Class Picker for Course 6

A web application that gives recommendations on what classes to take next.

Angelos Assos,Kaung Htet Win Thant, Natalie Muradyan

Table of contents

01

Problem

Why we care about this and what we wanted to achieve.

02

Approach

Our approach to solving this problem.

03

Solution

Our final solution to the problem.

04

Conclusions

The next steps, some discussion questions, and takeaways.

01

Problem
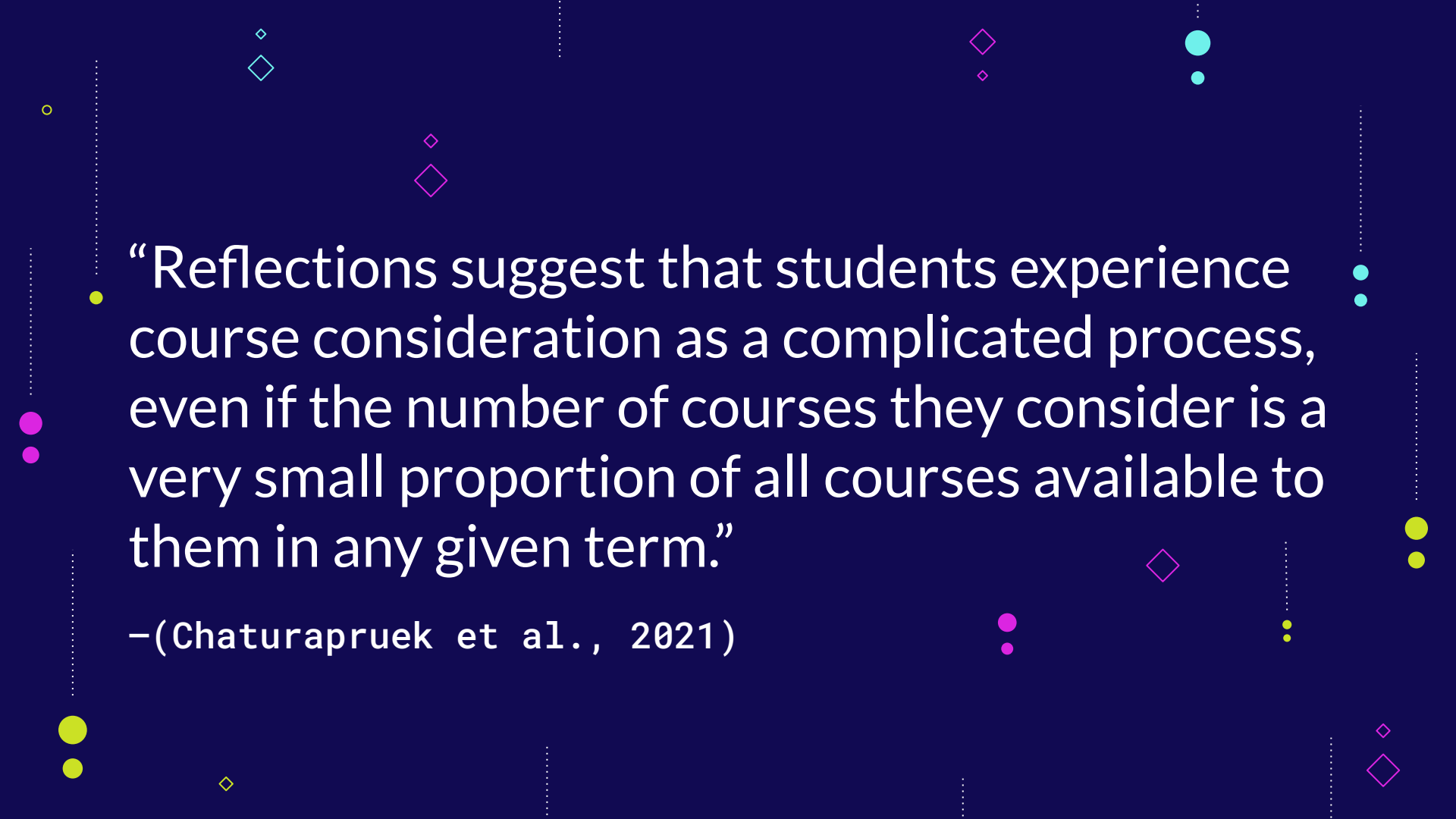
Why we care about this and what we wanted to achieve.

