Empower edX:

Increasing student engagement in massive open online courses

MIT (1960)

Hadi Ebrahimnejad

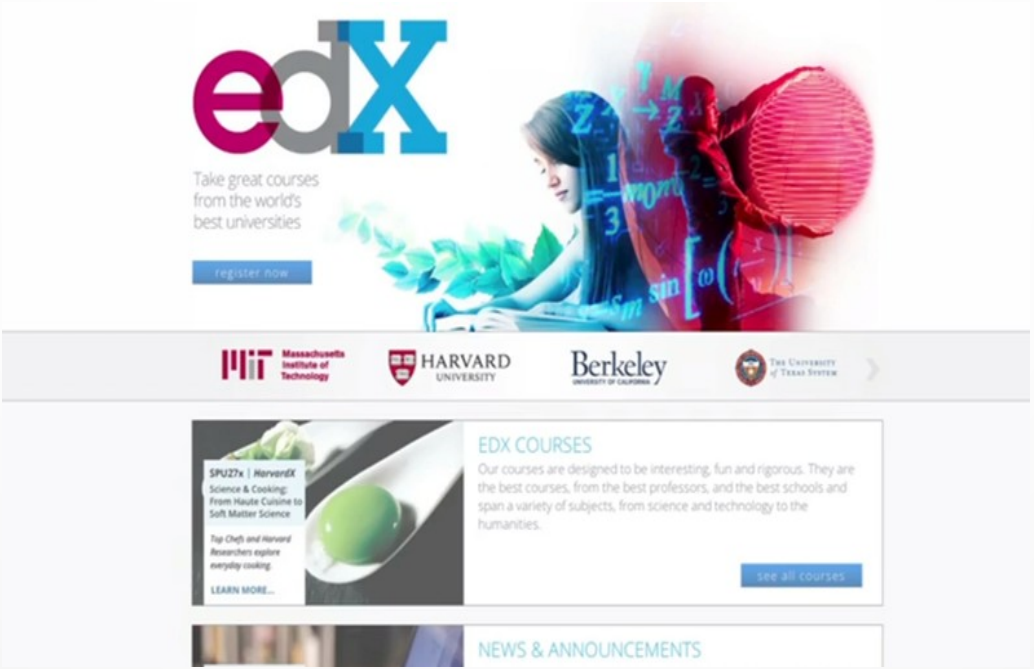
Education: past and present

In spite of tremendous technological advancements, education hasn't really changed for centuries.

MIT (2010)

Using online technologies

Online technologies can transform education in both scale and access.



Impact of massive open online courses

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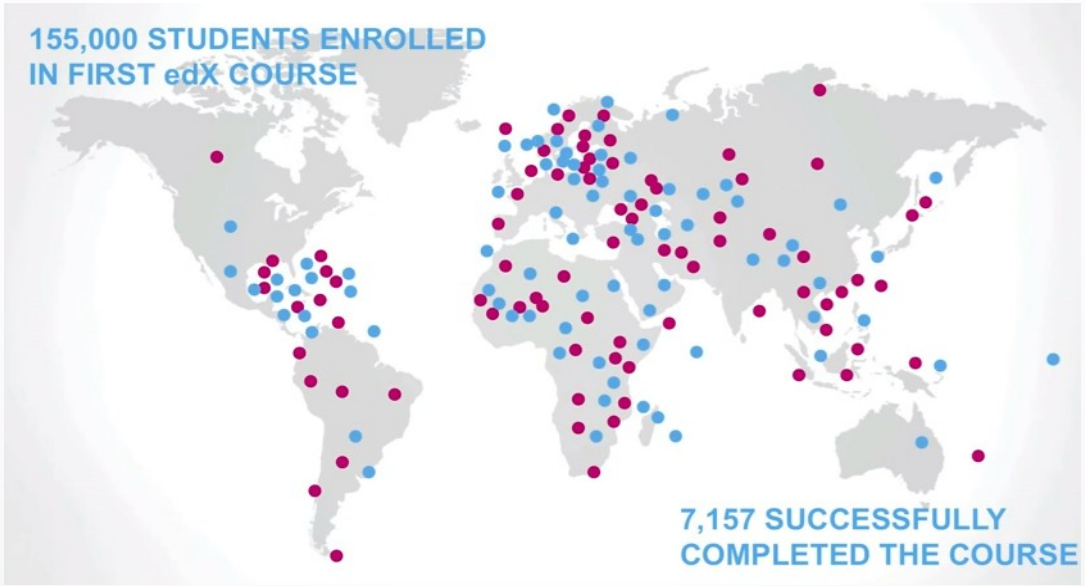

Impact of massive open online courses

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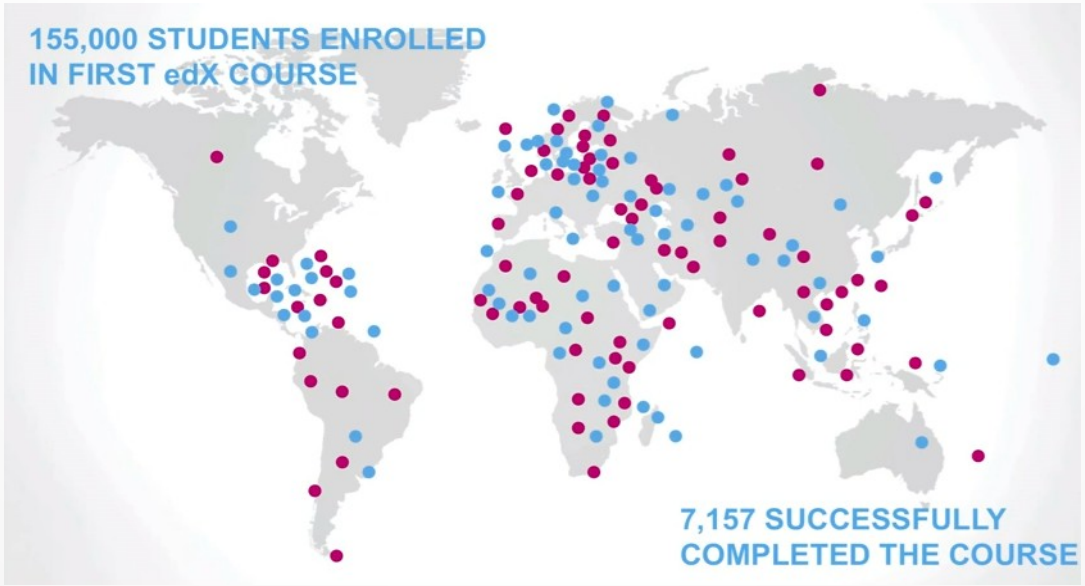
More than entire MIT alumni



