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Abstract

Increasingly, colleges and universities value undergraduate educational research experiences, though traditional apprenticeship models may be infeasible due to faculty time and resource limitations. The “embedded researcher” method can provide research experiences to large numbers of students within traditional courses while generating valuable data for faculty. Our implementation of this method at a Hispanic-serving university yielded both high student satisfaction and meaningful research data. Advantages with Hispanic undergraduates, limitations, potential modifications, and future directions are described.

Keywords

Hispanic education, research, teaching, sexual abuse, sexual offense, participant-driven sampling, embedded researchers

An In-Class Strategy for Involving Undergraduates in Research

Providing opportunities for undergraduate participation in research and other applied learning situations has increasingly become a pedagogical goal of universities. Evidence suggests that students involved in such activities are generally more successful across multiple domains than are students who do not participate in research. However, providing such experiences to those who need them most may require creative solutions, as traditional apprenticeship models are available to only small numbers of students,

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likely a self-selected group of the most motivated and talented. Hispanic students, who face a unique pattern of challenges in higher education, may especially benefit from applied learning activities such as active research. However, many Hispanic students follow nontraditional paths through higher education, a fact that not only offers additional challenges but also opportunities in this domain. The current article reports on a promising alternative to the traditional mentorship/apprenticeship model, in which student involvement on a research project was incorporated into a traditional academic classroom at a Hispanic Serving Institution (HSI)

Undergraduate Research Experiences

Involving undergraduate students in applied learning has increasingly been a goal of universities and faculty members, and the advantages of such arrangements for students are numerous (Sadler & McKinney, 2010). This article will focus on research involvement. Research-involved undergraduates are typically more engaged academically and demonstrate greater academic success and satisfaction (Henkel, 2006). Not surprisingly, they also produce better research papers and are more prepared for graduate school (Ware, Badura, & Davis, 2002). Involvement in research also increases critical thinking, appropriate scientific skepticism when consuming research data, and independent thinking and confidence in students' knowledge of the discipline (Henkel, 2006; Kierniesky, 2005; see also Schindler, 2011). The vast majority of research-involved undergraduates describe their experiences as positive (Seymour, Hunter, Laursen, & Deantoni, 2004). Furthermore, experience in research during the undergraduate years is commonly viewed as a positive credential for graduate school applications (Huss, Randall, Patry, Davis, & Hansen, 2002; Kierniesky, 2005). Hispanic students in colleges and universities face challenges that are not presented to dominant-culture students (Alfaro, Umaña-Taylor, Gonzales-Backen, Bámaca, & Zeiders, 2009; Becerra, 2010) and evidence the lowest academic achievement rates of any major ethnicity in the United States (Santiago, 2011); thus, Hispanic students may derive particular benefit from applied research activities integrated with their coursework.

Although the value of research experiences for undergraduates is clear, identifying appropriate mechanisms for such experiences may be difficult. Larger research-oriented universities may prefer the "apprenticeship" model in which a small number of highly motivated students are mentored by a faculty (or graduate student) mentor. Although it is beneficial for those students involved, this pattern cannot easily accommodate research experiences for vast numbers of undergraduates. Smaller teaching-oriented universities may use research-focused seminars or "capstone" courses, though such courses may provide only time-limited research involvement (a single semester), and may place considerable strain on the resources of instructors, particularly at universities with high teaching loads (Kierniesky, 2005). Hispanic students, in addition, are often nontraditional, part-time, and/or "commuter" (i.e., living at home rather than on campus) students, due to multiple demographic, economic, and cultural factors (Santiago,

2011). In such situations, taking advantage of traditional undergraduate research opportunities may be difficult or unrealistic.

One alternative is to build research experiences into a wide array of traditional lecture/discussion-based classes. Such opportunities may involve relatively brief but direct exposures to methods of research or may include more detailed involvement in student research. Including research opportunities across a broader array of classroom settings may be valuable in offering research opportunities to a greater number of undergraduates and to students who do not live a traditional full-time on-campus lifestyle. Such experiences can, as we will demonstrate, take advantage of local family and community relationships. Our implementation of these experiences may also allow instructors to “leverage resources” for multiple positive outcomes from a single initiative, an important consideration for faculty at universities with high workloads (research, teaching, or both) and large classes. We report our experience with combining didactic instruction and student research in a course on sexual abuse and sexual offense at a HSI in South Texas.

