



PARTICIPATORY ACTION RESEARCH EXPERIENCES FOR UNDERGRADUATES



Laura B. Sample McMeeking & Kathryn Boyd
CSU STEM Center

Correspondence: lasm@mail.colostate.edu
Colorado State University

Andrea E. Weinberg
School of Teacher Education & Principal Preparation

Introduction

In this study, we introduce and describe the innovative theoretical Participatory Action Research Experiences for Undergraduates (PAREU) model for direct engagement of undergraduate science students and non-scientific communities in the design and conduct of research. This model was developed from interview data collected before, during, and after a summer undergraduate research program focused on Participatory Action Research.

Background

The PAREU model is grounded in two areas of literature: 1) Research Experiences for Undergraduates and 2) Participatory Action Research.

Research Experiences for Undergraduates (REU)

- Many effective models with different features¹
- Program structures may vary by model, institution and discipline
- Student researchers take on different roles (i.e., employee, apprentice, research fellow) depending on varying factors²
- Multiple outcomes expected from the research experience: 1) Students' personal/professional development, 2) Ability to synthesize knowledge, 3) Improvement in research skills, 4) Professional advancement, 5) Career choice

Participatory Action Research (PAR)

- Goal is to solve concrete problems with collaborative research through group reflection
- Six important aspects of PAR³: (1) Social Process, (2) Participatory, (3) Practical and Collaborative, (4) Emancipatory, (5) Critical, (6) Reflexive with a historical context.
- Philosophical/methodological process to bring the unheard voices into the public sphere⁴

Context

Two African American female geoscience undergraduates participated in a second, PAR-focused, summer of REU. The women came from varied backgrounds and areas of the country. Each had previously participated in a lab-based REU and expressed interest in societal impacts of their research. They collaborated with community members in Bayou Terrebonne, one of the most at-risk coastal Louisiana parishes, to design and conduct research projects relevant to the community.