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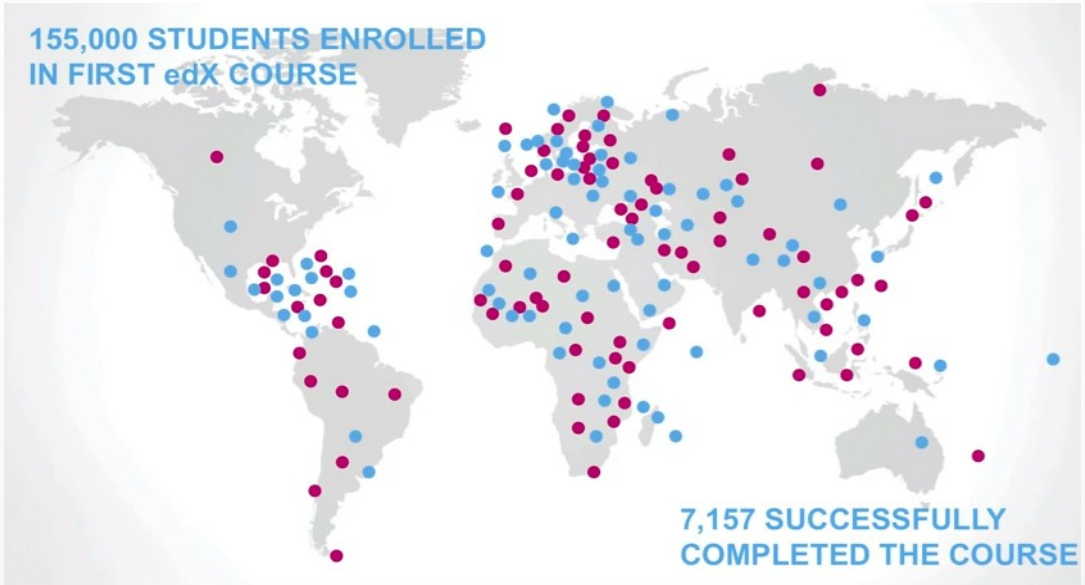


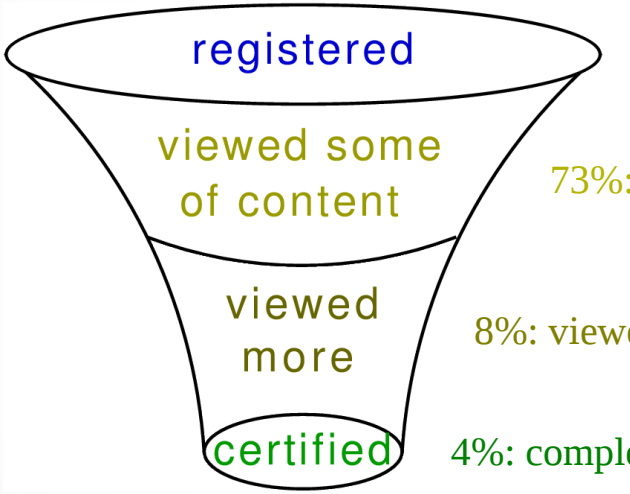
40 years of lecture time

edX data

Data is aggregated from a series of 17 online courses offered in 2012-2013 by Harvard & MIT on *edX* (445000 active registrants).

- Students
  - videos watched
  - chapters studied
  - days active
  - registration date
  - last interaction date
  - level of education
  - age
  - gender
- Courses
  - subject
  - instructor
  - start date
  - end date

