

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

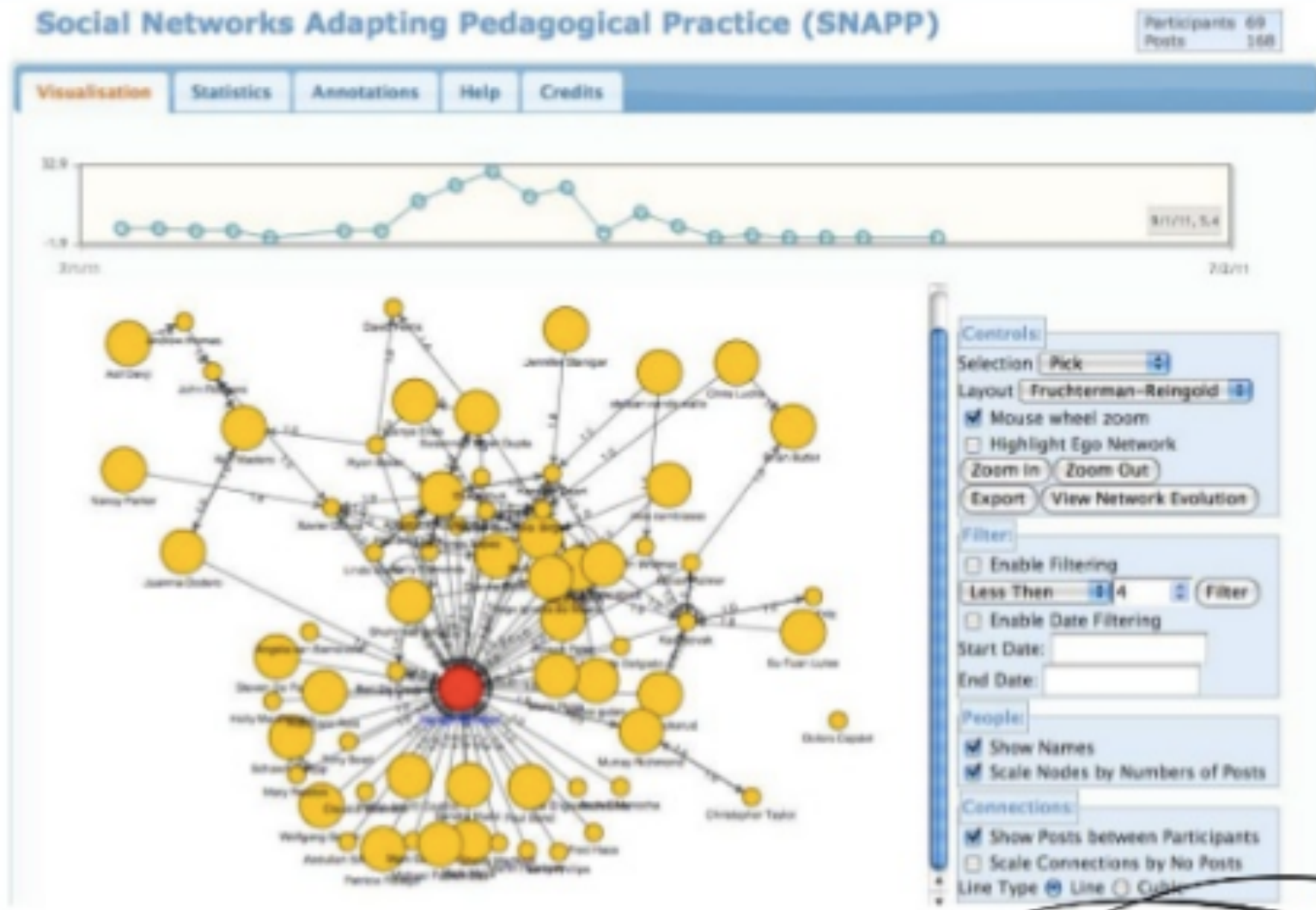
Scenario:

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)