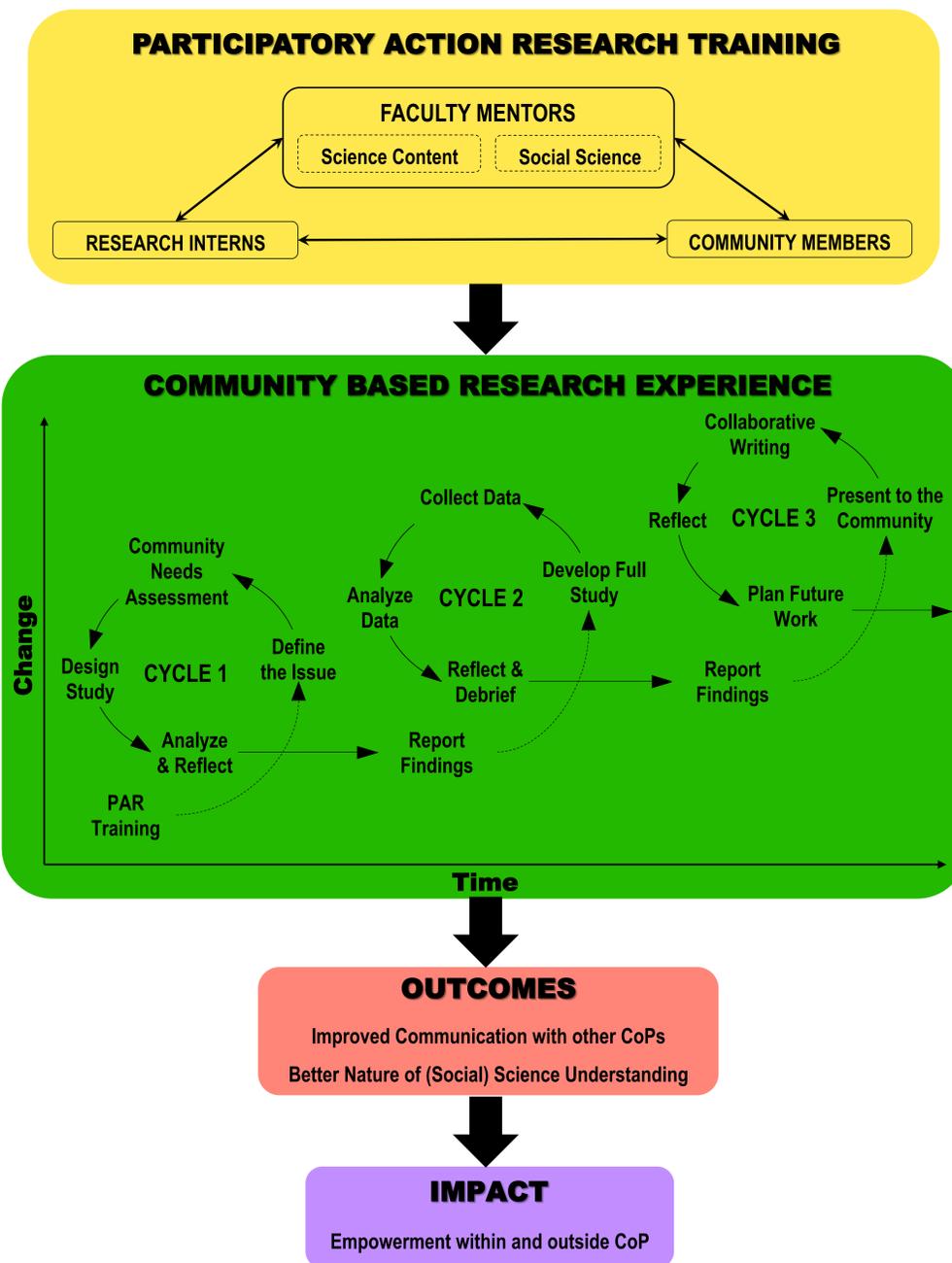


Methods

The following qualitative data collection and analysis methods were used:

- Three one-hour interviews with each undergraduate student participant using a protocol adapted from the URSSA⁵
- Interviews were recorded and transcribed verbatim
- Thematic analysis and constant comparative coding methods were used.
- Three researchers coded independently and themes were compared, refined, and additional salient themes identified.
- Member checking with both participants after themes were identified and representative quotes were extracted from transcripts.

PAREU Model



Findings

Interns report that all participants experienced increased agency through the development of: 1) communication and 2) understanding of the nature of science and social science. These are reflected in the actual quotes from their interviews (model outcomes are bolded)

Improved Communication with other Communities of Practice (CoP's)

"I don't want to be one of the people the community hates that comes and then just leaves. I want to finish up the results...and present it to the community and get feedback and then change it once it's validated by them..." (Intern → Community Members)

"Doing research with the community empowered them in a way that they know that ...their knowledge can be used for research." (Community Empowerment)

"... they know that they are smart but because it's always pushed on them that they're not, they just keep quiet and their voices aren't heard...but at least now they know that they can think a certain way and get their voices heard." (Community Elevated Voice)

Understanding of the Nature of Science and Social Science

"...I feel like I learned a lot about social impacts of extreme weather and climate change, which is why the internship was great..." (Relevance of Science Research to Society)

"I went in there ...needing to learn something from the communities and they are the ones that had the valuable knowledge. I was not necessarily the knowledgeable one...and seeing how vulnerable they actually are, that internship just made me learn that you need to look more into such communities to be able to help them..." (Intern Nature of Social Science)

"...the PARS [sic] isn't necessarily going to affect the modeling directly, but at the same time it is going to put it into context and help me as a researcher to understand and motivate me even more to do this modeling and see why it's important. So, it's not necessarily going to affect the research, but it's going to affect the researcher" (Intern Nature of Science & Nature of Social Science)

"So, I think when I present in front of more physical scientists, I'm going to be actually educating them on how science is expanding and you can't just limit yourself to one definition." (Intern Improved Understanding of Nature of Science)

Conclusions & Next Steps

- Undergraduates learn how to **communicate with non-scientists** and helps them see the **relevance of science to society**
- Community members are encouraged to **speak up about their needs** and are **empowered to pursue collaborative research** to aid the community
- Because the voices of all stakeholders are vital to understanding the full extent of the benefits and drawbacks of the PAREU model, we will expand this study to collecting a broader set of data from other stakeholders.

Acknowledgements & References

This work has been supported by the National Science Foundation Science and Technology Center for Multi-Scale Modeling of Atmospheric Processes, managed by Colorado State University under cooperative agreement No. ATM-0425247.

¹Council for Undergraduate Research (2012). Undergraduate research offices & programs: Models & practices. J. Kinkead & L. Blockus (Eds.) Washington, DC: Council for Undergraduate Research.
²Lopatto, D. (2009). Science in solution: The impact of undergraduate research on student learning. Tucson, AZ: Research Corporation for Science Advancement.
³Kemmis, Stephen (2005). Participatory action research: Community action and the public sphere. in Community action and the public sphere (3rd ed.). N. Denzin and Y. Lincoln (eds.) London: Sage Publications.
⁴Habermas, Jurgen (1998). The inclusion of the other: Studies in political theory, Cambridge; MIT Press
⁵Hunter, A-B., Weston, T.J., Laursen, S.L., & Thiry, H. (2009). URSSA: Evaluating student gains from undergraduate research in science education. Council on Undergraduate Research Quarterly, 29(3), 15-19.