Barriers to the Inclusion of Indigenous Knowledge Concepts in Teaching, Research, and Outreach

Ladislaus M. Semali, Brian J. Grim, Audrey N. Maretzki

Abstract

This study was performed to develop and test a theoretical model of the barriers and supports experienced by employees at a major land-grant university that affect their likelihood of incorporating place-based or indigenous knowledge (IK) into their teaching, research, and/or outreach activities. To test this model, we conducted a statewide survey of Penn State faculty at twenty-four campuses and Penn State extension educators from the sixty-seven counties in the commonwealth. The findings from this study suggest that educators' use of IK-related knowledge could be defined as "segmental," as opposed to reflecting a commitment to the intrinsic value of such knowledge. The educators' use of such knowledge was related to academic rank, geographic location of the individual's worksite, peer support received, and the technical or nontechnical nature of the individual's academic discipline.

Introduction

The academy is often characterized as an ivory tower. This view is currently being debated and the institution of higher education is undergoing transformation to include not only the generation of new knowledge, but also a process that "engages" the university with the community in the generation of theory and the improvement of practice *(Boyer 1990)*. Engagement, however, raises the question of how the academy can effectively relate to communities in which existing knowledge systems fail to correspond with the ways of knowing and scientific understandings of academics.

The preparation of university graduates and field-based practitioners to effectively engage with communities where place-based knowledge is generated and transmitted from generation to generation is currently gaining momentum through programs such as the Indigenous Knowledge for Development Program of the World Bank *(World Bank 2004)* and the Center for Science Education at the

UC Berkeley Space Sciences Laboratory (http://cse.ssl.berkeley. edu), a space science educational collaboration between the National Aeronautics and Space Administration (NASA) and the University of California, Berkeley. Since the 1992 Earth Summit in Rio de Janeiro *(Tokar 1992)*, indigenous knowledge as intellectual property has taken on new importance in the search for answers to many of the world's most vexing problems, such as disease, food security, ethnic conflict, agricultural productivity, land use, and water rights.

With the growing recognition of the value and importance of indigenous and place-based knowledge as cultural capital *(Bourdieu and Passeron 1986; Monkman, Monald, and Théramène 2005)*, for sustainable development *(Irwin 1995)*, and as a basis for "prior knowledge" *(Shapiro 2004; Fordham 1996)* or schemas in learning *(Bartlett 1932)*, both the number of projects and the amount of information on indigenous knowledge have increased *(Warren, Slikkerveer, and Brokensha 1995; World Bank 2004; Shiva 1993; Semali and Kincheloe 1999; Dei, Hall, and Rosenberg 2000)*. Despite all these efforts, development projects, university curricula, and nonformal educational programs still appear to make little use of this valuable resource. However, the situation is slowly changing as universities come to accept some level of responsibility for bridging the gap between community and campus-based knowledge systems.

Theoretical Background and Context of the Study

In 2004, the Interinstitutional Consortium for Indigenous Knowledge (ICIK; http://www.ed.psu.edu/icik/) undertook a study in collaboration with Penn State's Survey Research Center to investigate perceived opportunities for, and barriers to, the incorporation of indigenous knowledge (which we describe as knowledge grounded in the experience of a local community) into teaching, research, and outreach activities at Penn State. We view a community's "indigenous knowledge" as the systematic body of place-based information acquired by local residents through the accumulation of experiences, informal experiments, and an intimate understanding of the local environment *(Semali and Maretzki 2004)*. However, those individuals who possess, acquire, or generate the indigenous knowledge to which we refer are not necessarily a part of the indigenous cultural group that might once have occupied the area. We realize that communities' place-based knowledge systems and the academy's discipline-based knowledge systems can be complementary and mutually supportive, but the question of

concern is, what level of community engagement or participation can nurture complementarity?

According to Selznick's *(1992)* theory of participation, individuals involve themselves in the community in core or segmental ways. Core participation, reflecting a deeply held personal commitment, derives from a moral sense and is integral to an individual's identity. In contrast, segmental participation reflects a limited and instrumentally motivated commitment; it is contractual and definable in cost-benefit terms. In Selznick's view, segmental participation may be deeply involving as well as casual, but it represents a limited commitment, often based on expediency and rational calculation. As observed in this study, the motivation of academics to become engaged with the knowledge systems of communities suggests a mix of core and segmental participation. Nevertheless, Selznick's dichotomy is useful in explaining how an academic might perceive his or her involvement with a local community.

