

# Technical review of Insights, the learning analytics of Open edX platform, and the K-MOOC case

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# K-MOOC – The National MOOC Service

From Open edX CON 2017



Open edX 2017: State of Open edX

National platforms, so Aganant touched on this also, and we see this as a real critical way of driving impact of the platform is working closely with national governments who are offering education to their citizens. We think that this is just a amazing way to offer MOOC scale, massive open online education is just working through these governments. And we're really interested in working in concrete ways with governments who are doing this work or are considering it.

Top MOOC sites

**9 of 39 on Class Central are built on Open edX!**



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That's incredible, right?

# Results First!

The Insights Dashboard of K-MOOC

K-MOOC INSIGHTS

LOGIN



Insights to help course teams improve courses.

## Who are my students?

Target your course to fit the backgrounds of your students.

↓ Enrollment

## What are students engaging with in my course?

Improve frequently accessed content, or point students at underused resources.

📖 Engagement

## How well is my content supporting student learning?

Adjust your course based on where students are struggling.

☑ Performance

### Join the Open Source Community

The edX analytics data pipeline and edX Insights are

### Research at edX

We are committed to advancing teaching and learning.

### Need Help?

지원센터에서 해결방법을 찾을 수 있도록 도와줍니다.

# My Lectures

Only the professor and staff can access their analytics of their own lectures.

## Welcome, sheviousk!

Here are the courses you currently have access to in Insights:

 01/2016_B1
 01/2017_1
 02/2016_B1
 02/2017_1
 0164K/2015-01
NILE/KMOOC1/2016

### New to Insights?

Click Help in the upper-right corner to get more information about Insights. Send us feedback at [help\\_kmooc@nile.or.kr](mailto:help_kmooc@nile.or.kr).

We want this dashboard to work for you! Need help? [Contact course team support](#). Comments or suggestions? Email [help\\_kmooc@nile.or.kr](mailto:help_kmooc@nile.or.kr).

# Who? What? How?

## Main Page Layout

The screenshot displays a course dashboard with a dark navigation bar at the top containing the following tabs: [Course Home](#), [Enrollment](#), [Engagement](#), [Performance](#), and [Learners](#).

The main content area is divided into three columns:

- Who are my students?**
  - [Enrollment](#)
    - How many students are in my course?
      - Activity
    - How old are my students?
      - Demographics > Age
    - What level of education do my students have?
      - Demographics > Education
    - What is the student gender breakdown?
      - Demographics > Gender
    - Where are my students?
      - Geography
- What are students doing in my course?**
  - [Engagement](#)
    - How many students are interacting with my course?
      - Content
    - How did students interact with course videos?
      - Videos
  - What are individual learners doing?**
    - [Learners](#)
      - Who is engaged? Who isn't?
        - All Learners
- How are students doing on course assignments?**
  - [Performance](#)
    - How are students doing on graded course assignments?
      - Graded Content
    - How are students doing on ungraded exercises?
      - Ungraded Problems

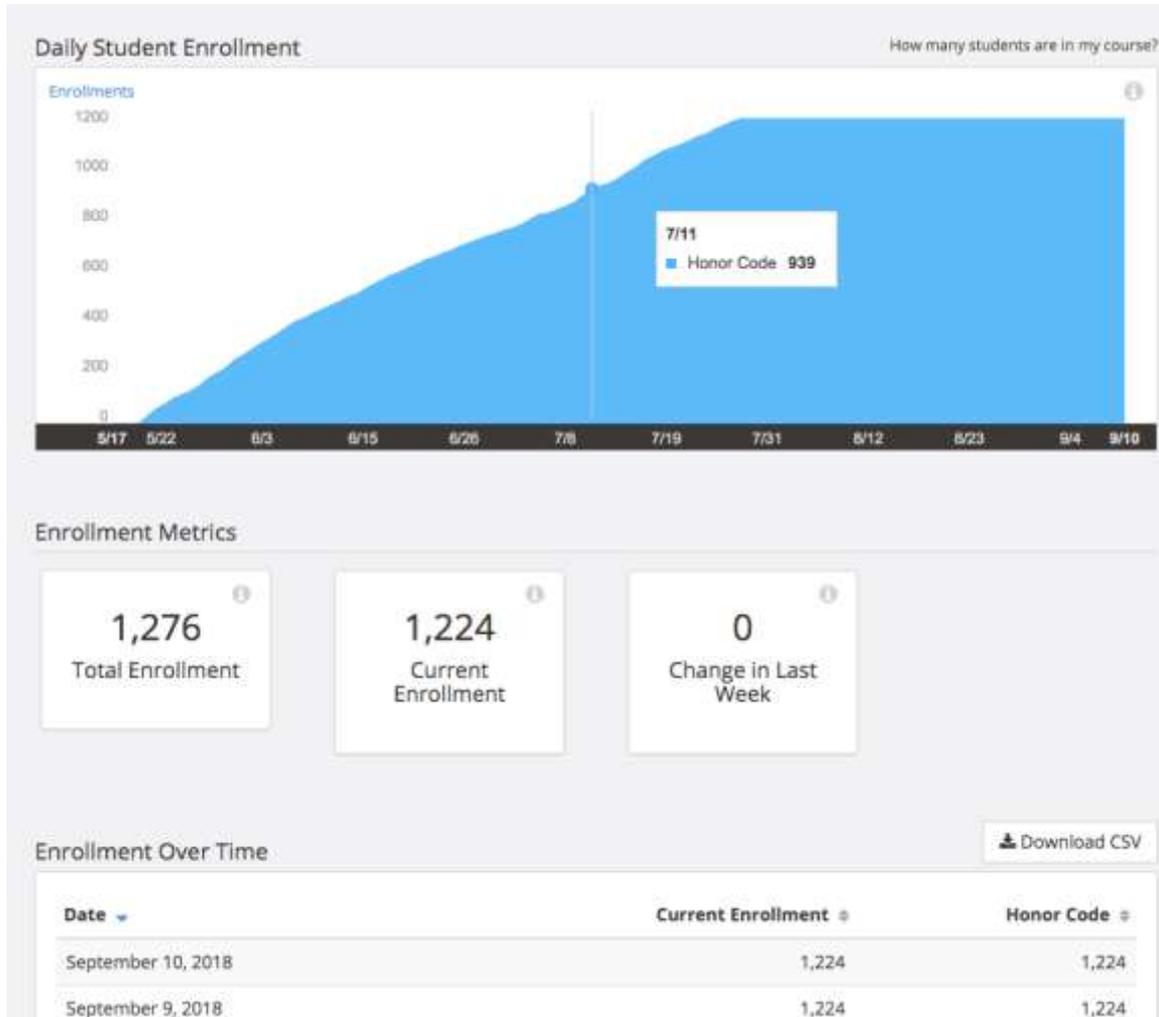
At the bottom of the dashboard, there are two sections:

- Basic Course Information**

Course Name	TART
Start Date	March 02, 2017
End Date	June 14, 2017
Status	Ended
- External Tools**
  - [Instructor Dashboard](#)
  - [Courseware](#)
  - [Studio](#)

