Transformative Teaching & Learning

Broad Educational Goals

1. Deep Disciplinary Knowledge and Skill

2. Leadership Skills
   a. Interdisciplinary facility
   b. Defining problems for others to solve
   c. Working Collaboratively – across “cultures”
   d. Integrity, diversity, life-skills

3. Knowing How to Learn

Transformative Teaching & Learning

Some ideas that have emerged

1. Creating degrees with long tails
2. Flipping the Institution
3. Embracing a *learning science* approach to CMU education
4. Involving students in interdisciplinary grand challenges
5. …….. Other ideas???? …….

Transformative Teaching & Learning

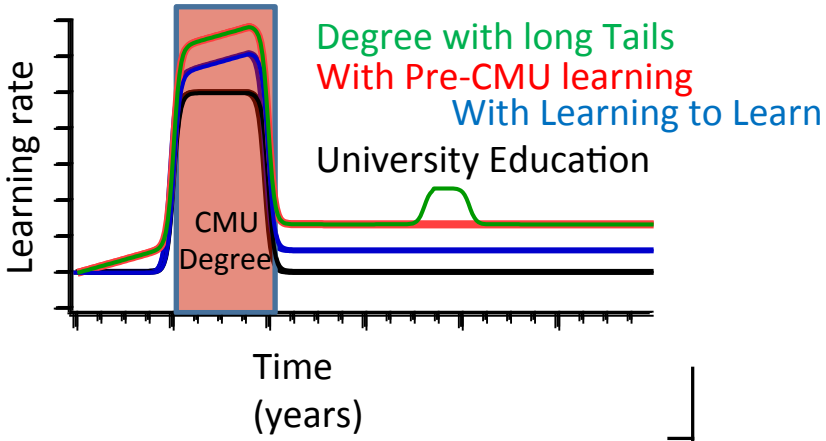
1. Creating degrees with long tails

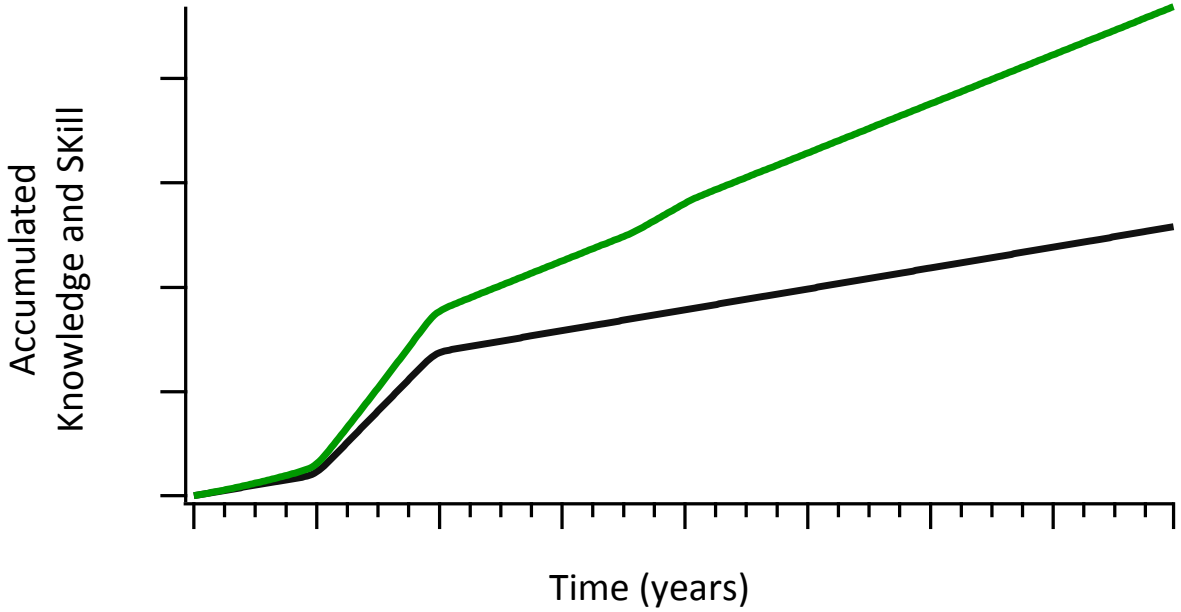
Typically students engage with a university for a discrete time (e.g. four years) during which they increase their knowledge and skill

What if:

