An assessment disconnect

- Institutionally, UM assembles a portrait of the student and a record of their progress
- This includes admission info, course selections, in sequence, with performance assessed only by grades
- It includes some information about extracurricular activities
- This institutional data provides our only current career-long picture of students
- For too long, this information has been inaccessible to most faculty
- This institutional portrait may still be inadequate for some purposes, and we should work to fix this

- One part of assessment is solidly built into our practice: grading in our courses
- Within a course, a rich and comprehensive body of assessment material is assembled and carefully reviewed
- Right now, this material is summarized and recited only as a grade, with 13 divisions (A+ -> E)
- For most faculty, our classroom is all we see of a student
- We don’t know where they came from
- We don’t know where they go to
- We can’t see how their preparation affects their performance in our class, or how their work with us affects their future

What might you want to know?

- How strong are course interconnections among the divisions (humanities, social sciences, natural sciences) compared to connections within them?
- What factors in a student’s preparation most seriously affect their performance in a particular course?
- What are the grade distributions for a particular course, sequence, or concentration?
- Which courses are students taking concurrently with (or subsequent to) a particular course?
- How are all of factors changing with time, and why?

Course questions

- At the start of a class: very little information: names, IDs, pictures
- At the end of a class: a suite of student work, hints at what they’ve learned, summarized as a grade
- Who is taking this class?
  - What background do they have?
  - What else are they taking now?
  - Where are they headed after this course?
- How does background affect student performance?
  - What students are almost certain to do well?
  - What students are at risk from the start?
  - How could you help both?
- How does this class connect across the curriculum?
  - What should students bring to the class?
  - What should students take for future courses?

Concentration questions

- What background do eventual concentrators bring to the university?
- How do they differ from other LSA students?
- Why do they select your concentration?
- What is the grade history in your courses?
- What affects this?
- How do your courses affect one another?
- Which courses are most important for overall success?
- Are you using AP credit appropriately?
- How do the programs of successful and struggling students differ?
MLSA

College Questions

- How do students meet the various college-level requirements?
- Are these approaches consistent with the aims of the requirements?
- What do students pursue that we do not require?
- How do participants in living-learning communities compare to the rest of the student body?
- How does participation in extracurricular activities affect student outcomes, from concentration choice to GPA?

MLSA

Data exists and is increasingly available

- Complexity of data gathering used to seem an insurmountable barrier
- Institutionally, large quantities of data are collected already
- These contain much of what we might want to examine
- They probe history too, already for more than a decade...
- Recently, efforts have been made to put this data in the hands of faculty and programs
- Existing data cannot answer every question, but...
- Faculty have a special responsibility to ask questions, help digest, and act on this information

MLSA

M-Pathways to student data

- M-Pathways: created a stable, integrated environment for records
- An extensive portrait of every student back to ~1996 is in this system
- Access has been limited to M-Pathways trained staff
- Access to this data provides faculty with wholly new tools for assessment
- We need to work with data professionals to define tools which allow us to easily address our most important questions

MLSA

ART: the Academic Reporting Toolkit

- In 2002, a committee was formed to approach this problem: LSA-MAIS Pilot User Group
- Their report provides an excellent overview of this problem, along with steps toward a solution

MLSA

Original ART projects

- Annual summary reports for departments and programs
- Online Reporting tools for administrators and individual faculty

MLSA

Easy web access to many queries

https://www-a1.lsa.umich.edu/AdminData/artmain2.aspx
Art course clustering: < 300

Art course clustering: 300+

What ART needs

- **Use** and feedback from faculty members with real questions
- The online tools are just a first cut, a guess at what sorts of things you might want
- ART as it stands is very course oriented, rather than student oriented
- If you need other things, they are not impossible to get
- They won’t become available until someone asks for them in a well thought out way
- Improvements need to be application driven
- We have been slow...

ART average grades: < 300

A new data access tool: LSA Advising Tools

This is very student centered, rather than course oriented...
Two personal examples

1. Who’s going to do well: a grade prediction project
   - Physics Department historical study aimed at connecting input properties of students to final grade
   - Course oriented joint project with Evarard and Gerdes

2. Does the Honors Program successfully pick incoming students who will be successful in their first year?
   - Comparative study of students who enter through freshman honors and those who don’t

Who does well?

- We want to map the incoming student (represented by many aspects of preparation) to the output grade
- This tells us two things
  - What preparation matters?
  - How does what we do affect outcomes, and for whom?

- To do this, we have
  - Defined parameters we suspect might matter at input
  - Extracted these, along with final grades, for 35,000 students taking intro physics over the last decade
- We are now constructing models to map input to final grade

Parameters available

- Information about student in the course
  - Course number
  - Semester
  - Instructor name
  - Q1, Q2, Q3 scores for the class

- Information about the students
  - High school GPA
  - SAT and ACT
  - State and Country of origin
  - First generation college student?
  - Socio-Economic Status
  - Admission rank
  - ID
  - Gender

UM information at start of term
- Cum GPA
- Number of credits at Michigan
- Number of transfer credits
- How many credits in math
- How many credits in science (Physics, Chem, Geo, Astronomy, BIO, Engineering)
- GPA in math and science
- Age on arrival to the class
- Athlete status

Information at the end of the term
- Grade in this course
- Number of credits in this term
- GPA in this term

What we’re finding

Most important predictive factor is UM GPA at the start of the course.

This mirrors results found at Washington for intro biology courses

What we’re finding

Mapping in the engineering intro physics course is different, and even more clearly dependent on prior student UM GPA.
**What we’re finding**

- **Physics 240**

**What we’re hoping to learn**

- Historical studies: how do the maps from input student to output grade change with:
  - Instructor
  - Course evaluation
  - Time (HS grade infl?)
  - Mechanics vs. E&M
  - 125/126 vs. 140/240
- Preparing for the future
  - Put in place the ability to probe the differential effect of course changes on high performers and at-risk students independently
  - Define factors which lead to success, and feed them back to advising

**Honors for freshmen**

- Students selected from UM accepted pool
- ~1500 HP essays received
- ~500 students selected
  - Number is limited by space restrictions...
- Roughly 10% of LSA students
- Are we selecting well prepared, motivated students?
  - 76% are at 3.5+ after first year (32% in LSA)
  - 34% are at 3.8+ after first year (11% in LSA)
- We don’t identify all top performers: among the 3.8+, 163 are in 1st year Honors, but 394 are not

**Data is important and available!**

- Much of what we do is little examined
- Existing M-Pathways data are very underutilized by interested faculty
- More users will generate better, more powerful, access tools
- Many questions cannot be answered with existing data
- It is our job to identify new, better forms of data, and to convince the institution to begin collecting these...