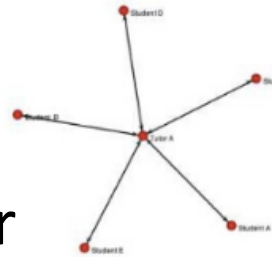


Pedagogical Uses of SNAPP

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

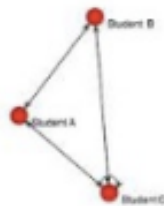
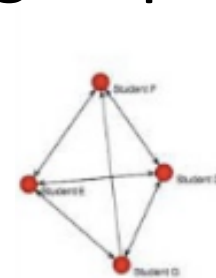
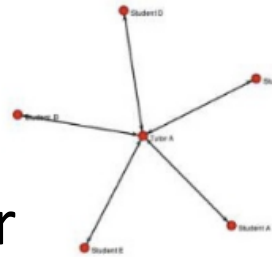
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- Graph used to view interaction via connectivity
 - Intervention to include isolated learners
- Identification of facilitator centric pattern
 - Indication there's not much knowledge sharing or collaboration



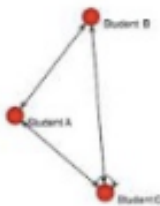
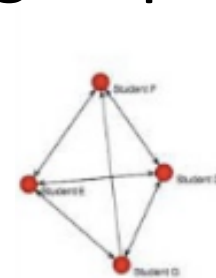
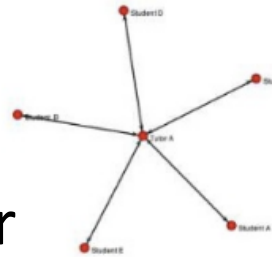
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 - Suggests lack of diversity



Pedagogical Uses of SNAPP

- Graph used to view interaction via connectivity
 - Intervention to include isolated learners
- Identification of facilitator centric pattern
 - Indication there's not much knowledge sharing or collaboration
- Clique formation and non-interacting groups
 - Suggests lack of diversity
- 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 University
- 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

The image shows a screenshot of the OneStop Austin Peay State University website. The main content area is titled "Courses You Should Consider:" and lists several course options with star ratings and "View Sections" buttons. A sidebar on the left provides detailed information for BIOL 1010: Principles of Life, including its description, prerequisites, and class details for the Spring Semester 2011.

BIOL 1010: Principles of Life

Course Description: A course for non-science majors. Topics covered include scientific methodology, the nature of living organisms, cell structure and function, cell chemistry and division, nature of heredity and gene action, the theory of evolution and principles of ecology. BIOL 1010 will not serve as a prerequisite of upper level biology courses.

Note: To add any of the sections below to your class schedule, return to the main OneStop window, click on the "Web Self Service" tab, then "Student", then "Registration", then "Add or Drop Classes". You'll also want to make note of the CRN for the course you wish to register for as this will make finding the class in the registration system easier.

Spring Semester 2011

Class Section: 01

Class CRN: 1135
Instructor: Finley, Mack
Credit Hours: 3
Time: 08:00 am - 08:55 am
Days: MWTF
Campus: Austin Peay SU, Main Campus
Location: Sundquist Science Complex E106A
Instructional Method: Conventional Methodology
Start Date: 13-JAN-11
End Date: 06-MAY-11
Capacity: 99
Seats Open: 98
Seats Filled: 1

Courses To Consider

Courses You Should Consider:

- BIOL1010 - Principles of Life
Description & Prerequisites: Course Description: A course for non-science majors. Topics covered include scientific methodology, the nature of living organisms, cell structure and function, cell chemistry and division, nature of heredity and gene action, the theory of evolution and principles of ecology. BIOL 1010 will not serve as a prerequisite of upper level biology courses.
- BIOL1011 - Principles of Life Lab
- BIOL1010 - Principles of Life
- GEO1041 - Physical Geology Lab
- BIOL2011 - Human Anat and Phys Lab
- GEO1040 - Physical Geology

Filter: MATH, ENGL, etc.

These suggestions are courses in which other students similar to you have made successful progress in your program of study. You should always consult your advisor when planning your schedule.

My Courses

AP Austin Peay Online
Wherever you go, there we are.

APOnline
Use this link to access your W1, W2, etc. APOne course sections.

Note: If you are planning to browse your course for longer than 30 minutes (or to take a quiz or post a forum topic), please use the direct login, <http://learn.ap.edu> to avoid OneStop timing out your online course session.

RODP
Click here to access your RSD, RSL, etc. courses. (Requires log-in)
RODP Login Instructions
Login instructions are located on the RODP Online login page.