1. A CMU degree taught students how to learn so that they were forever able to acquire knowledge more efficiently
2. Before coming to CMU, students could take CMU courses and learn while we used their performance in our courses to determine whether they would likely succeed at CMU
3. A CMU degree came with a long-term “subscription” to additional content that alumni could access years later
4. CMU Alumni could participate in these courses along with current students

The degree with long tails





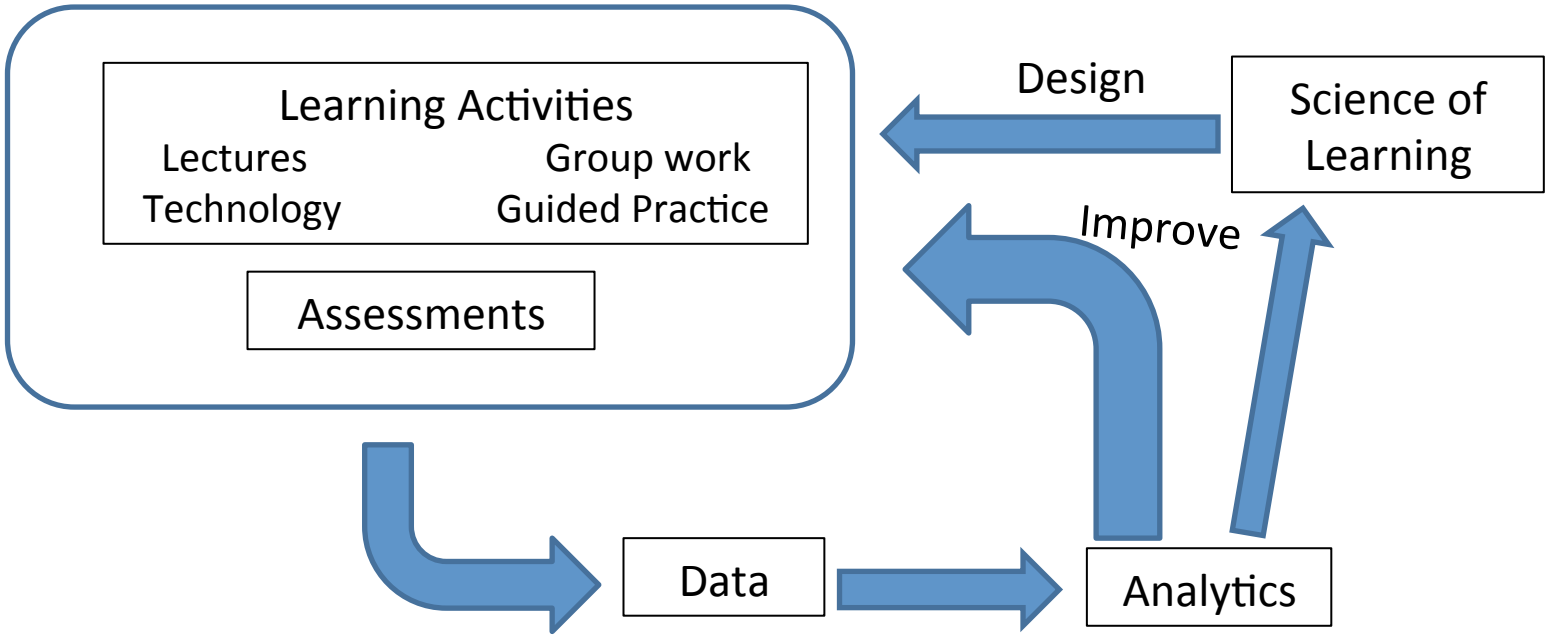
2. Flipping the University

- Typically students in the first year are taught content without context in large, semester-long lecture courses
- What if:
  - We could invert the traditional educational model to create opportunities for students to engage in early in discovery-based, *mentored* educational experiences.
  - Emphasize projects, teamwork, undergrad research that gives students an understanding of the value of the content that they will learn later
  - Create structures – small, modular courses, i-Term/j-Term – that facilitate these kinds of activities

