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What We Learned Through Asking About Evidence: A Model for Interdisciplinary Student Engagement

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Abstract

Traditional university learning modalities of lectures and examinations do not prepare students fully for the evolving and complex world of gerontology and geriatrics. Students involved in more active, self-directed learning can develop a wider breadth of knowledge and perform better on practical examinations. This paper describes the Evidence in Aging (EIA) study as a model of active learning with the aim of preparing students to be effective interdisciplinary researchers, educators, and leaders in aging. We focus particularly on the experiences and reflections of graduate students who collaborated with faculty mentors on study design, data collection, and analysis. Students acquired new methodological skills, gained exposure to diverse disciplines, built interdisciplinary understanding, and cultivated professional development. The EIA study is a model for innovative student engagement and collaboration, interactive learning, and critical scholarly development. Lessons learned can be applied to a range of collaborative research projects in gerontology and geriatrics education.

Keywords

graduate training; interdisciplinary collaboration; active learning; gerontology students; professional development; research in aging

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Gerontology is a fundamentally interdisciplinary field that brings together researchers, educators, and practitioners from a wide range of disciplines with a shared interest in aging (Bass, 2013; Ferraro, 2007). Within the clinical disciplines, considerable attention has been devoted to training geriatric practitioners—nurses, physicians, social workers, physical therapists, and others—to work interprofessionally on local and national initiatives (Barczi, et al., 2016; Fulmer, Flaherty, & Hyer, 2004; McKenzie et al., 2016; Solberg, Solberg, & Carter, 2015). More recent efforts have expanded beyond clinical settings to focus on developing interdisciplinary research programs in gerontology and geriatrics (Hanappi, Bernardi, & Spini, 2015; Schultz, Keyser, & Pincus, 2011; Trojanowski et al., 2012).

Scholarship related to interdisciplinary research and training in higher education is relatively recent (Davies & Devlin, 2007; Spelt, Biemans, Tobi, Luning, & Mulder, 2009). As a result, quite little is known about effective strategies to prepare students to work effectively in interdisciplinary research settings, or how to bridge traditional research and practice lines. This is particularly relevant at the doctoral level where, without an active PhD program in gerontology, students may receive robust training in their home disciplines but limited opportunities to collaborate with students and faculty in other disciplines who are engaged with aging. Yet it is exactly this type of experience that is needed to develop the theoretical base and knowledge that will advance the field of gerontology (Bass, 2013).

In this article, we examine the experience and reflections of graduate students who participated in an interdisciplinary research project. Students served as co-investigators to examine how gerontologists representing different disciplines view evidence. We describe and discuss the Evidence in Aging (EIA) study as an innovative model of active learning with the aim of preparing students to be effective interdisciplinary gerontological researchers, educators, and leaders.

Background

Interprofessional healthcare teams emerged in the U.S. in the mid-1950s as a conscious organizational form, primarily in fields such as mental health and rehabilitation, which required substantial coordination between disciplines (Fulmer et al., 2004). In the 1970s and 1980s, interprofessional teams emerged as a major component in the growing field of clinical geriatrics as providers recognized that high quality care for older adults, particularly those with complex health conditions, required coordination across disciplines (Reuben et al., 2004). During this time, the Department of Veterans Affairs led the development of formal interprofessional training programs in geriatrics. Shortly after, the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services began implementing the Geriatric Education Center (GEC) program, which provided funding to colleges and universities throughout the U.S. to support interprofessional education in geriatrics (Reuben et al., 2004). In 1995, The John A. Hartford Foundation funded eight academic institutions and community-based organizations to implement Geriatric Interdisciplinary Team Training (GITT) programs, which were aimed at improving care for older adults by training health profession students and clinicians in interdisciplinary geriatric practice (Fulmer et al., 2004). In 2015, HRSA combined several geriatrics training programs, including the GECs, to create the Geriatric Workforce Enhancement Program

(GWEP) (Busby-Whitehead, Flaherty, & Potter, 2016). In addition to continuing to support interprofessional training in geriatrics, the GWEP also seeks to address workforce shortages and support the integration of geriatrics with primary care (Busby-Whitehead et al., 2016).