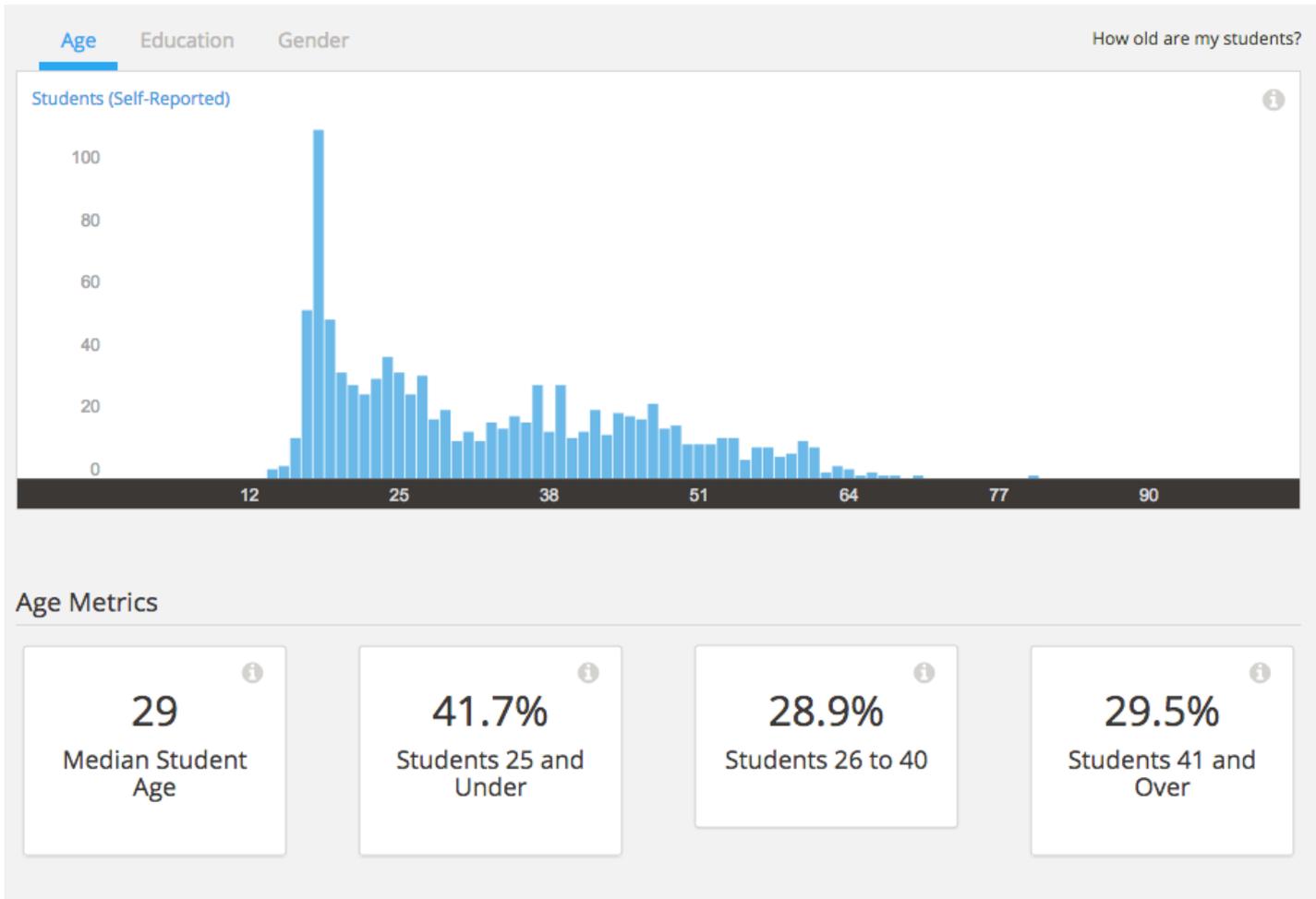
# How many students are in my course?

Increase of registration of learners for the course over time



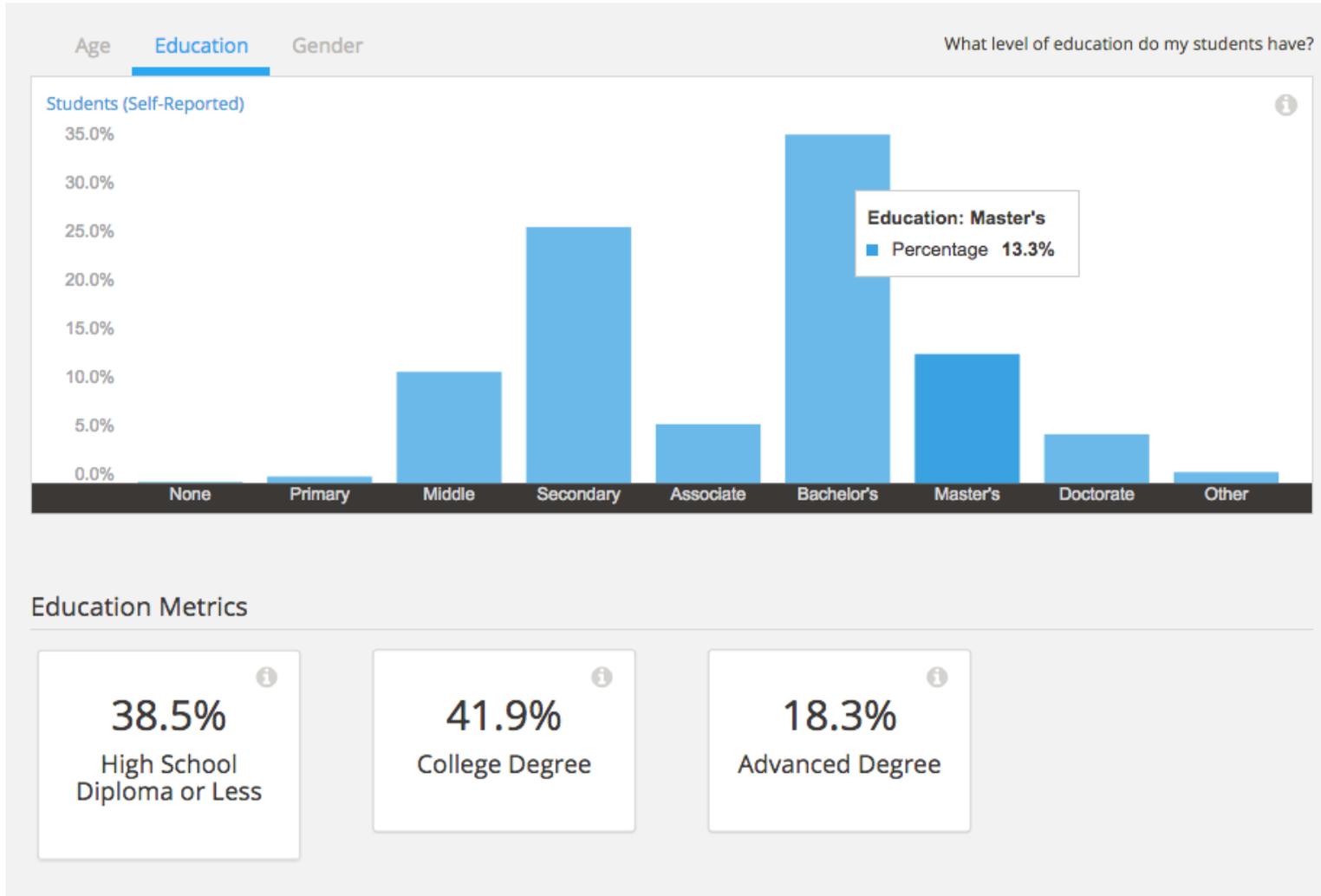
# How old are my students?