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 $\frac{3}{4}$ student population studying online
- First-Year Retention Experience (FYRe) is an online (closed) network to engage students in campus life

Retention Rates in FYRe

Fort Hays State University 2010-2011 TigerConnect Results

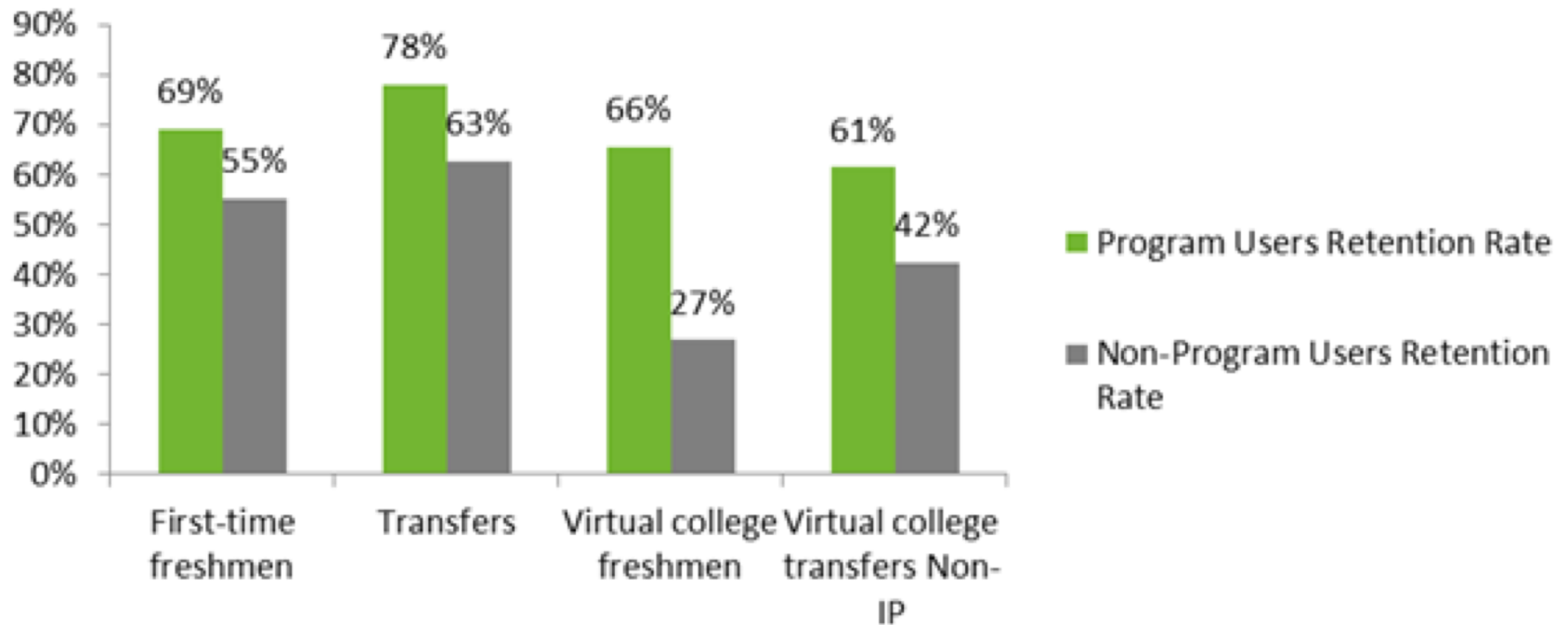


Image taken from <http://er.educause.edu/articles/2012/8/building-a-purpose-network-to-increase-student-engagement-and-retention>

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

INSIGHT FOR INFORMED DECISIONS

Assessment

215

action plans in the system

92

action plans in progress

37

action plans overdue

86

action plans completed

+ Responders Edit

- Residence Life 25%
- Tutoring/SI 20%
- Greek Life 18%
- Counseling 16%
- Other 21%



+ Reasons for RFI Edit

- Late to class 21%
- Missed assignments 18%
- Absences 16%
- Illness or fatigue 15%
- Substance abuse 5%
- Other 25%



+ Instructors with the most RFIs Edit

- Shannon Holmes 40%
- Danny Debelius 24%
- Peter Tomassi 16%
- John Garrand 14%
- Leslie Angelos 6%



