SPECIAL INVITED ARTICLE

A Conversation With Wilbert J. McKeachie: Involving Undergraduate Students in Research

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WILBERT J. MCKEACHIE IS THIS COUNTRY'S foremost teacher of teachers. His book *Teaching Tips* (McKeachie, 1999), now in its 10th edition, has become the standard reference work for new college teachers. Bill was born in Clarkston, Michigan, in 1921. He began his college education at Michigan State Normal College with the intention of becoming a high school teacher.

After service as a radio communications officer in the U. S. Navy, Bill entered the graduate program in psychology at the University of Michigan, where he received a PhD in 1949. His association with the Psychology Department at the University of Michigan has continued to this day. Initially, he coordinated the introductory course and began to examine factors that influence learning among college students. For 10 years he served as chair of the department. He has also served as director of the University's Center for Research on Learning and Teaching.

Bill has been active in the American Psychological Association throughout his career, serving as president in 1976–77. His considerable contributions to psychology have earned him numerous awards, including the American Psychological Foundation's Distinguished Teaching in Psychology Award and the American Psychological Association's award for Distinguished Career Contributions to Education and Training in Psychology.

In early October 1998 Bill delivered the Clifford L. Fawl Lectures in Psychology at Nebraska Wesleyan University. During his visit to Nebraska Wesleyan, Bill graciously consented to the following interview with the managing editor (Mark E. Ware) and Special Features editor (Richard L. Miller) of the *Journal of Psychological Inquiry*. Also participating in the interview were Clifford L. Fawl and Mary Beth Ahlum, faculty members at Nebraska Wesleyan University.

Miller: Before we begin, I thought that perhaps a little background on the purpose of this interview might be helpful. The *Journal of Psychological Inquiry* publishes undergraduate student research. In addi-

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tion, there is a Special Features section that serves a variety of purposes. It is a forum for student essays on topical issues and also features, from time to time, articles that provide information of interest to both faculty and students related to the research process. We have asked you for this interview in order to explore your thoughts on the role of undergraduate research in teaching.

Ware: This interview is designed primarily for the audience of students and, secondarily, for faculty, with particular emphasis on the scholarly component of teaching and learning and how that relates to students conducting research and subsequently presenting and publishing the results of that research. To provide a bit of background, the journal grew out of discussions among a group of several of us from Nebraska, Kansas, and the Great Plains area who have been involved with students presenting papers at student conventions. At some point, we began to ask ourselves, "And then what?" The "And then what?" implied taking the manuscript to the next step—following the model of a professional psychologist, you would publish it. And although we don't restrict publication to students who have previously presented their papers at conferences, we had originally envisioned the journal as another step in the evolution of increasing the quality of the work students had done. So, that's the context in which we wanted to talk with you.

Miller: To begin, I would like you to think back a bit to when you were a student. What motivated you to get involved in scholarship and research?

McKeachie: Well, I suppose my involvement in research began during my 1st year as a teaching assistant, which was my 2nd year of graduate school. I'd come out of the Navy [at the end of World War II] and taken some undergraduate and some graduate courses for the 1st year, and after that the returning veterans began flocking in. I'd gotten out of the Navy early because after the war was over they let us out in terms of the amount of combat we'd had. I'd had a lot of combat, so I got out in time for the fall term of 1945. By the next year, our department was swamped with students who were veterans. Don Marquis was the new chair, and he asked me to be a teaching fellow in the introductory psychology course. We felt that students should have a chance to discuss psychology and that we could have discussion sections in the introductory course. The first group of teaching fellows came from a variety of backgrounds. Some were clinicians, and at that time clinical psychology was pretty much either Rogerian (nondirective) or Freudian (psychoanalytic). Some of us were social psychologists (essentially group dynamics–oriented Lewinians), and some were experimental psychologists (behaviorists). We met once a week with Harold Guetzkow, who was the course coordinator and an assistant professor at the time—later to become a professor at Northwestern University—and we would talk about teaching. Each week we reviewed the plans for the week and what would be covered in the discussion sessions. Of course, we had different slants on what you ought to be doing based on the theoretical assumptions of each of the perspectives. Harold was a good adjudicator. He would listen to our disagreements and then say, "Whoa, that's an empirical question. Why don't we set up an experiment and find out who's right?" So we set up an experiment, and my stipend was increased from $300 to $500 to coordinate the research. That got me started.

