Undergraduate Research Across the Psychology Curriculum: A Case Study and Program Assessment

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Abstract: Over the past 10 years, the Psychology Department at Indiana University Kokomo has worked to incorporate more opportunities for students to engage in undergraduate research throughout the psychology curriculum. Our previous requirements included a lower level methods course that most students took prior to statistics, with the result that students did not have the opportunity to practice the use of statistics in research contexts unless they completed an independent research project during their senior year. We made several curricular changes to enhance these opportunities to apply statistical knowledge, to increase research literacy and critical analysis, and to better prepare students who go on to complete an independent research project. The lower level methods course was redesigned to explore psychology as a major and career, introduce research concepts, and help students develop critical thinking skills. We also reinstated an upper level methods course with statistics as a prerequisite, allowing better integration of statistics with research methods. Most recently, in fall 2018, we added a lab to the upper level methods course, in which students use computer-based statistical software for data analysis. In addition to these curricular changes, the department has recently been promoting and facilitating more student travel to research conferences throughout the undergraduate program. In this article, we describe the program we designed to scaffold student research and present a six-level framework applicable across a broad range of disciplines. We also present data collected from current students and alumni in psychology to assess their perceptions of the impact of these changes on their research confidence and competence as well as limited results from assessment of student learning. Finally, we provide recommendations for other programs interested in increasing opportunities for student research in their disciplines.

Keywords: undergraduate research, teaching research methods, psychological inquiry, teaching of psychology, supervised research, experiential learning, high-impact practices

The field of psychology spans a broad range of topics. One of the key elements that binds psychological subfields together is the reliance on empirical methods of knowing (Stanovich, 2019). In 2013, the American Psychological Association (APA) published its second version of *Guidelines for the Undergraduate Psychology Major*, which includes five comprehensive learning goals to be incorporated into undergraduate psychology programs. Goal 2 is "Scientific Inquiry and Critical Thinking," which includes skills in scientific reasoning and literacy as well as basic research skills in the interpretation, design, and conduct of scientific inquiry. Stoloff et al. (2010) analyzed the responses of 374 psychology

programs in North America that participated in online surveys collected by the APA. They found that, in practice, coursework in the broad domain of research methods and statistics was universally offered, and in 98% of those programs, research methods and/or statistics were required courses.

Although research methods and statistics are nearly universally required for undergraduate psychology majors, there is no consensus on how to teach these classes. Traditionally, these topics have been covered in separate classes, but some programs have combined them into a course sequence that integrates these subjects, such as Research/Statistics I and II (Christopher, Walter, Horton, & Marek, 2007; Stoloff, Curtis, Rodgers, Brewster, & McCarthy, 2012). This debate about how to structure the teaching of research methods and statistics focuses on whether these topics are best learned together or separately. While there are some logistical issues with combining methods and statistics, the main benefits are the ability to teach the statistics that are most appropriate for specific research methods while students are learning about them, and the ability to better incorporate student research projects into the extended time frame available in a two-semester research methods and statistics sequence (Christopher et al., 2007). Despite these benefits of combining methods and statistics, most programs keep these classes separate (Stoloff et al., 2010). One benefit of offering research methods and statistics separately is the potential to reduce anxiety among students taking these courses. Statistics and research methods courses have both been shown to elicit anxiety in students (Onwuegbuzie & Wilson, 2003; Papanastasiou & Zemblyas, 2008), and anxiety is negatively correlated with course performance (Freng, 2020; Onwuegbuzie & Wilson, 2003; Papanastasiou & Zemblyas, 2008). Further, higher performance in research methods courses is predictive of higher performance in upper level psychology courses, even after controlling for ACT scores and grade point averages (GPAs) before taking the statistics and research methods courses (Freng, 2020; Freng, Webber, Blatter, Wing, & Scott, 2011). Thus, students may fare better in research methods and statistics courses, and upper level courses in the major, if these anxiety-provoking courses are not taken in the same semester.

Another factor that may influence students' performance in research methods and subsequent courses is their perception of the subject area as a science. Friedrich (1996) developed the Psychology as Science scale. He found that greater belief in psychology as a science was associated with higher psychology GPA. Freng (2020) found that higher ratings on the scale were predictive of higher performance on the Psychology Assessment Test, but ratings of psychology as a science were not predictive of course performance in statistics, research methods, or upper level psychology courses. However, in Freng's study, students' beliefs about psychology as a science were assessed when they took introductory psychology, and these beliefs may change as students progress through the psychology curriculum. Freng did find that students who took research methods earlier in their student careers performed better in upper level psychology courses, even after controlling for ACT scores, the number of psychology courses students had completed, and their GPA in courses taken before research methods. Freng's interpretation was that developing an understanding of research methods early in their student careers may facilitate student performance in upper level courses.

Although students who are primarily interested in clinical subfields of psychology may not intuitively view research methods as applicable to their career interests, Freidrich (1996) found that students' views of psychology as a science were also associated with applied areas of psychology; students who scored higher on the Psychology as Science scale held more positive attitudes about psychotherapy efficacy and were more willing to seek psychotherapy. In their study of attitudes toward research, Papanastasiou and Zemblyas (2008) found that students' belief that research was useful for their profession was highly predictive of their final grade in their research methods course, with higher ratings of usefulness predictive of higher final grades. Although this research is correlational, an early introduction to psychology as a science, and early orientation to the role that science plays in different

careers in psychology, may facilitate student engagement and performance throughout the research program.

