Learning Analytics

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General Approaches

- Domain-driven:
  - Stakeholder: I have a problem
  - Analyst:
    - This is the data we'll need to understand the problem
    - [Gather data…]
    - This is what the data says what needs to be done
  - Analyst/someone else comes up with the solution that meets those needs

General Approaches

- Data-driven:
  - Stakeholder: I have a bunch of data
  - Analyst:
    - This is what the domain specialists indicate as important information to study
    - These are the techniques I have to explore the data
    - These are the patterns/relationships/models I've discovered
  - Analyst/someone else comes up rationale to explain the discoveries

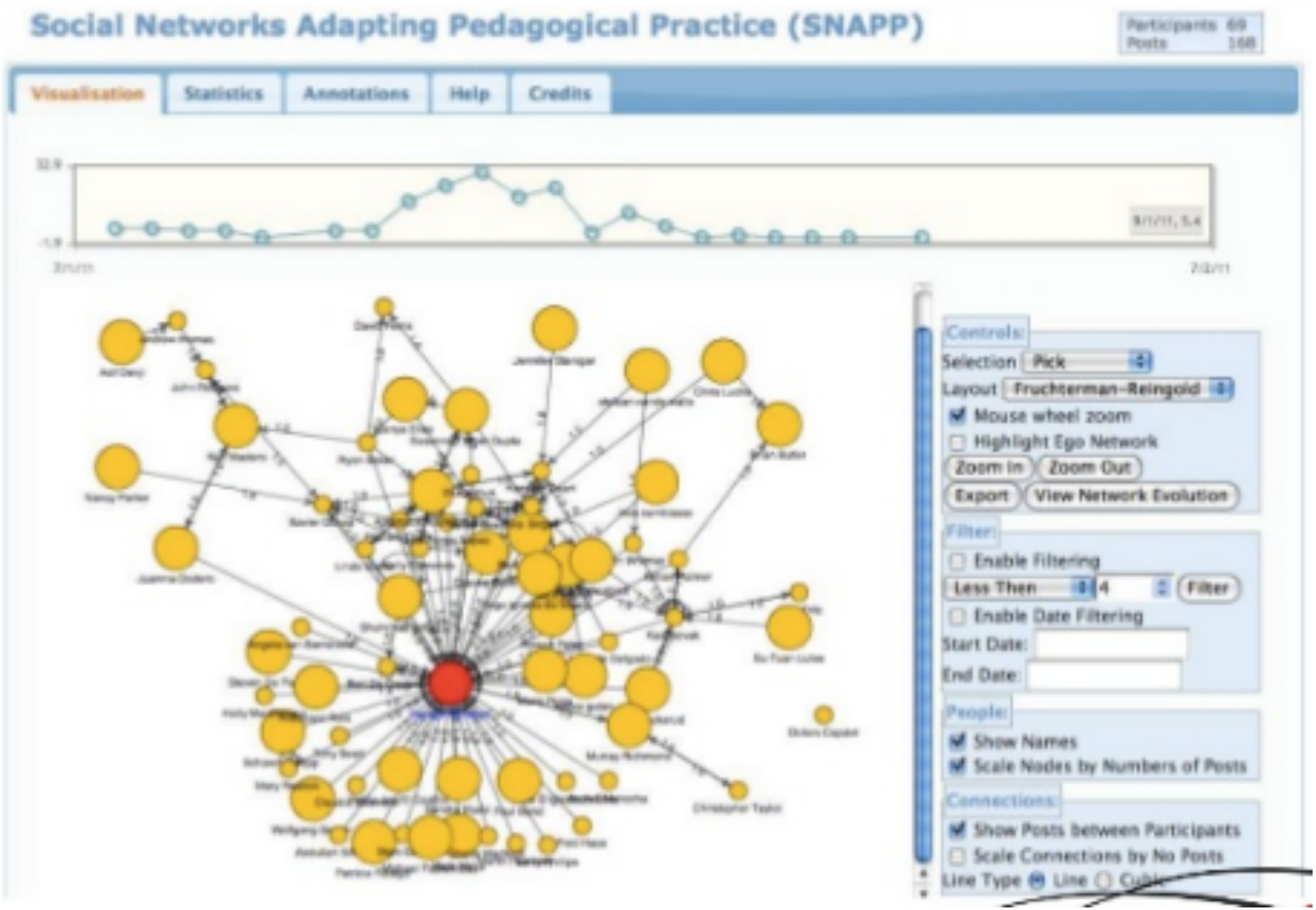
Scenario: Modeling Student Interaction

- Assist educators in identifying:
  - Learner isolation
  - Community formation
  - Creativity

- Why are these important in learning?

