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AUTHOR	Jones, Leslie S.; Letts, Will; Lewis, Bradford; Rodriguez-Munoz, Marisol
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ABSTRACT

This document summarizes an interactive symposium on the experiences of nontraditional graduate students in science education doctoral programs. Two of the authors were graduate students and two were very recent graduates now in faculty positions. By virtue of their academic/political interests if not their personal differences, they acknowledged that their scholarship as graduate students was necessarily located outside the mainstream discourse of the science education community. The authors are committed to focus their efforts on new areas of educational research. They recount pressures to assimilate into the organized system of higher education, but they all have found it necessary to resist and maintain their individualism. The authors argue that it is the uniqueness of their peripheral status that provides the crucial impetus for the original contributions that they plan to make to science education. (Contains 16 references.) (WRM)

Working and Learning on the Margins: Experiencing Doctoral Programs in Science Education as Nontraditional Graduate Students

An Interactive Symposium

Leslie S. Jones
Department of Biology/Science Education
2759 McCollum Science Hall
University of Northern Iowa
Cedar Falls, Iowa 50614-0421
319-273-7153
leslie.jones@uni.edu

Will Letts
Department of Educational Development
College of Education
University of Delaware
Newark, DE 19716
302-831-8708
wjletts@UDel.Edu

Bradford Lewis
Department of Instruction & Learning
4C11 Forbes Quadrangle
University of Pittsburgh
Pittsburgh, PA 15260
412-648-3137
bflewis@pitt.edu

Marisol Rodriguez-Munoz
School of Teaching and Learning
Arps Hall, 1945 N. High St.
The Ohio State University
Columbus, Ohio 43210
614-337-9166
rodriguez-munoz.69@postbox.acs.ohio-state.edu

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The Scenario...

Demographic trends in the United States indicate how the populations in our school systems continue to change. This situation poses an ongoing challenge to science educators, since it is our responsibility to develop educational strategies that meet the needs of a different group of students. Robertta Barba (1998) implies that given the nature of science education, it is hardly surprising that proportionally fewer culturally diverse students elect to pursue science education and scientific/technical careers. While the National Science Education Standards stress the importance of making science accessible to an increasingly heterogeneous population, they do little to provide sound theoretical frameworks or explicit explanations of how this might be done (Rodriguez, 1997). Thus, there is a need for innovative scholarship that will infuse fresh approaches to science education.

In order for science education to serve the more diverse national student population, the face of our own community literally needs to change. This has begun to happen, but there is still a pressing need for more science educators to be recruited from populations that remain underrepresented in the research community. Additionally, all students should be encouraged to pursue new and innovative veins of scholarship. Science education programs can fail to provide conducive learning environments for nontradtional students in the same way Sadker and Sadker (1994) have shown other schools fail to provide conditions for positive learning for female students. Science education programs must create an environment in which the experiences of non-mainstreamed students are valued as a contribution to the knowledge base. Cultural evolution mandates a move toward curricular changes in order to meet the different needs of society (Ost, 1975).

This session has been organized as a forum for discussion of ways to facilitate new approaches to graduate research in science education. The four members of this panel are nontraditional members of the science education community. We have each made a firm commitment to focus our efforts on new areas of educational research. This determination involves a move toward social justice in science education that would include as Bell (1997) suggests, a vision of full and equal participation by all groups in a system that has been shaped to meet their needs. Each of us has experienced what Myers (1976) identifies as the pressure to assimilate into the organized system of higher education, but we all have found it necessary to resist and maintain our individualism.

From Different Places on the Margins...

Two of us are currently graduate students and two are very recent graduates, now in faculty positions. By virtue of our academic/political interests if not our personal differences, we acknowledge that our scholarship as graduate students is/was necessarily located outside the mainstream discourse of NARST. As such we have experienced the sense that our work is at times de-valued, unappreciated, and unwanted as Johnsrud and Sadao (1993) report members of marginalized ethnic and racial minority groups very often feel. Yet, it is the uniqueness of our peripheral status that provides the crucial impetus for the original contributions we plan to make to Science Education.