From our experience

Choosing classes boils down to finding a class that is:

- Interesting
- Fulfills requirements within our major
- Fulfills general institute requirements
- Helps stay on track in the long run
- Personal preferences:
  - High ratings
  - Less than x hours
  - No final exam
  - Generally considered a good class

Ugh, so much to worry about!

"Reflections suggest that students experience course consideration as a complicated process, even if the number of courses they consider is a very small proportion of all courses available to them in any given term."

–(Chaturapruek et al., 2021)

What's more

- Especially at comprehensive universities with elective curriculums, students face many more potential courses of study than they can thoroughly consider—a case of decision making under bounded rationality.

- Research shows that even though first-years consider <2% of the available classes, these courses predict which academic major they declare two years later.

- Consideration presents a promising site for intervention in problems of equity, career funneling, and college completion.
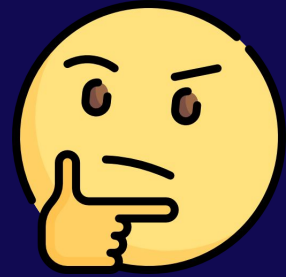
Scaling Down

- MIT has a wide range of classes and many elective curriculums

- At MIT, the most popular major is course 6 (EECS Department)

- Course 6 offers **many tracks** of study and many courses are specialized in something specific

How can we help students in Course 6 (EECS Department) choose classes that will meet their needs?
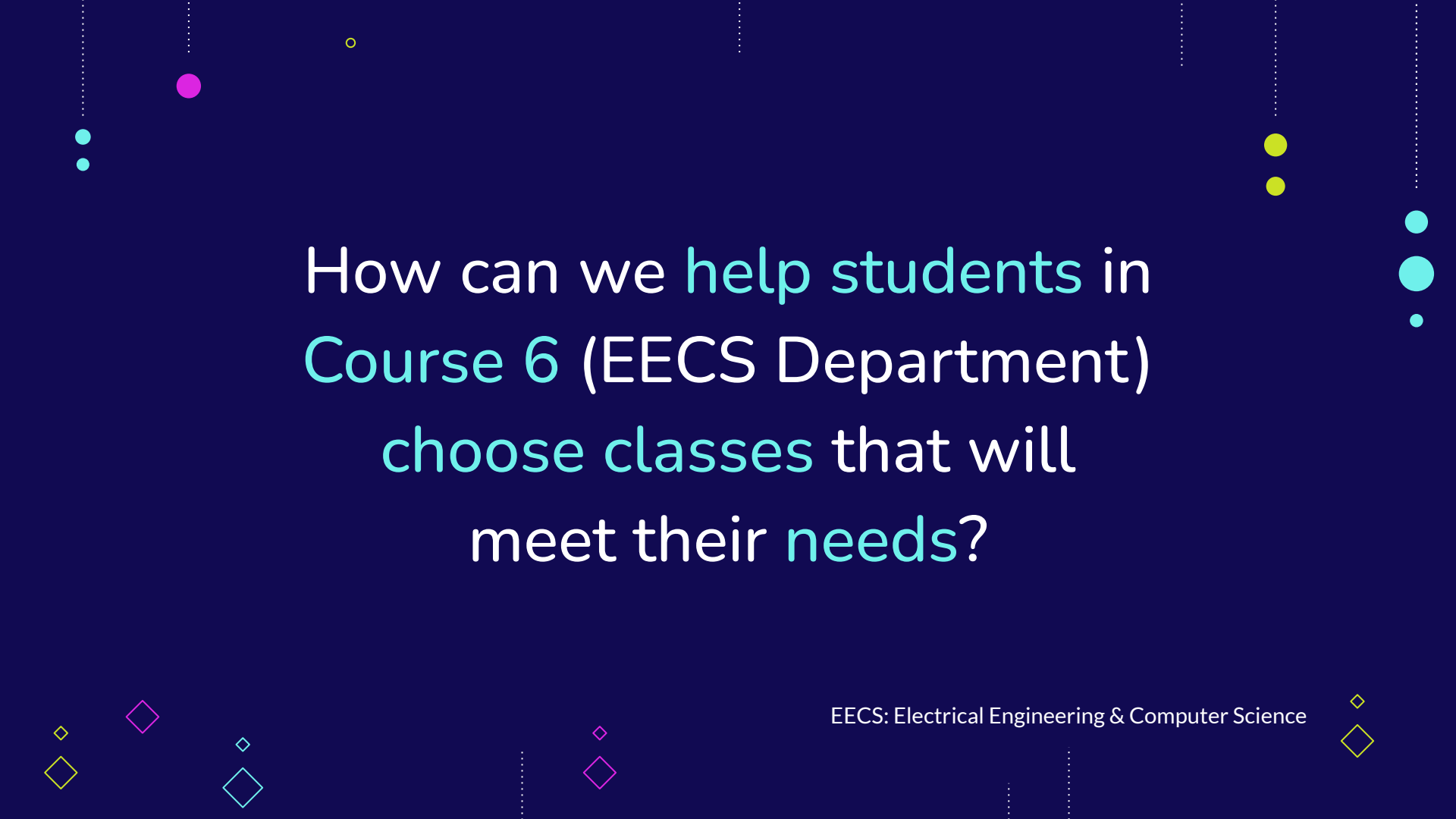
EECS: Electrical Engineering & Computer Science