Miller: That would have been a sort of Skinnerian-like incentive approach.

McKeachie: Well, I think it was more interest and curiosity since we each taught in one of three different ways. I think we tried to do a good job by each of the three methods we were using, and it was fascinating to see how it was going to come out, how we could develop measures that would tap the things that we thought ought to be affected.

Ware: Do you remember what some of that early research was like; on what did it focus?

McKeachie: Oh sure, it was part of my first publication (McKeachie, 1951). The behaviorists tended to believe in frequent testing and feedback, or reinforcement, I guess you could call it. I think there were eight of us who were teaching the discussion sections, so in some of the sections we had true–false questions that we would give as a quiz. I think we were teaching it twice a week, so that almost every class period there would be a quiz, and students would answer the quiz and get so many points for it. In class, we would ask really specific questions and actually grade them on their answers to our questions when we would call on the students. That was a sort of behaviorist approach. The group dynamics people favored discussion, and so, in those eight sections, each of us would bring in general questions and try to encourage all of the students to participate in the discussion. We had coursewide tests, a midterm and a final, and I think we gave essay tests once a month or something like that. The third method (perhaps favored by the clinicians) was a kind of nondirective approach. We called it a "tutorial." Students were allowed to work individually. Originally we weren't even going to have class. Those who advocated this approach felt that students should be able to work on their own and ask the teacher for help and have the teacher assist them. The dean said, "The students

are paying tuition, and they're going to object to paying tuition if they don't have classes, so you've got to meet the students." So we took along a suitcase full of books to each discussion session, books that were all about whatever the topic was. Of course, the students were still getting the lectures, and if there was some demonstration that was appropriate, like demonstrations of Gestalt phenomena or something, we'd all do that in all the sections. But other than that, we would just sit in the back little room, or depending on how it was laid out, maybe the front of the room, and the students came in and studied and did problems in the books, and presumably they'd come up with questions and stuff. It turned out that what they did was to just study 2 hr a week less than the other students outside of these sections. They'd spend the time in class studying. Essentially, the question we were asking was very analogous to the Lippitt studies of authoritarian, democratic, and laissez-faire leadership (Lippitt & White, 1943).

Ahlum: When you began to develop as a student and knew this was your career, what was your family's reaction? What was the societal reaction to psychologists? I remember a professor of mine who said he was in medical school in the 1950s and that people were aghast that he was studying psychology. Did you experience that at all?

McKeachie: No, I don't think so. My folks were just glad I survived the war. Neither of my parents had a college education. My dad had gone to a short course in agriculture. He was a country school teacher. [Country school districts did not require a college degree to teach elementary or high school.] He also went to the Ferris Institute for a summer after the 11th grade to learn to be a teacher, but my mother only had a 9th-grade education. There was certainly no doubt that I was going to college, and so when I went on to graduate school, they were very pleased that I was going, regardless of the field.

Miller: After that beginning, you've obviously had a remarkable scholarly career. What is it that's kept you interested in conducting research?

McKeachie: Well, it's funny. It's because nothing ever comes out right. There were always more things to know. I think that maybe one study I did out of a hundred turned out the way I expected. With all of the others, there was some complication. Things are never as simple as you think. You always end up feeling like you really need to follow up, to do something more, and you're always writing proposals before you've had a chance to analyze all the data from the previous study. It seems as if I can never get it finished. And you have students who have ideas, and you want to work with them. It's the same way now. I still have my research group going, and we're talking about what we're going to do next year.

Miller: How do you feel when you do get one finished? Is there a great sense of accomplishment and relief, or is it, well, let's keep moving?