Life-long higher education is in action.



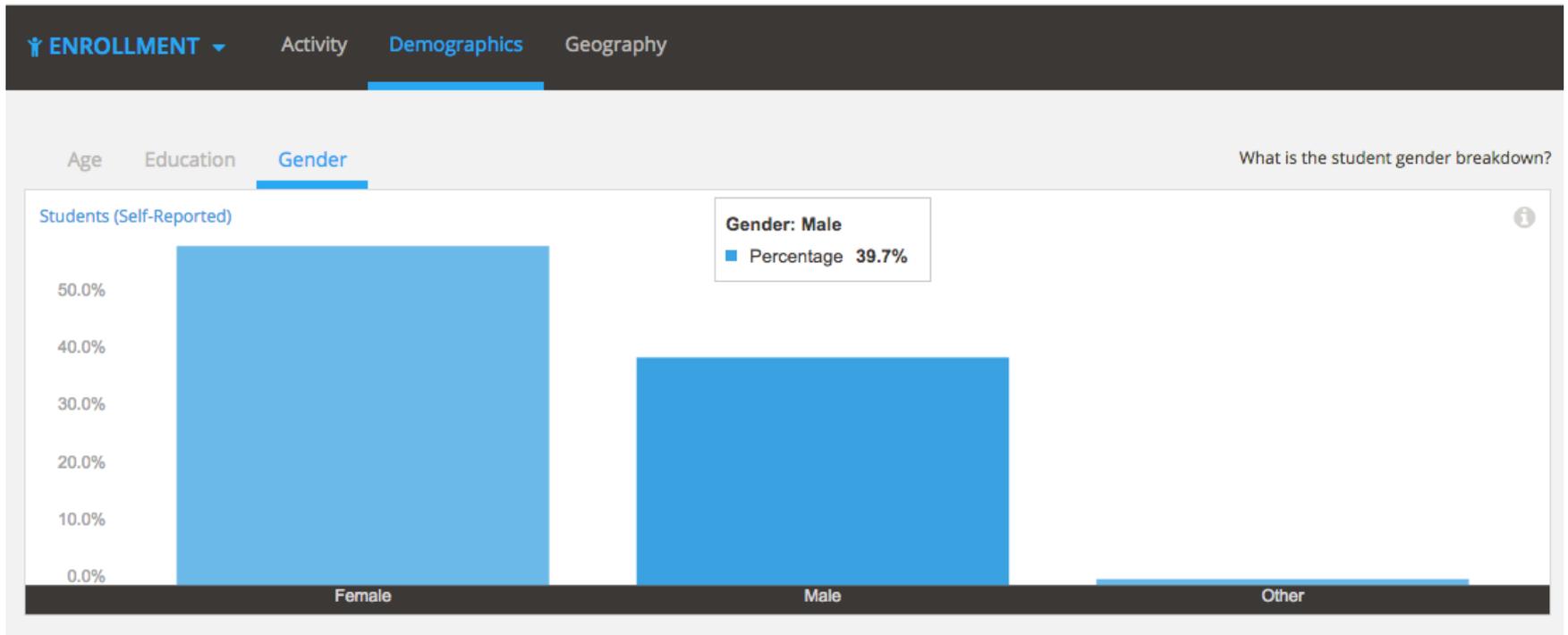
# What level of education do my students have?

Collage students may want their major and graduates may want another concerns.



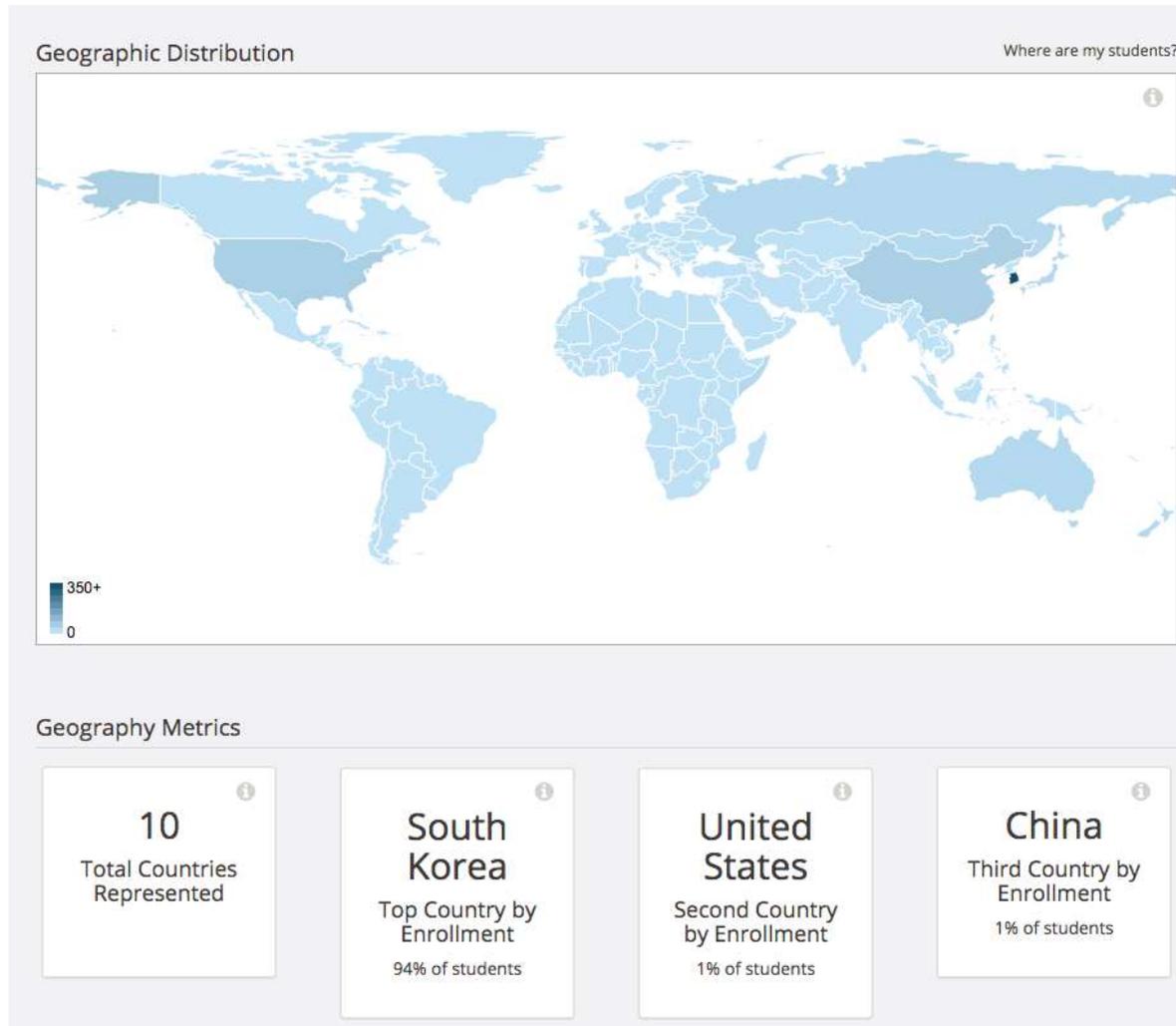
# What is the student gender breakdown?