Existing Solutions

firehose

- Helps choose classes that fit in your schedule.

- Doesn't customize to student's requirements.

- Doesn't provide targeted data per major.

☑ **CourseRoad**

- Helps plan for classes in the long run.

- No customization.

- Much less popular as it simply makes a plan and doesn't help with the decision making.

02

Approach

Our approach to solving this problem.
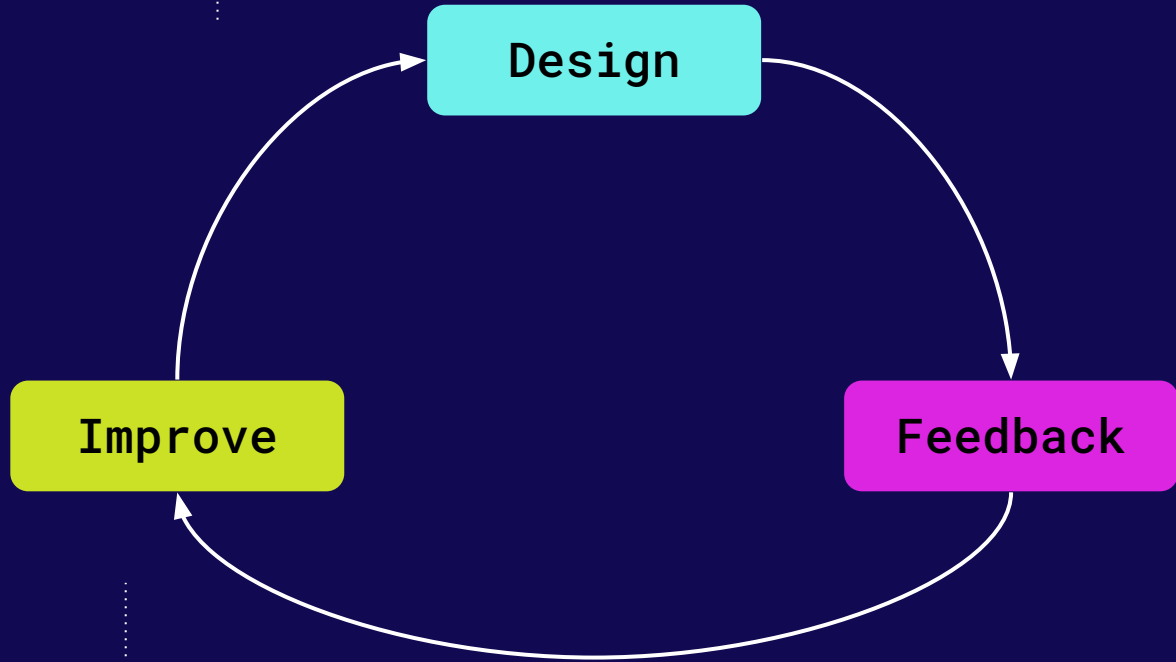
Design → Feedback → Improve → Design