An undergraduate class titled “Sexual abuse and sexual offense” required a seminar-style review of pertinent literature, semistructured interviews on course-relevant topics with community residents in the students’ networks, and distribution of anonymous questionnaires soliciting sensitive data. The interview topics were chosen by the students as part of a comprehensive research project. The questionnaire was composed of demographic items plus five validated research instruments for assessing sexual abuse and offense experiences and related constructs. Thus, this course represented both a professional-level introduction to a body of literature and a substantive contribution to research with a seriously underresearched population (i.e., US–Mexico border-area residents).

The method employed for data collection may be called the “embedded researcher” method, a variety of participant-driven sampling (Salganik & Heckathorn, 2004) shown to be useful in populations resistant to traditional data collection tactics (e.g., mail surveys, phone interviews, etc.), and for assessing “hidden” behaviors and populations (Richardson, 1999; Richardson & Resendiz, 2006). This method consists of employing researchers who are “embedded” residents of the communities in which (and about which) data is collected. These embedded researchers—in this case, undergraduate students—serve as researcher-liaisons between the principal investigator (PI) and the community research participants. As members of the research participants’ family or friend networks, embedded researchers automatically possess a high degree of cultural competence and may collect data from individuals otherwise disinclined to participate in research.

This type of research requires a relationship of trust between the PI (the instructor) and the embedded researchers (the students), a relationship naturally occurring in the university setting. *Familismo* (Halgunseth, Ispa, & Rudy, 2006), the relatively collectivist nature of Mexican American communities (Dabul, Bernal, & Knight, 1995), and the fact that the vast majority of students at this midsize public university were local residents guaranteed a high level of trust between students and community members—that

is to say, the students' family, friends, and neighbors. These factors created a natural environment in which to apply the embedded researcher method.

In addition to benefits for PIs such as the sampling of "hidden" populations or behaviors and using participants' cultural competence to increase data validity, embedded researchers, we reasoned, are likely to derive educational benefits from their participation. First, the anxiety of approaching a friend to request a research interview would seem to be much less, for most people, than that involved in approaching strangers—potentially a barrier to student research participation. Second, making students part of a larger project might provide more inherent structure than, for instance, an honors thesis, leading to almost certain completion and thus a "success" experience with research. Third, students may feel a sense of universality and support from peers involved in the same project. Fourth, the embedded-researcher methodology and peer interaction might result in a reduction in effort an instructor might otherwise spend on certain common research tasks (e.g., data collection, writing initial results, quality checks of materials), and this may facilitate requiring and guiding each student to complete a full project, from the "brainstorming" stage through dissemination of results. Fifth, because this project was built into the course, it did not require any greater student time commitment than it would have without the research component. This last consideration may be especially important for students who live off campus, care for family members, or work part- or full-time—as is true of the majority of students at this HSI (University of Texas–Pan American, 2008)—because such students might be unable to participate in traditional mentorship models requiring large amounts of volunteer time in addition to coursework.

Implementing an "Embedded Researcher" Program Within an Advanced Undergraduate Psychology Course

The advanced undergraduate psychology course was offered during the Fall semester 2009. More than 95% of students at the university live with family and commute daily to school (University of Texas–Pan American, 2008). Twenty students were enrolled—8 males and 12 females. All students were apparently of Hispanic ethnicity (informally judged by student last names and verbal self-report). All students but one were "traditional" college students, meaning their college attendance was continuous and immediate after high school graduation. None of the students lived in on-campus housing (i.e., all were "commuter" students). Three students were criminal justice majors, two majored in biology, and one in social work. The remainder were psychology majors.

Course Research Details

The class met twice per week with didactic material on Tuesdays and research on Thursdays. Didactics consisted of reviewing and discussing two professional journal

articles or book chapters per week, encouraged with required one-page targeted response papers. The instructor (the first author of this manuscript) managed classroom discussions, encouraging critical thought and application of the concepts to news items, cultural trends, and student experiences.

The research portion of the course encompassed a full research project for each student. Students generated ideas, proposed topics and research plans, added their proposals to an institutional review board (IRB) application, recruited participants, conducted interviews and distributed questionnaires, transcribed interviews, extracted themes from interview transcripts, presented results to the class, and wrote a research report.

The student data-collection requirement included interviewing seven non-college-student community residents and distributing an anonymous questionnaire to each interviewee, to be mailed back to the PI in pre-addressed, postage-paid envelopes. All IRB requirements were followed, including providing interviewees with informed consent and following other ethical procedures.