For Bradford Lewis, in the relatively few years of following current events and politics it seems that when events underscoring our nation's racial dilemmas are brought to the fore (such as the O.J. Simpson trial and verdict, or the Million Man March) there is invariably an appeal for

"a new discourse on racial issues." Calls for racial discourse reached a zenith in June, 1997, when President Clinton organized the President's Initiative on Race. One of the five goals of this initiative is, "to promote a constructive dialogue, to confront and work through the difficult and controversial issues surrounding race" (One America, 1997). The President would reiterate his appeal for public discussion on race in subsequent speeches (Clinton, 1997). However, the purpose of much public discourse is to impose one political agenda over another by whatever means available, rather than to exchange ideas on issues towards mutually agreed upon solutions (Hunter, 1991). Hence, the calls for discourse may be viewed with skepticism and researchers interested in race and equity issues must examine the nature of public discourse to discern what impact if any it has on scholarship. This presentation will examine public discourse on racial issues as a starting point to discuss the treatment of racial issues in science education scholarship. Four types of public and scholarly discourse are identified: silent - discourse in which issues important to some participants are dismissed as insignificant or overlooked as non-existent; alienating - discourse characterized by invectives or misrepresentation, so that some participants refuse to engage in dialogue or participants talk past one another; euphemistic - discourse which is so encumbered by right-sounding phrases that the intended meaning is lost; and empowering - constructive dialogue which enables participants to move towards shared understanding. Examples of the four types of discourse are presented, and the negative impact of silent, alienating, and euphemistic discourses on the science education community will be discussed as well. The paper includes anecdotes from both new and veteran researchers; and concludes with suggestions to advisors, reviewers, editors, and new scholars on ways to improve science education research on racial issues by moving towards empowering discourse.

As a graduate student, officially in a foreign language education program, Marisol Rodriguez-Munoz is outside of the mainstream of that discipline due to an interest in science. Yet, this person faces the same outsider status in science and NARST because of a background in language education. The presentation will be something of a "Chameleon's Tale" documenting the experiences of a bilingual teacher interested in science as well as the issues surrounding knowledge legitimization in the academy. As part of the research agenda for the improvement of schooling for language-minority children, the National Research Council has suggested as one of the focal areas the study of language minority students in the context of specific content areas. Historically science has been one of the content areas in which language minority children have faced many challenges. The purpose of this talk will be to generate questions about existing practices that delineate research in science classrooms where English language learners are a fraction of the student population. What constitutes science research in these classrooms? Who does research in these classrooms? How is this research received? Using constructivist theory, predicaments about the articulation of 'crossdisciplinary' research and the complexity of the inquiry will be explored.

Will Letts says, "but still, like dust, I rise" and calls the presentation, "Reflections on sexual minority issues in science education" stating: If I had a dime for every time a professor, fellow student, or friend advised me to pursue my research interests-- but not until I had a job, no, not until I had tenure-- I'd be a very rich person. This (superficial?) affirmation of my interests, tempered by the knowledge of what the academy is really like has been a deep sense of concern for me for a number of years. As a graduate student who is interested in knowledge legitimization (like the previous symposium participant), I am simultaneously fighting for the legitimacy of the questions I want to study. So in a sense, this session marks a coming out for me-- coming out

into the open with these issues to validate their study. Although I have been extremely lucky to have the mentors that I do, the general climate within science education still feels inhospitable. After all, this is (one of) the last identity categories that still goes unexamined, unstudied, unmentioned. The purpose of this paper will be to usher these issues out of the closet-- to bring them into the full light of day for all to examine, think about, even argue against. My hope is to encourage a much-needed heteroglossia around these issues. For too long too many people have been silent on sexual minority issues in our community, leaving the work to a very few interested people. Whenever this is the case, we run the risk of hearing a unitary voice, rather than diverse voices. Sexual minority issues in science education are as diverse as the sexual minority communities, so we need to encourage people to come to voice around these issues. A realistic first step might just be establishing a dialogue within our research community. Picking up Sue Rosser's banner that we need to encourage uncovering of other biases [other than gender bias] such as those of race, class, sexual preference and religion which may permeate theories and conclusions from experimental observation (p. 68), I will outline what is one interpretation of a research agenda for science education around the issues of minoritized sexualities. The agenda originates with the questions, What can be seen from the margins that members of sexual minorities occupy? Is it different from the view from the center? I will then examine issues related to sexuality in relation to the curriculum, pedagogical practices, and people who occupy our schools. I will conclude with a critique of science based on sexuality theory and research, paying particular attention to the heteronormative nature of science.

Unlike most science educators, Leslie S. Jones joined the community with a background in scientific research rather than extensive K-12 teaching experience. Science education was chosen as the site for obtaining the academic credentials to pursue a commitment to address equity issues in the long-neglected area of postsecondary science education. Breaking with disciplinary traditions held many challenges. Graduate school included early struggles to be allowed to create a degree program that would support a dissertation topic examining racism and sexism at the postsecondary level. The support of faculty members who could see the merit of an interdisciplinary approach was crucial to counteract the active interference and discouragement from more traditional people. Critical grounding in social value issues came from a concentration outside of the College of Education in Cultural Studies of Science, obtained through coursework in Comparative Studies, Black Studies, Women's Studies, English, and Anthropology. Qualitative methods were chosen as the most appropriate strategy for inquiry, but that choice invoked a fairly constant positivist challenge surrounding epistemological and methodological legitimacy. Caught in a paradigm war that is far from resolved in our field, the strong grounding in statistics obtained as a quantitative bench scientist actually became an asset when it was necessary to explain and justify so many aspects of the approach. In the end, there was tremendous satisfaction in the realization that the scholarship was strengthened by the journey. In spite of being told such a focus would be unmarketable in a job search, it turned out that a focus on educational equity was an asset.