Class Picker

Original Prototype

Year at MIT: ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior

Semester: ☐ Fall ☐ Spring ☐ IAP

Course: ☐ 6-1 ☐ 6-2 ☐ 6-3 ☐ 6-4

Please add the classes you've taken.

Add Class: [▼]

Classes Taken:

Recommend!

Year at MIT: ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior

Semester: ☐ Fall ☐ Spring ☐ IAP

Course: ☐ 6-1 ☐ 6-2 ☐ 6-3 ☐ 6-4

Please add the classes you've taken.

Add Class: [▼]

Classes Taken: 6.0001, 6.0002, 6.009, 6.006

Recommend!

Year at MIT: ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior

Semester: ☐ Fall ☐ Spring ☐ IAP

Course: ☐ 6-1 ☐ 6-2 ☐ 6-3 ☐ 6-4

Please add the classes you've taken.

Add Class: 6.00 ▼

Cla

6.0004 (Introduction to Low-level Programming in C and Assembly)
6.002 (Circuits and Electronics)
6.003 (Signals and Systems)
6.004 (Computation Structures)

Recommend!

Year at MIT: ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior

Semester: ☐ Fall ☐ Spring ☐ IAP

Course: ☐ 6-1 ☐ 6-2 ☐ 6-3 ☐ 6-4

Please add the classes you've taken.

Add Class: [▼]

Classes Taken: 6.0001, 6.0002, 6.009, 6.006, 6.004

Recommend!

Year at MIT: ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior

Semester: ☐ Fall ☐ Spring ☐ IAP

Course: ☐ 6-1 ☐ 6-2 ☐ 6-3 ☐ 6-4

Please add the classes you've taken.

Add Class: ▼

Classes Taken: 6.0001, 6.0002, 6.009, 6.006, 6.004

Recommend!

We think this Spring semester you should take the following classes:

6.033 (Computer Systems Engineering)
- Fulfills Requirement: Header Subject, CIM2
- Exams: Midterm, Final
- Project: No
- Hours/week: 10

6.046 (Advanced Algorithms)
- Fulfills Requirements: Header Subject
- Exams: Midterms, Final
- Project: No
- Hours/week: 13

6.141 (Robotics: Science and Systems)
- Fulfills Requirements: CIM2, DLAB2, II, EECS
- Exams: None
- Project: Yes
- Hours/week: 20

Interview 3 Students

We found that our interviewees:

- Ask their friends for advice on classes.

- Lookup old class materials such as syllabus, old websites, previous final projects.

- Have a hard time making sure they'll stay on track with all their requirements.

- Have a hard time knowing what exactly they'll get out of the class.

Questions

What did you eat for breakfast today?

What is your major and year at school?

Are you satisfied with what you are taking right now?

Have you thought about your next semester's classes?

How do you usually pick classes for the semester?

What are the factors that affect your choice of classes?

Do you go class shopping? (class shopping is when someone signs up for many classes and drops the ones they don't like after 1-2 weeks of classes)

Are there any data/analytics that you consult to make decisions?