> *"...the motivation of academics to become engaged with the knowledge systems of communities suggests a mix of core and segmental participation."*

According to Boyer *(1990)*, engagement calls for a level of interaction that goes beyond the scope of outreach or involvement. The Kellogg Commission defined engagement as "the design of teaching, research, and extension and service functions to become more sympathetically and productively involved with community concerns and needs" *(1999, 1)*. A decade after Boyer, Ramaley *(2002)* observed that this "new" model of scholarship and engagement could change both society and the university. According to her, reciprocity and complementarity of knowledge are essential if university-community relationships are to survive the initial euphoria of engagement; this requires a process in which knowledge and expertise flow not only from university to community but also from community to university. This two-way flow implies both "outreach" on the part of the university and "in-reach" on the part of the community, with the partners being respectful of each other's domains of knowledge and ways of knowing *(Semali & Maretzki 2004, 104)*.

Unfortunately, the level of engagement envisioned by Boyer, the Kellogg Commission, and Ramaley has not, in our view, been achieved. This is a situation that we believe may be related, at least

in part, to the gap that exists between the discipline-based ways of knowing that characterize the campus and the more holistic and integrated ways of knowing that are operational at the community level. This observation led us to investigate the use of place-based or local knowledge among Penn State faculty and cooperative extension educators statewide.

Case Study of a Land-Grant University

Penn State is a land-grant university with twenty-three commonwealth campuses throughout the state and a main campus at University Park. In addition, Penn State Cooperative Extension has an office in each of the sixty-seven counties in the state. This geographically dispersed professional staff makes Penn State an excellent case study for investigating whether one's physical place of employment is linked to university-community engagement. The substantive hypothesis of this research is that *a Penn State faculty member or extension agent will be more likely to employ place-based or indigenous knowledge concepts if s/he works at a location other than the main campus and receives peer support for using IK, but will be less likely to use IK if s/he is highly ranked within the promotion and tenure system and/or works in a "technical" department (as defined in appendix A, variable 4).* Since we were unable to identify research studies that have addressed a comparable topic, our variables were selected to reflect the authors' theoretical propositions that distance from local communities, higher ranking within academia, and associations with the "hard" sciences all decrease the likelihood of incorporating IK into teaching, outreach, and research. This theory was formed by the authors' observations of the way faculty and extension agents have responded to ICIK-sponsored programs for the past decade.

Community Engagement as an Institutional Issue

Faculty, staff, and administrators at Penn State are becoming increasingly sensitive to the importance of multicultural education and internationalization of the curriculum. Recently, the University Senate mandated the inclusion of diversity-focused courses as part of general undergraduate education, targeting both the United States and international cultures. Although efforts to internationalize and culturally diversify are being actively pursued at Penn State, this task is not without obstacles. Administrators and faculty acknowledge the challenges, but they are also aware of the increasing breadth of opportunities for academic scholar-

ship. In 2000, a university committee released promotion and tenure guidelines contained in a report titled *UniSCOPE 2000: A Multidimensional Model of Scholarship for the 21st Century (Hyman et al. 2001)*. When departmental committees began to implement these guidelines, internal reports and interviews with faculty members revealed several barriers. First, faculty members pointed out that the current system of rewarding scholarship is biased toward basic research and resident teaching over other forms of scholarship. Second, the academic culture continues to favor quantitative over qualitative methods of inquiry. Though not explicitly acknowledged, this culture seems to operate as faculty committees at the departmental level begin to evaluate promotion and tenure dossiers. Third, new faculty members are discouraged from undertaking in their pretenure years any scholarship that extends to off-campus or to nontraditional audiences. With these realities in mind, the present study aimed at developing a theoretical model to assess factors affecting faculty and extension agents' use of knowledge that is generated outside the academy.