Case Study 1: SNAPP

Image taken from slideshare.net (Bakharia & Dawson 2011)



Pedagogical Uses of SNAPP

- Graph used to view interaction via connectivity
  - Intervention to include isolated learners

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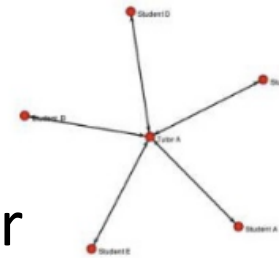
- Identification of facilitator centric pattern
  - Indication there's not much knowledge sharing or collaboration



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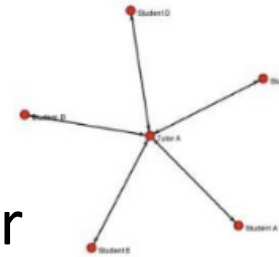
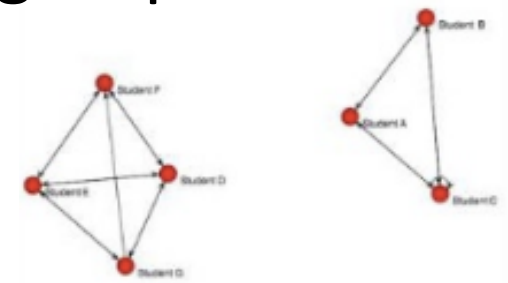
  - Suggests lack of diversity





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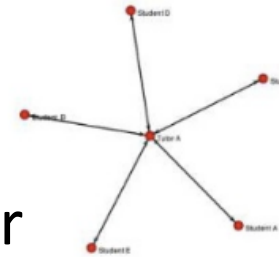
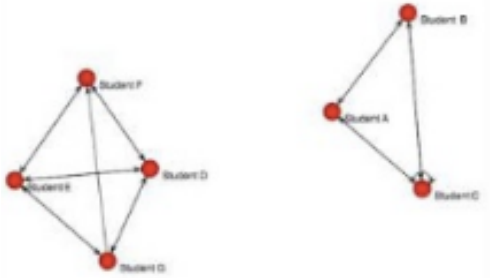
- Lots of nodes with a low degree
  - Lack of engagement or understanding





Scenario: Recommending Electives

- Assist students in finding:
  - Interesting non-degree electives
  - Relevant electives
  - Highly recommended electives

- How do you decide which electives to take?

Case Study 2: Degree Compass

- Piloted in Austin Peay State Univeristy
- Recommends courses that best fit student talents and program of study
- Generates ranked list of courses that help student progress through the program
- Ranking of courses is overlaid with estimation of best student performance
- Recommends:
  - Courses required for graduation
  - Courses central to curriculum and major
  - Courses students are expected to succeed in (How?)