What is one statistic that you wish existed to help you with your decision

Based on the Feedback

- Provide curated data about each class that is not easily available to students.

  - Gather data from students who have taken the class on:

    - Key learning points in the class

    - Links to old syllabus/class website

- Keep the format general so the program can be extended to other majors.

  - Mention prerequisites, units, hours, and general things that apply to classes from all majors.

03

Solution

Our final solution to the problem.

Our Solution

Website

Our tool is web-based, and is therefore accessible on desktops, tablets, and phones.

Class Picker

Year at MIT: Freshman

Semester: Fall

Course: 6-1

Please select the classes you have taken so far.

Add Class:

6.8810[J] Data Acquisition and Image Reconstruction in MRI (6.556)
6.8830[J] Signal Processing by the Auditory System: Perception (6.552)
6.8300 Advances in Computer Vision (6.869)
6.8301 Advances in Computer Vision (6.819)

Recommend Classes!

Class Picker

Year at MIT: Freshman ▾

Semester: Fall ▾

Course: 6-1 ▾

Please select the classes you have taken so far.

Add Class:

6.8810[J] Data Acquisition and Image Reconstruction in MRI (6.556)
6.8830[J] Signal Processing by the Auditory System: Perception (6.552)
6.8300 Advances in Computer Vision (6.869)
6.8301 Advances in Computer Vision (6.819)

Recommend Classes!

Class Picker

Year at MIT: Freshman

Semester: Fall

Course: 6-1
- 6-1
- **6-2**
- 6-3
- 6-4

Please s   he classes you have taken so far.

Add Class:

6.8810[J] Data Acquisition and Image Reconstruction in MRI (6.556)
6.8830[J] Signal Processing by the Auditory System: Perception (6.552)
6.8300 Advances in Computer Vision (6.869)
6.8301 Advances in Computer Vision (6.819)

Recommend Classes!

Class Picker

Year at MIT: Freshman ⌄

Semester: Fall ⌄

Course: 6-1 ⌄

Please select the classes you have taken so far.

Add Class:

6.UAR Seminar in Undergraduate Advanced Research
6.100A Introduction to Computer Science Programming in Python (6.0001)
6.100B Introduction to Computational Thinking and Data Science (6.0002)
6.100L Introduction to Computer Science and Programming (New)

6.100A

[Recommend Classes!]

Class Recommendations for 6.100A, 6.1200, 6.4100

Course Title:

6.100B Introduction to Computational Thinking and Data Science (6.0002)

Course Number:

6.100B

Prereqs:

6.100A

Semester:

Fall and Spring

Credits:

3-0-3 units

Repeatable?:

Credit cannot also be received for 16.C20[J], 18.C20[J], CSE.C20[J]

Description:

Provides an introduction to using computation to understand real-world phenomena. Topics include plotting, stochastic programs, probability and statistics, random walks, Monte Carlo simulations, modeling data, optimization problems, and clustering. Combination of 6.100A and 6.100B counts as REST subject.

Professors:

A. Bell, J. V. Guttag

Demo Time!

Technology Used

Initial Prototype:

- Google Slides

- Quick to create

- Easy to get feedback on

Final Prototype:

- Web-Development:
  - Node JS+Express JS
  - Python
  - HTML+CSS
  - mySQL

- Allows for adding actual logic, algorithms to the tool

- Works with databases which can be stored for long periods

Intended Users & Context

Currently:

- The tool is targeted at Course 6 (EECS) students at MIT.

- The tool is intended to be used to help pick classes, curated to the student's current courseroad and interests.

In the Future:

- The tool can be expanded to any majors in any college.

- The tool can extend to add customization per major and allow for it to be used in a wider context.

Learning Objectives

- Find classes that are actually interesting for the student.

- Stay on track to graduate on time.

- Relieve the stress of choosing among a wide variety of classes with little knowledge.

- Help first-year students make an informed decision by providing more detailed description per class.

Playtesting Session

- What features should we add next?

- Feedback on the tool.

