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ABSTRACT

Texts and courses related to research methods generally teach students essential research designs, data analysis techniques, and interpretation guidelines. However, students are less likely to learn how research techniques function holistically. To provide this holistic understanding, a classroom activity has been developed at St. Mary's College of Maryland that provides a context for research methods and promotes active learning and critical thinking. First, students are assigned two readings: a discussion of therapeutic touch in clinical psychology and a description of field research in comparative psychology. The instructor then leads a guided discussion of the texts, focusing on research-related topics illustrated by the readings, such as what determines the investigators' choice of topic area and initial research questions to address. Students are then expected to generate ideas and formulate operative definitions. Specific research designs and methodology are then discussed, providing students with an opportunity to generate research method topics and show how they apply to the text. By presenting biographical summaries of the authors and introducing unpredictable problems they experienced during research, the readings help students relate to the research efforts and to the idea of research. An evaluation of the course conducted with students enrolled in the fall 1995 section confirmed that the course readings and discussions helped students gain a new perspective on research. (TGI)

The Bigger Picture:

Context in the Research Methods Course

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Abstract

Students often learn the techniques of the research endeavor without seeing how they function holistically. An active learning exercise uses personal accounts of research programs to provide this context, simultaneously offering an opportunity for review.

The Bigger Picture:

Context in the Research Methods Course

Research methods texts and courses impart to students those research designs, data analysis techniques, and interpretation guidelines essential to our discipline. However, students are less often given the larger context within which these methods are actually used. How do researchers choose a topic area? A particular approach? How do they build a research program, in which a series of studies may provide answers to questions not even thought of originally? What is the bigger picture? Coverage of these topics can provide a way for students to see how the disparate concepts and techniques they've learned in the methods course fit together in "real life." It also provides an integrative active learning and critical thinking opportunity for review and application of that previously-learned material.

In my undergraduate methods class, I accomplish these goals by requiring students to read two chapters from The Undaunted Psychologist (1993): Tiffany Field's "The Therapeutic Effects of Touch" and Lary Shaffer's "Cracking the Crab Case." Both chapters are behind-the-scenes summaries of the decision-making that goes into programmatic research. Because of the value of active learning, I lead a guided discussion to ensure that the students themselves bring out the important points illustrated by the articles, and that they generalize beyond those specific examples to their own areas of interest. This approach also increases the likelihood that students will read the chapters carefully instead of just skimming (see Chamberlain & Burrough,

1985), although they're so engagingly written that the increase may be small.

Summary of Readings

Tiffany Field's chapter on therapeutic touch covers clinical psychology research of developmental interest, and is largely experimental in nature. Field starts with the benefits of pacifiers for premature infants, and ends with the use of massage in child and adolescent psychiatric patients. Also useful is a nice appreciation of the relevant animal research.

Lary Shaffer's chapter is quite different, involving mainly field research in comparative psychology, an area that most psychology students never contact. Both naturalistic observation and experimentation in the field are described. Shaffer starts with general feeding behavior in herring gulls, moves to gulls that specialize in foraging for one particular species of crab, and ends with research that determines why particular crabs are vulnerable to gull predation at particular times.

Active Learning Exercise

Many research methods topics are well illustrated by one or both of the articles, and many of these topics can easily and enjoyably be prompted from the students. The discussion might begin, for example, with a question about what determines an investigator's choice of topic area. Both chapters offer clear and unexpected answers: Field herself bore a premature infant (for health reasons) and became interested in research on this population as a direct result. Shaffer was intrigued by the glamor of wild creatures in exotic natural surroundings.

Students can be asked what determines their own interest areas (you might be surprised). Pragmatically, the less exciting role of funding pressures is not ignored in either chapter (Field, pp. 3, 5, 11; Shaffer, p. 69), and students need to be aware of it.

The initial choice of specific research questions to address is also well described in the chapters; springboards are the work of other investigators, contradictory results in the literature, current theory, and careful observation of the subjects. Both chapters emphasize the importance of the latter: Fruitful questions, the starting point of research, are more likely to be asked after attainment of a good understanding of the organism, its world, and its capabilities (Field, p. 5; Shaffer, p. 62). In Shaffer's case, an additional cogent reason determined his choice of foraging behavior: He wanted to ensure that he would find enough information for a dissertation, and gulls do have to eat (Shaffer, p. 62).

