

Public Abstract

First Name:Morgan

Middle Name:Leigh

Last Name:Presley

Adviser's First Name:Deborah

Adviser's Last Name:Hanuscin

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Title:INVESTIGATING HOW PARTICIPATORY ACTION RESEARCH AND THE USE OF ASSESSMENT INSTRUMENTS CAN SUPPORT COLLEGE SCIENCE INSTRUCTORS SCIENCE ASSESSMENT LITERACY.

The purpose of this dissertation study was to investigate how engaging in participatory action research (PAR) and using assessment instruments can support a college science instructor's science teacher assessment literacy. This study also examined the benefits and challenges college science instructors face when engaging in PAR and using assessment instruments in the college science classroom.

I used a case study approach within the context of PAR focused on implementing assessment instruments. Multiple data sources were used in this study – interviews, observations, recordings of lesson planning sessions and reflections, and artifacts—to build the case.

The findings of this study demonstrate that engaging in PAR and using assessment instruments can support the development of science teacher assessment literacy in several ways. This experience helped my participant gain confidence in his beliefs about teaching, learning and assessment, expand his knowledge of formative assessments strategies, and develop his knowledge of interpretation of assessment data. In addition, our PAR collaboration and use of assessment instruments supported the participant in integrating his knowledge in ways that supported changes in his practices. Furthermore, this study illustrates how departmental policies and mandates regarding assessment can constrain this process. This study also demonstrates that assessment instruments can be useful resources for college science instructors in several ways. First, assessment instruments can help science faculty develop learning activities and labs that address student misconceptions. Second, assessment instruments can help science faculty incorporate higher level thinking questions into their instruction and assessments. Third, having access to articles on assessment instruments that consequently outline student misconceptions can not only inform but also validate science faculty members' understanding of students.

This study also demonstrates that engagement in PAR by science faculty and science education researchers can be a feasible and an effective form of professional development that is tailored to the specific needs and unique teaching contexts of faculty members; the participant found this experience preferable to, and much more effective than, attending a workshop.

This study has implications for science education researchers and science faculty interested in PAR, professional developers and assessment instrument developers. This study raises questions about the extent to which faculty science assessment literacy may be constrained by departmental guidelines and policies for assessment, as well as the degree to which PAR can achieve its emancipatory aims in environments where faculty have limited academic freedom regarding course policies.

This study highlighted the importance of establishing an open and trusting relationship between science faculty and researchers, the need to understand the teaching context of the science faculty member and the constraints it poses, and explicit discussion of goals for the collaboration. These enhance the ability of PAR to provide professional development that is tailored to the individual faculty member's needs and circumstances.

This study highlighted several barriers to faculty use of assessment instruments, including access and usability of the instruments themselves. A central database of assessment instruments in formats that can be easily adapted by faculty would enhance the ability of college science faculty to implement these high-quality assessment resources into their practice.