This course has 60% of female.



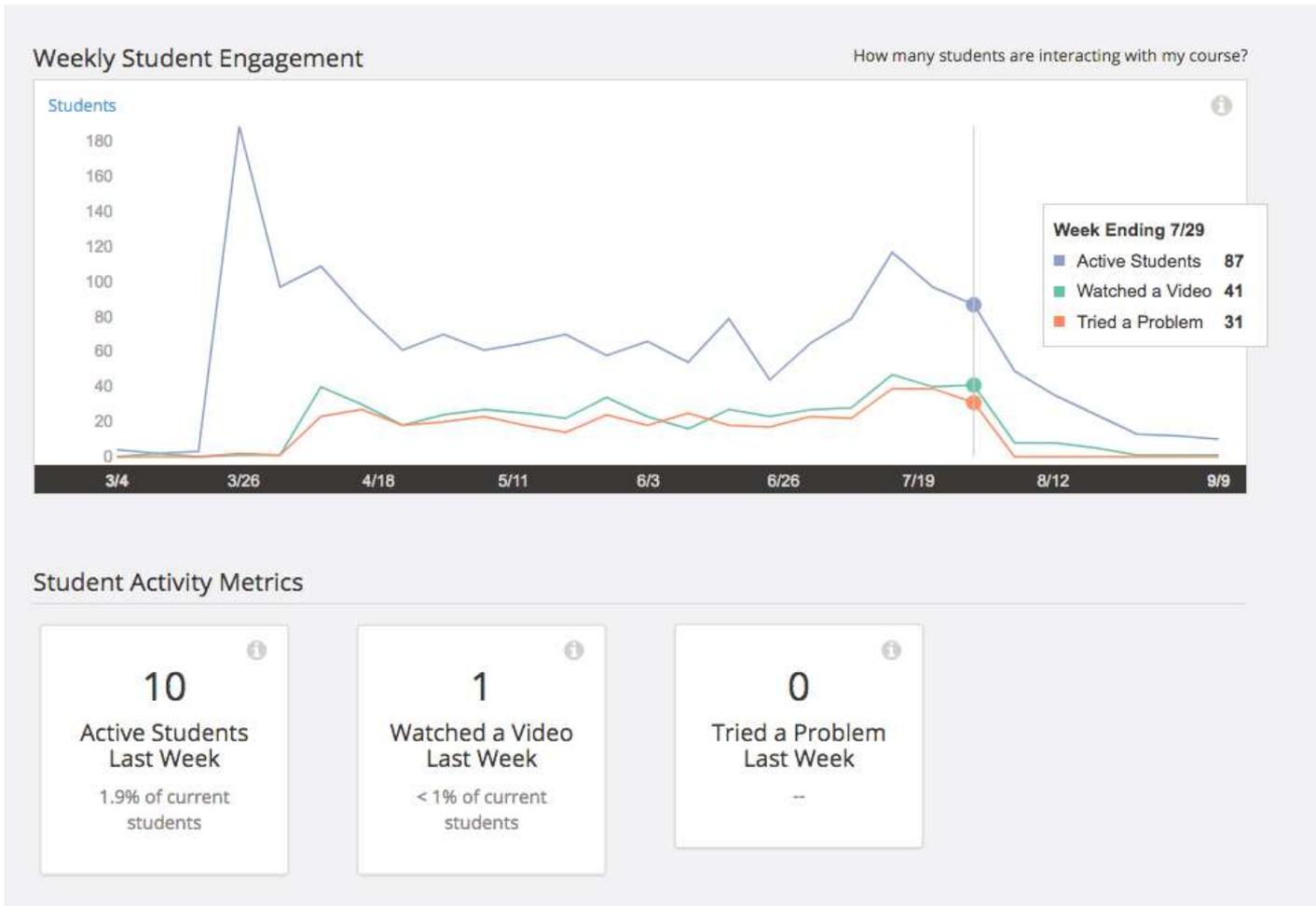
# Where are my students?

English captions are really necessary?