From these starting points, what next? Students should be able to generate ideas, and one suggestion to look for is the formulation of operational definitions: These are covered early in the research methods course, and need to be thought out early in a research program as well. I ask the students to find examples, and both chapters offer good ones. Field in particular discourses at length on the difficulties of operationally defining therapeutic "touch" (p. 7). Different and sometimes unspecified definitions in the existing literature led to contradictory clinical results, and a standard practice that was actually harmful. Students are impressed, and the importance of

operational definitions is underlined. This is a good point at which to ask for other examples from their content courses.

Specific research designs and methodology can then be discussed. Both chapters illustrate the hypothesis testing process: Field suspects that pacifier use and massage might both promote premature infants' ability to thrive, and tests these hypotheses directly. Her research designs make use of inferential statistics, the t test in particular (although it's not explicitly described). (An ethics question can be raised at this point, since babies in Field's control groups were prevented from benefitting from her interventions.) In turn, Shaffer knows that his gulls are locating sand domes hiding crabs on the beach, so he tests which features of the domes are cuing the gulls (p. 64). His approach is experimental in nature, but nontraditional enough to spark a discussion on the essential characteristics of experimental design.

The more inductive style of research in which a specific hypothesis is not required and, in fact, may not be possible, is also presented in these chapters: Shaffer has no idea initially why his crabs are making themselves available as gull prey, and must simply gather as much data as he can and try to find order somewhere (p. 68). Such less-traditional approaches offer a good basis for discussion of the strengths and limitations of these methods.

Both chapters explicitly emphasize the detective nature of programmatic research, a metaphor that students can readily appreciate. Field must determine why her interventions are

successful; Shaffer must solve the mystery of the crabs. The links from study to study are solidly based on the clues available from past research. For example, Field noted contradictory previous research on the effects of handling on blood oxygen in premature infants, and therefore took oxygen readings in her own work testing the effects of massage (p. 7).

In Shaffer's case, useful clues included the results of a study from 1900 (Shaffer, p. 67). Students enjoy seeing how even work performed so long ago can still be valid and useful; and the cumulative and cooperative nature of science can be emphasized. The authors also frequently refer to collaborators and other researchers in the same area, who are instrumental to their progress (e.g., Field, pp. 9-10).

During the discussion, students can be asked to generate research methods topics and show how they apply to the chapters. Topics that might be suggested this way are the various forms of reliability and validity, several of which are well illustrated by the chapters. Field's use of the Brazelton Assessment Scale for infants (p. 8) can lead to such a discussion. How would its reliability be assured? How would it be validated? Field discusses threats to validity in her own work, such as confounds (pp. 8, 9), which students can locate. The role of replication is also discussed, and can be tied in with reliability and validity. As for Shaffer, special aids such as blinds were necessary to ensure that his field observations were unobtrusive and valid. Even the collection and measurement of dead crabs, surely an unobtrusive measure, prompted validity questions: Were

the crab carapaces found at the gull nests typical of those the gulls caught, and of those available on the beach? Sampling and measurement issues are relevant here as well. And what a great opportunity to delve into the mechanics of probability: Shaffer marked 500 individual crabs in one study area and then watched for them to reappear, alive or dead (p. 71). This research technique tracks the fate of individuals and allows an estimate of population, and is common in field biology. Most psychology students will be unfamiliar with it, and intrigued--and interested in how probability mechanics applies to other psychology problems.

Another key topic is the necessity of avoiding causal inferences from correlational data. Both chapters offer several good discussion points: For example, Field explicitly addresses this issue with respect to the puzzling finding that therapeutic touch was correlated with later gains in mental and motor abilities (p. 8). Based on their knowledge of the categories of correlation/causation confusions (in one scheme, directionality, third variables, and selection bias, Stanovich, 1992), students are able to describe and understand the chapter examples. They have trouble, however, understanding why even experimental evidence of significant physical benefits and monetary savings was not enough to ensure application of the techniques Field had tested. Instead, characterization of an underlying physiological mechanism was necessary before adoption was widespread (Field, pp. 6, 8). My students were upset about this reductionistic attitude, but it's a perennial problem in many areas of

psychology.