The participants were residents of the US–Mexico border region, recruited from students' own social networks in homes, workplaces, or other community locations. Interviews lasted between 20 and 45 min, in general. The topics of the interviews were heterogeneous, being chosen individually for students' research projects in consultation with the instructor and other students; all interviews involved assessing interviewees' attitudes and knowledge of phenomena related to sexual abuse. Students did not ask about interviewees' personal experiences with sexual abuse or recruit interviewees based on such considerations.

The anonymous mail-in questionnaire, by contrast, contained demographic questions as well as measures of participants' sexual history (Kaufman, 1993), acculturation (Bauman, 2005; Cuéllar, 2004), *machismo* and *familismo*-related attitudes (Cuéllar, Arnold, & González, 1995), social desirability (Reynolds, 1982), and a free-response item. As they are not the primary focus of this article, these measures will not be discussed in detail here except to note that the interview and all questionnaire measures were available to student-researchers both in Spanish and in English. The sexual history form and portions of the demographics were translated through a rigorous backtranslation and review process in a previous project. The *Machismo* and *Familismo* scales were originally developed by Cuéllar et al. (1995) in both English and Spanish, and the remaining items, including the interview, were translated to Spanish by a professional translator and reviewed by native Spanish speakers for accuracy and clarity. Student-interviewers, who were personally acquainted with the interview participants, decided whether to present materials in Spanish, English, or both.

Student Research Activities

The research process accounted for about 50% of students' in-class time (i.e., every other class period), with a proportionate amount of time expected to be spent in outside-class

research activities. For the first 3 weeks of the 15-week semester, students participated in guided peer and whole-group discussions to generate hypotheses, discuss methods, and generate a written research proposal. This phase overlapped partially with 2 to 3 weeks in which students completed ethics training required by the IRB, formatted their proposals for inclusion in the course's IRB application, and participated in interview training. Meanwhile, reading and discussing didactic materials on alternate class days increased the students' knowledge base about both research methods and the content domain of sexual abuse and offense.

The middle 4 to 5 weeks of the course were occupied with weekly updates from student-researchers, support and feedback from their peers, and guidance from the instructor, as needed. Presentations and final papers were developed principally during this time period, in structured class consultation sessions (both small group and full class) with peers and the instructor. Students presented their research to one another during the final weeks of class, receiving feedback from their peers and evaluation from the instructor. Final research report papers were turned in at the end of the semester.

Outcomes of Our Program and Directions for the Future

Student Experiences

Standardized teaching evaluations showed that this course was perceived positively by students, comparable to the previous year, when the course was taught in a 100% didactic format (i.e., no research experience). Ninety-four percent of students rated the quality of instruction and the course as "good" or "excellent" (previous year, 96%), with 70% to 85% indicating "excellent" in each of the various areas of evaluation (previous year, 70% to 80%). Handwritten comments for both years consistently emphasized a positive experience, with phrases such as "interesting," "opened my eyes," "informative," and affirmations that they would recommend the course to others. Apparently, the addition of the research experience component did not noticeably reduce student satisfaction with the course. In addition, 3 of the 6 students who chose to write comments on their evaluation forms during the 2nd year included positive notes specifically about the research experience: "I liked the research process," "[I liked most] the independent research," and "[I was motivated to work for a higher level of skill and/or knowledge] . . . because it helped me in conducting my own research." It seems that the research component was, at least for some students, a contributor to their positive experience in the class.

Research Motivation and Involvement

All students collected data, gave research presentations, and completed brief research reports. Five students chose to adapt their presentations for a local research conference the following semester. Several others later commented that the class provided them

with important new knowledge, reasoning ability, and perspectives on world issues. Two students joined the first author's research team in a project expanding the embedded researcher methodology for a more extensive study of sexual abuse phenomena in the US–Mexico border region. Several students commented verbally that they wished they had devoted more time to this course, compared with their other classes.

Research Productivity

Although the main benefit of the paradigm described here is, arguably, an educational benefit for students, one of the attractions of this style of hybrid research-teaching approach may be the appeal to instructors of data collection as part of the instruction process. Seventeen students complied with the seven-interview requirement, 3 students conducted only six, and 1 conducted eight. A total of 138 interviews were ultimately conducted. Course requirements specified that each interviewee should be presented with the standardized questionnaire packet. An anonymous poll of class members, conducted after approximately three fourths of interviews had been completed, indicated more than 90% implementation of this requirement. Although only 15% of anonymous questionnaires were returned by mail, several included detailed, valuable information.