Theoretical Model of Incorporation of IK

In designing a survey instrument to assess perceived barriers to the incorporation of place-based knowledge concepts into the classroom teaching, research, and nonformal teaching (outreach/ extension) activities of Penn State faculty and cooperative extension staff throughout the commonwealth, we hypothesized that geographic, professional, and social factors operating within the institutional setting might all play a role and that these factors would interact to encourage or deter the entry of such concepts into the environment of the academy. Specifically, we suggested that the following personal and institutional factors would be operative.

First, because they both reside and work in a community where the campus is a visible, but not the dominant, institution, where research and publications are relatively less important than effective teaching and community service, and where professionals are as likely to be active in local community organizations as in their disciplinary communities of interest, individuals employed at locations away from the large flagship campus of the university would be more likely than those on the main campus to identify with their local community, to value the locally generated knowledge that is resident in that community, and to employ strategies to incorporate this knowledge into their teaching, research, and outreach activities.

Second, because they have achieved academic status through success in securing competitive research funding and publishing in selective peer-reviewed journals, individuals at higher academic ranks would be less likely than those at lower academic ranks to find place-based knowledge of value in their work.
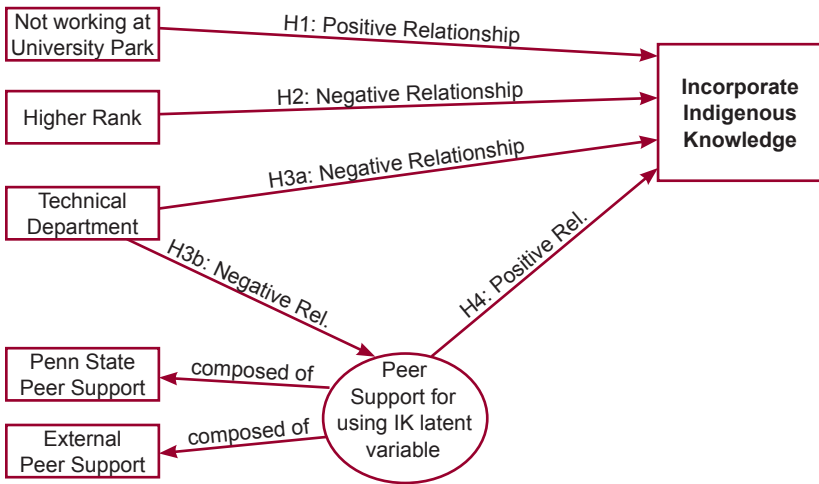
Third, because of the theoretical nature of their disciplines and the techniques they employ for testing hypotheses, faculty in "technical" disciplines such as the sciences, mathematics, engineering, and medicine would be less likely than those in the social sciences, arts, and humanities to incorporate place-based or indigenous knowledge concepts into their research and teaching activities. It would also be expected that faculty in technical fields would be less likely than those in other disciplines to support peers who choose to incorporate place-based knowledge into their academic activities. The basis for these hypotheses can be found in the nature of experimental science that adheres to the concept that the relationship of cause and effect must be statistically demonstrated to reduce the probability of "chance occurrence."

In the design of scientific experiments, variability, other than that being directly measured, is considered to be unexplained, the mathematical equivalent of "error," and is so accounted for in the statistical analysis of the data obtained. Biological and physical scientists are trained to reject hypotheses that do not meet accepted standards of academic and statistical rigor. This training reflects a worldview that is, in many ways, antithetical to the worldview of those individuals for whom observation and experience are key to an understanding of nature. Place-based knowledge is systematically devalued by faculty in technical disciplines because, in their worldview, such knowledge has no validity, having been obtained through methods that are considered unscientific, unreliable, or nonreplicable by those who pass judgment on the quality of scientific research findings *(Smith 1999)*. Bringing place-based knowledge into the classroom, therefore, reflects a high-risk activity for faculty in the technical disciplines, especially for faculty who have not yet been tenured in their department.

"Bringing place-based knowledge into the classroom...reflects a high-risk activity for faculty in the technical disciplines..."