McKeachie: Well, I don't know. There's certainly a sense of accomplishment. You get it written up, and it always gets rejected at first. Not rejected outright but sent back for revision and resubmission. So, yeah, certainly it's nice to get things done and see them in print. I read some of it, and I'm like, "Yeah, that's pretty good stuff!" It really sometimes looks better in print than it did as a manuscript.

Ware: How about handling those rejections or even the necessity for revision? Students, for example, can be very discouraged by getting back a review that says, "More work is needed." How about yourself?

McKeachie: Well sure, it's frustrating, especially if it's a research proposal and it's pretty good. Personally, I sometimes think that the reviewers didn't understand at all what was important, but most of the time the suggestions are good, and if it's outright rejected then there's always another journal. Usually, if it's rejected, I think sure, this isn't earthshaking. Most of the things I publish aren't earthshaking. I think some people would be interested, so I'll send it to a journal that doesn't have such strict standards. You find a lot of publications that—if you just stuck to the really important journals—probably wouldn't get published at all.

Miller: In the *Journal of Psychological Inquiry,* we publish both literature reviews as well as the empirical articles and historical pieces. What would you see are the advantages for undergraduate students engaging in each of those types of scholarly endeavors?

McKeachie: Well, I think they're all important. My mentor, Don Marquis, said, "You don't need to study history of psychology. Anything that's important is going to be in today's literature." So, at Michigan, we never had a history of psychology course until I was chair, I think, and, actually, when I taught honors, I started with Plato, and then I came up through Locke and Hume and so forth. It wasn't until later that I realized that there were a lot of bright people who for many years past had good ideas. William James had a lot. Every once in a while, one of my students will discover William James as they read in the library. And they're impressed. He was a pretty smart man. And so, of course, one of the bad features of being my age is when a student comes to me with a "new idea." I remember that so-and-so did that back in the late '40s or late '50s. One of the graduate students in my research group is planning to do his dissertation work on press—academic press. I said,

that's great. I haven't heard that term since Henry Murray, and I sent him back to look at what Murray said about need press. But I'm not sure that the people my student was working with realized that the term had developed that far back. You keep files in your mind on all of that, and, you know, it's really kind of depressing to remember that we did something 20 years ago, or somebody did that 30 years ago. It's not really healthy. On the other hand, I think it's useful for people to at least be aware of the history of ideas. I was reading an article recently or maybe reviewing one for a journal that cited Vygotsky, who is now the big thing in educational psychology. It was quite clear that the authors of the article thought Vygotsky was contemporary, as they were referring to a 1982 publication and didn't realize that the material was about 60 years old.

Miller: What about your own experience involving undergraduates in research? Tell us a little about that.