+ Prescribed Action Plans Edit

- Student Success Ctr 505
- Student Activities 455
- Career Center 444
- Counseling Center 386
- Other 429



+ Intervention Success Form Results Edit

- Student back in class
- Difference in student
- Passed course
- No change
- Problem is worse



+ Top Course Referrals Edit

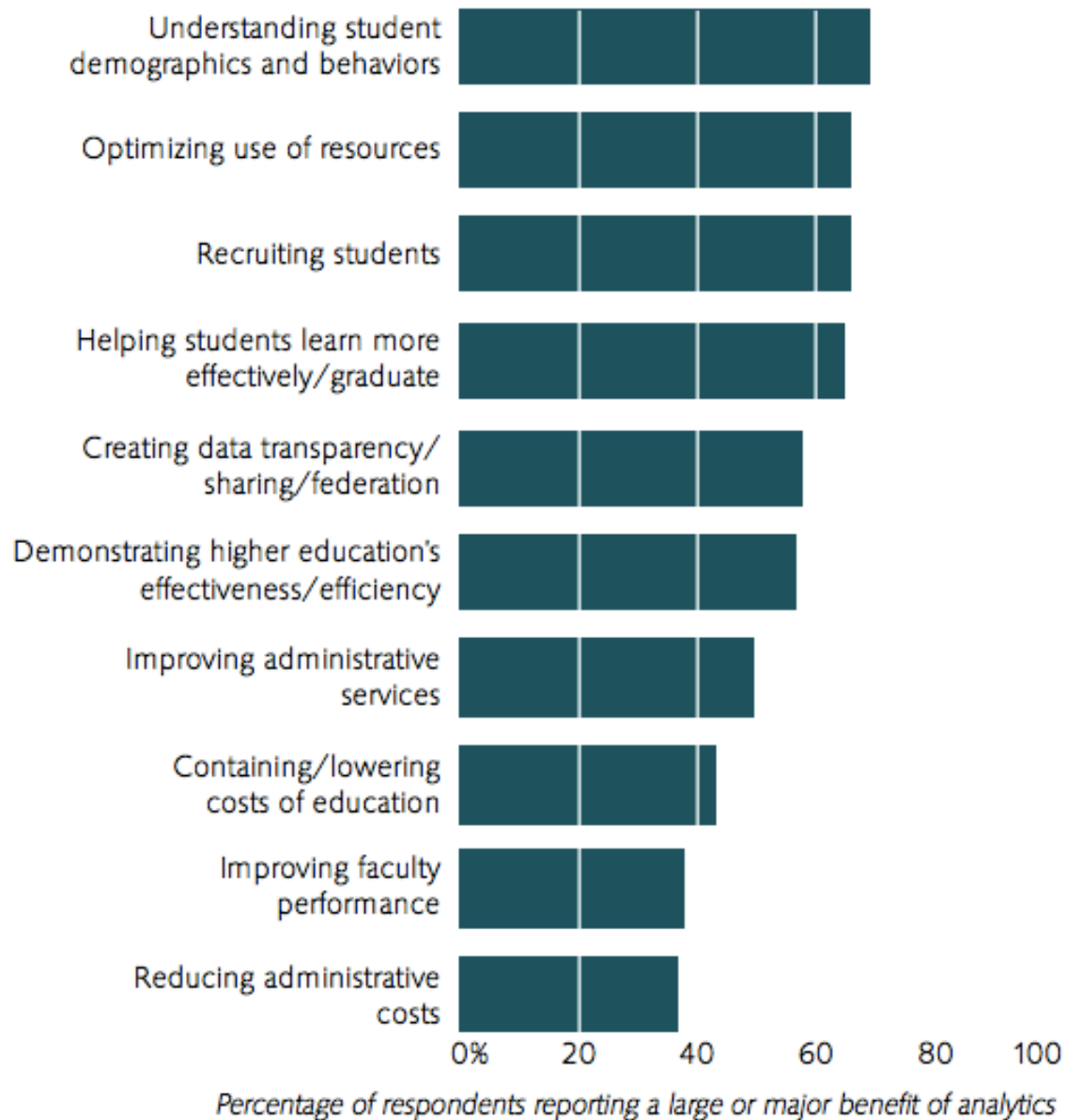
- University 101 435
- English 111 378
- Math 141 321
- Freshman Seminar 284
- Business 100 211
- Other 739



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



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