Through our individual reflections on our experiences of Science Education from the standpoint of marginalized scholars, we plan to outline some of the challenges that exist for those who choose to engage in nontraditional academic activity. There will be special emphasis on pointing out published scholarship that has been an inspiration for our work. The narratives will also address an important aspect of postsecondary education by highlighting specific ways our

mentors have contributed to our growth and development by creating a space where we can engage in new venues of scholarship.

Among the Possibilities...

Traditionally the focus of the science education community has been on the K-12 classroom. In cases where our attention has turned to the postsecondary setting, the preparation of preservice and professional development of inservice teachers have received the most attention. As we now move to meet a recognition of the "imperative to improve undergraduate education in the science, mathematics, engineering and technology (Kyle, 1997, p. 547), there is good reason to attend to issues of the education of science educators. Faculty diversity lags well behind student diversity in most institutions of higher education and will continue to do so until programs become more hospitable and rewarding for graduate students from different backgrounds (Kitano, 1997). There are clearly demands for new perspectives in research in science education and we hope to generate discussion on the ways to open up the educational process to new types of scholarship.

Science education has attempted to focus on resiliency as an elusive image in science education programs. As non-traditional graduate students, our inquiries have positioned us in the periphery of many conversations in science education. By attempting to explicate the many ways in which our scholarship has evolved while working in peripheral spaces, we are making visible our discourse of invisibility (Rodriguez, 1997) and making explicit our resiliency. If we, as an educational community, are to meet the calls for more equitable science education in the nation's classrooms as Mary Atwater (1995) and other leading science educators have begun to call for, our efforts to train teachers depend on the training of our science educators. It seems high time to begin to discuss this issue and there is no better place than in the constituted forum of our annual conference.

Literature cited

Atwater, M.M. (1995). The multicultural science classroom. The Science Teacher (February) pp. 20-23.

August, D. & Hakuta, K. (Eds.) . (1997). Improving schooling for language-minority children: A research agenda. National Research Council. Washington, D.C: National Academy Press. Prepublication copy.

Barba, R.H. (1998). Science: In the multicultural classroom. Boston: Allyn and Bacon.

Bell, L. A. (1997). Theoretical foundations for social justice education. In M. Adams, L. A. Bell, & P. Griffin, (eds.) Teaching for diversity and social justice. (pp. 3-15) New York: Routledge.

Clinton, W. J. B. (1997, July 17). Remarks by the President to the National Association of Black Journalists, Hyatt Regency Hotel, Chicago, IL. [On-line]. Available: www.whitehouse.gov/Initiative/19970717-4277.html.

Hunter, J. D. (1991). Culture wars: The struggle to define America. United States of America: Basic Books.

Johnsrud, L.K. & Sadao, K.C. (1993) Ethnic and racial minority faculty within a research university: Their common experiences. Paper presented at the annual meeting of the Association for the Study of Higher Education. New Orleans, LA.

Kitano, M.K. (1997). A rationale and framework for course change. In A.I Morey & M.K. Kitano (eds.) Multicultural course transformation in higher education: A broader truth. (pp. 1-17). Boston: Allyn and Bacon.

Kyle, W.C. (1997). The imperative to improve undergraduate education in science, Mathematics, engineering, and technology. Journal of Research in Science Teaching 34, (6) 547-549.

Myers, W. A. (1978). Problems of minorities at majority institutions: A student's perspective. In V.L. Melnick & F.D. Hamilton (eds.), Minorities in science: The challenge for change in biomedicine. (pp. 65-71). New York: Plenum Press.

National Research Council. (1996). National science education standards. Washington, D.C: National Academy Press.

One America: About the initiative. (1997, July 24). [On-line]. Available: www.whitehouse.gov/Initiative/about-plain.html.

Ost, D.H. (1975). Changing curriculum patterns in science, mathematics and social sciences. School Science and Mathematics 75:48-52.

Rodriguez, A. J. (1997). The dangerous discourse of invisibility: A critique of the national research council's national science education standards. Journal of Research in Science Education, 34, 19-37.

Rosser, S. V. (1990). Female friendly science. New York: Teachers College Press.

Sadker, M. and Sadker, D. (1994) Failing at fairness: How America's schools cheat girls. New York: Charles Scribner's Sons.

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Organization/Address: Univ. of Northern Iowa	Telephone: 319-273-7153 FAX: 319-273-7125
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