- How might this tool have a greater impact?

Playtest Results

Hypothesis: Our tool can help pick classes that interest the student.

Results:

- Participants were hesitant about this.
- Note: "Since I have a very specific area of interest, I'm not sure if the tool can account for that. I would have to do my own research eventually."
- Our take: In the future, we can add a feature allowing to search for a specific class and get our curated information on that class.

Playtest Results

Hypothesis: Our tool can help the student stay on track to graduate.

Results:

- Participants agreed with this statement.
- Note: If someone wants to graduate earlier than in 4 years, the tool may not account for that.
- Our take: It would be much harder to add this feature to the tool and would require more time and data collection.

Playtest Results

Hypothesis: Our tool can help first-years make an informed decision about which classes can help them in the long run.

Results:

- Participants slightly agreed with this statement.
- Note: "It's hard to say if this will be effective without seeing actual results, but the idea makes sense."
- Our take: In the future, we would need to ask third years who have used our tool in their first year for feedback.

04

# Conclusions

The next steps, some discussion
questions, and takeaways.

Next Steps

- Gather data from many students about:

  ○ Key learning points in the class

  ○ Links to old syllabus/class website

  ○ Hours spent in class

- Extend the tool to work with other majors.

- Add filters so students can specify:

  ○ Light/Heavy load semester

  ○ Finals/Midterms/Projects

- Playtest more and iterate!

- Make the website publicly available to all students at MIT.

- Improve the appearance of the website.

- Add diagrams and charts to make the data more visual.