The Funnel



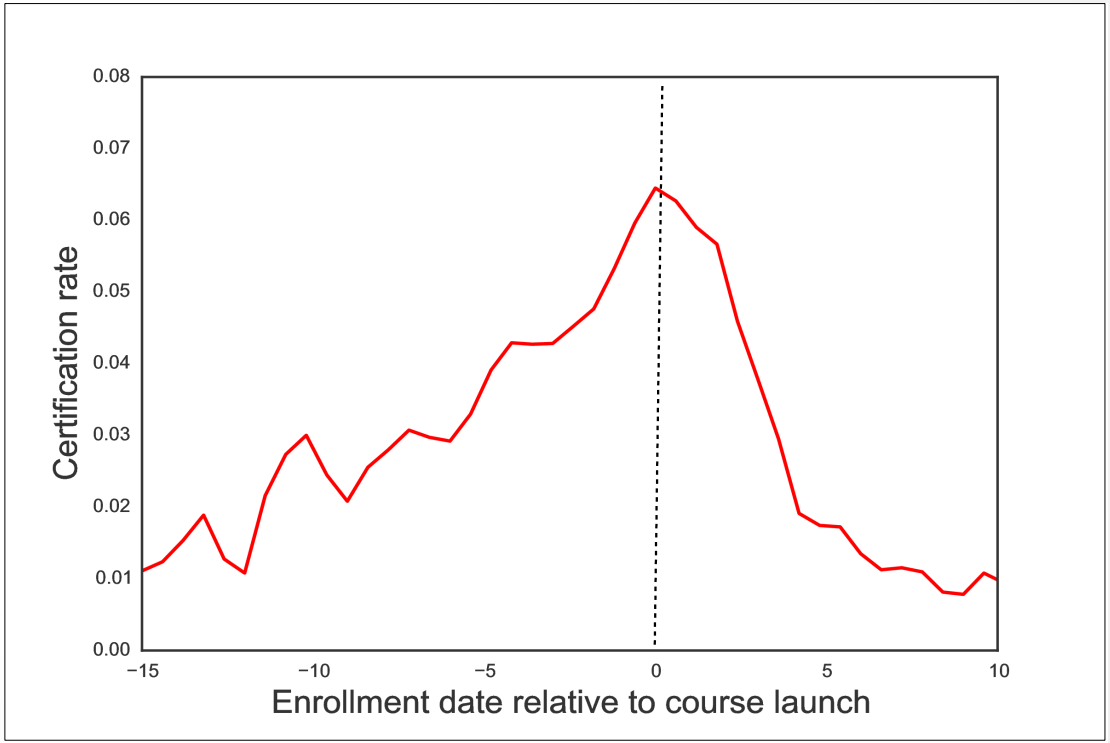
73%: accessed the course content

8%: viewed more than half of content

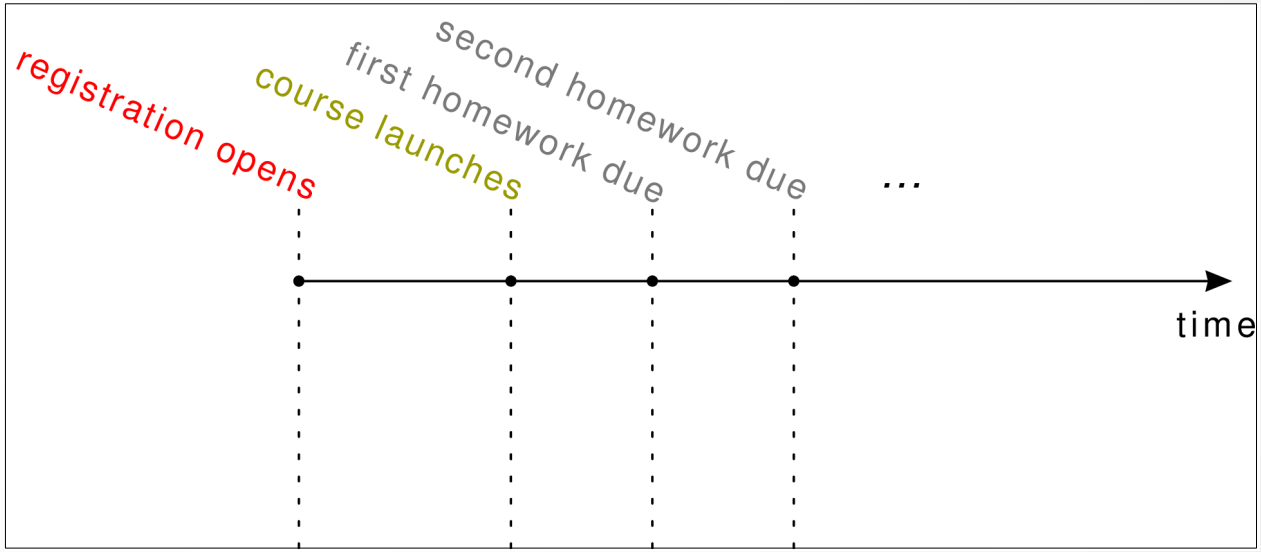
4%: completed the course and certified

Point of maximal interest

- Certification is highest for student who register near course launch.
- It rapidly drops for those registered later.



Course timeline



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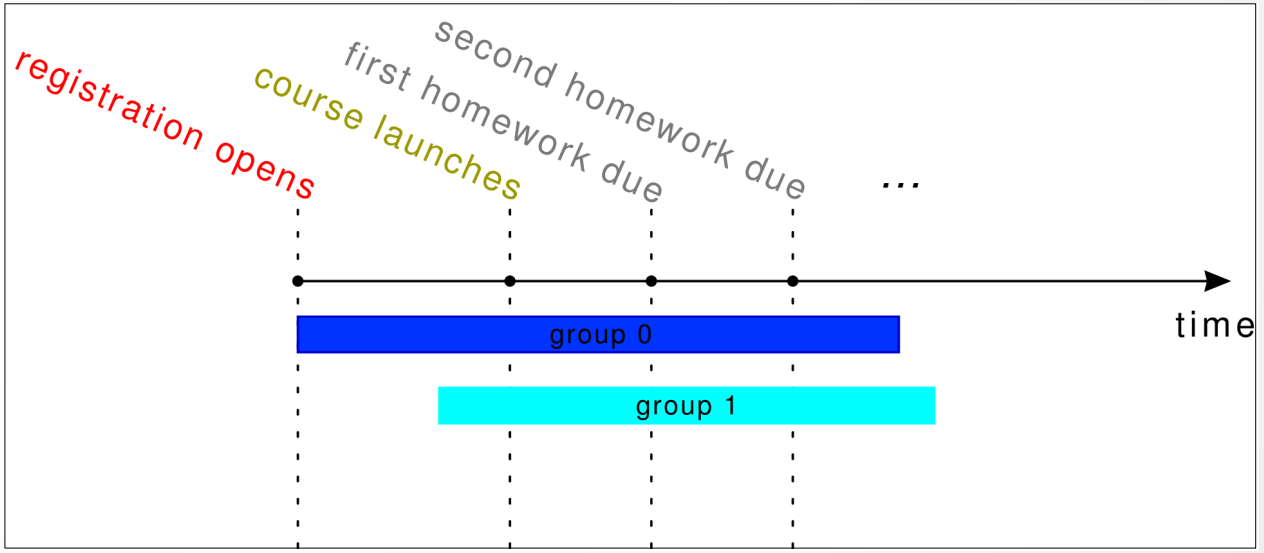
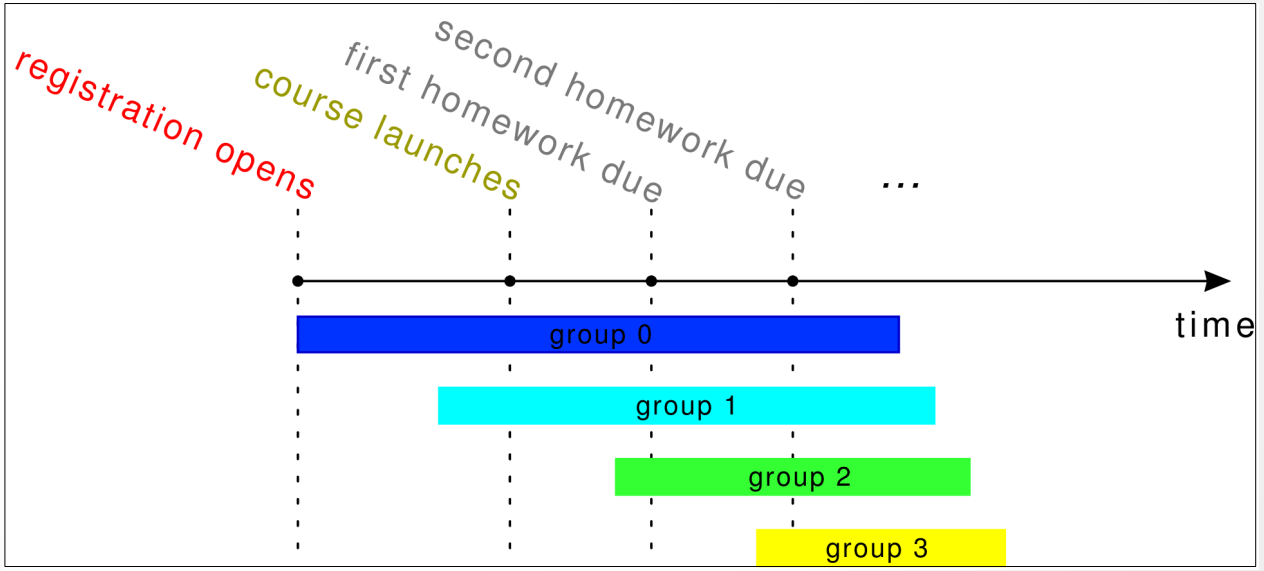