In addition to shaping perceptions, participation in research is beneficial to students as a high-impact practice. Increasingly, high-impact practices have been investigated to assess their effectiveness in learning (Kuh, 2008). High-impact practices are teaching techniques that have been empirically demonstrated to improve student learning and retention; they include undergraduate research as well as collaborative student projects (Kilgo, Ezell Sheets, & Pascarella, 2015). The undergraduate research methods sequence in psychology provides an ideal way to implement high-impact practices because of its emphasis on skills development, as well as its use of collaborative research teams. Although earlier investigations did not find group projects to be common in the majority of research methods syllabi (Landrum & Smith, 2007), collaboration provides an opportunity for students to participate in research in a way that is similar to how research is typically conducted in psychology and other sciences. In addition, the APA (2013) advocates using authentic assessment for the outcomes associated with this goal, including students conducting research independently or in teams.

Thus, research methods and statistics have an important role in the psychology curriculum. For faculty seeking to evaluate and improve their research course sequence, an important first step is to identify what, specifically, they want their students to know and be able to do relating to research. These learning outcomes can then guide curriculum revision efforts in a process called backward design. In their discussion of backward curriculum design, Wiggins and McTighe (1998) identified three stages: (a) identifying learning outcomes, (b) identifying how achievement of those learning outcomes will be assessed, and (c) identifying pedagogical approaches and student experiences designed to achieve those learning outcomes. Wiggins and McTighe also described four criteria that may be used to identify potential learning outcomes: what will have lasting and broad applicability, what is central to the discipline, what students tend to have difficulty with, and what is interesting and engaging to students. We believe that undergraduate research experience meets all these criteria. Although he focused on course design rather than curriculum design, Fink (2013) also emphasized backward design, with the added steps of identifying situational factors (e.g., the context of the course, class and student characteristics) and of ensuring integration among learning outcomes, assessment, and pedagogical approaches and student experiences.

It is important that such integration occurs not just within each course but also at the program level (i.e., across the major). If the curriculum is just a collection of separate courses, students may learn concepts in one course but never have the opportunity to review, practice, apply, and/or build upon these ideas in later courses (Maki, 2002). According to Suskie (2018), "Student learning is deeper and more lasting when students can see connections among their learning experiences. . . . Learning experiences should therefore be purposefully designed as coherent, integrated, and collaborative, building upon and reinforcing one another" (p. 19). This seems especially important for research concepts and skills, which are challenging for many students and thus will likely require multiple exposures with repeated practice before students achieve mastery and can apply these conceptual, analytic, and methodological tools in meaningful research contexts.

A coherent curriculum assists students in achieving program learning outcomes by providing connected learning experiences across multiple courses as well as cocurricular experiences (Maki, 2004; Suskie, 2018). Ongoing program assessment provides a context for continued attention to improving curriculum coherence and identifying areas where students lack sufficient learning opportunities or support to achieve program outcomes (Maki, 2002; Suskie, 2018). Curriculum mapping—that is, identifying which courses and learning experiences provide opportunities to introduce, reinforce, and emphasize each learning outcome—can help faculty visualize program learning opportunities and identify misalignments or gaps (Maki, 2004). If effective, a coherent curriculum provides students with

"*multiple, iterative* opportunities to develop and achieve key learning goals, through a variety of learning activities and settings" (Suskie, 2018, p. 67).

Our focus above has been on the psychology curriculum; however, research supports that students generally have difficulty learning statistical and research methods concepts across disciplines, which then creates common challenges for teachers of these courses (Garfield & Ben-Zvi, 2007; Lewthwaite & Nind, 2016). There are also commonalities in best teaching practices for these courses that apply across disciplines. In statistics, students learn best by being actively engaged in the classroom, practicing concepts and skills (with feedback), constructing meaning (not just memorizing concepts and algorithmically applying formulas), and confronting misunderstandings and errors in reasoning (Garfield & Ben-Zvi, 2007). In their review of the teaching of research methods across the social sciences, Wagner, Garner, and Kawulich (2011) found little literature on teaching research methods in general; however, they did find articles on teaching research methods within many specific social sciences disciplines. Thus, it seems there is a general concern across these disciplines for how to teach research methods effectively, even if there has not been much interdisciplinary conversation about shared challenges and concerns. More recently, Lewthwaite and Nind (2016) did find that some interdisciplinary discussion and research has begun, particularly around the value of active, reflective, and experiential learning opportunities. We argue a reasonable supposition is that the research methods sequence has the potential to support upper level coursework and promote high-impact practices across disciplines.

In this article, we describe efforts to increase student engagement and success in undergraduate research in the psychology curriculum at Indiana University Kokomo (hereafter IU Kokomo). We describe the research program and its challenges prior to 2012, when major changes were instituted to better address situational factors, to target several departmental learning outcomes, and to better scaffold students' development of research knowledge and skills. This includes a review of changes made to introduce research concepts and scientific inquiry early in the psychology curriculum and to provide students with a more in-depth research experience. We then discuss the current undergraduate research program, along with a generalized framework that could be applied across other disciplines. To assess student satisfaction with the structure of the undergraduate research sequence, in terms of their confidence and ability to understand and conduct research, we conducted a survey of current psychology majors and recent graduates of the program. The results of this survey, as well as instructor feedback and limited assessment data, are used to reflect on the efficacy of the current research program in our department and to provide suggestions for other programs considering changes to increase student research opportunities and program effectiveness.

IU Kokomo Case Study: A Brief History

The next two sections present a case study of the historical development and current structure of the research/inquiry program in the Psychology Department at IU Kokomo. Psychology faculty members developed this program as part of the degree requirements and available learning opportunities for psychology majors seeking a bachelor of arts (B.A.) or bachelor of science (B.S.) degree in psychology. IU Kokomo is a public regional university with an enrollment of approximately 3,100 students that offers B.A., B.S., and master of arts degree programs in north-central Indiana. The Psychology Department has nine full-time faculty. The undergraduate program serves about 140 majors and 170 minors. Approximately 35% of our psychology majors are first-generation college students.