McKeachie: Actually, it started my 1st year of teaching, in a way. I was in charge of the experimental psychology course with a laboratory, and Roger Brown, who later taught at Harvard, was one of my teaching assistants. Traditionally, it was like a chemistry lab. You had a study each week. We did the Purkinje phenomenon, rods and cones, and some such classic demonstration each week. In the last third of the term, the students would devise their own experiments in which they would collect data themselves. And then in summer of 1951, I went to Cornell to work with a group chaired by the head of the APA, Dael Wolfle, to work on a model psychology curriculum (Buxton, Cofer, Gustad, MacLeod, McKeachie, & Wolfle, 1952). We argued that instead of a conventional experimental psychology lab, the undergraduate curriculum should include labs on motivation, perception, and action. So we instituted that curriculum at Michigan. I was only an assistant professor, but I was the chair of the undergraduate committee. So I was able to put the changes into effect. And one of the things we did in those labs was to have students carry out some research. At various times, I taught the courses with labs in motivation and perception. I taught the human learning course. Now I teach the introductory course, and my students have just finished what we call miniexperiments. This is something where in groups of roughly three, the students actually analyzed some data. They had the choice of about three things that we could provide data on. And it's amazing. It's not large-scale research, and if the study is on fellow students, we don't worry about statistical significance. The students can do an observational study if it's not intrusive or taking other people's time. If they are going to involve people outside the class, they have to go through the regular review procedures. The students come up with really interesting research projects—as good as the majors did when I was teaching the majors in junior/senior classes. You get three bright students together, and they can come up with some really interesting research. And then we have a little APA Day on a Saturday toward the end of the term, where they present their papers. They have to turn in written reports as well. So they have to do the review of the literature, since I think that a literature review is good in giving students a sense that they know more about some area than anybody else, maybe even more than the professor does. I think that's important in building a sense that the student can master a body of information about something and that they've got something that other people don't have. Of course the skills of conducting a literature review are important as well. One of the things you hope is that when they get out of college, they'll have the ability to ask psychological questions. Maybe their grandmother or grandfather develops Alzheimer's disease, or they've got a child who's having a problem in school, or they don't agree with the intelligence tests that have been given, or something. I hope that they are now able to go to the library or the World Wide Web and get information. So I think that learning how to review the literature is an important thing, but I think that to actually carry out some research has unique benefits beyond historical review, and we do require the literature review as part of the research paper that our students write. The projects are not as big as you have for a senior student, but nonetheless, they've got to go to the library and find some journals and see what other people have done. What you hope is that—and I think there's some evidence that this occurs for our majors—they will learn to ask, "What is the evidence?" and I hope to get this started among our freshmen. You go to faculty meetings and people in other fields have instant opinions about what the curriculum should be, or what the policy should be, and I think psychologists and lawyers are more likely to ask if there is any evidence that's relevant to this particular idea. I think that's an important thing in society in general.

Miller: Some of our colleagues have suggested that while undergraduate research is a good thing for students who are planning to go on to graduate school, it is probably unnecessary for those who will be entering the world of work immediately after obtaining their degree. I wonder if that would be your view, or if you think there are advantages in conducting research for any student.

McKeachie: Well, I think it's great for people who are going to go on to graduate school, and in fact, it probably helps them to gain admission if they've got something published or have done a good research paper they can send in. But for the others, as I say, I think it's an important part of general education. The way we're trying to get them to think is just generally useful in society. It helps them to be good citizens, so I see it as a general educational objective rather than a preprofessional one.

Ware: What about some of the more specific skills, such as writing and speaking?

McKeachie: One of the big things in college education in the '70s and '80s was writing across the curriculum. We began to realize that a freshman English course doesn't necessarily teach students to write for a variety of different audiences. In teaching students speaking skills, I'm really disappointed. We used to have a speech department, but that's been merged into communication, and speech is now de-emphasized, even though rhetoric was one of the classic areas of learning. I pitched fast-pitch softball for many years, and my catcher was Al Storey, who was the head of our extension program and a faculty professor of speech. He had a lot of our athletes in his speech instruction class. I always felt that our athletes, when they were interviewed on television, were more articulate than a lot of the other big-time athletes, so I was really disturbed when they downplayed speech in the curriculum. I really think it's probably more important now, maybe even more important than writing, because almost anything people do today, they are required to speak. It's still offered at Michigan, but it's not nearly as important as it once was.

Ware: Students really grapple and complain about APA style. What are your impressions about the advantages of using APA style and requiring students to have some degree of mastery in it?

McKeachie: I think it's a good thing. The results of the miniexperiments that my students turn in are roughly in APA style. We ask them to think of three divisions: an introduction with some reference to the literature on what the problem shows, a description of the data and how you analyzed it, and then some discussion of how it came out and the reason you think it came out that way. It's roughly APA style. But for their final paper, they're required to follow APA style. I think it's a good style manual; you know it's used not just in psychology but as a model in a lot of other places. I had a Puerto Rican graduate student last year, and I gave him a Strunk and White [authors of *The Elements of Style*] just for general writing. The MLA [Modern Language Association] style manual is useful, but I really like the APA style manual. It gives a rubric and a structure for writing that I think is important. I think it makes it easier for undergraduates than if they simply tried to write a narrative without the structure. Part of it is that it forces you to think about what should be said. It's not just information, but it forces you to think about what needs to be in a communication about research.