And fourth, we hypothesize that regardless of academic rank, geographic location, or discipline, individuals who receive support from peers in their efforts to incorporate place-based knowledge

Figure 1: Hypothesized Model of Educators' Incorporation of IK

concepts into their professional activities will be more likely to do so than those individuals who do not perceive themselves as receiving such support. These four hypotheses are summarized in figure 1.

Methodology

We conducted a mixed-mode Web–paper mail survey of all faculty and cooperative extension educators (N = 6548) at the Pennsylvania State University in the fall of 2004. The members of the whole population sample were randomly assigned to two different subsamples: 5,548 were assigned to a Web-only group and 1,000 were assigned to a Web-with-mail group. The latter group received the same four-contact Web survey as the former group plus an equivalent paper follow-up survey and a reminder postcard. This sampling design was chosen for the research quality issues described in the following paragraphs. To contain the added cost of the mail sample, 1,000 was determined to be a sample of sufficient size to obtain enough respondents to make statistical comparisons between the two groups. The sample included all full-time and part-time faculty at all 24 Penn State locations as well as all extension educators in Pennsylvania's 67 counties. This sampling frame accessed a total of 91 different locations, including Dickinson School of Law and the Penn State College of Medicine *(see Grim, Semali, and Maretzki 2005)*.
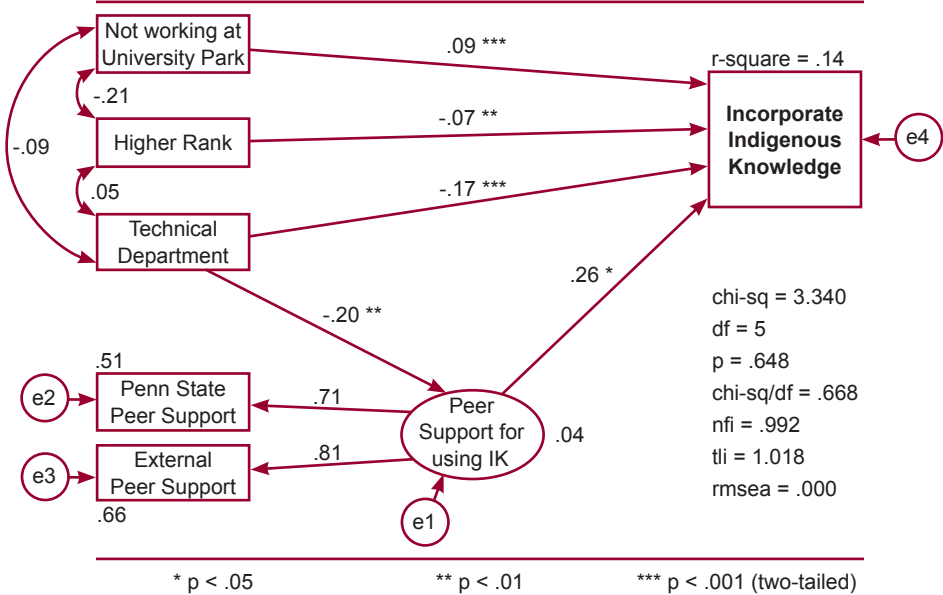
Table 1: Response Rates by Mode

Mode	Subsample with Paper Follow-up (N = 1000)		Without Paper Follow-up (N = 5548)		Total Combined Sample (N = 6548)	
	n	rate	n	rate	n	rate
Web	315	31.5%	1471	26.5%	1786	27.3%
Paper	137	13.7%	0	0.0%	137	2.1%
Total	452	45.2%	1471	26.5%	1923	29.4%

A Web survey was a particularly good option for this popula-tion since all Penn State employees are assigned e-mail accounts. These accounts are frequently used because the addresses and pass-words associated with them are tied to other services, including library accounts and personnel information. These e-mail accounts and addresses are kept current and are discontinued almost imme-diately upon termination of employment. The fact that all Penn State employees have official e-mail addresses overcomes one of the most serious concerns in Web surveying, coverage bias *(Kaye and Johnson 1999; Crawford, Couper, and Lamias, 2001)*. There is the potential for nonresponse bias due to coverage error if all poten-tial respondents do not have equal access to the Web *(Alvarez and Van Beselaere 2003)*. However, the use of the Web within the Penn State community is ubiquitous; in general, university communi-ties mirror, if not lead, the general public in the adoption of such technology *(Less 2003)*. Still, the varying level of respondent expe-rience and comfort with Web browsers is a possible source of bias *(Dillman et al. 2001)*.