In this section, we begin with a brief description of the program prior to fall 2012. This is followed by a review of the challenges faced and changes made that led to our current program. A note on terminology: Although there is significant overlap in common uses of the terms research and inquiry, research here refers specifically to the systematic empirical methods (e.g., experiments,

surveys, observational methods) used within the discipline. Inquiry refers to any focused investigation and is used here to imply a broader collection of activities, which also includes student learning, information gathering, critical thinking, and questioning and exploration across a range of personal, professional, and academic (disciplinary) contexts.

The Pre-2012 Research/Inquiry Program

The psychology major requirements at IU Kokomo have gone through several iterations, but prior to 2012, the core courses in the research sequence were General Psychology (PSY P103), Methods of Experimental Psychology (PSY P211), Statistical Techniques (PSY K300), and Senior Seminar in Psychology (PSY P457). In General Psychology, students were introduced to scientific thinking and basic types of psychological research methods. They then further developed their critical thinking skills and learned about research methods more in depth in Methods of Experimental Psychology. In this methods course, students conducted a survey research project as a class, and each student proposed a hypothesis based on the data collected. The instructor then analyzed the data for the students, because the statistics course was not a prerequisite for the class, and students individually wrote research reports as the final paper. In Statistical Techniques, students learned how to conduct statistical analyses. Last, in Senior Seminar, students focused on a topic selected by the instructor (e.g., self-esteem, positive psychology), read more advanced scholarly literature, including empirical studies, and wrote a research proposal as the final paper in the class. Students could also elect to take a Supervised Research sequence (PSY P493/P494), where they developed their own research project, while working with a faculty member; they had to select between supervised research and psychological internship options (most chose the latter due to more practice-based interests).

Program Challenges

The pre-2012 program had several limitations, which faculty identified and discussed during program assessment meetings, summer "retreats" (where psychology faculty met to discuss broader curriculum and programmatic issues), and an external program review. Here we briefly outline six challenges identified during those discussions. The first three challenges relate directly to the research course sequence, whereas the last three address how the research sequence fits with additional program goals and components of the psychology major.

The first challenge identified was that the Methods of Experimental Psychology (PSY P211) course was bursting at the seams; we were just trying to do too much in this course. Course goals included reviewing a variety of research methods and designs commonly used in psychology as well as research ethics, while also developing students' skills in critical thinking, information literacy, conducting literature reviews, and writing in APA style. Students and faculty were overloaded and stressed out, due to the amount of material and the number of writing assignments. We had one shot at helping students learn these skills, as there was no upper level research course and many of our other upper level content courses (e.g., cognitive psychology, social psychology) did not have research methods as a prerequisite.

A second challenge we faced was that students typically took their only research methods course before taking statistics. A few students took these courses in reverse order or concurrently (due to scheduling needs), but the methods course instructors generally could not rely on students having an understanding of the role of descriptive and inferential statistics in quantitative research or their being familiar with specific statistical procedures. A challenge faculty confront when sequencing these two courses is that each course is needed to understand the other, and students really need to learn how statistics and (quantitative) research methods are interrelated. On the one hand, if students take statistics before research methods, they may lack an understanding of research necessary for them to grasp the role of statistics in research data analysis. On the other hand, if students take research

methods before statistics, then, as we experienced, they lack basic tools for quantitative analysis in their research methods course.

The third challenge was related to the previous one, in that, given we taught research methods before statistics, students did not have a context for applying what they learned in statistics after completing that course. In the feedback received from students, several expressed concerns about a lack of statistical competence and confidence due to there not being opportunities for them to use statistics and apply what they learned in research. After the statistics class, there was no upper level methods course; most students did not elect the supervised research sequence (instead choosing the internship option), and the Senior Seminar required only a research proposal (not its implementation). Thus, students learned about research methods and statistics separately, but these were not integrated or applied in later coursework.

A fourth challenge was related to our students having diverse interests, career goals, and plans after graduation (e.g., whether they planned to attend graduate school). Our research program was mostly a one-size-fits-all approach that did not accommodate these differences well (a previous attempt to develop a research track failed to attract enough students to be viable). For those not planning to continue on to graduate school or who are pursuing more practical interests, the most important research-related goals are for them to have a basic understanding of research and to develop as good research "consumers" who can comprehend, critically evaluate, and apply research findings. In contrast, for those planning to go to graduate school, their undergraduate program should ideally also provide them with initial opportunities to be engaged as research "producers." These students would more likely benefit from an upper level research methods class as well as opportunities to develop their own research projects. Although the supervised research sequence was meant to address the latter, few students selected this option.

The fifth challenge was separate from the research sequence but was related to issues of personal and career-related inquiry. Through our program assessment efforts and review of the APA undergraduate program guidelines, we had earlier identified several learning outcomes that were not adequately addressed in any of our required courses. These were related to students' personal growth (e.g., student learning and success, communication skills, personal ethics) and career development (e.g., knowledge of careers, personal career exploration and planning). Moreover, in our campus's move from reliance on faculty to reliance on general professional advisors, issues arose related to how we could best recruit students into the major and provide students with information about program faculty, course requirements, and learning opportunities. In 2004, we had developed a one-credit course called Introduction to the Psychology Major (PSY P199), required of psychology majors, to address these personal and career outcomes as well as critical thinking skills (to off-load some of this from the research methods course). However, students often thought this new course required too much work for just one credit, and many did not take it seriously as an extra "add-on" (not counting as a full class, it added to an already heavy course load for both students and faculty).