Miller: In addition to the *Journal of Psychological Inquiry,* there is the journal published by Psi Chi [*Psi Chi Journal of Undergraduate Research*] and a number of other journals publishing undergraduate student research. What do you think about this development?

McKeachie: Oh, I think it's great. Doing the research and just writing it up is usually the most popular part of my course. Students really get a good kick out of it, and can then see in print what they've done. You know, I still get a kick out of seeing my stuff in print. I think that's very reinforcing, even though I'm not a strong behaviorist. It's not like working for a grade; it's kind of a recognition that you did something well, and it gives you a sense that you're worth something; it's self-efficacy.

Miller: Earlier you described some of your own experiences, and it seems like what you often do is have teams of students working together on a research project. What do you think are the advantages and disadvantages of that approach versus individual student projects?

McKeachie: Well, the advantages are that, particularly in a course like mine, which is not a lab course, they're able to get the work done because they can divide up the tasks. Also, they have different ideas, and they can consult with one another. You get all the advantages of cooperative learning and that kind of social facilitation, and not letting people goof off and put things off until the last minute, because the other people—at least one of them—wants the job done. One of my friends is a vice president at General Motors. He was a statistician and used to be head of the Census Bureau. General Motors brought him in as vice president for market research and because they were having trouble selling cars. Well, he got there, and he found out that the problem wasn't so much selling but that the engineers and the production people and the marketing people weren't talking to one another. So the designers would come up with things that were hard to engineer and hard to produce, if not sell, and each of these types of individuals were talking only with their group and having very little communication between the groups. So his job is basically to get people to work more in groups across these lines so that in the beginning when they're starting a car, all of the potential people who are going to be involved have some sort of say

on what goes on, and they don't come up with a lemon. And so, I think people in industry, generally, feel that being able to work collaboratively in groups is much more important than it used to be. The organization is not just individuals who have got to compete with everybody else in the organization to get to be president. Now you get ahead by being effective and working in groups. So working in groups, I think, is a skill in itself that is important as a general education objective, or at least as a vocational one. Really, I think it's general education whether you're going to work for General Motors or just in school to learn. In fact, it's probably a skill needed for anything you're going to work in. It used to be that dentistry was the last refuge of the lone professional. And now I go to my dentist's office and there are four hands in my mouth. Even dentists don't work alone. I do still think there's a place for individual research as we do in our honors program. Last year we did an individual project. But I think to start out, the team approach gives support for people who lack confidence and helps them stay on task. They still have a sense that it's their product, even though its shared work with other students.

Miller: Have you developed techniques to minimize social loafing within those teams?

McKeachie: Well, the team approach works fairly well. It always has. If out of my class there are ten teams, we'll have one or two where somebody goofs off, and when we get feedback early in the process, we get it straightened out. Or maybe the students simply don't get along. Once or twice, I warn them ahead of time that once you get out of school you're going to be working with other people who are not necessarily the people you choose to work with. It's not all going to be easy, so you're going to encounter problems in these teams that are normal problems, and part of the training is learning how to cope with these, and we're here to help you. There are always a few cases, but relatively few, where the team approach doesn't work. I talk about this at the beginning of the class. But the real zinger, I guess, is that I have them turn in a group report and everybody gets the same grade. Except that I say that each of you will be given, when you turn in your paper, a slip with 100 points, and you can distribute the 100 points among your team in terms of each person's contribution, and if there are three of them they can always do 33.3, 33.3, 33.3. But, and I say, if it appears from the slips that are turned in that one person is not carrying his share of the load, that person will get a lower grade than the group grade, and if it looks as if one person is doing most of the work, maybe that person would get a higher grade. I don't like the notion that it's mainly a negative sanction, but in most cases it seems to work without the sanctions.

Miller: What would you see as the particular challenges of group work?