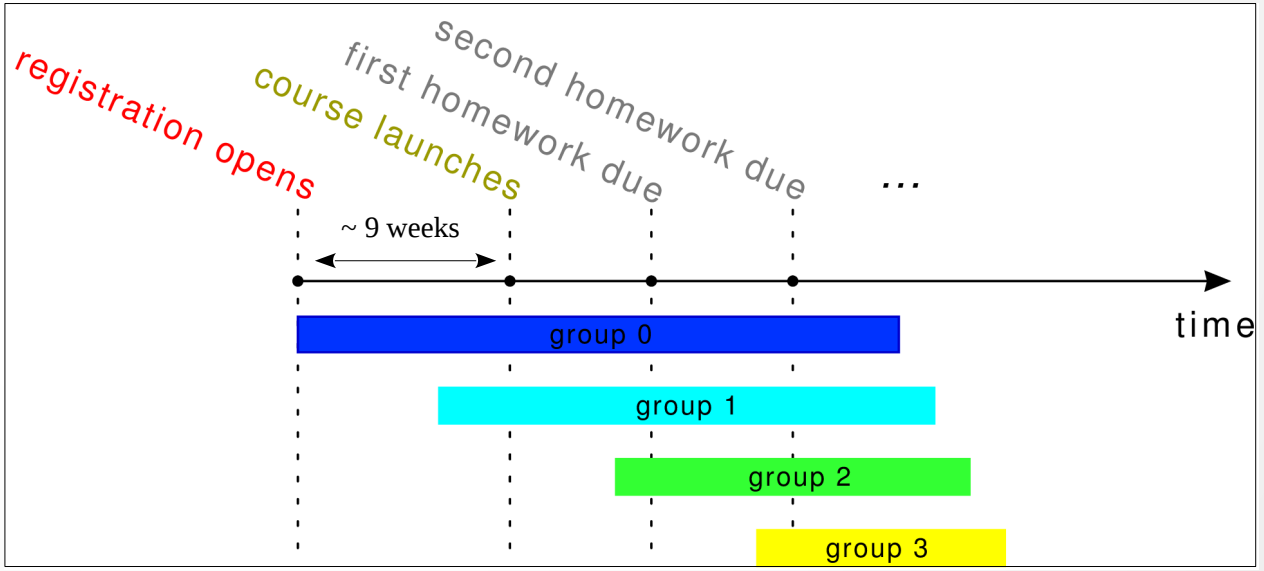
Course timeline

- Performance of late registrants (grp 2 & 3) suffers from shorter/missed deadlines.



Course timeline

- Performance of late registrants (grp 2 & 3) suffers from shorter/missed deadlines.
- Early registrants (grp 0) have to wait longer to get access to course content.



'course view' negatively affected by timeline

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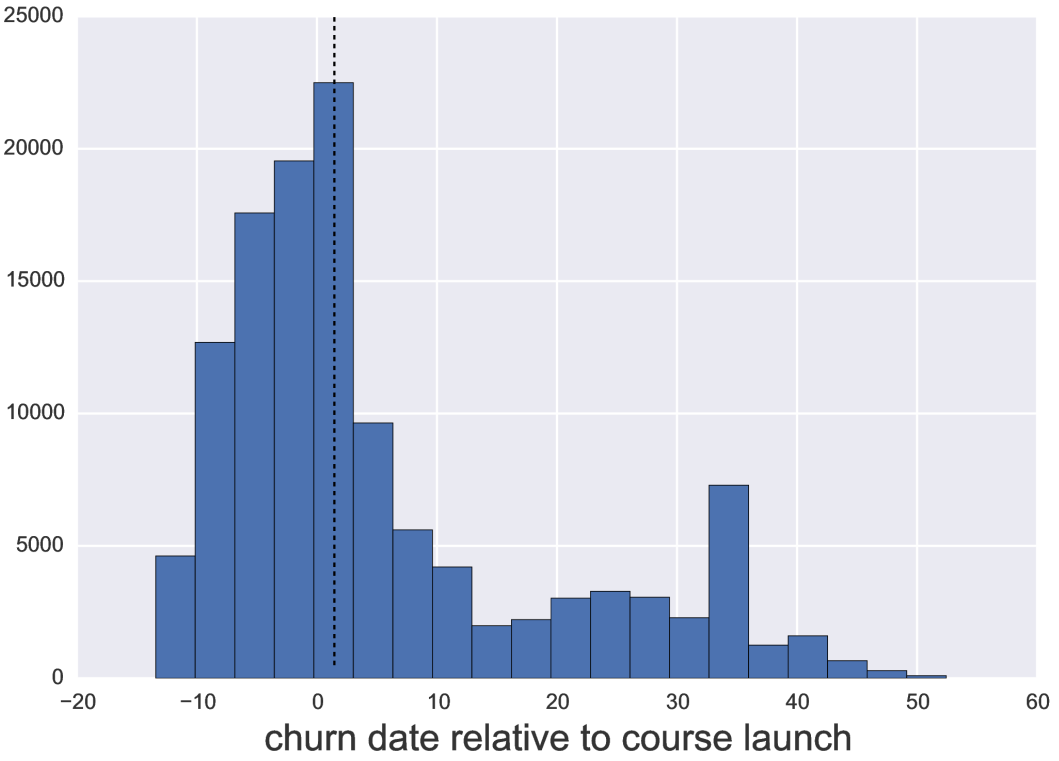
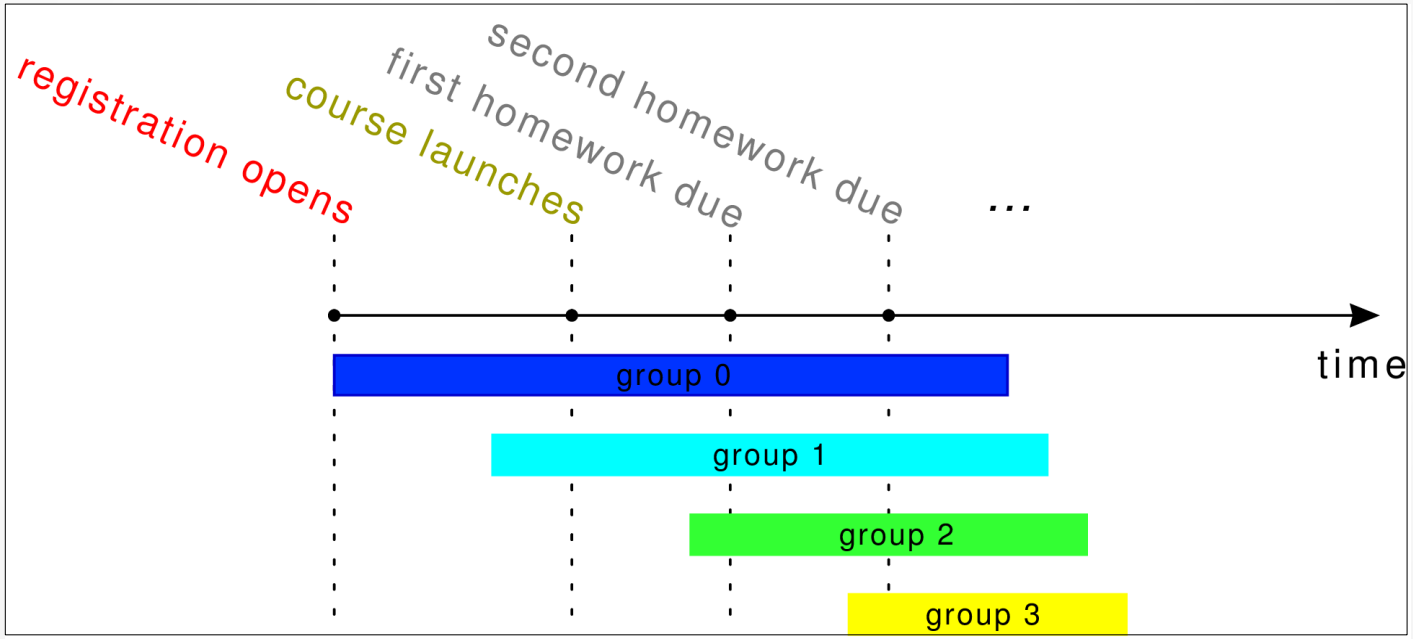