Figure 1. **Degree Compass**

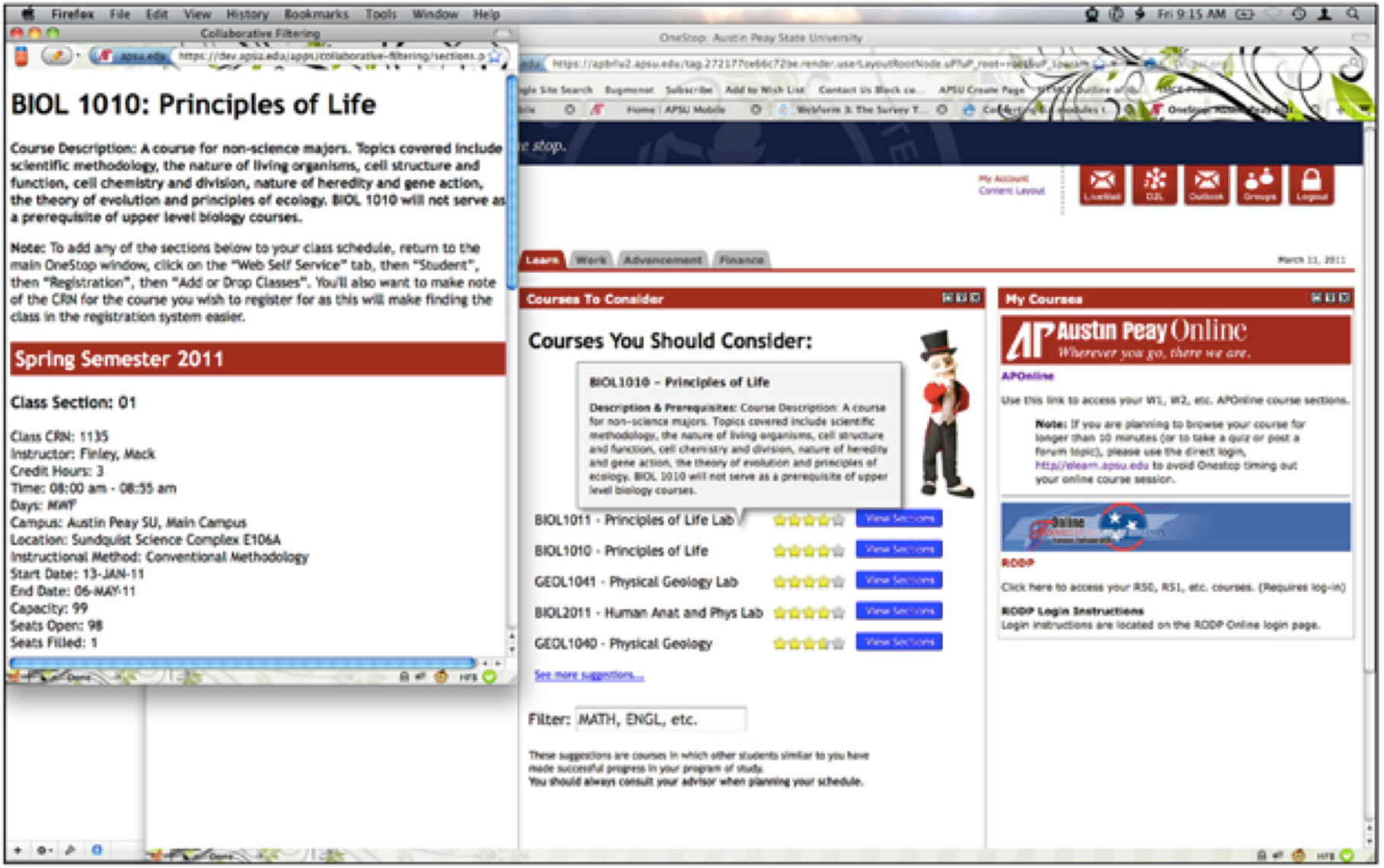


Image taken from http://er.educause.edu/articles/2012/9/austin-peay-state-university-degree-compass

Potential Impact on Student Success

- U.S. Higher education statistics:
  - 77% advances to second year
  - 55% students graduate at post-secondary
  - 60% full-time undergrads take 8 years to get a 4-year degree
- Uses predictive analytics to determine ideal curriculum and quickest path to degree completion
- Acquired by Desire2Learn Inc. in 2013

Scenario: First-Year Retention

- Assist students in:
  - Integrating into new campus life
  - Identifying events or clubs of interest
  - Staying on track academically

- What was your transition to first year university like?

Case Study 3: FYRe

- Build a “purpose network” to:
  - Improve student and parent engagement
  - Increase student retention rates
  - Track and collect success metrics
- Piloted at Fort Hays State University, which has ¾ student population studying online
- First-Year Retention Experience (FYRe) is an online (closed) network to engage students in campus life