The final challenge also concerned our broader program structure and goals. In addition to Senior Seminar, in 2008 we added History and Systems of Psychology (PSY P459) as a second required senior course. In addition to the traditional "history and systems" content, this course sought to provide a senior capstone experience for psychology majors that could help them review and integrate ideas from previous courses and "dig deeper" into foundational issues and controversies within the field. Through discussions of historical and modern systems of thought in psychology, the course also aimed to further develop psychology majors' critical thinking and writing skills. Although as faculty we thought this was a valuable addition to the curriculum, it also increased the number of required courses for our majors. In addition, an external program reviewer noted that we were fairly unique in requiring two different senior capstone courses and recommended we choose just one.

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Program Changes

The new research/inquiry program introduced in fall 2012 was designed to address the above challenges. It aimed to provide students with a broader, deeper, and more integrated understanding of research methods and to promote the value of an inquiry orientation in their roles as emerging student scholars, future professionals, and lifelong learners. In this section, we briefly outline key revisions made in creating the new program. Specific components are discussed in greater detail in the next section, which outlines the six levels of our current program.

First, a new course, Introduction to Psychological Inquiry (PSY P259), was created. This course now focuses on developing students' knowledge and skills for personal inquiry (as students and lifelong learners) and building a foundation for scholarly inquiry within psychology (as student researchers and future professionals). The former includes topics such as introduction to the psychology major, strategies for self-regulated learning, and career exploration. The latter includes emphasis on critical thinking, writing a literature review in APA style, and developing an understanding of basic research methods concepts. This new course incorporated many elements of the one-credit Introduction to the Psychology Major course (which was eliminated) and replaced the previous lower level research methods (PSY P211) requirement.

Second, a new upper level research methods course, Experimental Psychology (PSY P355), was added as a requirement for all psychology majors. Statistical Techniques (PSY K300) was a prerequisite for this course. Thus, this addressed several challenges above. With Introduction to Psychological Inquiry (PSY P259) now providing an introduction to research methods and focusing on critical thinking and APA-style writing, this upper level course was then able to offer a more in-depth look at various research methods (especially important to prepare those going to graduate school). Moreover, students now took statistics between these two courses (creating a "stats sandwich"). PSY P259 provided students with a basic understanding of research and the general role of statistics in research, prior to their taking the statistics course. After the statistics course, students then had the statistical tools to apply in the upper level research methods class (including knowledge of SPSS, a commonly used computerized statistical analysis program). This enabled students to better understand the relationships between statistics and research methods, while providing them opportunities to apply statistical knowledge and skills in the context of research design and data analysis. Recently, we expanded the upper level Experimental Psychology course to four credits, adding a lab component to provide additional opportunities for application and guided practice.

Third, around the time we were revising the research/inquiry program, our campus was also expanding degree options for students through the development of B.S. degrees, which were primarily intended to provide students options with reduced general education requirements but more coursework within their majors. In psychology, we retained the B.A. degree (now targeted mostly to those seeking a broader liberal arts education) but added two B.S. degree tracks. The B.S. General track required more coursework in the natural sciences, especially biology and/or chemistry, and was targeted more to students who were transferring in from nursing or other natural science fields or were pursuing careers in physical therapy, occupational therapy, medicine, or neuroscience. The B.S. Psychological track, in contrast, required more upper level psychology courses and was developed specifically for students planning to pursue graduate school in psychology. Whereas the B.A. and B.S. General track degrees continued to give students an option of the two-semester supervised research sequence (PSY P493/P494) or an internship (now preceded by a class on helping skills and ethics), those in the B.S. Psychological track were required to complete the supervised research sequence. Thus, those planning on attending graduate school in psychology had further opportunities to explore their own research interests and develop their skills as both research consumers and producers through work on their own research projects.

Fourth, as recommended by our external program reviewer, we eliminated one of our two senior capstone courses, specifically the Senior Seminar course. We chose to retain History and Systems as our senior capstone, in part because of our belief in its importance (see course goals described above), but also because we now felt comfortable dropping Senior Seminar given the other changes made to the research/inquiry curriculum. For those in the B.A. and B.S. General tracks, the upper level research methods course now provided sufficient depth to prepare them to be good consumers and appliers of psychological research (these students still retained the option of taking the supervised research sequence as electives). Those in the B.S. Psychological track were now required to take the supervised research sequence, ensuring they would get practice not only developing a research proposal but also implementing it by conducting their proposed project. Thus, we believed the former group no longer needed Senior Seminar and the latter group would now get a more in-depth and authentic research experience.

Finally, we sought to better integrate these research/inquiry components (with greater attention to connections between courses) and create additional experiential opportunities for students beyond the classroom. This was facilitated by the development of an Institute for Undergraduate Research in Psychology, with a coordinator who was given one course release per year to provide time for planning and overall coordination of the research/inquiry components. Further, the Psychology Department was able to expand research-related learning opportunities available to students through coordination and funding provided by a campus-wide program promoting student engagement and experiential learning. This program, called KEY (the Kokomo Experience and You), is discussed further below.

IU Kokomo Case Study: The Current Program

The program changes discussed above resulted in our current research/inquiry program for psychology majors at IU Kokomo. This section provides an overview of our program goals and outcomes, followed by the introduction of a six-level framework for scaffolding students' research/inquiry development and a description of each level. Although the department has been engaged in on-going discussions of program goals, the curriculum, and their implementation, and the ideas for program change developed gradually through these discussions, most changes in program requirements focused on here were implemented together, beginning with students declaring psychology as a major in the fall 2012 semester. Minor changes that were made to the program after 2012 are discussed where appropriate.