Beyond interprofessional training within the clinical disciplines, scholarship related to interdisciplinary education is still emerging, with key questions focused on teaching methods, desired learner outcomes, and models for promoting interdisciplinary research (Borrego & Newswander, 2010; Kurpinski, Johnson, Kumar, Desai, & Li, 2014; Larson, Landers, & Begg, 2011; Spelt, et al., 2009). Interdisciplinarity moves beyond *collaboration* to draw from and integrate diverse disciplinary perspectives in order to solve complex problems (Borrego & Newswander, 2010; Hanappi et al., 2015; Trojanowski, et al., 2012). Interdisciplinary research has led to important advances in the basic sciences, and generated important subdisciplines such as neuroscience and biochemistry. However, social sciences have retained stronger boundaries between disciplines, such as rewarding investigators for publishing in their own discipline's journals while at the same time indirectly discouraging them from publishing with others (Bass, 2013). In addition to advancing the development of theory and scientific discovery, interdisciplinary training may benefit students' ability to think critically and creatively, draw connections between seemingly disparate bodies of knowledge, and recognize and challenge internal biases (Bass, 2013; Borrego & Newswander, 2010; Ivanitskava, Clark, Montgomery, & Primeau, 2002; Repko, 2008).

Active learning strategies, which focus on allowing students to build knowledge by making connections between ideas and experiences, are ideally suited for interdisciplinary education. Active learning builds on constructivist learning theory, which views education as a process of experiential learning and engagement: students interact with new information in order to assimilate it into existing mental frameworks as knowledge (National Research Council, 2000; Prince, 2004; Michael, 2006). Active learning is firmly rooted in social constructivist theories, which emphasize the social context of learning (Palinscar, 1998). Active learning strategies differ from the traditional lecture format by emphasizing practical activities and peer discussions (Prince, 2004; Roehl, Reddy, & Shannon, 2013). Support for active learning has been well established, with studies demonstrating improved student performance on objective measures (Freeman, et al., 2014; Yoder & Hochevar, 2005); increased critical thinking and problem-solving capacities (Kember & Leung, 2005; Prince, 2004); enthusiasm for learning and the specific area of study (Deltor, Booker, Serenko, & Julien, 2012; Morreale & Balon, 2012; Rotgans, & Henk, 2011; Thaman, Dhillon, Saggar, Gupta, & Kaur, 2013); and enhanced writing abilities (Prince, 2004).

Institutional Context

The EIA study was developed as an optional activity within the newly-formed Aging Studies Interdisciplinary Graduate Group (ASIGG) at the University of Minnesota. ASIGG is an informal group open to all professional and graduate students at the university. Activities develop according to participating students' interests, including writing workshops, research presentations, and career development activities. An ASIGG faculty advisor offered all students involved in ASIGG the opportunity to volunteer on a collaborative research project in Fall 2015. Approximately 30 students were on the ASIGG email list at the time, and 13

decided to participate. Those who decided not to become involved in EIA study cited various reasons including general time constraints and other research and personal commitments.

Background: The EIA Study

The EIA study broadly explored perspectives on evidence with a sample of all faculty affiliated with the University of Minnesota's Center on Aging. This study was the first project to explore how gerontologists perceive evidence on aging. It was designed to maximize learning about a previously unexplored phenomenon.