Retention Rates in FYRe

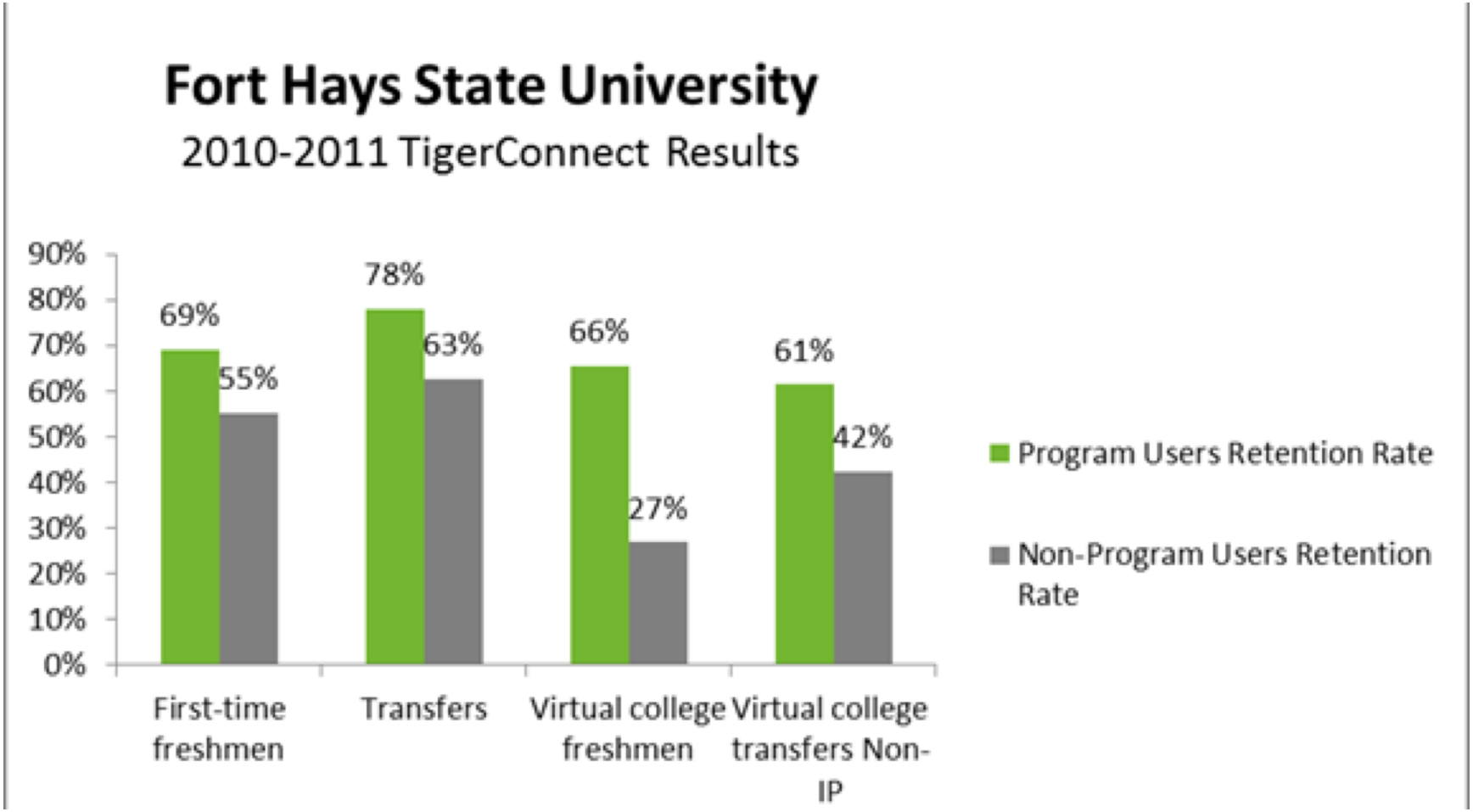


Image taken from http://er.educause.edu/articles/2012/8/building-a-purpose-network-to-increase-student-engagement-and-retention