At several points, students have the opportunity to see that, however careful the planning and execution, and however logical the theory, the data are sometimes different from what was expected. How do researchers handle such a denouement when developing their research programs? The chapters can ignite discussion, with students (and instructors) providing examples from other research areas. Sometimes detective work can salvage something important from the wreckage. The happier side of unexpected results, serendipity, is also clear in both chapters (e.g., Field, pp. 8, 9), and students knew it all along: Luck does play a role! Students can offer examples of other serenditipitous findings in psychology, including Pavlov's initial work on classical conditioning, Selye's General Adaptation Syndrome, Olds and Milner's discovery of intracranial stimulation as reinforcement, and various psychotherapeutic drugs, such as lithium for bipolar disorder.

Finally, demystification is also a highly worthwhile goal. We, as researchers, know that ours is a very human endeavor, but students only see the textbooks and dry professional journals, and have trouble imagining themselves in our places. How can we interest more students in research, but at the same time ensure that they will not take research results as mysterious veridical products of omniscient prodigies (also see Brems, 1994 for useful suggestions)? The biographical summaries that accompany the chapters help by showing the researchers as ordinary human beings with outside interests. The unpredictable hitches in research,

well portrayed in the chapters, are even more powerful: Shaffer in particular seems accident-prone, losing a research blind and almost losing a truck, and surviving a hilarious confrontation with the Harbor Master (pp. 65-66, 70). The long hours and hard work required by research (Field, p. 3), enlivened sometimes by more serious hardships, are also accurately depicted. Shaffer, repeatedly cold, wet, and seasick in the service of science (pp. 64, 66), regretfully notes that "while there may be no gain without pain, there can be pain with no gain" (p. 64); Field in her turn reaps only frustration in her search for one underlying mechanism (p. 6). Students need to hear about this side of research too. It <u>is</u> part of the bigger picture.

I have outlined an integrative exercise designed to help students see how psychologists actually make use of research methods principles in long-term research programs. Individual instructors can easily tailor the particular methods covered to suit their own needs, and can use other works of a similar nature rather than these particular chapters. Other chapters in the same book would be good candidates; and I have myself used Skinner's (1956) "Case History of Scientific Method," sometimes described in methods texts, as a basis for similar discussions. Any such material can be supplemented by the original research reports for more rigor. Finally, active learning approaches have been shown to offer potential benefits (e.g., Meyers & Jones, 1993), but those instructors who would rather ensure content coverage could easily lecture over the material, and provide the extra depth and integration themselves: The exercise is readily

modifiable.

Evaluation

I used this one-session exercise during Fall 1994 for the first time, and it seemed to work well: The 10 students enjoyed the articles, saw their relevance, discussed readily, and obtained a different perspective on research and researchers. In Fall 1995, I administered a brief anonymous evaluation for this class session that confirmed this positive reaction, although it should be noted that the class was small (N=6). On a 5-point scale from "strongly disagree" to "strongly agree," the usefulness of the readings was rated as 4.5, and of the discussion session as 4.33. Representative written comments were: "The readings made the concepts learned from the book come to life," "It permitted a glimpse into the 'real world' of research," and "Made us figure out things for ourselves--pick apart the research." Two students wanted more material of this sort: "Maybe spend two days on this and give one or two more articles to fully flesh out the real-life examples. This would be good at the very end of the semester to recap our class."

Conclusion

Shaffer, having cracked his crab conundrum, concludes with a comment on the relevance of such research to human psychology. Like other foraging animals, we "see things when we know what we are looking for, but we are likely to overlook even quite obvious things that we do not expect to find" (Shaffer, pp. 72-73). Research methods help us to see more clearly.

Similarly, knowledge without generalization is nearly as

useless as a clinical intervention that is only effective while it is in place. Providing context for research methods gives students a different perspective that might reasonably enhance their ability to generalize. It is also fun to do.

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Author Note

1. An earlier version of this paper was presented at the annual Conference on Undergraduate Teaching of Psychology in Ellenville, NY, March, 1996.

2. My thanks to the members of the Research Methods class of Fall 1995 for their helpful and detailed comments about this session, and to Dr. Roy Hopkins for his useful editorial suggestions.

3. Copies of this paper are available from the author at the Department of Psychology, St. Mary's College of Maryland, St. Mary's City, MD 20686.

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