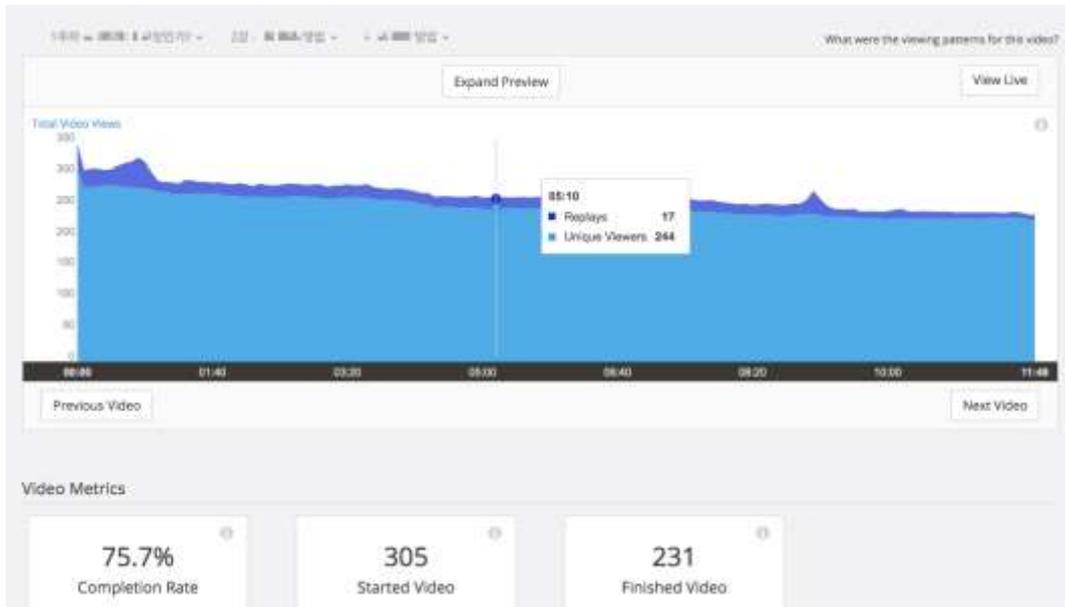
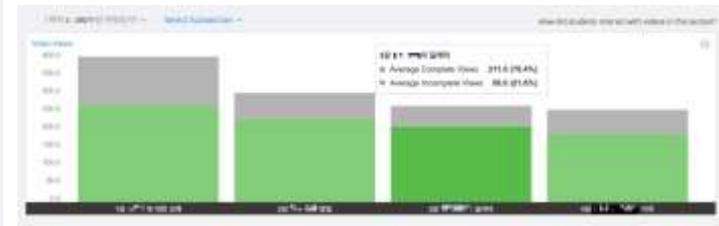
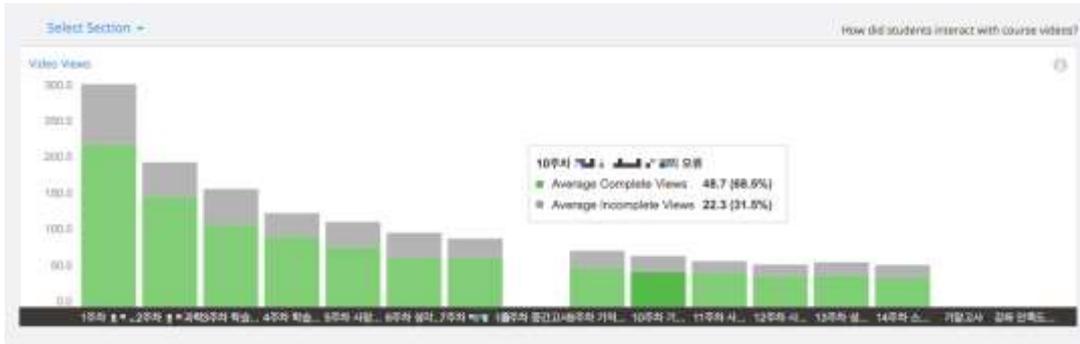
# How many students are interacting with my course?

The timing for sending e-mail to learners. How to maintain learners engagements?



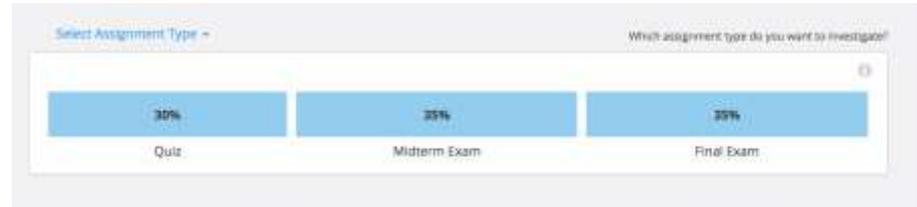
# How did students interact with videos?

The length of video can be tuned and the making methodology can be improved from the patterns.

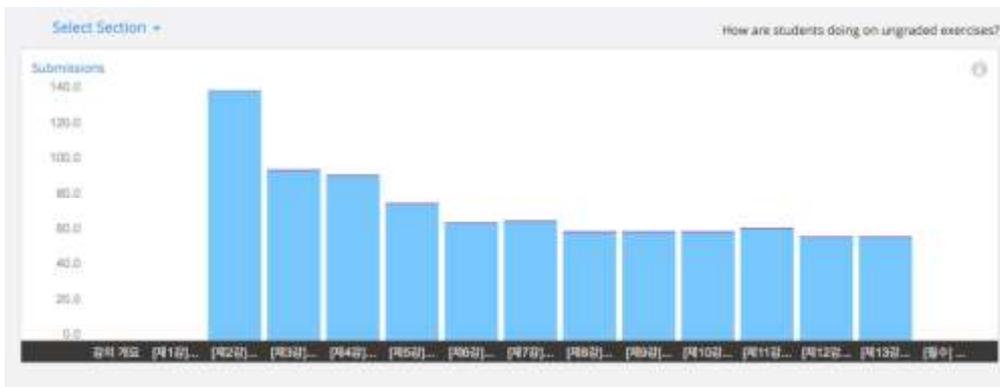


# How are students doing on the quiz?

You can adjust the difficulties for the quiz for the next term.



Graded problems



graded problems

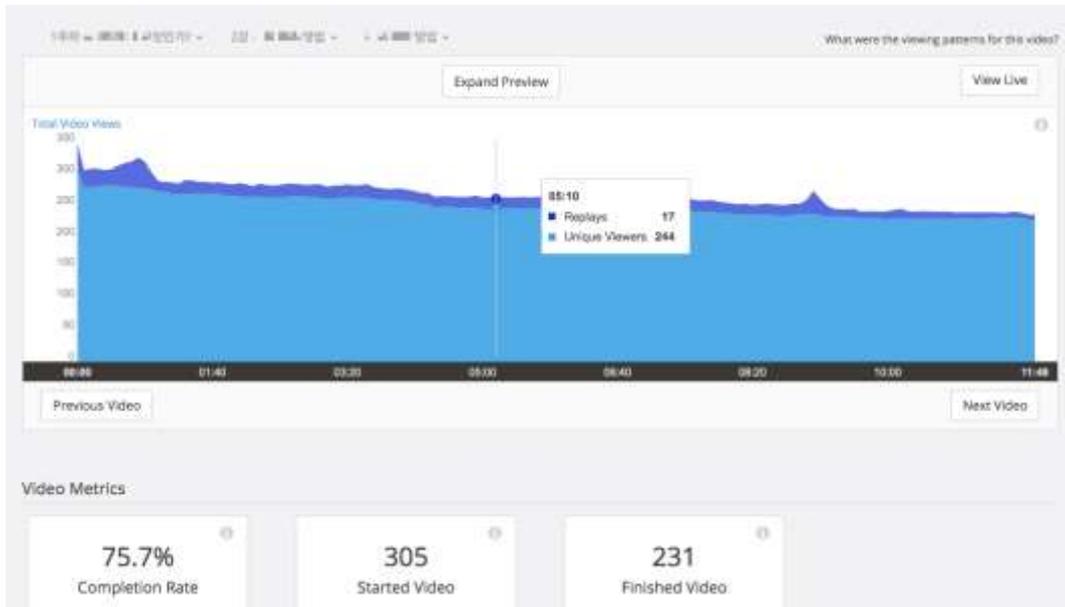
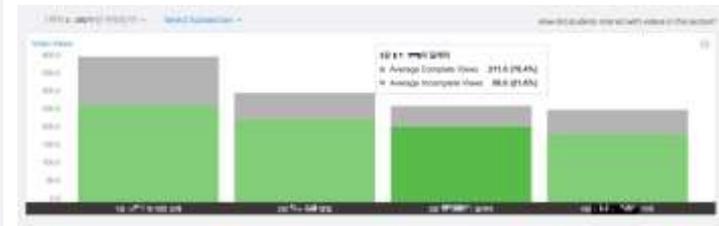
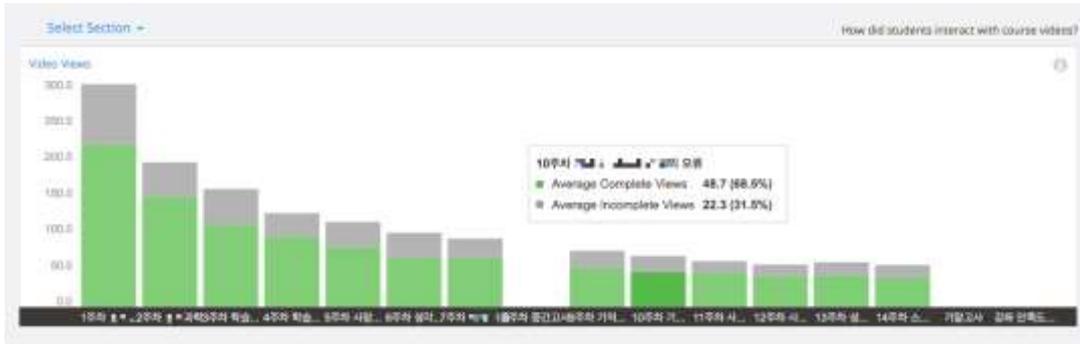
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# Easy access to the analytics