These data, and a description of the data-collection process, provided pilot data instrumental in obtaining a grant from the South Texas Border Health Disparities Center to study sexual abuse and offense in the US–Mexico border population; this method was implemented on a larger scale in that project. Thus, the research-experience approach we have described was directly useful both in improving instruction and in furthering future research productivity through a time- and effort-efficient process.

Limitations of the Method

It is, of course, true that the time spent in class pursuing research came at the expense of more in-depth didactic instruction. The instructor considered this trade-off worthwhile, because of the known student benefits of hands-on research experience, and student evaluations and comments provided no suggestion that the students were dissatisfied with the time requirements of the research component. Some students, however, verbally suggested that more time should be spent on interview training—even with family and friends, this was an area of anxiety.

A more fundamental limitation of this method is that it may be difficult to implement at colleges or universities without a strong “commuter” student base. However, not all students in our course lived locally; one was from Mexico and another from elsewhere in the United State. These students used innovative methods, including telephone and Internet chat, to recruit and interview their friends and family after consulting with the IRB. Questionnaires were sent via mail or email for participants to print, complete, and anonymously return if they chose. These modifications may

facilitate the use of this method with noncommuter populations. In less sensitive content areas, it might also be possible for students to direct interviewees to Internet-based questionnaires, which would bypass some of these difficulties.

IRB procedures were more complex than with other questionnaire-based studies, leading to an IRB process which might be overwhelming for undergraduate students. In this particular situation, the IRB worked with the instructor/investigator to create a “blanket” approval for the common elements of the study and the general structure of the student interviews—before the content of these interviews had been chosen by students, but with reasonable limitations for this content stipulated—pending later approval for the finer details of individual student projects as these were chosen. This arrangement reduced the students’ IRB commitment to a manageable level although still allowing some degree of involvement with real-world IRB procedures.

Confidentiality was both more and less secure than in traditional questionnaire research. The PI had no interaction with, or knowledge of, participants. However, because he knew the students and students knew the participants, a potential link existed between investigator and participants, potentially reducing the anonymity of interview and even (with small sample sizes) questionnaire data. This somewhat complex situation is endemic to the methods we used, and we worried that it might cause undue difficulties for students. Although some students seemed initially confused or worried by confidentiality issues, these seemed to serve as material for meaningful classroom discussions about the ethics of confidentiality in research.

Suggestions for Implementation

Looking beyond the apprenticeship model. One of the goals of our approach was to examine techniques for increasing student involvement in the research process where faculty and financial resources may be limited. We wish to note that we are not opposed to the apprenticeship model, and often use it ourselves. However, the apprenticeship model is not sufficient for reaching out to large numbers of students and involving them in the research process. The embedded researcher model described here is one approach for involving large numbers of student-researchers within a pedagogical format. Applying the embedded researcher approach will require somewhat more advanced planning than might be expected from a traditional lecture-based course. For instance the instructor may wish to discuss with the local IRB how much research ethics training may be required of the students, and the instructor’s research experience will be required in realistically scheduling the various necessary activities and deadlines throughout the semester, such as interview training, proposal development, data-collection completion, and the like.

Involving students in hypothesis generation. One issue the instructor may wish to decide is how much to involve the students in hypothesis generation. Naturally, involving the students in hypothesis generation will increase their investment in the research project. However, the instructor need also keep a close eye on timelines and feasibility. In particular, projects that might involve sensitive information (sex, violence, drug use,

etc.), guiding students from ethics training through IRB approval to data collection and reporting results may require more time than is allotted during a traditional semester. As we have discovered, however, there may be ways of working with the local IRB in advance to expedite the process, given the pedagogical limitations. Alternatively, the instructor may wish simply to have a project prepared, particularly one which fits directly with the topic of the class in question so that it is “ready to go” for the semester. The first author of this article is, at the time of writing, preparing to implement such a modification.