The interview protocol was developed with extensive input from student investigators. Students collaborated on drafts and joined faculty investigators in pretesting the items. The resultant interview contained items about each respondent's background and current work. It asked respondents a series of fixed-choice questions related to their reliance on evidence for various tasks, circumstances or attributes of a study that might influence their trust in evidence yielded, and the credibility of various research designs. Interviewers captured respondents' reflections as they replied to fixed questions, and probed for elaboration of their thinking (Kane et al., 2016; Kane & Kane, 2016).[1]

Student collaborators conducted most of the interviews. Faculty mentor RK managed the training and fieldwork logistics. All interviewers completed an in-depth training session with role-playing and a mock interview. Students conducted their first interview under the observation of RK or one of two doctoral students with considerable prior interviewing expertise. To further enhance the quality and consistency of interviews, the study utilized a comprehensive manual detailing how to contact respondents, elicit informed consent, handle questions, and a question-by-question discussion of the intent of each item and how to ask it without biasing responses.

Student co-investigators were assigned to interview faculty outside their primary fields both to enhance the learning experience and to avoid students interviewing their own academic preceptors. All students participated in the interviewer training, and 11 students constituted the cadre of interviewers. RK completed six interviews to fill in when student schedules did not coincide with respondents' availability. Interviews ranged from 20–90 minutes (mean 43 minutes).

Interviews were conducted from December 2015 to March 2016. Sixty-four (64) faculty affiliates of the Center on Aging participated; two declined directly and two were non-respondents because appointments could not be arranged over a 4-month period. All respondents were interviewed in-person except two faculty members on long-term leave who were interviewed by videophone. Many interviews were audio-recorded with permission to enable interviewers to further capture respondents' comments. Before data collection, the study was approved by the University of Minnesota Institutional Review Board. All faculty respondents provided written informed consent.

[1]Please contact first author (JF) for a copy of the interview protocol.

We provided this background to explain the nature of the study in which students served as co-investigators. Detailed description of the EIA study measures and data are beyond the scope of this manuscript. This article focuses on the experience and reactions of participating students and faculty advisors involved in this innovative educational approach. It emerged from a student presentation at the 2016 Gerontological Society of America Annual Scientific Meeting (Finlay et al., 2016) discussing student perceptions of the EIA experience.

Case Study of the EIA: An Innovative Educational Experience

Description of Student Co-Investigators

The thirteen graduate students who participated in the EIA study included nine PhD students, three master's students, and one research fellow at the master's level who was doing additional studies in aging. Their primary fields of study included three in health services research, three in nursing, two public health students (specializing in nutrition and community health), and one each in geography, health and business administration, environmental design, evaluation studies, and public policy. Students contributed to study design, training, conducted and observed interviews, entered and analyzed data, and provided the field notes, reflections, and discussion analyzed here.

Data Used to Explore the Educational Experience

We relied on two sources of data for the findings presented in this article: interviewers' immediate reflections completed after each interview; and interviewers' delayed reflections. Directly after each interview, all interviewers completed a form on their impressions of the interview in four categories: (1) Immediate impressions (e.g., any key words, phrases, or quotes that stood out during the interview, perception of the respondent's sense of interest in or engagement with topic); (2) Any non-verbal communications observed during the interview (e.g., tone of voice, movement, gestures, body language); (3) Anything the interviewer noticed in interview (e.g., impressions if in respondent's office, interruptions); and (4) Preliminary "analysis" (e.g., hunches or impressions about this respondent's views of or uses of evidence, any other insights). Students recorded their impressions and perceptions about major themes, surprises, speculations, and connections immediately after conducting each interview.

Six months later, the lead author asked all students who volunteered to be involved in EIA knowledge dissemination (n=8) to provide a short reflection on key takeaways from the experience and how the study impacted their personal growth and professional development. Five students volunteered their reflections.

In addition to the two ways we organized our impressions, the paper includes reflections from a faculty mentor RK on what the two EIA faculty learned from this collaboration themselves. They represent different disciplines (geriatric and preventive medicine for the former; social work, gerontology, and bioethics for the latter) and methodological backgrounds. Their thoughts about the EIA, its rewards and challenges, and the lessons for future such projects, are included after the student findings. The views of the faculty

principle investigator for this collaboration are filtered through RK's recollections of their conversations right up to the time of his sudden death.