It is fast and isolated from the LMS.

## 1. Browse the complex course tree easily.

You can access each component and even browse to videos and problems.

## 2. Export to Excel

Every data can be downloaded as CSV format.

## 3. Isolated from LMS

No server burden because the Insights has separated DB and service.





Google 검색 또는 URL 입력 🔊

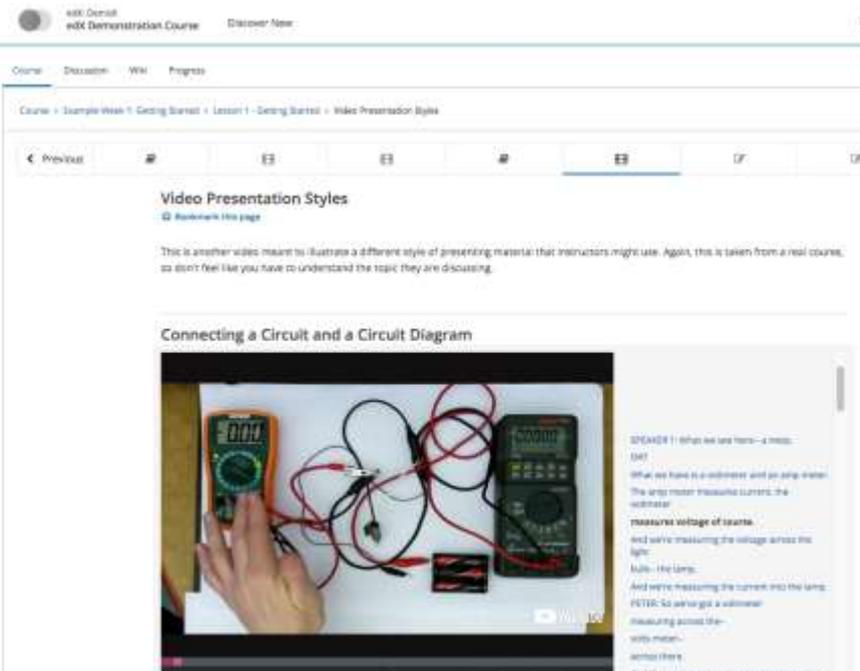
- |   |  |  |  |   |
|---|--|--|--|---|
| <br>코테크시스템(주)            | <br>StackEdit - In-b... | <br>강좌   K-MOOC... | <br>sey TOKEN | <br>NAVER    |
| <br>Mac Torrents   T... | <br>StackEdit          | <br>sey TOKEN     | <br>GitHub   | <br>바로가기 추가 |



# Every Learner's Activities are collected.

The tracking log of Open edX

```
...{"POST": {}, "GET": {"videoId": "\u02pltkrhgX+Demo_Course", "path": "/courses/course-v1:edX+DemoX+0", "time": "2018-09-12T06:53:13.066157+00:00", "page": n...{"username": "honor", "event_type": "/courses/course-v1:sh; Intel Mac OS X 10.13; rv:62.0) Gecko/20100101 Firefo...onstrations/19a30717eff543078a5d94ae9d6c18a5/?child=first...": [{"I": "\u02pltkrhgX+Demo_Course", "path": "/courses/course-v1:edX+DemoX+De...": {"username": "honor", "event_type": "/courses/course-v1:ndler/get_completion", "ip": "192.168.33.1", "agent": "68.33.18/courses/course-v1:edX+DemoX+Demo_Course/course...": {"POST": {"usage_key": "\u02pltkrhgX+Demo_Course/course...": {"user_id": 7, "org_id": "edX", "co...equential+block19a30717eff543078a5d94ae9d6c18a5/h...": {"username": "honor", "event_source": "browser", "name":...a/5.0 (Macintosh; Intel Mac OS X 10.13; rv:62.0) Gecko/a30717eff543078a5d94ae9d6c18a5/?child=first", "host": "e/courseware/interactive_demonstrations/19a30717eff5430...event", "ip": "192.168.33.1", "event": {"duration": {...": {"username": "honor", "event_source": "browser", "name":...a/5.0 (Macintosh; Intel Mac OS X 10.13; rv:62.0) Gecko/a30717eff543078a5d94ae9d6c18a5/?child=first", "host": "e/courseware/interactive_demonstrations/19a30717eff5430...event", "ip": "192.168.33.1", "event": {"duration": {...play_video"}...": {"username": "honor", "event_type": "/courses/course-v1/save_user_state", "ip": "192.168.33.1", "agent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10.13; rv:62.0) Gecko/20100101 Firefox/3.0", "event": {"POST": {"saved_video_position": {"course": "course-v1:edX+DemoX+Demo_Course/courseware", "path": "/courses/course-v1:edX+DemoX+Demo_Course/courseware", "time": "2018-09-12T06:53:48.93...": {"username": "honor", "event_source": "browser", "name":...a/5.0 (Macintosh; Intel Mac OS X 10.13; rv:62.0) Gecko/a30717eff543078a5d94ae9d6c18a5/?child=first", "host": "e/courseware/interactive_demonstrations/19a30717eff5430.../event", "ip": "192.168.33.1", "event": {"duration": {...use_video"}...}
```



Login

Navigation

Submitting Quiz

Closing Browser

Forum Contents

Video Start

Video Stop

Video Resume

Browser Agent

Ip address

User id

Time stamp

# Tracking Log $\neq$ Web/WAS Log

The format of tracking log can be handled by program.