Program Goals and Outcomes

The IU Kokomo Psychology Department faculty developed goals and outcomes for the psychology major, based on a report by a committee of the APA's education division (APA, 2007). That report outlined a set of 10 goals that are important for undergraduate psychology programs. The psychology faculty at IU Kokomo selected and/or modified a subset of eight of those goals that most directly applied to the psychology program's mission. The outcomes from our program goals that most relate to research and inquiry are listed in Appendix 1.

Program Research/Inquiry Components

The research program for psychology majors at IU Kokomo consists of six levels (see Table 1). Each level provides support or scaffolding for the next, moving students from first exposure to basic

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research concepts, to more advanced concepts and skills, and finally to their application in meaningful experiential contexts.

Table 1. Indiana University Kokomo Psychology Department research program levels.

Level	Course	Description
1	General Psychology (PSY P103)	Introductory course (survey and first exposure to disciplinary content areas and research methods)
2	Introduction to Psychological Inquiry (PSY P259)	Introduction to disciplinary inquiry (e.g., the major/faculty, careers, critical thinking, research)
3	Statistical Techniques (PSY K300)	Statistics (or other analytic tools for nonquantitative research)
4	Experimental Psychology (PSY P355)	Research methods course (upper level course on discipline-specific research methods)
5[a]	Supervised Research I/II (PSY P493/P494)	Supervised research (independent student project)
6[a]	Experiential (KEY) opportunities	Experiential Opportunities (e.g., conference and presentation opportunities)

Note. The described topics are applicable across disciplines. KEY = Kokomo Experience and You.
[a]Levels 5 and 6 are available opportunities but not requirements for all psychology majors.

The psychology program has been able to maintain a high level of quality and rigor in our courses because we have been intentional about keeping the courses as small as possible. As it is a very work-intensive course, Introduction to Psychological Inquiry is always held to 25 or fewer students per section each term. This allows instructors to provide more directed attention to student learning goals and interests as well as more substantive feedback on their writing assignments. The Statistical Techniques course typically enrolls between 20 and 35 students per section. It is rarely offered online but has been previously capped at 25 students when it has been offered in that format. Recently, the course cap for face-to-face courses was lowered to 32, so no more than 32 students will be in a course moving forward. Experimental Psychology is always the smallest course, with a limit of 20 students in both the lecture and lab components. While not the subject of the current analysis, our General Psychology courses had been previously offered with course caps of 45 students.

Level 1: General Psychology (PSY P103). This is a one-semester introduction to the field of psychology. As a survey course, students are provided an overview of basic concepts across a wide range of topics or subdisciplines (e.g., research methods, the brain and nervous system, sensation and perception, memory, learning, thinking and intelligence, human life span development, personality, social psychology, and psychological disorders and treatment). This is the first course in psychology taken by psychology majors. However, the vast majority of students in this course are not psychology majors, as it is required by many other majors (e.g., nursing, business), counts toward campus-wide general education requirements (e.g., for social and behavior science and ethically responsible citizenship), and is a popular elective for students.

With regard to research and inquiry, General Psychology provides the first exposure to research concepts and critical thinking skills within the major. Instructors spend 1 to 2 weeks

specifically focused on introductory topics relating to critical thinking and research methods. These concepts and skills are then reinforced throughout the semester, as they are applied to various content areas within psychology. This provides a foundation for all subsequent psychology courses. Learning outcomes, shared across all sections of the course, are organized in terms of four broad areas: (a) understanding psychology as a discipline; (b) basic psychological literacy; (c) methods of inquiry; and (d) critical thinking and application of psychology. Specific learning outcomes relating to methods of inquiry include the following: Explain the role of research methods in psychology as a science; demonstrate basic psychological literacy in research methods; evaluate appropriateness of conclusions derived from psychological research; and recognize need for ethical standards/actions in psychological research. Related critical-thinking learning outcomes include questioning unsupported claims, identifying potential biases, and recognizing psychological issues that have varying viewpoints.

Level 2: Introduction to Psychological Inquiry (PSY P259). This course aims to develop students' skills as learners, inquirers, and consumers and producers of research in psychology. Specifically, the course addresses three broad areas:

- Psychological contexts of inquiry (understanding psychology as a discipline and a major)
- Learning and inquiry orientation (developing students as self-regulated learners and critical inquirers)
- Foundations of research methods (learning basic research concepts and skills).

The course provides an overview of basic inquiry processes and psychology as an area of inquiry. It explores two interrelated strands that are woven throughout the course. About half of the course emphasizes inquiry from a more personal and student perspective, including discussion of the psychology major, careers in psychology, and concepts and strategies for developing as a self-regulated learner and critical and reflective inquirer. The other half of the course emphasizes scientific inquiry within the discipline of psychology, with an emphasis on critical thinking skills used for evaluating claims people make relating to psychology and an overview of research process, methods, and design. Students have the opportunity to develop and apply learning, inquiry, critical thinking, and writing skills throughout the course. Reflection journals, assignments, and inquiry projects help students reflect on their own goals and skills and learn about careers in psychology. A major assignment for the course is the completion of a literature review on a psychology-related topic, with an emphasis on identifying scholarly sources, integrating ideas in a literature review paper, and writing in APA style.

This course was designed for psychology majors to provide basic knowledge and skills relating to psychological inquiry, critical thinking, and research methods that will be further developed in statistics, experimental psychology, and, for some, supervised research. After successful completion of this course, students should also be better able to understand and think critically about research studies in other psychology courses (as well as those from other disciplines) and claims made in everyday contexts (e.g., in the media, by family and friends, by politicians). The course topic sequence as organized recently (in spring 2020) is outlined in Appendix 2. Although there are some differences in course structure, emphasis, and assignments across the four faculty who have taught this course, there is significant overlap with respect to the above course description and these course topics.

