Intersectionality in classroom culture: navigating interconnected contexts and identities

Emily Maxim Lamm[1], Dr. Richard Duschl[2]
[1]Sustainable Climate Risk Management Summer Scholar
[2] Department of Curriculum & Instruction of Education, Pennsylvania State University

Introduction

- Given the urgency of climate change, a dynamic and interdisciplinary science curriculum needs to encourage **climate literacy** and **collaboration** among students.
- **The Next Generation Science Standards** (NGSS) have raised the bar for what students are expected to master as they move through a unified K-12 science curriculum.
- Teachers must be equipped with tools to manage **classroom culture** and be prepared to fulfill the heightened NGSS expectations.
- **Professional development programs** need to foster an understanding of **intersectionality** – the overlap of race, class, and gender.

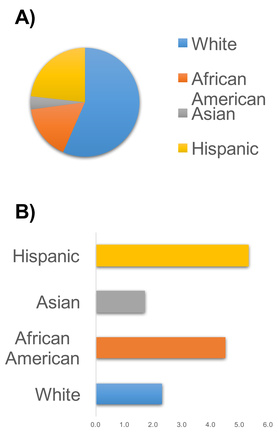
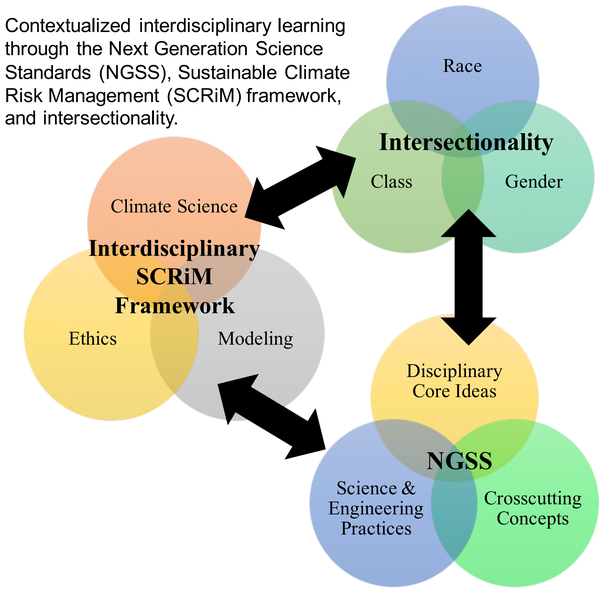


Figure 1. 2011 **A)** K-12 Public School Enrollment, and **B)** Dropout Rate 10th-12th Grade [1]

Methods

Contextualized interdisciplinary learning through the Next Generation Science Standards (NGSS), Sustainable Climate Risk Management (SCRiM) framework, and intersectionality.



Findings

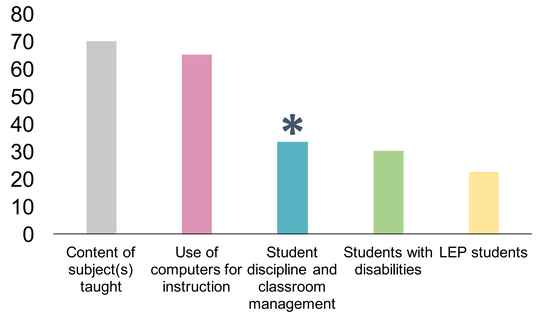


Figure 2. Participation of public middle and high school science teachers in professional development activities (2011–12).[2]

- Only **28%** of math and science teachers received **33 or more hours** [3]
- Studies suggest **80 hours** as a minimum [3]

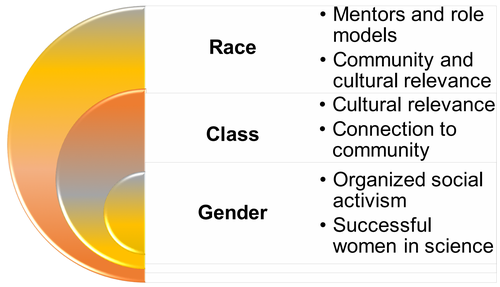


Figure 3. Opportunities for engagement of racial minorities, economically disadvantaged students, and girls.[5]

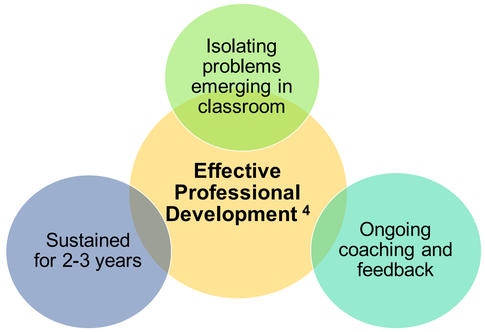
Achievement Gaps:

- Assessment **disparity maintained** throughout the academic year
- Lowest scores for students from families below poverty line and minorities [6]

Inequity Continues [7]

- **Women** with bachelor's level S&E degree earn **30% less** than men
- **Minorities** with bachelor's level S&E degree earn **19% less** than whites and Asians

Recommendations



Intersectional Overlap:

- Relatable Role Models
  - Networking by Teachers
- Activities Situated in Community
  - Collaborating with Nonprofit Organizations
- Relevance of Science
  - Insight into:
    - Research, Careers
  - Interconnected Cycles Teaching
    - E.g. Biogeochemical Cycle

Conclusions

Take Homes:

The classroom is not an isolated microcosm
- Bidirectional flow of learning in & out of the classroom
- Social co-construction of knowledge

Identity is a web of influences continually being spun
- Discourse is potent and meanings are differential

Context matters
- Social relevancy and value
- SCRiM modeling and interdisciplinary learning

Future Work:

- Streamline data collection on offerings and outcomes of induction programs, mentoring, and ongoing professional development
- Encourage feedback and insight to provide students with a voice and a sense of agency

Acknowledgements

This work was supported by the National Science Foundation through the Network for Sustainable Climate Risk Management (SCRiM) under NSF cooperative agreement GEO-1240507. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

An especial thanks to Dr. Richard Duschl, Dr. Scott McDonald, Megan Hanscom, and Jeffery Taylor II.

Contact: Emily M. Lamm ~ emily_lamm@yahoo.com ~ (412) 216 - 9670

References

[1] U.S. Census Bureau. "School Enrollment (Below Postsecondary) In Public Schools," Current Population Survey, 2011.

[2] National Science Foundation. National Center for Science and Engineering Statistics: special tabulations (2014) of 2011–12 Schools and Staffing Survey. National Center for Education Statistics. Appendix table 1-26. *Science and Engineering Indicators 2016.*

[3] National Science Foundation. National Center for Science and Engineering Statistics: special tabulations (2014) of 2011–12 Schools and Staffing Survey. National Center for Education Statistics. Figure 1-15. *Science and Engineering Indicators 2016.*

[4] Wilson, Suzanne M., Heidi A. Schweingruber, and Natalie Nielsen, eds. *Science Teachers' Learning: Enhancing Opportunities, Creating Supportive Contexts.* Washington, D.C.: National Academies, 2015. Print.

[5] "Appendix D - "All Standards, All Students"." *Next Generation Science Standards: For States, by States.* Washington, D.C.: National Academies, 2013. 1-21.

[6] National Science Foundation. National Center for Science and Engineering Statistics: special tabulations (2014) of the 2011–12 National Postsecondary Student Aid Study (NPSAS:12). Science and Engineering Indicators 2016

[7] National Science Foundation. National Center for Science and Engineering Statistics: Scientists and Engineers Statistical Data System (SESTAT) (1995, 2003, 2013). http://sestat.nsf.gov. Science and Engineering Indicators 2016.