An Exploration of Social Networks for Under-Represented Minority Students in LA-supported Classrooms

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Why diversity is important in STEM?

In 2014, only 30\% of students who receive an Undergraduate STEM Degree are of an Under-Represented Minority (URM) background.

- URM includes the following: Black, Hispanic, Am. Indian, and 2 or more race students

Programs exist to contribute to the retention and inclusivity for URM students in STEM:

- Summer-bridge programs
- STEM Outreach programs
- On-campus resources

The Learning Assistant (LA) program could be a new resource that promotes inclusivity and retention for URM students in STEM.

Exploring LA impact on URM students?

Previous studies have shown that LAs impact students through:

- improving higher-order cognitive skills\textsuperscript{1}
- improved learning gains in a General Biology II course\textsuperscript{2}
- facilitating clicker-question discussions in class\textsuperscript{3}

This project focuses on social networks within LA supported classrooms:

- Where do URM students lie within these social networks?
- Is there any significant difference within degree centrality or LA interaction with URM students?

Social Network Analysis

Data Collection:
Social network surveys for courses A and B during Spring 2017/2018

Data Analysis:

- Comparison of Means:
  - Average Degree Centrality (Avg. DC)
  - Average Learning Assistant Interaction (Avg. LAI)
  - Network Density
  - Course Demographics

Tools used:
- R (statistical programming language, and visuals)
- yEd Graphical Editor (visuals)

Discussion & Next Steps

- 3 out of the 4 sections have no significant difference in Avg. DC while URM students in the 4th section (course A, Spring 2018) have a significantly higher Avg. DC than Non-URM students
- Network data reveals that URM students are similarly or more connected than non-URM students, so they are still a part of the overall classroom network and not disadvantaged

Next steps:
- Focus on more courses with social network data at partner institutions with different demographics
- Analyze current institution data by comparing more social network characteristics (i.e., eigenvector centrality, betweenness, etc.) with demographic data (i.e., course grades, English second language, first-gen. status, etc.)

Social Networks for Course A and B

![Figure 1.1](image1)

![Figure 1.2](image2)

![Figure 2.1](image3)

![Figure 2.2](image4)

![Figure 3.1](image5)

![Figure 3.2](image6)

![Figure 4.1](image7)

![Figure 4.2](image8)

<table>
<thead>
<tr>
<th>COURSE</th>
<th>TERM</th>
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<tr>
<td></td>
<td>Group</td>
<td>n</td>
<td>Avg. DC</td>
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</table>

Course A

- URM students have a significantly higher degree centrality than non-URM students (p < 0.05) in 2018
- 2018 URM students have a higher Avg. DC than 2017 URM students
- Network Density is similar from 2017 to 2018

Course B

- Network Density decreased approximately by ~50% from 2017 to 2018
- Avg. DC for LAs decreased by ~50% from 2017 to 2018
- There’s a decrease in Avg. DC and ACG. LAI from 2017 to 2018 for both URM and non-URM students

Acknowledgments

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References

1. Sellam et al., 2017
2. Talbot et al., 2015
3. Knight et al., 2015

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