

Chapter 1

Subsection

Next Steps, or How to Use XBlock Asides

- Initial work integrated into core platform in Dec 2014
 - underlying architecture available, but do not yet render in Studio or LMS
- Currently available in XBlock Workbench
 - which means YOU can also play around with Asides!
- EdX working on timeline to finish the feature



Still Needed

- Granular Asides configurability (turn on / off per course, configuration of storage mechanism, etc.)
- Improved Studio / LMS integration and rendering
- Platform tweaks to enable Asides

Questions?

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