UNIVERSITY OF MINNESOTA ROCHESTER

Maximizing Education Effectiveness Through Active Learning

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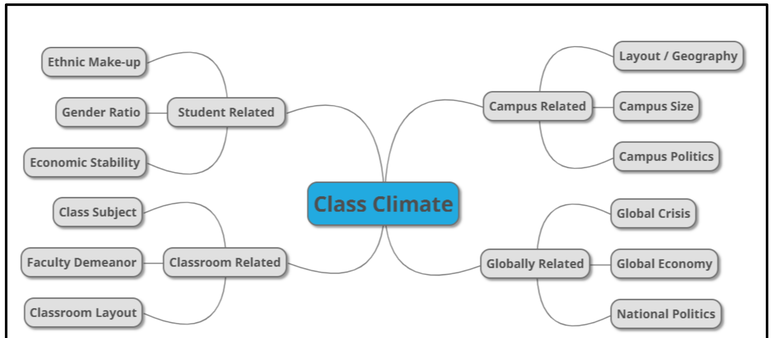
Understanding the Past

Class Climate:

Understanding the Factors Responsible for Success

The class climate is a way of thinking about the learning environment. It is the culmination of all the factors that contribute to student success. Below is a thought map of the various types of factors related to class climate.



These factors an many more contribute to student success.

Figure 1: A Thought map of all of the factors that contribute to class climate. This figure was created using mindmup.com.

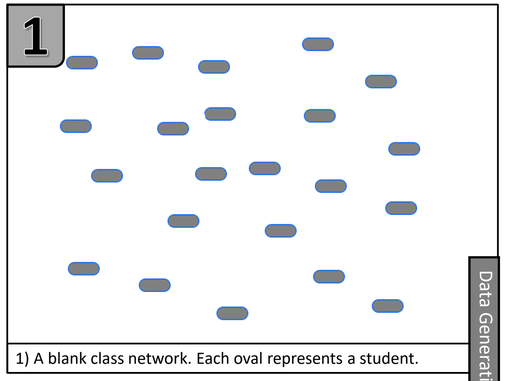
The Shift Towards Active Education

- What does it mean to shift towards active learning-based education?
  - Active learning-based curriculums are designed to encourage students to engage with the material themselves in as many ways as possible, as opposed to exposing them to the material through lecture.
- Why would do want an active learning-based curriculum?
  - UMR's diverse body put's some students at a disadvantage in curriculums, and maximizing their inclusion in the classroom through active learning is crucial for the success of campuses like UMR.

Maximizing the Present

The Mutual Preference Method:

Using Student Relationships to Guide Group Formation



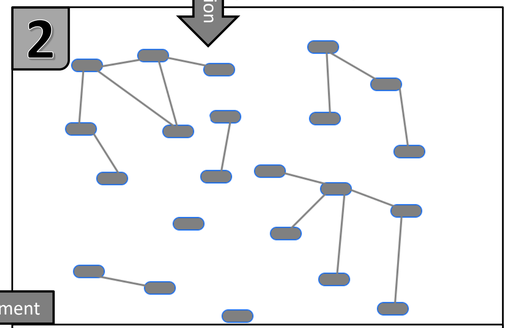
1) A blank class network. Each oval represents a student.

Data Generation

One way of increasing student engagement with the curriculum is to increase interaction with their environment through group work!

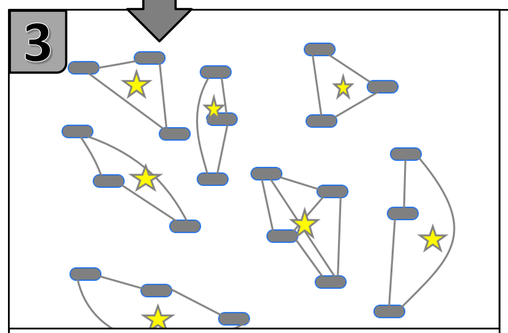
We began work on a method to create the best student groups possible from data provided by the class.

By asking students to list collaborators that they would prefer to work with, we managed to make groups composed solely out of members that requested to be together.



2) The raw data. Students help us form links around which groups are built. These links are then refined into groups of three.

Data Refinement



3) The finalized groups. Careful arrangement of the students results in groups of mutually preferred collaborators.

Careful notes on these types of interventions can be useful tools for educators.
Novel methods like these increase student performance when they are successful, and teach us new things about education when they are not.

Although not enough data was collected to make any assertions about the method's success, initial trials are promising. The following components of Class Climate seemed to affect group success:

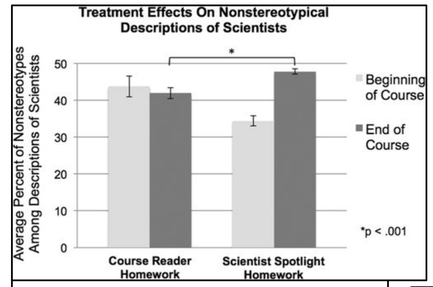
- Activity Structure
- Gender Ratio
- Existing Student Relationships

Visualizing the Future

The Scientist Spotlight:

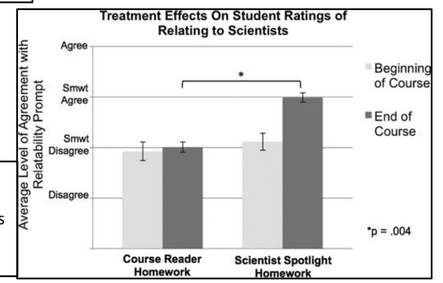
Helping Students See Themselves As Scientists

A massive limiting factor for student engagement over time is the students' ability to see themselves as professionals in the field they are studying. By helping students to identify role models in science, we may be able to help learners facing adversity in the classroom.



Researchers in California were able to positively alter students' perceptions of scientists. This was done through activities designed to introduce the students to as diverse a range of scientific role models as possible (Schinske et. al., 2016).

This graph shows how a class that uses scientist spotlight activities (right) changes their descriptions of scientists compared to a control class (left). After the semester, the scientist spotlight class demonstrated a significantly higher percentage of non-stereotypical responses.



This graph shows how decreasing scientist stereotypes causes a statistically significant increase in relatability among students. This phenomenon has been linked to increased academic success in students.

References

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