Current timeline



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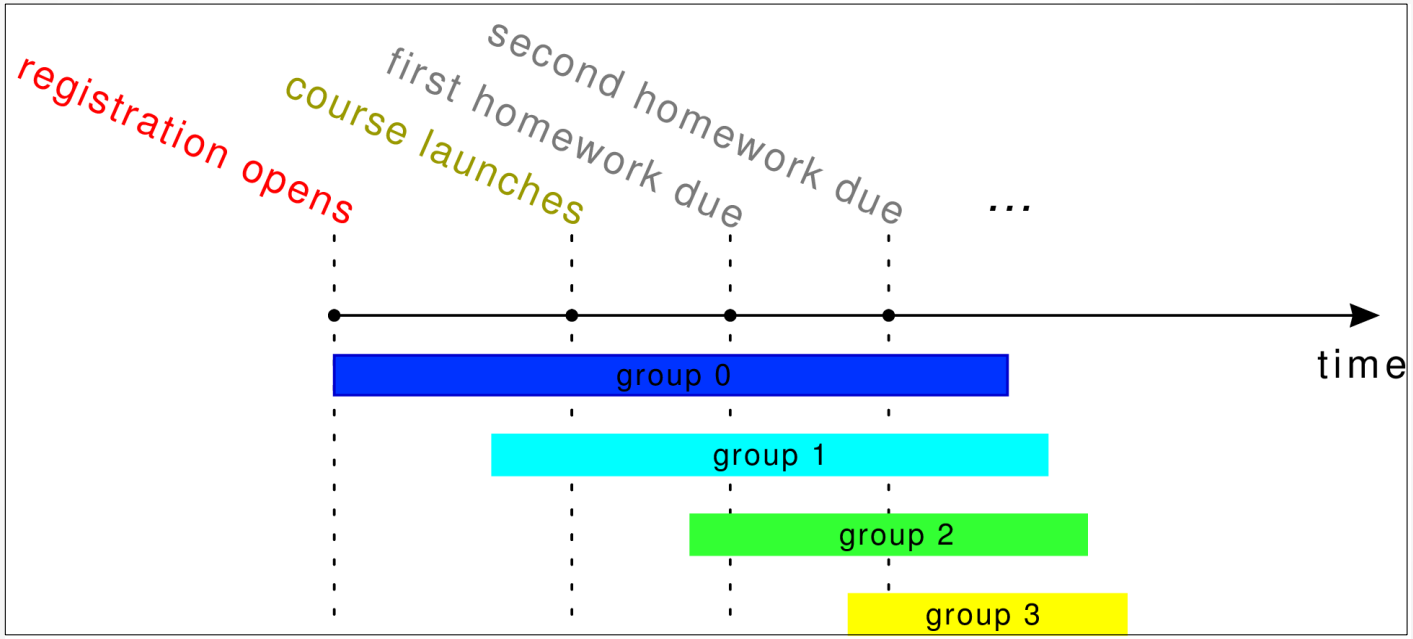
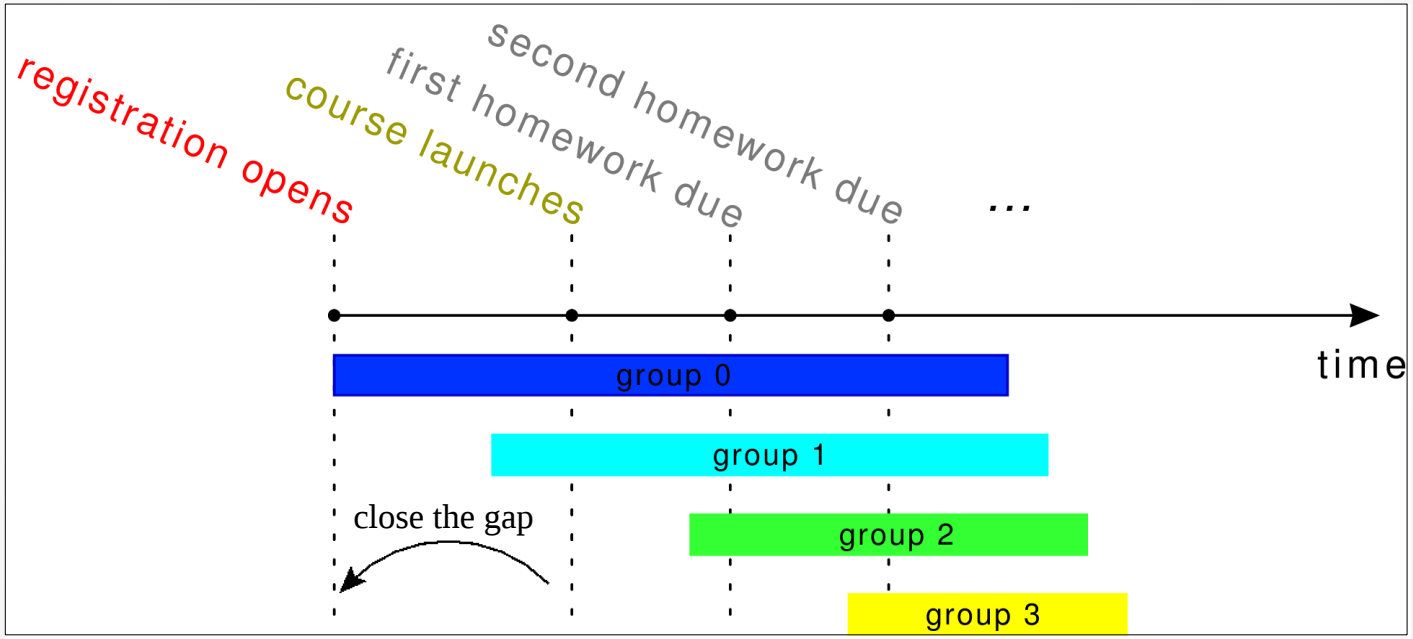