Level 3: Statistical Techniques (PSY K300). This course aims to provide students with an understanding of basic descriptive and inferential statistics. Topics include displaying data with tables and graphs, measures of center and spread, correlation, normal distributions, probability, sampling distributions, confidence intervals, basic tests of significance (z and t tests for one and two samples), and an introduction to more advanced procedures such as analysis of variance (ANOVA), the chi-square test, and regression. In addition to this fairly standard list of course topics, students also learn

the statistical computer program SPSS. The emphasis is on understanding concepts (over number crunching) and applying concepts and skills to data analysis using SPSS.

Level 4: Experimental Psychology (PSY P355). The main goals of this course are for students to learn more about research methods in psychology and to integrate the use of statistical techniques with research methods. Students learn about the basic methods in psychological research, particularly surveys, correlations, and experiments. They learn about validity and ethics in research as well. The experiential component of this class is that students conduct experiments with a small group of their classmates. To allow students to have a more authentic experience in research, each group selects a topic to perform an experiment on, using vignettes to manipulate their independent variables. Students complete training to work with human participants through the Collaborative Institutional Training Initiative (CITI). They then complete the Institutional Review Board forms for course credit. Data are collected using Amazon MTurk, and students select and perform the appropriate statistical analyses to test their hypotheses. This class was designed for students to have the opportunity to implement the skills learned in Statistical Techniques, because we find that unless students have practice with those skills, they show a decreased ability to remember and use SPSS in later research projects.

For the first 3 years that we offered this class, we offered it as a three-credit class. As the class evolved, we found that students did not have enough time to complete the group research project in addition to learning the content and skills required for the class. Thus, in fall 2018, we added a one-credit lab to the class. The lab was scheduled in a computer classroom so that students could have access to programs for conducting their research online, including Qualtrics and SPSS. The lab time focuses on practicing SPSS as well as completing group work to progress in their research project.

The final product is an individually written APA-style research report. For students who opt to complete their experiential requirement in psychology through an internship, this will likely be their final experience in conducting research; other students use this course in preparation to complete their own independent research project in Supervised Research (PSY P493/P494).

Level 5: Supervised Research I and II (PSY P493/P494). Undergraduate majors are required to complete one of two tracks: an internship track or the research track. In the research track, students complete Supervised Research I and II, in which they conduct an independent research project under the supervision of a psychology faculty member. One of the faculty members in the Psychology Department acts as the Institute for Undergraduate Research in Psychology coordinator, who provides support and guidance for undergraduate research. Students who plan to conduct supervised research are encouraged to meet with the coordinator to determine which faculty member would be the best fit to supervise their research program, based on each faculty member's expertise in a particular subject area and/or research methodology. The student then selects a faculty mentor to work with on an individual basis, providing a personal connection between the student and that faculty member.

Students typically take Supervised Research I following the completion of Experimental Psychology, but some students enroll in these courses concurrently. In Supervised Research I, students complete a literature review in an area of interest and design a study. If their certification has lapsed, students update their CITI training. With faculty assistance, students also complete a research proposal to submit to the Institutional Review Board for study approval; this is another skill students gain experience with in Experimental Psychology. If students plan to work with animals, they must complete the applicable CITI training and, with faculty assistance, complete a research proposal to submit to the Institutional Animal Care and Use Committee. Students often employ survey or experimental designs, conducted with online participants, but some conduct in-person studies. In Supervised Research II, they typically collect and analyze their data, complete a research report in APA style, and often present their results at the campus, university, regional, or national level (discussed more in Level 6, below).

Level 6: Experiential (KEY) opportunities. The KEY program was launched in fall 2016 to support and promote experiential learning opportunities at all levels of the undergraduate curriculum. The KEY program supports experiential learning on campus, but it also facilitates domestic and international trips for groups of students.

As part of the psychology program at IU Kokomo, students are encouraged to attend conferences to learn about how research is conducted and disseminated and to encourage scientific inquiry. These efforts are typically under the purview of Introduction to Psychological Inquiry (Level 2) or Psychology Club. Students often present their own results from their independent research projects (Level 5) publicly. Presentation options include IU Kokomo's annual Undergraduate Research Symposium (campus level), Indiana University's annual Undergraduate Research Conference (university level), other undergraduate and professional conferences in Indiana, regional conferences such as the annual conference held by the Midwestern Psychological Association, and national conferences such as the annual conferences of the APA and the Society for Personality and Social Psychology. Conference attendance is encouraged for psychology students at any level, but it may be especially useful earlier in the curriculum because of the example and encouragement it provides. Approximately 20 to 30 psychology majors and minors attend conferences each year.

In an effort to cultivate a departmental environment in which students have regular exposure to psychological research, we also began holding monthly research meetings at the department level in fall 2019. These research meetings are advertised to psychology courses and the Psychology Club, and they provide a regular opportunity to learn about research for students who may not be able to travel to conferences. Thus far, faculty members have given presentations on their own research (either completed or in progress), but students are invited and encouraged to present their own research as well. Through the conferences and research presentations, we provide greater opportunities for faculty and student interactions outside of the classroom.

Summary and Generalizability Across Disciplines

As students move through these six levels, they advance their understanding and skills relating to research and inquiry. Each level provides scaffolding for more advanced understanding and skills at higher levels. Although we have described the details specific to our psychology program, the general approach is applicable across many disciplines (see Table 1). The framework is general enough that it can be easily adapted to meet the needs of different disciplines, program goals, and institutional contexts.