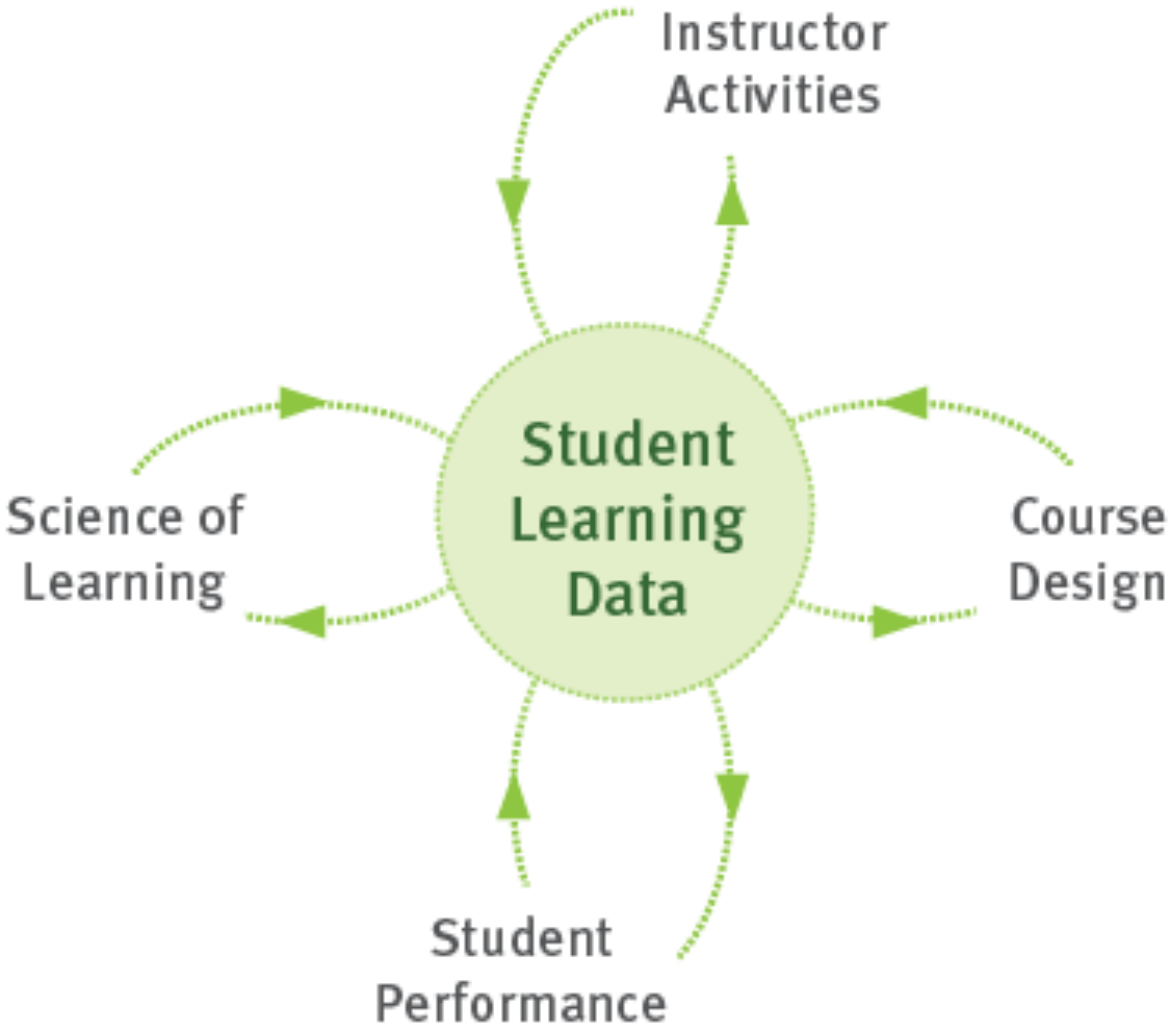
3. Embracing a *learning science* approach for CMU education

CMU is already a world leader in learning science research

We are poised to be a world leader applying learning science to CMU education



3. Embracing a *learning science* approach for CMU education



3. Embracing a *learning science* approach for CMU education

The Payoff:

Demonstrably Better Learning Outcomes

- **Intro to Statistics**: Better outcomes, in ½ the time
- **Algebra**: Rand Corp. Study: an extra year of learning, across all SES groups

Better Use of Instructors

- Technology → Standard concepts and skills
- CMU Professor → Nuanced case studies or novel applications

Data-driven, iterative improvement culture

- Students can *personalize* learning
- Courses, programs, and degree outcomes can be *systematically* improved

4. Interdisciplinary Grand Challenges

- Early: interdisciplinary exposure to a grand challenge topic
- Later: interdisciplinary collaborative research on the same topic
- Community, alumni, outside engagement
- Grand challenge topics:
  - Sustainability
  - Cybersecurity & Privacy
  - Terrorism
  - BioEngineering (genetic, neuro, etc.)
  - Inequality (economic, educational, etc.)

5. Other Ideas????