## Formatted JSON Data

```
{
  "username": "honor",
  "event_source": "browser",
  "name": "play_video",
  "accept_language": "en-US,ko-KR;q=0.8,ko;q=0.5,en;q=0.3",
  "time": "2018-09-12T07:03:27.819466+00:00",
  "agent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10.13; rv:62.0) Gecko/20100101 Firefox/62.0",
  "page": "http://192.168.33.10/courses/course-v1:edX+DemoX+Demo_Course/courseware/interactive_demonstrations/19a30717eff543078a5d94ae9d6c18a5/?child=first",
  "host": "192.168.33.10",
  "session": "281a84f6cc492f023ac0f3e19a1f8345",
  "referrer": "http://192.168.33.10/courses/course-v1:edX+DemoX+Demo_Course/courseware/interactive_demonstrations/19a30717eff543078a5d94ae9d6c18a5/?child=first",
  "context": {
    "user_id": 7,
    "org_id": "edX",
    "course_id": "course-v1:edX+DemoX+Demo_Course",
    "path": "/event"
  },
  "ip": "192.168.33.1",
  "event": ""
  {"duration": 275, "code": "\u02pLltkrhGM", "id": "\u0636541acbae448d98ab484b028c9a7f6", "currentTime": 8.84
  "event_type": "play_video"
}
```

# Video presentation of Tracking Log

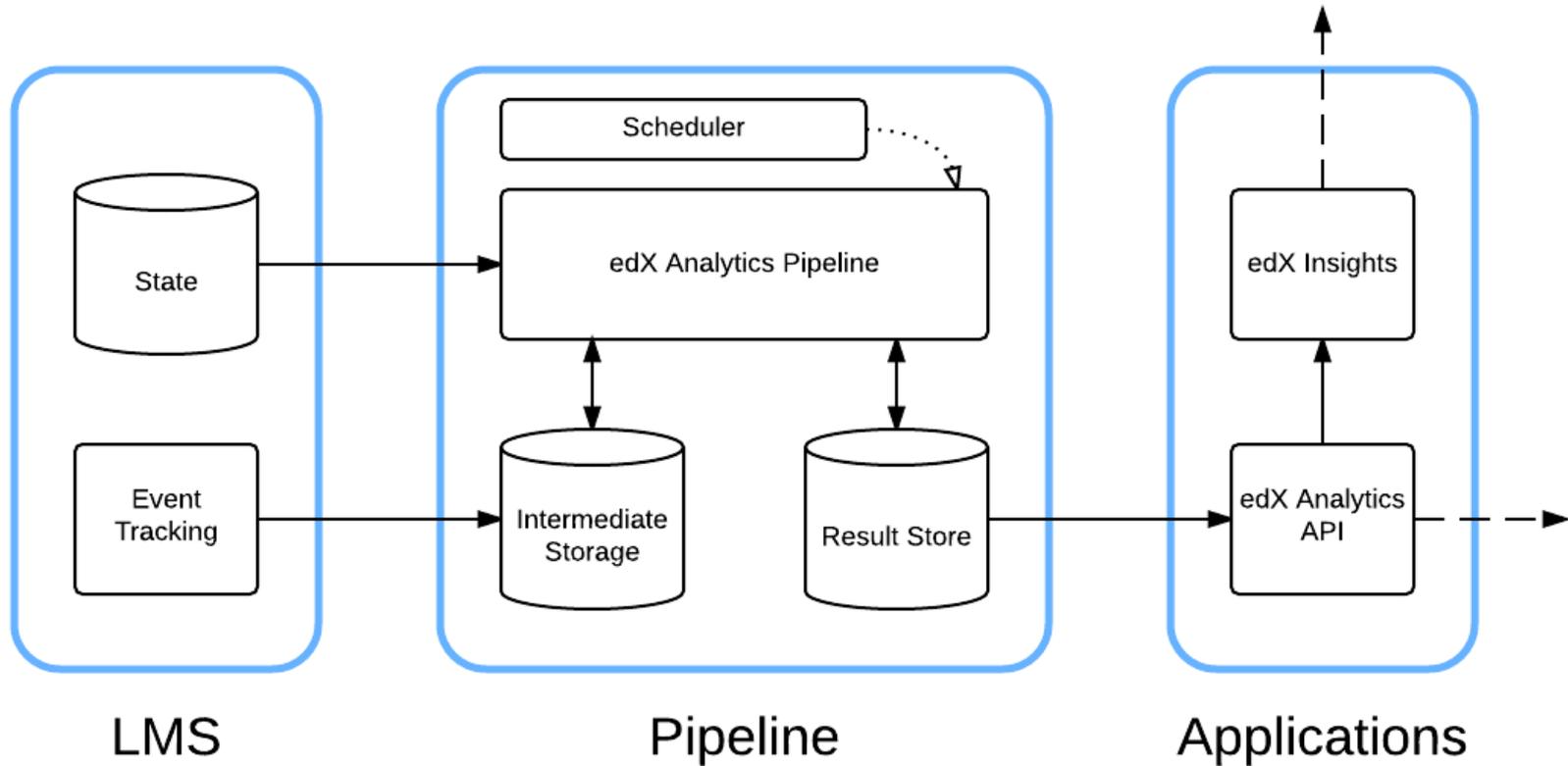
```
terminal (1) terminal (2) terminal (3) terminal (4) 192.168.33.1
{"username": "", "event_type": "/notifier_api/v1/users/", "ip": "127.0.0.1", "agent":
, "host": "localhost", "referrer": "", "accept_language": "", "event": "{\\\"POST\\\":
\\\"1\\\", \\\"page_size\\\": [\\\"10\\\"]}", "event_source": "server", "context": {"user_id":
urse_id": "", "path": "/notifier_api/v1/users/", "time": "2018-09-15T00:15:03.6199"}
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\\\"1\\\", \\\"page_size\\\": [\\\"10\\\"]}", "event_source": "server", "context": {"user_id":
urse_id": "", "path": "/notifier_api/v1/users/", "time": "2018-09-15T00:20:04.0565"}
{"username": "", "event_type": "/notifier_api/v1/users/", "ip": "127.0.0.1", "agent":
, "host": "localhost", "referrer": "", "accept_language": "", "event": "{\\\"POST\\\":
\\\"1\\\", \\\"page_size\\\": [\\\"10\\\"]}", "event_source": "server", "context": {"user_id":
urse_id": "", "path": "/notifier_api/v1/users/", "time": "2018-09-15T00:25:04.5102"}
{"username": "", "event_type": "/notifier_api/v1/users/", "ip": "127.0.0.1", "agent":
, "host": "localhost", "referrer": "", "accept_language": "", "event": "{\\\"POST\\\":
\\\"1\\\", \\\"page_size\\\": [\\\"10\\\"]}", "event_source": "server", "context": {"user_id":
urse_id": "", "path": "/notifier_api/v1/users/", "time": "2018-09-15T00:30:04.9910"}
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, "host": "localhost", "referrer": "", "accept_language": "", "event": "{\\\"POST\\\":
\\\"1\\\", \\\"page_size\\\": [\\\"10\\\"]}", "event_source": "server", "context": {"user_id":
urse_id": "", "path": "/notifier_api/v1/users/", "time": "2018-09-15T00:35:00.4500"}
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, "host": "localhost", "referrer": "", "accept_language": "", "event": "{\\\"POST\\\":
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urse_id": "", "path": "/notifier_api/v1/users/", "time": "2018-09-15T00:40:00.8903"}

{"username": "", "event_type": "/", "ip": "192.168.33.1", "agent": "Mozilla/5.0 (Mac
0_13_6) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/69.0.3497.92 Safari/537.36",
"referrer": "", "accept_language": "ko-KR,ko;q=0.9,en-US;q=0.8,en;q=0.7", "event":
}}, "event_source": "server", "context": {"user_id": null, "org_id": "", "course_id":
ne": "2018-09-15T00:41:22.036573+00:00", "page": null}
```



# Insights Architecture

Big data (tracking log) is pipelined to Map Reduce-Hadoop Engine



# Docker Based Development Tool

Analytics devstack is provided at GitHub and it's open sourced.