Analysis

The first author (JF) thematically analyzed the written field notes and student reflections using Braun and Clarke's (2006) six steps of thematic analysis: (1) familiarization; (2) generation of initial codes; (3) search for themes; (4) review themes; (5) define and name themes; and (6) write up of themes analyzed. Through multiple close readings of notes, the first author in collaboration with other student researchers compared interpretations and points of divergence to refine and clarify codes. Regular peer debriefing and group meetings enhanced transparency and credibility (Marshall & Rossman, 2014).

Results

Five overarching themes emerged that demonstrate the EIA as an innovative model of interdisciplinary training and active learning. First, students acquired new methodological skills and learned firsthand about study design. Second, students were enthusiastically engaged and valued the collaborative nature of the project. Third, students gained exposure to different sub-disciplines within gerontology and geriatrics. Fourth, the EIA study served as a productive platform to explore personal views and compare them to peers and diverse faculty across the university. Fifth, the study provided valuable professional and knowledge translation opportunities such as conference presentations, manuscript development, exposure to the publication process, and extensions to national and international companion studies.

(1) Methodological Skills Gained Through Peer Collaboration

Students noted methodological and analytical skills acquired and honed through the EIA study in their 6-month reflections. As students from a variety of skills and backgrounds, we were able to serve as each other's guides and teachers. Students with expertise in questionnaire and interview construction collaborated with faculty mentors on developing the informed consent form and semi-structured interview protocol. Another student with qualitative research experience (JF) developed the prototype of the template for field notes. Two doctoral students with prior interviewing expertise served as adjunct interview instructors at training workshops. One of the student collaborators (MW), who had set up the online data entry system, taught her student colleagues how to enter data on the secure research capture web platform. Those with experience gained confidence and teaching practice through instructing peers, and those without previous experience gained newfound methodological skills before heading into the field.

After completing the interviews and data entry, we began a continuous and interactive process of analyzing results. This was an opportunity for students with a different set of skills to take the lead. Those from a quantitative background hosted workshops on using the statistical software package Stata to tabulate and understand quantitative results. Those from a qualitative background demonstrated how to conduct thematic analysis and code interview statements and field notes.

(2) Enthusiasm for Collaborative Learning

Participating students bonded during fieldwork. We regularly swapped stories, shared interviewing tips, compared notes, and speculated about emerging trends and hunches. One student observed in the delayed reflection:

> Often graduate students – particularly those of us doing PhD's – can feel isolated as we focus for years on a largely-solo research study. This was a wonderful opportunity to collaborate closely with other students and connect through shared interests. I gained professional colleagues and strengthened friendships in the process.

For many students, the study was a welcome and productive reprieve from ongoing dissertation work, and an opportunity to learn new skills from other students. One student wrote in the delayed reflection: "This was an incredibly insightful experience for me. I benefited greatly from the opportunity to collaborate with a diverse group of intelligent, motivated students." Students involved in fieldwork widely shared this positive view of interdisciplinary collaboration with peers.

(3) Exposure to the Breadth of Gerontology and Geriatrics

Interviewing was a valuable opportunity to meet and converse with a broad array of faculty and research leaders from across the university and affiliated organizations, such as the Veterans Administration and health providers. We gained connections with disciplines with which we were less familiar, and learned different approaches to gerontology. A student reflected in the delayed interviewer field notes:

> I appreciated the opportunity to interview faculty with whom I had never interacted before. Not only did I learn about how faculty across broad aging-focused disciplines view evidence, but I also learned a bit about the different kinds of work that gerontologists do. It was a great learning experience in this way.

Students appreciated hearing about the diverse, often unexpected, career trajectories of gerontologists and geriatricians. Respondents were keen to discuss our own graduate work and encourage emerging scholars and practitioners entering the field. Students noted in their interviewer field notes that overall the faculty respondents were supportive and generous with their time.