Of the 5,548 in the Web-only sample, 1,471 responded (26.5%), while 452 of 1,000 (45.2%) responded from the Web-with-mail sample. The latter response rate is comparable to rigorous studies such as the national telephone Survey of Consumer Attitudes, which has a response rate of 48% (*Curtin, Presser, and Singer 2005*). The combined total was 1,923 respondents, or 29.4% of the whole population. See table 1.

A total response rate of 29.4% is higher than average for many Web surveys. Sheehan *(2001)* did an analysis of response rates to e-mail surveys from 1986 to 2000. She found that just as in all modes of survey research, response rates are declining. The

**Figure 2: Results of Testing the Hypothesized Model of Educators'
Incorporation of IK**

| Not working at University Park | .09 *** | r-square = .14 |

-.21

-.07 **

-.09

Higher Rank

.05

-.17 ***

Incorporate Indigenous Knowledge

e4

Technical Department

.26 *

-.20 **

chi-sq = 3.340
df = 5
p = .648
chi-sq/df = .668
nfi = .992
tli = 1.018
rmsea = .000

.51
e2 Penn State Peer Support   .71

External Peer Support   .81

Peer Support for using IK   .04

e3

.66

e1

* p < .05   ** p < .01   *** p < .001 (two-tailed)

average e-mail survey response rate in 2000 reported by Sheehan *(2001)* was 24%.

The responses from the subsample with paper follow-up (n = 452) were compared with the sample without a paper follow-up (n = 1471). Performing *t* test comparisons of the mean response to each substantive item on the survey did not reveal any important differences between the subsample with paper follow-up, which had a much higher response rate (45.2%), and the sample without a paper follow-up, which had a lower response rate (26.5%). The only significant difference between the two was that a *t* test of the mean level of academic rank found a slightly higher mean in the paper follow-up subsample (3.433 vs. 3.098), and this difference was statistically significant (p < .001, two-tailed). This difference, however, is attributable to a mode effect: the paper surveys inadvertently failed to offer a lower response option. There were no other mode differences discovered. This observation provides some evidence that nonresponse did not bias the total combined sample, which was the data set used in the analysis reported below.

Analysis

We used structural equation modeling (SEM) (figure 2) to test the model implicit in our substantive thesis. SEM is appropriate for

testing a theoretical model that includes both latent and intervening variables, such as the measure we use for peer support. SEM is especially appropriate for this study in that it allows both for a theory-driven model to be developed and tested and for various goodness of fit tests and other ways of testing the model to increase the level of confidence in the findings. Though SEM is often discussed as if it were *causal modeling,* this is not appropriate since the causal mechanisms in SEM are no surer than in other forms of linear regression analysis.

"...receiving support from peers in their efforts to incorporate IK concepts into their professional activities is the strongest relative predictor of whether a faculty member or extension educator will actually do so."

The variables we used are shown in appendix A. The dependent variable to be explained is the level of Penn State educators' use of Indigenous Knowledge (IK, i.e., local, traditional, and/or folk knowledge or ways of knowing that are grounded in the experience of a local community), particularly in teaching. This variable (variable 1 in appendix A) is treated as an ordinal variable: if educators incorporate IK in their research or outreach but not in their teaching (= 2), this can reasonably be construed as a step toward incorporating IK in teaching (= 3), in that what someone researches eventually will find its way into the classroom or the nonformal teaching environment.

Results

The results summarized in figure 2 indicate that our model of the processes affecting the incorporation of IK into teaching, outreach, and research is a good fit. The chi-square statistic for the model (chi-sq = 3.340, df = 5, p = .648) indicates that it is a good fit with the data. In other words, any departure of the data from this model is insignificant. Also, when the ratio of the chi-square statistic to the degrees of freedom is close to or less than 1, then the model is generally accepted. The chi-sq/df ratio of .668 suggests that the model fits very well. The other goodness of fit tests also were very strong.