McKeachie: Well, I think part of what makes it work is trying to get through to students that it's not just another task. They need to know some basic principles of group activities, like at the first meeting to get schedules. At a big campus like ours, one of the big problems is meeting to do the work. We give them some class time for planning, but most of the work has to be outside of scheduled class meetings. So we say, get your schedules and find all the times that are going to be available, and before you break up, be sure you all agree on the time and on what each person's going to do before the next meeting. And don't just say, "OK, are we all agreed?" Ask each person, because some people just keep quiet, and if they've made an oral commitment, they're more likely to follow through on it. And try to figure out tasks so that each person's making a contribution that's appropriately equivalent, so one person isn't doing all the work. These sorts of things, I think, are important.

Miller: Do you usually meet with your research teams outside of class?

McKeachie: In general, my teaching assistants, who are also undergraduate students, meet with the research teams. I recruit teaching assistants by offering course credit, and they learn a great deal in the process.

Miller: When you think of working with undergraduate students on research, do you think of it as a part of teaching, or do you think of it as a part of research and scholarship?

McKeachie: I think of it as mostly teaching. I have my own separate research group, but I think you could make an argument that it's also a scholarly activity. You've got to review the proposals and research and guide it, and I think that requires a good deal of scholarly activity.

Miller: We've been talking about some of the advantages to students of conducting research. What are the advantages you might see for faculty in becoming involved with undergraduate research?

McKeachie: Well, undergraduate students have a lot of good ideas. I think it's stimulating; I think it provides rewarding interaction with students. So I think it has both intellectual and interpersonal rewards. It's work, but it's worth it.

Miller: What are your plans for teaching and research in the coming years?

McKeachie: My last grant proposal was turned down, and it's such a nuisance to write proposals that I decided to finance the research myself. My wife and

I decided a long time ago that now that I am retired we wouldn't live on my salary, so we give part of it to the department chair for a discretionary fund, because when I was chair, we might be handling a budget of $3 million but if somebody wanted $50 for slides, we didn't have any place to go get it. So I always needed some extra money. I try to keep about $10,000 in a fund for our department chair, and then I also try to keep $10–20,000 in a fund for research on learning and teaching that's administered by Paul Pintrich, who's a colleague of mine, and he uses some of it for travel or supporting a graduate student to go to a convention and other research activities. The bulk of the fund goes to Dr. Lind, who has done research with me since he took his PhD 4 years ago. And I've got a couple of undergraduates who are funded this way as well. Anyway, that does help support my research, and I have a research office at the education school, but since I don't have an appointment in education they would like me to bring in some outside money, so we are again working on a proposal for external funding.

Miller: What's the next research question you'd like to have an answer to?

McKeachie: Well, I think I'd like to know a lot of things, but an area I see that is very important is how you get or develop greater intrinsic motivation. I mean, we know something about it, but I'd like to get a better fix on what teachers do. I think autonomy is one of the things that contributes to it, and we've done a little bit there. I think it would be interesting to look at the relationship between that and students' conceptions of education as they begin to see that it's not just a matter of learning facts but more of what's called self-regulation—planning and managing your own learning effectively by making sure you really do understand things and get meaningful information, not just the kind you need to pass the test with. We have a set of scales called the Motivating Strategies for Learning Questionnaire. We need to know how different teachers influence these things. I think it's kind of cyclical, but it may be that certain things are cues in getting started. Paul Pintrich is interested in students' conceptions of learning, and he thinks maybe that's the key thing. I'm more inclined to think it's developing some kind of sense of self-efficacy, which then moves them to pursue learning.

Miller: We're almost out of time. Do you have any final observations in terms of this collaborative endeavor between faculty and undergraduate students to involve the students in scholarly research.

McKeachie: Well, I just think it's great that you've set up this publication. I also get the Whitman High School publication [the *Whitman Journal of Psychology*] and it's even starting in high school, and I think that's terrific. Anything we can do in this area really does make a difference. Students do decide to go into psychology because they find this an exciting thing to do, and that's nice, and I think it's a good indicator that research is a valuable thing, but I just think that giving students a sense that here's something you can learn for the rest of your life is important. They're learning from their experience, like those being trained in music who can hear more in a symphony. I think that student involvement in research makes life richer.

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