(4) Cultivate Interdisciplinary Understanding

As a diverse group of students, we were intrigued by how perspectives on evidence varied by discipline. We generally observed the implications of this variability for the field of gerontology and geriatrics. We found some of the survey results and recorded quotes particularly interesting as they provided useful prompts to consider limitations to our own points of view and potential implications for our future professional roles. For example, substantial variability by field in respondent responses to the question, "How strong is the evidence available to guide your work?" generated lively discussion. Respondents in the biological sciences expressed greater confidence in the evidence to guide their work than individuals in other fields, and those in the health sciences tended to be the most skeptical with respect to available evidence. During team meetings, students and faculty mentors

grappled with these results at length. We looked to the commentary of respondents recorded in our field notes that shed light on these disciplinary differences. One student recorded a poignant quote from a social and psychological sciences faculty respondent in the interviewer field notes:

> We are not reductionists, we work with much more complexity and come from a complex standpoint. The outcomes we deal with are also complex, like quality of life and caregiver stress. We have higher bars to leap; we have to prove effectiveness in complex patients, not just effectiveness in isolation with one problem.

We speculated that the perceived level of complexity in one's work influenced opinions about strength of actionable evidence. Medical practitioners often pointed to the "messiness" of studying individuals in the real-world and trying to utilize evidence that is behind current practices. They struggled to apply evidence for average patients when making particular decisions for older patients.

We found it interesting to hear that those with clinical experience expressed frustration at the notable lack of high-quality evidence to recommend an intervention. They articulated that study participants did not reflect the complexities seen outside of the clinic. They felt the evidence to represent actual patients sparse. The lack of age-specific or patient-specific guidelines and evidence for aging populations can put older patients at risk. Multiple chronic conditions and complex cases make this issue more serious. One student reflected after one interview in the interviewer field notes:

> A key theme appears to be the applicability or transferability of evidence to the populations that respondents actually serve. This respondent perceived a disconnect between the results from controlled studies and population-based descriptive studies, and the type of evidence needed to make decisions for individuals and their families.

Not all interviewed faculty shared this same level of frustration. For example, faculty from biological sciences were likely to rate the evidence available to them as adequate or strong. They pointed to substantial literatures across the laboratory sciences. These "bench scientists" were in general not directly responsible for patient care or as focused on "messy" real-world outcomes as clinicians. Clinical researchers tended to recognize randomized controlled trials and systematic reviews of such trials as their gold standard, but expressed frustration at the inability to get information that they could usefully apply to particular patients.

One pair of questions elicited spirited discussion amongst student collaborators and served as a central point for reflection and general observation. When asked if disciplines in aging *do* share a common view of evidence, 63% of the 64 faculty respondents disagreed. In a follow-up question, we asked faculty respondents whether disciplines in aging *should* share a common view of evidence. Just over half (52%) agreed that disciplines in aging should share a common view of evidence. We were interested in the divergence of responses and reflected on these two questions during group debriefing sessions. Again, we also looked to

the qualitative commentary volunteered by faculty interviewees to better understand the difference.

Those in favor of a shared view of evidence advocated for commonality to build understanding and shared standards across disciplines. Faculty with this opinion stressed the need for collaboration and mutual appreciation between often-divergent approaches. Some faculty respondents optimistically reasoned that shared criteria and standards could serve as a common-ground platform. Faculty respondents who disagreed that disciplines within gerontology should share a common view of evidence reported that the statement was overly prescriptive and potentially harmful to interdisciplinary gerontological scholarship and practice. They stressed the importance of separate norms and practices across distinct fields of aging, and the need to build respect and appreciation for a diversity of approaches and standards. Going back to the centrality of context, faculty respondents reasoned that application and context across fields necessitates different types and expectations of evidence. One participant recorded in the interviewer field notes a faculty respondent as saying: “Different questions require different types and levels of evidence, and it is not necessary or appropriate to use the same definition of evidence for all.” As students, the utility of different questions and methods for different purposes resonated with many of us as we considered what approaches we use to address our own research questions.