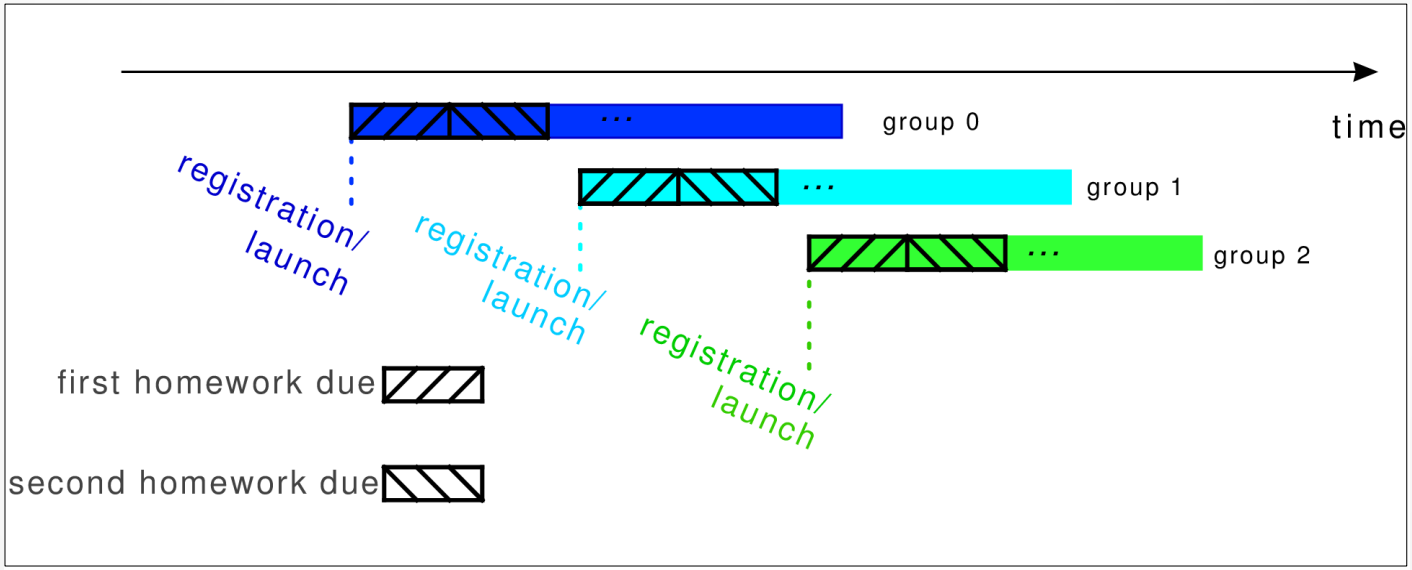
How can one overcome this problem?

Current timeline



How can one overcome this problem?