Snowball sampling. One big advantage to the embedded researcher approach for the instructor is that it provides an opportunity for the instructor as a researcher to move beyond college student samples, which remain a mainstay of much of psychology research. By requiring students to interview or administer surveys to members of the general population, the entire research project moves beyond college students to samples which, arguably, are of greater interest for many projects—they may include children, marital partners, working class individuals, people with a greater range of education achievement, and the like. In this sense the embedded researcher approach bears some resemblance to “snowball sampling” (see Ferguson, 2011) in which a core group of individuals are selected as a primary sample, who then nominate other individuals outside of the primary group who form the secondary sample, who are actually assessed and analyzed. Even where the primary sample involves college students, the secondary “snowball” samples have been found to be highly representative of the populations from which they are drawn (Ferguson, 2011). Thus, although they are nonrandom, snowball samples tend to have considerable advantages over other forms of nonrandom sampling.

Although the primary sample in snowball sampling are not typically “researchers” invested in the research process, the similarities between snowball sampling and the embedded research paradigm are considerable and there is every reason to believe that community samples generated by this approach would be similar in quality to traditional snowball samples. This provides considerable incentive for instructors who wish to move beyond college student samples. In addition, there seems to be no reason why a true snowball sampling methodology could not be implemented by the student-researchers themselves—recruiting the primary sample and giving instructions for recruitment of the secondary sample. In addition to increasing sample sizes and giving students involvement with an additional research methodology, the secondary sample would be even further removed from the instructor/researcher, resulting in increased anonymity.

Involving the IRB early in the process. Given the particulars of the embedded researcher paradigm and the timelines involved, one of the largest early obstacles to successful implementation of the method we have described is likely to be IRB approval. Thus, it behooves the instructor interested in the embedded research paradigm to discuss plans with the IRB well in advance of the semester. The investment of the IRB in the process may vary by project. Projects which are not designed to be published and which do not cover sensitive topics or use sensitive populations may fall under “pedagogy” rather than “research,” requiring a different level of IRB involvement such as expedited or

even exempt status. However, this determination should be made in consultation with the IRB. We do not recommend that instructors assume their research-based pedagogy is exempt from IRB oversight without first consulting with the IRB itself. Notably, research intended for eventual publication, which involves sensitive topics or sensitive populations (i.e., children, inmates, victims of crimes, pregnant women, individuals with intellectual or mental health limitations, etc.), will almost certainly require considerable IRB involvement. Involving the IRB early in the process, rather than waiting until the beginning of the semester, will decrease the number of roadblocks to implementing the embedded research paradigm in the class. The IRB will be able to provide advice about the ethical (and perhaps practical) details of such matters as student interview training, ethics training, and the like; and, very likely, to provide realistic estimates of the time required for each step toward project approval.

Buyer beware! Lastly, we suggest that instructors using the embedded researcher paradigm be transparent about their intentions at all levels. At minimum, students enrolled in the course should be informed of the embedded researcher pedagogy in the syllabus as well as verbally on the first (and second and third, given late student adds) day of class. Even better would be, if possible, for mention of this paradigm to be made in the course description, if it is a regular feature of a given course. This will help prevent any student misunderstandings of what is expected of them during the course. In the class described in this article, students are emailed the syllabus, including a description of the research requirements, well before the semester starts, in addition to frequent and prominent explanations of the course structure during the first few class sessions.

Future Directions

It is clear that future implementations of this method should involve more student research training (e.g., in interviewing techniques) prior to data collection and greater attention to student anxieties before beginning interviews, as these issues seemed to concern the students. It would also be useful to modify the procedures to allow tracking of students after the course is complete, along with a reasonably specified control group (perhaps another section of the course, without the research component), so that follow-up data collection might illuminate any relationship between the research experience and later student academic abilities and success. Eventually, although far beyond the scope of this project, we would also like to see a direct comparison between the academic outcomes from using these methods with Hispanic students attending an HSI, Hispanic students attending a non-HSI college, and non-Hispanic students at a non-HSI college, to see whether such in-depth research involvement benefits Hispanic students more than others.

Conclusion

Based on both student reports and more objective outcomes, the incorporation of embedded researcher methods into didactic courses as described here is well received by students, is perceived as useful and educational, and offers significant benefits for

instructors who wish to combine effective undergraduate didactic instruction, research experiences, and truly useful data collection.

Student reactions to this course format were overwhelmingly positive and the implementation of the method (delivery of interviews and questionnaires) was very high, even with the sensitive nature of the subject matter, suggesting that this teaching/research strategy can be successfully undertaken with Hispanic students in their communities, with a variety of content domains. Use of this or similar methods in multiple classes across social science domains could provide in-depth mentored research experiences to a much larger undergraduate audience than is feasible with other models.

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