We reflected on the faculty responses in the context of our own graduate research and future plans for collaboration. We discussed one key question at length: Can you do interdisciplinary work if you hold divergent views of evidence? This question arose in our interviewer field notes as many of us grappled with comments made by interviewees who stated a desire for interdisciplinary collaboration, but gave little credence to most research approaches beyond their narrow sub-discipline. The challenge of conducting interdisciplinary research was highlighted by a lack of clarity we observed on study design and methodology. One student wrote in the interviewer field notes:

> Each participant reported working in an interdisciplinary setting. Although they purportedly saw their interdisciplinary partners as equals, many respondents were biased toward trusting the research with which they were most practiced or familiar. For instance, qualitative researchers may have considered double-blind randomized control trial very trustworthy, with the caveat that they are not the ‘end all be all’ in terms of developing a robust understanding of the situation. Conversely, some basic scientists were highly skeptical of less scientific methods.

Limited knowledge of methodology beyond that used within our own field may hamper interdisciplinary efforts. We reflected on the need for diverse theoretical and methodological training in gerontology programs to build understanding, appreciation, and true collaboration across disciplines of aging.

(5) Scholars in the Making

The EIA provided valuable opportunities for scholarly development, knowledge dissemination, and further interdisciplinary discussion and collaboration. In debriefing discussions and general observations, we noted that a key takeaway from this study was the importance of context in how evidence is understood and acted upon. Depending upon

professional role, faculty respondents tended to espouse different perspectives on evidence. Furthermore, we appreciated when some faculty respondents noted the fluid nature of evidence based on transient paradigms and epistemologies. One student recorded a compelling faculty respondent quote in her interviewer field notes:

> I think [evidence] is both cumulative and contextual. Things may be somewhat true until you get more/new information. There is no such thing as strong evidence we can put in a lockbox - we can't say we know this is for sure forever. We have to look at the context of other studies in other places in other populations, and in the context of historical time what else has changed.

Older faculty respondents in particular noted observing passing trends and changing standards of evidence throughout their careers. We learned from faculty respondents to be cautious given the temporal and often-fleeting nature of evidence. Many of us honed our scholarly approach to reviewing academic literature and our own writing given the EIA experience.

We learned firsthand about marshalling results into distinct writing projects, co-authoring journal articles, and the realities of the publication process. Students wrote in their delayed reflections that the project sharpened their critical thinking and writing skills. Both early-stage and advanced student researchers benefitted from the breadth of experience on the team, and learned from one another in addition to faculty mentors in the process. The EIA study enabled student researchers to deliver oral presentations, develop posters, and organize symposia at national and international conferences. For master's degree students, the EIA study was an opportunity to gain exposure to the wider academic world. Doctoral students enriched breadth of expertise and used the study to network with different colleagues and potential future employers. Knowledge dissemination has led to broadened conversations with fellow students and diverse gerontologists and geriatricians worldwide.

The Faculty Perspective

ASIGG offered an opportunity to bring together graduate students and faculty mentors on a truly cross-disciplinary collaborative experience. Based on RK's own reflections and those recalled from Dr. Robert Kane, she offers some themes, positive takeaways, and challenges from a faculty perspective.

Graduate Research Assistants Versus Research Collaborators

Graduate students are routinely hired to work on real-life research projects; that exposure is considered intrinsic to their learning and often brings added value to the project through the issues they raise. But research assistants work on projects as a job – they are paid to work a requisite number of hours and fulfill job requirements. In the EIA study, students were volunteering collaborators who constituted a critical mass of additional investigators. It was planned from the outset that students share in writing and publications through donated time and energy. Faculty were committed to carefully consider student suggestions, and indeed many student ideas strengthened the design and sharpened conclusions.