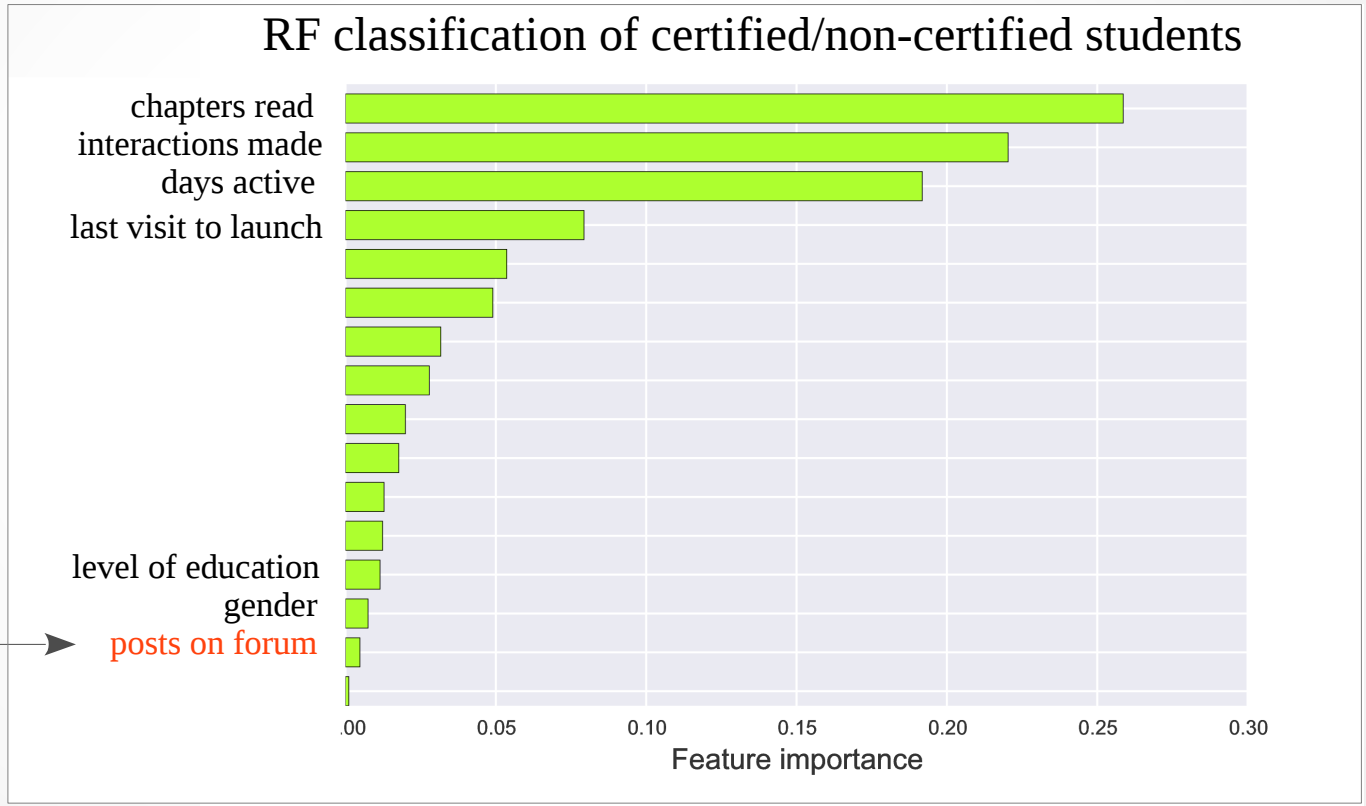
Asynchronous timeline



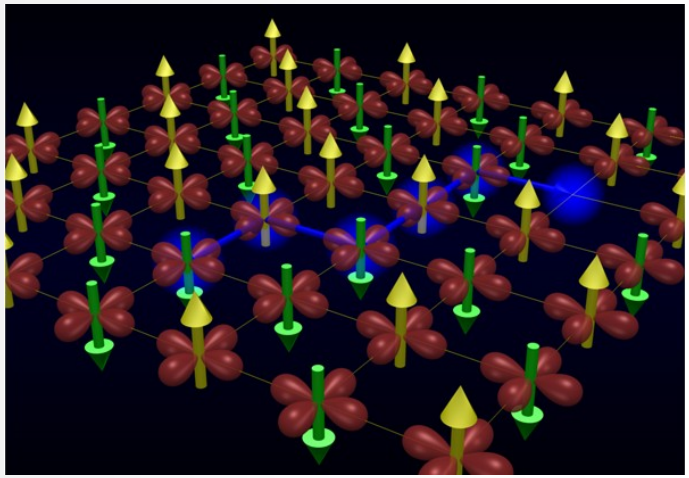
Is communication important?

- Asynchronous timeline interrupts communication among different groups of students.

- However, communication has negligible importance.



Holes in magnetic materials



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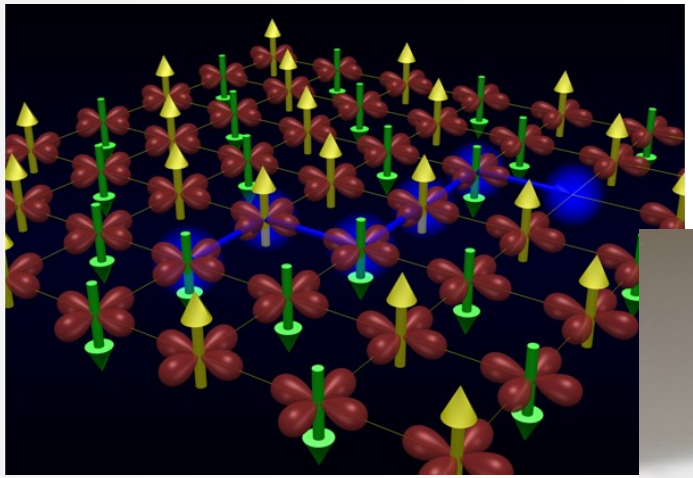
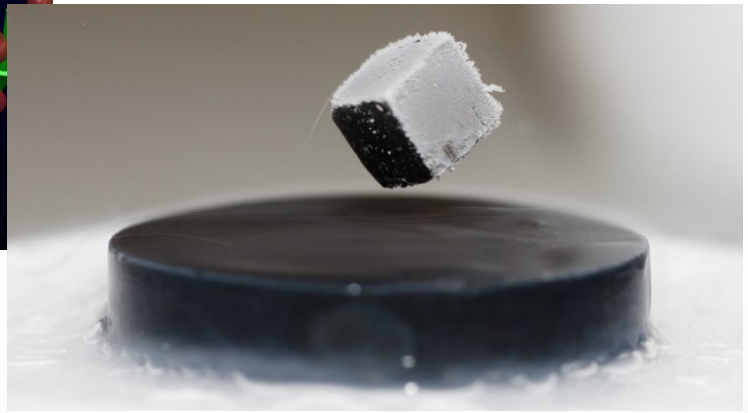


High-temperature superconductors



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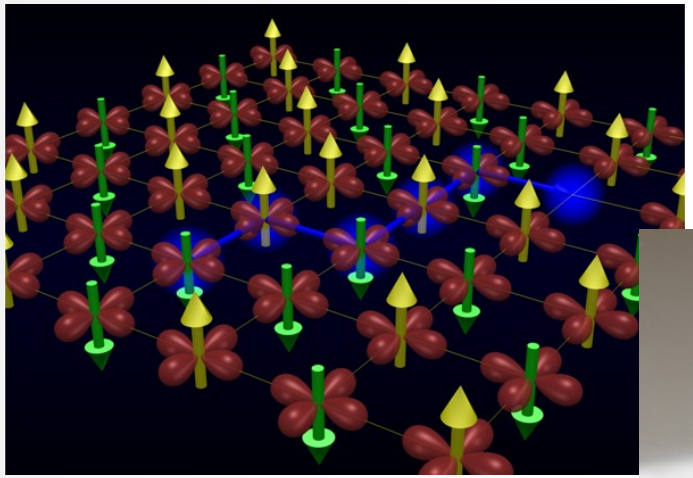

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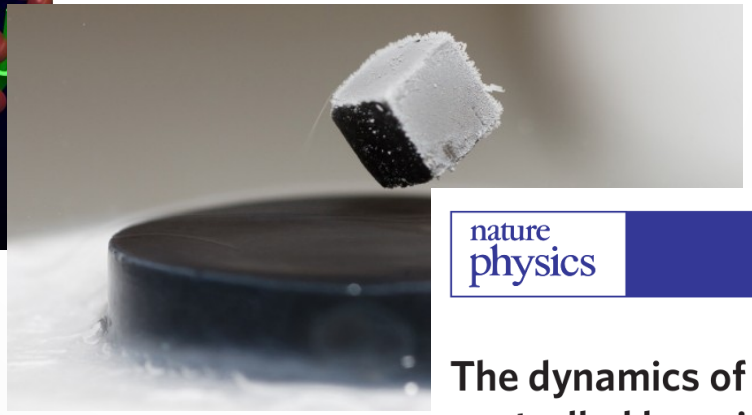

nature physics

ARTICLES

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The dynamics of a doped hole in a cuprate is not controlled by spin fluctuations

Hadi Ebrahimnejad[1], George A. Sawatzky[1,2] and Mona Berciu[1,2]*

Understanding what controls the dynamics of the quasiparticle that results when a hole is doped into an antiferromagnetically ordered CuO_2 layer is the first necessary step in the quest for a theory of the high-temperature superconductivity in cuprates.

