Research Revisited as a Learning and Teaching Exercise:
An Alternative Approach to Engage Undergraduates and Faculty in Research

Greg Light, Su Swarat, Bernhard Streitwieser & Denise Drane Northwestern University

NORTHWESTERN UNIVERSITY

Research and Teaching are Connected Practices aimed at Learning:

• Students can extrapolate from own learning processes to understand how knowledge is constructed through research

• Faculty can demonstrate the knowledge development process in research as a model of individual knowledge construction

• As such, research becomes an extension of learning for undergraduate students, and an extension of teaching for faculty

Multi-leveled Mentoring as Scaffolds:

• Students are introduced into the community of scientific practice through legitimate peripheral participation (Lave & Wenger, 1991)

• Multi-leveled mentoring allows faculty and students alike experience the connected nature of research and learning/teaching exercises, and thus benefit from both.

• The "closeness" between adjacent mentors (e.g. peers) takes advantage of "zone of proximal development" (Vygotsky, 1978), and easies the entry into the scientific community.

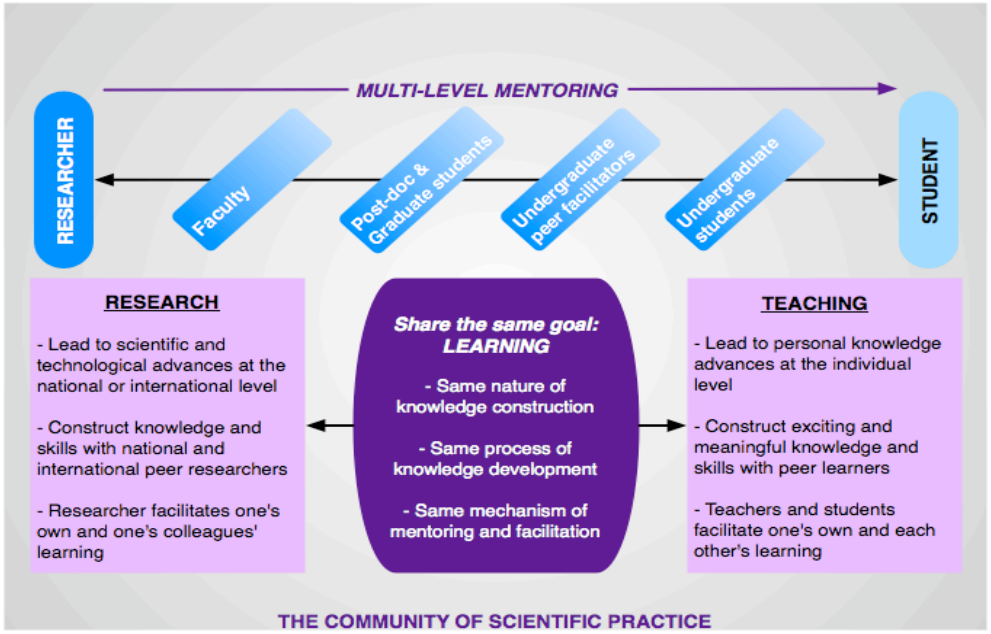
The Science Research Workshop Program (SRW): Creating a Community of Scientists

• **Goal**: Give participants early, legitimate research experiences to encourage persistence in academic and professional science research through entry into a community of practitioners

• **Program**: A collaboration between education and science faculty to help students in biology, chemistry and materials sciences to develop an original science proposal for independent funding, and to carry out their proposed studies

• **Structure**: Two semester program divided over 14 meetings — "Faculty Café" & Peer-led Workshops

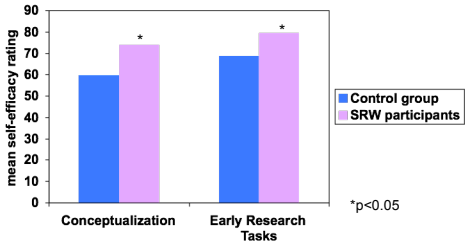
• **Activities**: Students 1) identify and engage in research activities in a lab; 2) write a proposal for a Northwestern Undergraduate Research Grant, and 3) spend a summer in the lab conducting their research



SRW Participation:

Year	Completed SRW program	Submitted research proposal	Received funding	Carried out study in the summer
2007-2008 (Pilot)	18	11	11	11
2008-2009	22	16	16	19
2009-2010	21	21	18	18

SRW Impact:
Mean post-program research efficacy ratings (2007-2009)



SRW Impact:
Sample participant quote

"I might have felt before that research is inaccessible to me, big-time labs were out of my league, but that's underestimating your potential. You can learn to focus your knowledge and do something with that and do successful research. Knowing that is important. You can start early even if as a freshman you don't know everything in the field yet." ***Brian, Freshman in Biology***

Acknowledgements:
* The Searle Center for Teaching Excellence wishes to acknowledge the support of the National Science Foundation, the STEM faculty, the Undergraduate Research Grant office, and the Writing Program at Northwestern University, as well as students and peer facilitators in the SRW program.
*This material is based upon work supported by the National Science Foundation under Grant No. 0525550. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.