Tension Between Student Learning and Study Quality Control

The interviewing labor force of graduate students often resulted in high caliber interviews, especially for the qualitative component. Yet standardizing the student interviewers and trying to eliminate interviewer variation was an ongoing challenge. RK made initial assignments of interviewees to students, who then emailed their assigned respondents to set up an appointment. That in itself was interesting to observe: different interviewers developed unique styles in their approach to elicit participation and informed consent. We experienced the usual complexities of involving students with competing obligations including classes, dissertation completion, their own fieldwork, and travel to conferences. Students were not in the same program and their schedules varied widely. The training of students had to be staggered. For example, one student was abroad for field experience and not able to begin interviewing until six weeks after others started. Her training was done individually, and she completed five interviews in a compressed time period. Another student had a delayed start due to dissertation responsibilities and a research assistant position. She too had a late start, yet completed three interviews.

The need for study quality occasionally conflicted with maximizing student learning. For example: two students did not master the skills required to conduct a semi-structured interview due to idiomatic English language barriers. Decisions about whether or not a student should proceed to complete interviews were made jointly by the faculty mentor and individual students. One student opted out of interviewing after the training, while another conducted two interviews after additional coaching. These students were invited to observe and take notes at other interviews, and perform data analysis.

EIA Study Extensions

This paper concentrates on researcher experiences of the first phase of the EIA. We viewed this work as important in itself, and as an instructive experience to help us design a data collection tool suited to an electronic survey. Some of the students were involved in refining the EIA to survey a national sample of the leadership and editorial boards of the Gerontological Society of America (GSA). Students worked on quantitative and qualitative analysis of the interview responses. Several students helped facilitate the final phase, an international study among members of the International Association of Geriatrics and Gerontology (IAGG).

Students delivered symposium papers at the GSA 2016 annual meeting and the IAGG 2017 meeting. In both instances, they participated in sessions with well-known discussants. Four PhD students and two master’s students have graduated and moved on to post-doctoral or faculty positions since the EIA began. It is impressive how many in the group continue to work together, such as holding telephone conferences and working on projects remotely. They continue to gather socially at conferences and support each other in their evolving careers.

Future Educational Research Collaborations

Robert Kane remained enthusiastic about the value of this educational experience for students, and the added value of student participation to the project. In setting up such

projects, faculty should anticipate logistical issues so that the study will be rigorous while still respecting student obligations and opportunities. It can be a fruitful learning experience and tangible additions to students' resumes. There is merit to having multiple faculty involved from different disciplines as study investigators. Robert Kane and RK did not always agree on research methods or interpretation of the findings. They showed students first-hand how philosophical and methodical tensions occur, and how to resolve these issues productively in cross-disciplinary research. Diverse student participants added great value to the project, and future efforts would benefit from purposefully incorporating students from a mix of fields and stages of graduate school.

Future faculty-student research collaborations may involve original research (like the EIA study), advocacy projects, or even policy development. Research projects might entail primary data collection, systematic reviews, or analyses of existing data sets. Regardless of the goals and type of project, we suggest three guidelines. First, the topic should be something of interest to both faculty and students. Ideally it is also relevant to the broader academic field, which will yield opportunities for manuscripts and presentations. Second, the project should be inherently cross-disciplinary to attract a wide range of graduate students. Third, the project timeframe should be relatively short to accommodate graduate degree timing.