The results not only provide evidence supporting our overall model, but also each of our hypotheses. First, individuals employed at locations away from the flagship campus of the university are

more likely to incorporate this knowledge into their teaching, research, and outreach activities (standardized regression coefficient .09, p < .001, two-tailed). This finding is also reflected in the greater interest expressed by non-University Park faculty for staying informed about indigenous knowledge through ICIK (37.5%) versus University Park faculty (28.7%).

Second, individuals at higher academic ranks are less likely than those at lower academic ranks to incorporate IK into their teaching, research, or outreach (-.07, p < .01, two-tailed). Third, faculty in technical disciplines are less likely than those in the social sciences, arts, and humanities to incorporate place-based or IK concepts into their research and teaching activities (-.17, p < .001, two-tailed). Related to this observation, we found that being in a technical discipline was negatively associated with peer support for the incorporation of IK (-.20, p < .01, two-tailed). And finally, though technical departments seem to discourage peer support for incorporation of IK, receiving support from peers in their efforts to incorporate IK concepts into their professional activities is the strongest relative predictor of whether a faculty member or extension educator will actually do so (.26, p <.05), regardless of their discipline.

Finally, we should mention that we also tested other possible influences, such as gender and race/ethnicity. Neither of these other influences was strong or approached statistical significance in the model.

Conclusion: Lessons Learned from the Study

The research objective of this study was to empirically test a theoretical model of the incorporation of place-based knowledge in teaching, research, and outreach activities of faculty and cooperative extension agents at a major land-grant university. The study provides evidence that (1) individuals employed at locations away from the flagship campus of the university are more likely to incorporate IK into teaching, research, and outreach activities (.09); (2) individuals at higher academic ranks are less likely than those at lower academic ranks to incorporate IK into their teaching activities (-.07); (3) faculty in technical disciplines are less likely than those in the social sciences, arts, and humanities to incorporate place-based or IK concepts into their research and teaching activities (-.17); and (4) being in a technical discipline is negatively associated with peer support for the incorporation of IK. The data showed that technical departments seem to discourage

peer support for incorporation of IK (-.17). Receiving support or advice from peers is the strongest relative predictor of whether faculty members or extension educators will incorporate IK into their professional activities (.26).

The challenges to the academy that were revealed by this study are multifaceted and require attention. We observed that the use of local or place-based knowledge by many university faculty and extension educators appears to be segmental, limited, and based on expediency and rational calculation. This finding confirmed Selznick's *(1992)* theory of core and segmental participation, suggesting that there is a lack of commitment to the use of place-based knowledge that is related to higher academic rank, working at a research-focused campus location, or being in a technical discipline.

First, our findings suggest that conferences, seminars, and workshops designed to enhance community engagement skills of faculty and extension staff would be better received at locations other than the main campus. However, both the need for and the challenge of providing such training and support is obviously greater on a research campus where the pressure to "publish or perish" precludes faculty involvement in activities that are not on the scientific "cutting edge" of their discipline.

At a time when Penn State, like other institutions, is seeking to promote campus-community partnerships, it seems reasonable to build a critical mass of faculty and extension educators who work in close proximity to local communities and who could provide critical peer support for the valuing of place-based knowledge. Educators working at locations distant from the main campus have a unique opportunity to transform the academy through openness to, and respect for, alternative worldviews and ways of knowing that are operational in every community. This place-based knowledge can complement and give local relevance to science-based knowledge generated by basic researchers concentrated on the main campus.

Second, universities need to be attentive to professional beliefs and the frames of mind that facilitate or inhibit a faculty or staff member's capacity to develop, use, or disseminate community-related knowledge. Globalization is challenging the relevance, appropriateness, and effectiveness of existing modes of research, teaching, and university-community partnership building. The mighty force of globalization transcends natural boundaries, resulting in an increasingly borderless flow of goods and services,

money, skilled and qualified manpower, information, and culture. This force threatens the survival of local species, cultures, and place-based ways of knowing and doing *(Shiva 1993)*. The process of globalization also threatens place-based knowledge when such knowledge is not employed as a complement to the science-based knowledge generated by those from outside a local community. Engaged universities will need to become proficient in developing support systems for community-based learning that can complement academic approaches to knowledge transfer. The challenge is to coordinate these two ways of knowing in an iterative, integrative fashion that not only enables practice to proceed from theory but also enables theory to be generated from local practice *(Hassel 2005)*.