## 1. Pandas

You can develop your own analytics with Python.  
Not R!

## 2. Hadoop

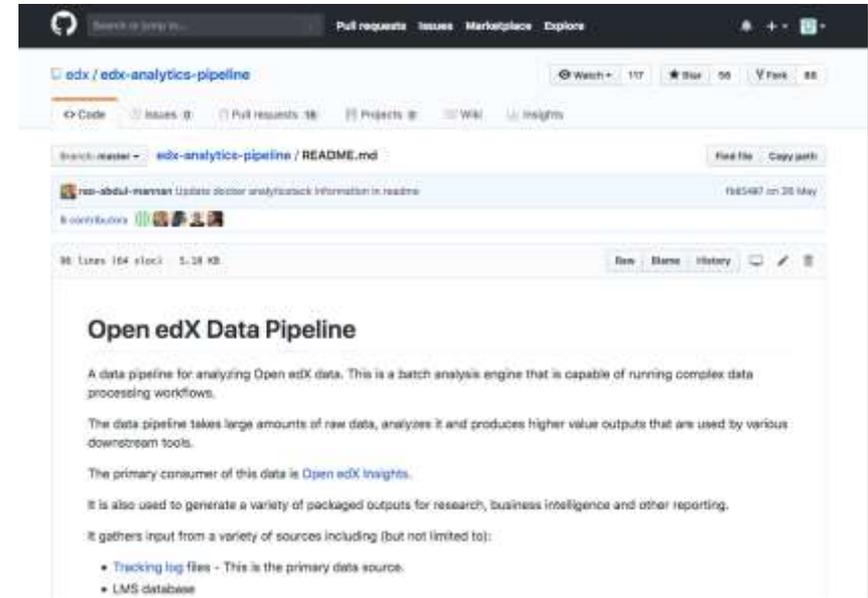
You can handle complex Hadoop with Python!

## 3. Docker

All the basic development environment is ready on Docker image.

## 4. It's free!

All development & production SW are license free.



# What do you want to know more?

For the complex analysis of your courses.

**The level of education and age relation?**

**How often a learner revisits the video to solve quiz?**

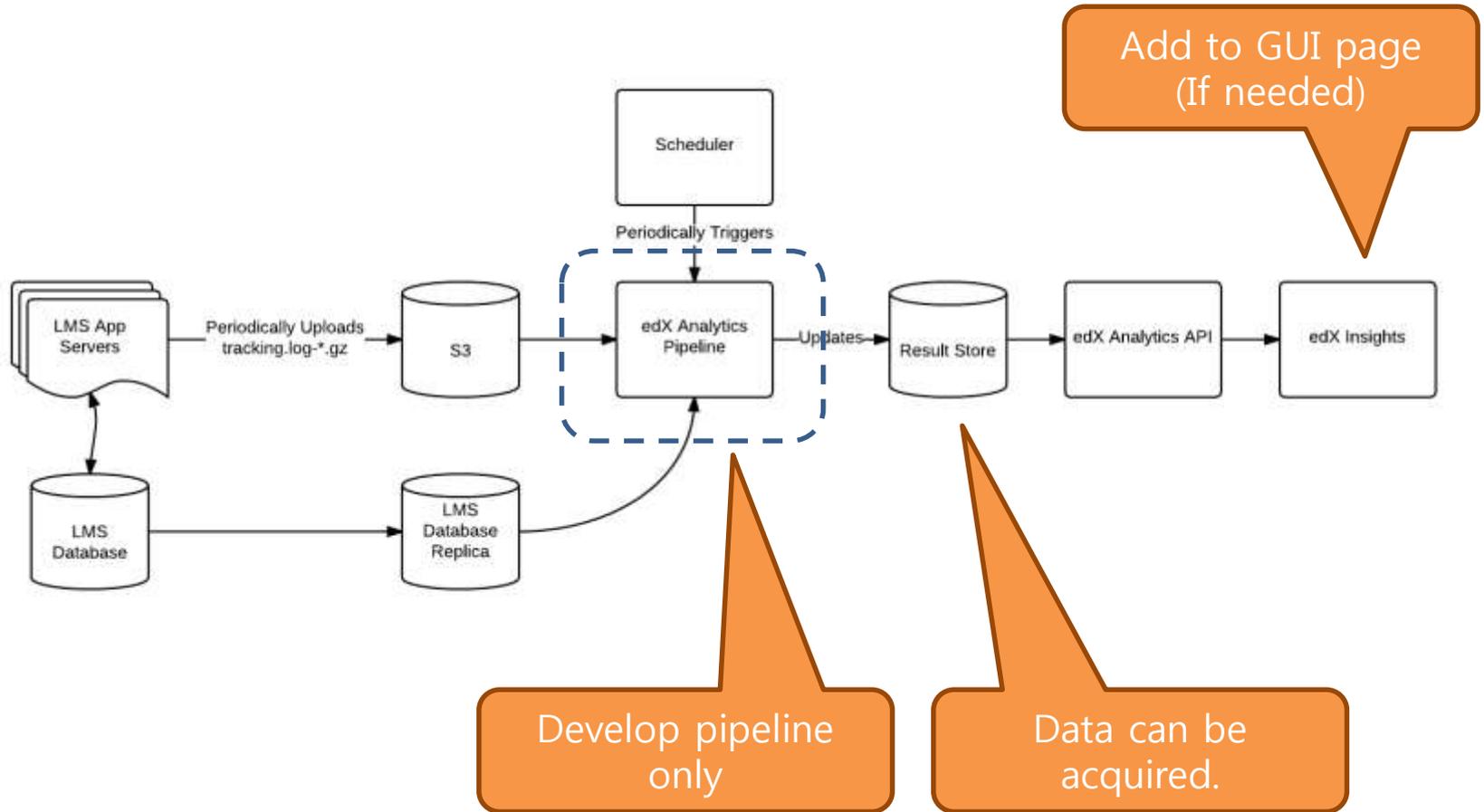
**Construct recommendations for learner? (Using deep learning?)**

**Forum activities and the performance relation?**

**How to make good online course? 😊**

# What to do for new analysis?

Just build a new analytics-pipeline.





Thank you.

made by Hongseob Lee