Conclusion

We describe the EIA project as an innovative approach to interdisciplinary student engagement in gerontology. The first two themes that we presented are consistent with the hallmarks of active learning. The first, *Methodological Skills Gained Through Peer Collaboration,* is consistent with other work that has shown "learning-by-doing" to be an effective way to learn research methodology (Keen, 1996; Longmore, Dunn, & Jarboe, 1996; Winn, 1995). While most students participating in this project had some training in quantitative or qualitative methods, few had both. To complete the project, students had to train each other in the basics of each approach. Students who only had experience working with large, administrative data sets learned to collect data through semi-structured interviews. At the same time, students with little exposure to quantitative methods learned to read and interpret study outputs. Although this informal cross-training was not enough for students to conduct independent research in their non-dominant method, it provided students a valuable opportunity to gain exposure to other methods and better understand how interdisciplinary collaboration can enrich understanding of study aims and findings. For students in the process of developing questions for their dissertations, it allowed them to consider the potential benefits of using a mixed-methods approach to answering their own research questions.

The second theme, *Enthusiasm for Learning*, is consistent with literature suggesting that active learning increases student satisfaction and interest in a subject area (Morreale & Balon, 2012; Rotgans & Schmidt, 2011). Particular to this group of students, the collaboration required to complete the project was in direct contrast to the work of writing a master's thesis or dissertation. For most students, this was a welcome change of pace and, for some, it created a valuable level of peer support for dissertation and thesis completion.

The other three themes that emerged from this analysis highlight the potential benefits associated with interdisciplinary learning for the field of gerontology. The third theme, *Exposure to the Breadth of Gerontology and Geriatrics*, is related to the idea of professional development. The GSA has developed a nationwide mentorship program to match students and emerging gerontologists to more established professionals (Gerontological Society of America, n.d.; Kahana, Stuckey, & Borawski, 1990). However, access to the program requires GSA membership and knowing the specific area of gerontology that interests you. The barriers to professional development were fewer in the current study. Students met with gerontologists and broadened their view of what the field of gerontology encompassed. This type of broad-based exposure may help students take alternative paths and seek out more formalized or specific mentorship based on these experiences.

Perhaps most importantly, as seen in theme four, *Cultivate Interdisciplinary Understanding,* this work challenged our discipline-specific notions about what constitutes "good" research or "good" evidence. Breaking down biases or attitudinal barriers may be one of the greatest benefits of interdisciplinary training (Fulmer at al., 2005). The realization that faculty were more likely to trust evidence produced by the type of research they most frequently conducted was eye-opening for students, as we too were becoming indoctrinated into similar beliefs. One student reflected: "As for my own views of evidence, I feel that they have definitely evolved over the course of this study to reflect greater consideration of the unique input that is provided by each study design toward our understanding of different phenomenon in the field of aging."

The notion of challenging discipline-specific training carried into theme five, *Scholars in the Making*, in which students had to grapple with difference in training related to manuscript style and discipline-specific journal preferences. Disciplinary status is a barrier to interdisciplinary training (Bass, 2013; Gardner, 2013). Forcing students into these collaborations earlier in their career may help break down some of these structures. The submission of abstracts resulting from the EIA study to national and international conferences allowed some students to participate in a gerontology-specific conference for the first time.

This study has its challenges and limitations. Student volunteers were self-selected, and therefore likely predisposed to be positive about the experience. The manuscript includes formal retrospective feedback from only a sub-set of student co-investigators. The prestige of the EIA's faculty mentors likely contributed to the high level of engagement we experienced from faculty members who participated in the study. We also found that the faculty interviewed seemed overall very supportive of us and interested in promoting our development as gerontologists. We did not formally measure interdisciplinary exposure or competence before and after participation in the active learning project. There was also no control arm to this study to compare to the active learning intervention. However, we think this type of interdisciplinary, experiential project holds promise for breaking down discipline-specific siloes related to beliefs about the quality of evidence based on study design and methods.

The EIA study serves as an innovative model of how academic institutions without PhD programs in gerontology can foster interdisciplinary collaboration and professional identification with gerontology. It provided unique opportunities to examine epistemological and methodological differences between disciplines. A wide range of other collaborative student-faculty research projects could be conceived based upon this cross-disciplinary model. We believe discipline-specific training combined with interdisciplinary collaboration will produce stronger generations of future gerontologists.

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