"...the use of local or place-based knowledge by many university faculty and extension educators appears to be segmental, limited, and based on expediency and rational calculation."

Third, the data indicate that land-grant universities have a tremendous resource in their branch campus faculty and cooperative extension educators. Cooperative extension in particular is very well positioned to enhance the reciprocity of knowledge exchange between the university and local community residents, including youth, adults, and the elderly. For this reciprocity to occur, however, requires that the academy's historical "transfer of skills and technology" model give way to a community-based, place-sensitive model in which campus-based experts are willing to be "on tap" in response to local community in-reach, rather that being "on top" of the outreach and extension process.

According to Hassel *(2005)*, overcoming the challenges exposed by this study will require us to employ the craft of cross-cultural engagement to build trust as a foundation for enhanced intercultural relationships and to understand divergent or place-based knowledge systems. In fact, the process of building an academic foundation for effective community engagement has never appeared more challenging than it does in the opening decade of the new millennium, but neither has it ever been more important. We believe that a recognition of, and taking appropriate action to reduce barriers to, the creation of complementarity between place-based knowledge and academic knowledge can contribute to

producing a climate of engagement that could change both society and the university.

Acknowledgments

References

Alvarez, R. M., and C. Van Beselaere. 2003. Web-Based Surveys. California Institute of Technology. http://survey.caltech.edu/encyclopedia.pdf. (accessed 27 July 2005).

Bartlett, R. 1932. *Remembering*. Cambridge, Mass.: Harvard University Press.

Bourdieu, P., and J. Passeron. 1986. *The forms of capital*. In *Handbook for theory and research for the sociology of education*, edited by J. G. Richardson, 241–58. New York: Greenwood.

Boyer, E. 1990. *Scholarship reconsidered: Priorities of the professoriate*. Princeton, N.J.: Carnegie Foundation for the Advancement of Teaching.

Crawford, S., M. P. Couper, and M. Lamias. 2001. Web surveys: Perception of burden. *Social Science Computer Review* 19: 146–62.

Curtin, R., S. Presser, and E. Singer. 2005. Changes in telephone survey nonresponse over the past quarter century. *Public Opinion Quarterly* 69: 87–98.

Dei, G., B. Hall, and D. G. Rosenberg. 2000. *Indigenous knowledge in global contexts: Multiple readings of our world*. Toronto: University of Toronto Press.

Dillman, D. A., G. Phelps, R. Tortora, K. Swift, J. Kohrell, and J. Berck. 2001. Response rate and measurement differences in mixed mode surveys using mail, telephone, interactive voice response and the Internet. Draft paper. http://survey.sesrc.wsu.edu/dillman/papers/Mixed%20Mode%20ppr%20_with%20Gallup_%20POQ.pdf (accessed 21 July 2005).

Fordham, S. 1996. *Blacked out: Dilemmas of race, identity, and success at Capital High*. Chicago: University of Chicago Press.

Grim, B. J., L. Semali, and A. Maretzki. 2005. Checking for nonresponse bias in Web-only surveys of special populations using a mixed-mode (Web-with-mail) design. Working paper. http://www.ed.psu.edu/icik/%20Working_Paper.pdf.

Hassel, C. 2005. The craft of cross-cultural engagement. *Journal of Extension* 42 (6). http://www.joe.org/joe/2005december/index.shtml (accessed December 2005).

Hyman, D., E. Gurgevich, T. Alter, D. Gold, R. Herrmann, P. Jurs, D. Roth, J. Swisher, S. M. Whittington, and H. Wright. 2001. Beyond Boyer: The

UniSCOPE model of scholarship for the 21st century. *Journal of Higher Education Outreach and Engagement 7* (1&2): 41–65.

Irwin, A. 1995. *Citizen science: A study of people, expertise, and sustainable development.* London: Routledge.