Parent FYRe and EarlyIQ

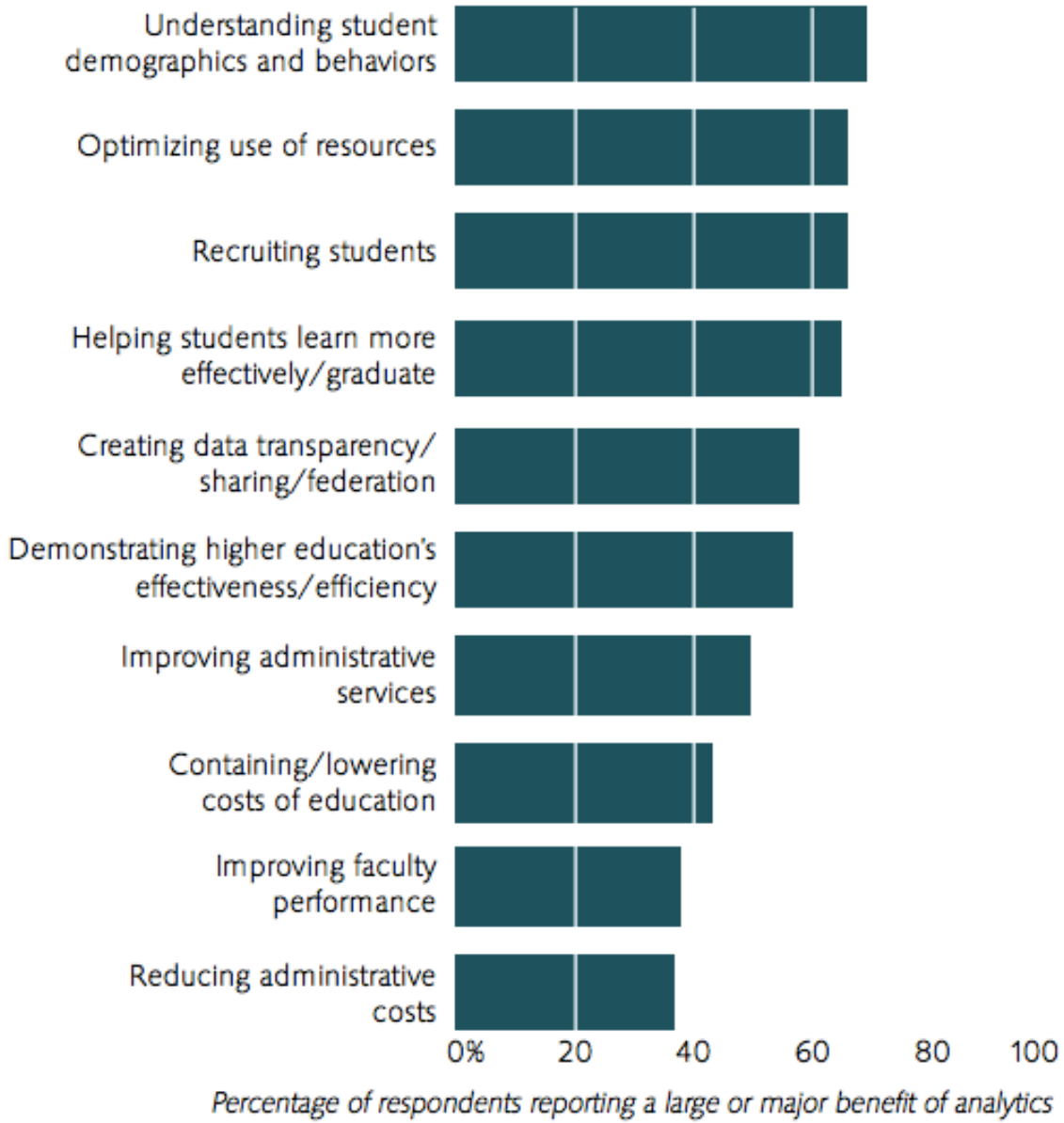
- Parent FYRe
  - Parent network for students in program
  - Communicate student support efforts and interests for students and families
- EarlyIQ
  - Administrative interface to identify at-risk students
  - Implement intervention plans, track progress, communicate with other faculty

Image taken from http://er.educause.edu/articles/2012/8/building-a-purpose-network-to-increase-student-engagement-and-retention

Summary

- LA can involves many aspects:
  - Incorporate data from multiple sources
  - Profile individual learners
  - Identify at-risk learners
  - Model progress and activity in (near) real-time
  - Automate interventions
  - Adapt personalized learning content, activities, and assessments
  - Facilitate interventions or decision making
  - Compare learner profiles to domain models for assessment

Figure 4. Perceived Benefits of Analytics for Higher Education



Reference: Analytics in Higher Education: Benefits, Barriers, Progress, and Recommendations (EDUCAUSE 2012)

Inventory of LA Tools

- From Ferguson et al. 2016, Appendix 1:
  - Inventory of tools/systems for various purposes

- In-class exercise:
  - For each tool, take turns presenting the following:
    - Basic description of the tool
    - What is good, cool, novel, etc.?
    - What is bad, weird, needed but not done, etc.?

Overview of A1

- A very short assignment to get you into the course
  - Exercise 1:
    - Pick a tool from Ferguson et al. 2016
    - List 3 features to improve it
  - Exercise 2:
    - Data collection for later modeling exercise

- Future assignment expectations
  - Programming in (new) languages