Levels 1 and 2 introduce students to research and inquiry while providing a basic foundation for future learning. The key features of our framework at these levels are (a) the inclusion of lower level courses that provide both an introductory survey of the content of the field (likely open to both majors and non-majors) and an introduction to disciplinary inquiry (for majors and possibly minors) and (b) a broad emphasis on inquiry, which includes personal, professional, and scholarly inquiry relating to the discipline. Adaptations, however, could be made to accommodate a two-course introductory sequence (for Level 1) or different emphases in the introduction to disciplinary inquiry course (for Level 2).

Levels 3 and 4 provide more in-depth understanding and skills specific to research within the discipline. For disciplines where quantitative research is important, statistics and upper level research methods courses are likely appropriate, though there will be variation in emphasis across disciplines. For example, ANOVA and experimental designs may get more attention in psychology, whereas regression and observational or quasi-experimental designs may get more emphasis in sociology or business. Some programs may also combine statistics and research methods into a two-course integrated sequence. Disciplines with more emphasis on nonquantitative research could replace

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statistics with courses such as qualitative inquiry, program evaluation, or various forms of critical or theoretical analysis. Of course, for a broader focus, students could take courses in both quantitative and nonquantitative methods. For these middle levels, key features of our framework to be retained are (a) the integration of research tools with research methods (for us, statistics "sandwiched" between the introduction to disciplinary inquiry at Level 2 and the more advanced research methods course at Level 4) and (b) the connections of these middle levels to the lower and higher levels (building on the introductory courses and providing tools to be applied in subsequent research activities).

Finally, Levels 5 and 6 provide opportunities for students to apply what they have learned, in more individualized supervised research and experiential opportunities. These activities enable students to begin to develop their own areas of interest and research ideas and become engaged as consumers and producers of disciplinary research. In our program at IU Kokomo, although these are not required of all students, we have sought to make them available to all our majors and promote them as valuable components of their undergraduate experience that can better prepare them for graduate school (if applicable) and their careers. Programs can adapt how supervised research is offered (e.g., for larger schools, meeting in research groups may be not only possible but necessary) and what experiential opportunities are available (e.g., on-campus presentations, experiential learning activities, opportunities for students to attend or present at conferences). A faculty member (with a course release) who oversees these activities and dependable administrative support and funding sources are helpful to ensure high-quality opportunities can be provided consistently for students.

Assessment of Student Experiences in the Research Program

Method and Design

To measure the effectiveness of the changes to the research program, faculty developed a survey to be given to current and former students that focused on the required coursework and experiential learning activities. The primary areas of interest were (a) whether students perceived the required course or activity as effective in developing a critical skill for the research process and (b) whether the required course or activity effectively increased their confidence in conducting research. Questions were drafted that addressed the individual courses as well as student attendance at one of several research conferences throughout their academic careers.

We sought research approval through the university Institutional Review Board, which was received in January 2020. After approval was obtained, we consulted with the Office of Institutional Research and Office of Admissions to receive email-only contact information regarding current psychology majors and psychology graduates from 2013 to the most recent graduating class (2019). Less recent graduates would not have experienced some of the changes made to the program in 2012. As part of the approval process, an email script was sent to the collected list of current and former students. A mail merge list was loaded into Qualtrics, which was used to generate the survey. Students received the survey directly from Qualtrics' distribution system at three points in time over the course of 6 weeks.

From the original list of 220 email contacts, 75 students responded. Two respondents were eliminated from the final pool, leaving a final sample of $N = 73$. One was eliminated because they did not complete the entire survey. The other response was eliminated because the student indicated they completed the majority of their degree requirements at a different campus before transferring into our program to complete their degree. No students in any of the authors' current courses were directly solicited for participation in the survey to reduce any suggestion of coerced participation.

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Demographic Data

The survey respondents were evenly split between graduates and current students. Slightly more than half (37) were graduates, with most of this group having graduated between fall 2013 and summer 2018. Other information about the class standing of the participants is listed in Table 2. The respondents were overwhelmingly female (64), which reflects enrollment in our major in general. We did not ask questions about their race, ethnicity, or sexual identity because diverse students are not heavily represented in the program and responses to these demographic questions could have easily identified them.

Table 2. Survey respondents' class standing.

Class	Frequency
Sophomore	16
Junior	9
Senior	11
Recent graduate (fall 2018 to fall 2019)	14
Slightly older graduate (fall 2013 to summer 2018)	23
Total	73

Introduction to Psychological Inquiry (PSY P259)

Fifty-six respondents had completed Introduction to Psychological Inquiry. Respondents who had not completed the course could be currently enrolled, could be scheduled to take the course in a future semester, could have transferred in with an equivalent course, or could have progressed through the research sequence before the course was introduced in 2012. As shown in Table 3, fifty-four (96%) of the respondents found the course slightly effective or better in helping them develop basic research skills. All the respondents (56) reported that the course was slightly effective or better in helping them develop critical thinking skills. A subset of that group (38) responded to a question regarding the preparation they received for the next course of the research sequence. Twenty-six (68%) of those respondents felt the course prepared them well for Experimental Psychology (PSY P355). This is important, as Experimental Psychology is research intensive and requires students to apply the initial knowledge gained in Introduction to Psychological Inquiry. There is still room to improve so that more students feel prepared for the experimental methods course, and discussions are underway about potential modifications to the course to increase student confidence and understanding of research methods.

Table 3. Student-perceived effectiveness of courses in achieving targeted goals.