Summary

- Course timelines need to be synchronized with student registration:
  - Current solid timelines are against open design of online courses.
- 'Gender, age and level of education' have little relevance to 'certification'.
- 'Certification' should not be the focus in online courses:
  - 73% 'viewed the course content' vs 4% 'certified'

Predicting student churn

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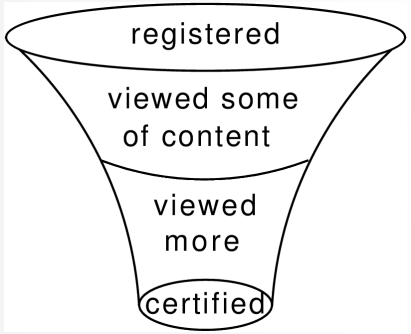
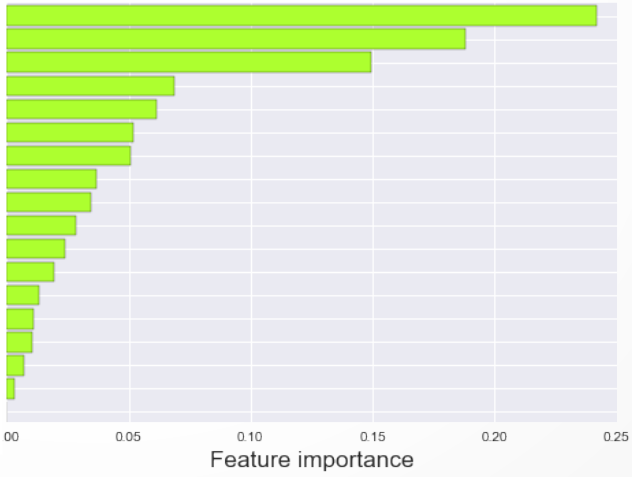


Can we construct a churn predictor for student certification?

Chapters read
Days active
Interactions
Videos played

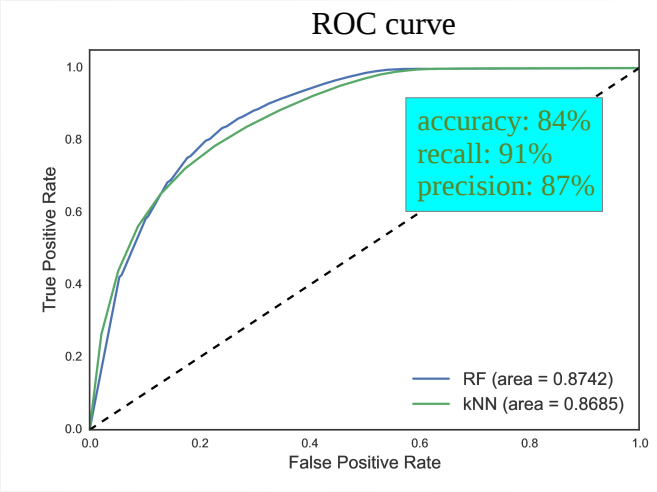
Course length
Age
Instructor
Courses registered
Level of education
Gender
Posts on forum

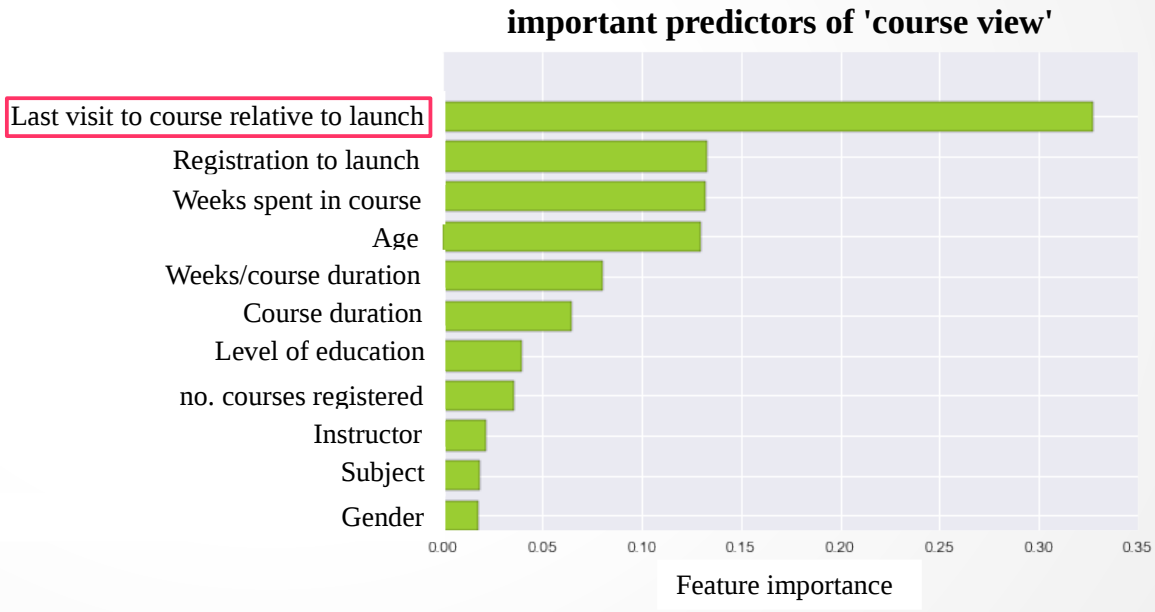


accuracy: 97%
recall: 97%
precision: 99%

RF classification of a balanced population

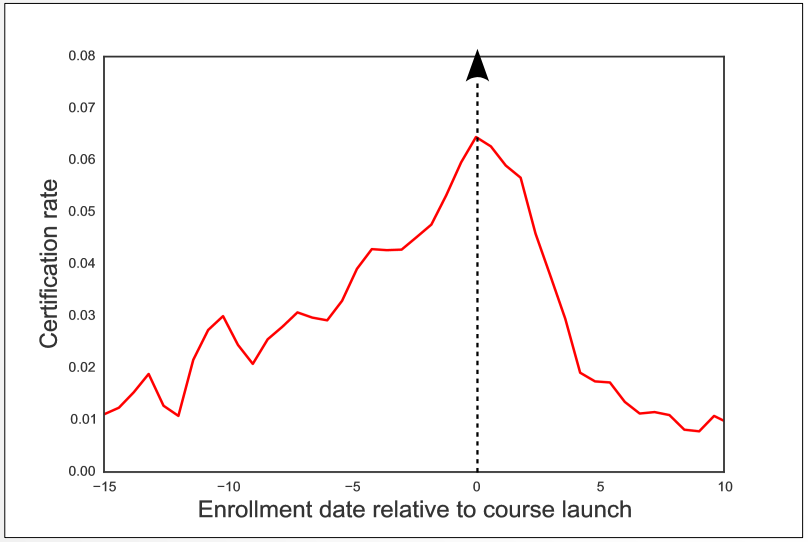
Predicting 'course view'





Effect of enrollment date

Certification rate rapidly declines after course launch.



	Before course launch	After course launch	Overall
Registration	48%	52%	100%
Certification rate	5.3%	2.6%	3.9%
Course view rate	65%	80%	73%

Thinking in terms of probabilities