  ○ Data from previous years

  ○ Recommended courseroad

Class Recommendations for course 6 Majors
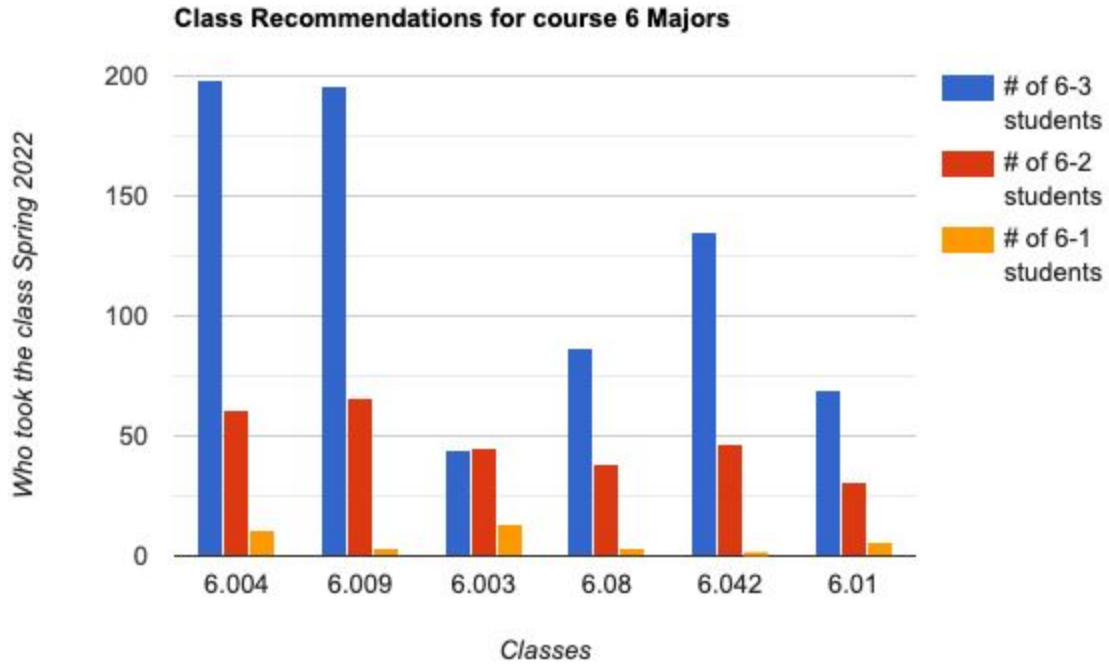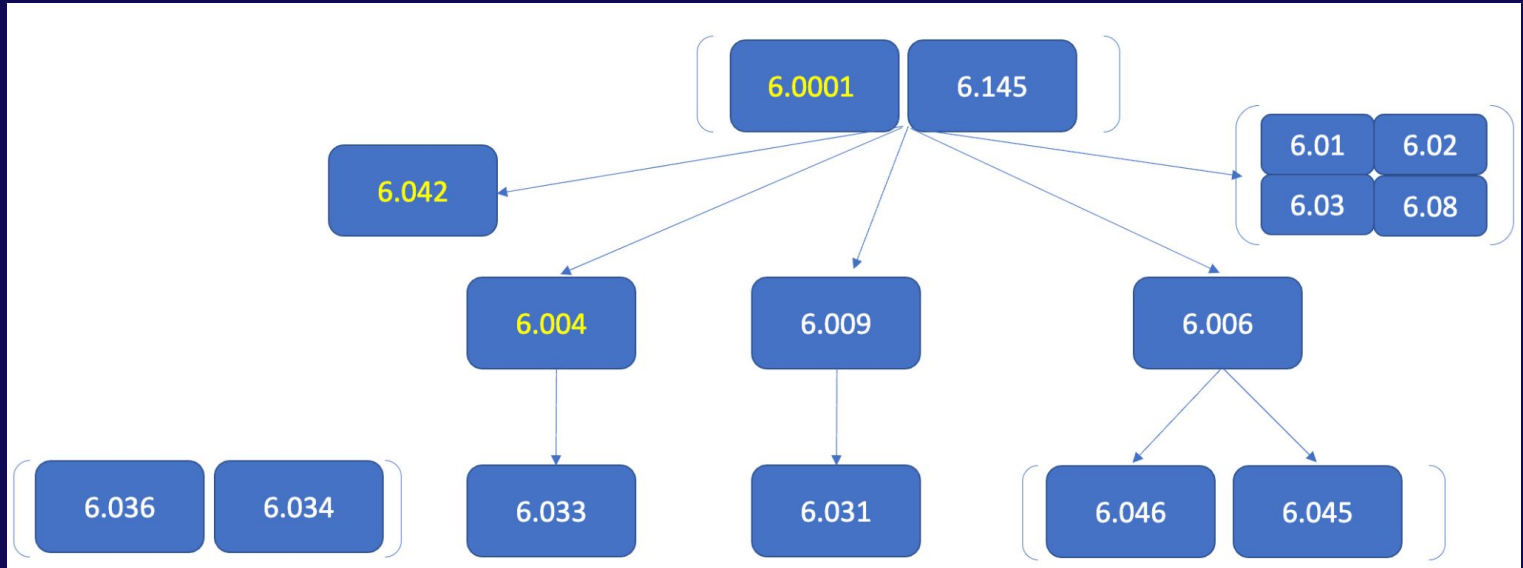
Next classes to take: 6.033, 6.009, 6.006,
(6.01 or 6.02 or 6.03 or 6.08)

Acknowledgments & Citations

Thank you to all the instructors and our interviewees for the valuable feedback and help throughout the semester! Special thanks to our mentor, Preeti for her guidance and constant support!

[1] Chaturapruek, S., Dalberg, T., Thompson, M. E., Giebel, S., Harrison, M. H., Johari, R., Stevens, M. L., & Kizilcec, R. F. (2021). Studying Undergraduate Course Consideration at Scale. AERA Open, 7, 233285842199114. https://doi.org/10.1177/2332858421991148

Discussion Questions

- Do you think our tool would help solve the concerns of equity, career funneling, and college completion to some extent?

- As mentioned earlier, *Chaturapruek et al.* mention that the first classes the undergraduate take have influence over what the student decides to major in. Do you think our tool could add internal bias and influence this decision towards the more popular majors?

Thanks!

Questions?