Kaye, B. K., and J. Johnson. 1999. Research methodology: Taming the cyber frontier. *Social Science Computer Review 17*: 323–337.

Kellogg Commission on the Future of State and Land-Grant Universities. 1999. *Returning to our roots: The engaged institution.* Washington, D.C.: National Association of State Universities and Land-Grant Colleges.

Less, K. 2003. Faculty adoption of computer technology for instruction in the North Carolina Community College System. Ph.D. diss., East Tennessee State University. http://etd-submit.etsu.edu/etd/theses/available/etd-0627103-160627/unrestricted/LessK08052003f.pdf (accessed June 2005).

Monkman, K., M. Monald, and F. D. Théramène. 2005. Social and cultural capital in an urban Latino school community. *Urban Education 40*: 4–33.

Ramaley, J. 2002. Seizing the moment: Creating a changed society and university through outreach. *Journal of Higher Education Outreach and Engagement 8*(1): 13–27.

Selznick, P. 1992. *The moral commonwealth: Social theory and the promise of community*. Berkeley: University of California Press.

Semali, L., and J. Kincheloe. 1999. *What is indigenous knowledge? Voices from the academy*. New York: Garland.

Semali, L., and A. Maretzki. 2004. Valuing indigenous knowledges: Strategies for engaging communities and transforming the academy. *Journal of Higher Education Outreach and Engagement 10* (1): 91–106.

Shapiro, A. M. 2004. How including prior knowledge as a subject variable may change outcomes of learning research. *American Educational Research Journal 41* (1): 159–89.

Sheehan, K. 2001. E-mail survey response rates: A review. *Journal of Computer-Mediated Communication 6*. http://www.ascusc.org/jcmc/vol6/issue2/sheehan.html#references (accessed May 2005).

Shiva, V. 1993. *Monocultures of the mind: Perspectives in biodiversity and biotechnology.* London: Zed Books.

Smith, L. T. 1999. Decolonizing methodologies: Research and indigenous peoples. London: Zed Books.

Tokar, B. 1992. After the "Earth Summit." *Z Magazine 10* (4): 38–44.

Warren, M. D., L. Slikkerveer, and D. Brokensha. 1995. *The cultural dimension of development: Indigenous knowledge systems.* London: Intermediate Technology Publications.

World Bank. 2004. *Indigenous knowledge: Local pathways to global development; Marking five years of the World Bank Indigenous Knowledge for Development program.* Washington, D.C.: Knowledge and Learning Group, Africa Region, World Bank. http://www.worldbank.org/afr/ik/ikcomplete.pdf.

About the Authors

• Ladislaus M. Semali is associate professor of education at the Pennsylvania State University, Curriculum and Instruction Department, specializing in literacy education, comparative and international education, and non-Western educational thought. His work has been published in the *International Review of Education* and *Comparative Education Review*. He is author of *Literacy in Multimedia America* (Routledge/Falmer) and *Postliteracy in the Age of Democracy* (Austin & Winfield) and editor of *What Is Indigenous Knowledge? Voices from the Academy* with Joe Kincheloe (Garland). Contact: Lms11@psu.edu.

• Brian J. Grim is a Senior Research Fellow in Religion and World Affairs with the Pew Forum on Religion and Public Life. He is also manager of international data for the Association of Religion Data Archives, housed at Penn State University. At Penn State he is a faculty research affiliate of the Population Research Institute and the Survey Research Center, with interests in international religion, survey methodology, and Global Information System mapping of religious demography. Previous to this, he worked for twenty years as an educator, researcher, and development coordinator in China, the former U.S.S.R., Kazakhstan, Germany, Malta, and the Middle East. Contact: Grim@psu.edu.

• Audrey Maretzki is emeritus professor of food science and nutrition at the Pennsylvania State University, Department of Food Science, where she specializes in community nutrition, local food systems, and nutrition education with low-income communities. For more than a decade, she has been involved with the empowerment of African women farmers through the establishment of local NutriBusiness cooperatives that enable women to process their agricultural commodities and market culturally appropriate dry food mixes for individuals with special nutritional needs. Contact: Anm1@psu.edu.