Course (and targeted goal)	Very effective	Moderately effective	Slightly effective	Not effective at all	Total
P259 (research skills)	23 (41%)	22 (39%)	9 (16%)	2 (4%)	56
K300 (statistical literacy)	25 (52%)	11 (23%)	7 (15%)	5 (10%)	48
P355 (research skills)	17 (45%)	11 (29%)	6 (16%)	4 (11%)	38

Statistical Techniques (PSY K300)

Like many programs, the statistics course has the most variability in how students perceive its usefulness. However, on a positive note, the overwhelming majority of respondents (43; 90%) thought the course was slightly effective or better in helping them develop statistical literacy (see Table 3). Students are exposed to real-world applications of data reporting and the ways in which statistics influences their daily lives. This allows them to move beyond learning statistics as abstract concepts and apply them to real-life data. In addition to the previous findings, two thirds of our respondents thought the statistics course helped prepare them a moderate amount or better for the next course in the research sequence (Experimental Psychology), and the remaining third thought it prepared them a little. While students are introduced to statistical analyses and the research process in this course, application of what they have learned mostly occurs in Experimental Psychology.

Experimental Psychology (PSY P355)

Thirty-eight of the 73 respondents had completed Experimental Psychology. As with Introduction to Psychological Inquiry, respondents who had not completed the course could have been currently enrolled, could have been scheduled to take the course in a future semester, or could have progressed through the research program before the course was introduced in 2012. Thirty-four (89%) thought the course was at least slightly effective in helping them develop basic research skills (see Table 3). Twenty-three students (61%) indicated they felt the course helped prepare them to conduct independent research. Those who complete independent research are exposed to CITI training, work through the Institutional Review Board process, draft their own research questions, and analyze data. They typically are able to work through the initial portions of the independent research sequence quite easily because they can draw on their previous training. Twenty-two completed the course with a lab component—an addition beginning in fall 2018—and the majority (17; 77%) thought the lab was a beneficial component of the course. The lab component increases the amount of time students have to work with data, independently and in small groups, as well as to reflect on good and bad research design and explore what they could have done to improve their studies.

Supervised Research I and II (PSY P493/P494)

The independent research courses are completed by a subset of psychology majors. Of the 73 respondents, only 18 had completed both semesters of supervised research at the time of the survey. Not surprisingly, of those who had completed this set of courses, the vast majority (17; 94%) indicated they were moderately confident or very confident in their research skills. One respondent indicated they were not confident, but there was not a follow-up question, so there is no explanation as to why they chose that option.

Experiential Opportunities

One-third (24) of all respondents had attended at least one research conference during their time as an undergraduate student. Of those who did, two-thirds (18) said attending increased their confidence in conducting research at least moderately. All respondents who attended at least one research conference found it to be a valuable educational experience.

Research Program

When asked about the psychology research program as a whole, a majority of respondents indicated that the program developed their understanding of research in a supportive way (59; 81%), that they felt moderately confident or better in their ability to conduct psychological research (51; 70%), and that they felt moderately confident or better in their ability to read and understand psychological research (63; 86%).

Program Assessment Data

In addition to the survey data, we also have limited assessment data on student learning of research-related learning outcomes. Instructors assess such learning within courses, but the psychology faculty could do more to assess broader trends and longer term retention of knowledge and skills at the program level. In the History and Systems senior capstone course, senior psychology majors typically take the Area Concentration Achievement Test for psychology. This is a standardized test assessing knowledge in 10 specific areas of psychology that compares our students to thousands of other senior psychology majors across the country. Relevant here are the subtests for statistics and experimental design. Our goal has been to be above the 50th percentile for group performance. Whereas over the 5-year span from 2013 to 2018 we consistently scored at or above the 50th percentile in statistics (ranging from the 49th to the 56th percentile), scores for experimental design have been consistently below this benchmark (ranging from the 32nd to the 42nd percentile). We hope expanding the Experimental Psychology course to four credits with the computer lab provides students extra time for concept application and guided practice and can help increase these scores.

Conclusion

Overall, the respondents were pleased with the sequencing of courses and the support they received throughout the program to develop various skills. Notably, the vast majority of respondents thought Introduction to Psychological Inquiry (PSY P259) and the Supervised Research sequence (PSY P493/P494) were helpful in developing critical thinking and/or research skills. These are important skills within the major but also for daily living, when misinformation is often placed alongside factual data. Individuals need to know how to process and choose the best sources of information. A great majority felt that Statistical Techniques (PSY K300) and Experimental Psychology (PSY P355) were helpful in building knowledge and skills, and the majority thought these courses prepared them well for the next step in the research program. Many students find both courses difficult, but as reflected in the survey data, they understand and appreciate the role of each course in the research program in developing their understanding of research and the role it plays in psychology. Additionally, a great majority of respondents felt the research program as a whole was successful in developing their understanding of research and increasing their confidence in understanding and conducting research.

Anecdotally, our graduates have inform us of how much more prepared they are than their graduate school colleagues because of the research courses required in our program. This preparation and opportunity for experiential learning has led to a number of them receiving admissions into programs ranging from counseling to organizational psychology to law school and fully funded doctoral programs. Finally, as was noted previously, students who attend research conferences find them valuable and learn a great deal from them. We will continue to seek funding through internal and external sources to increase attendance at local, regional, and national conferences and to provide conference presentation support for students to present their own research. These experiences allow

our students, who are often first-generation students, to see new opportunities on personal and professional levels, as well as increase their confidence in their ability to conquer new challenges.

As a high-impact practice, undergraduate research provides multifaceted value. Even in students who do not conduct independent research or pursue research-focused graduate study, the undergraduate research curriculum can develop collaborative skills and facilitate critical thinking and careful consumption of information. However, courses designed to teach students these skills (such as statistics and research methods) can elicit anxiety in students (Onwuegbuzie & Wilson, 2003; Papanastasiou & Zemblyas, 2008), which is associated with lower performance in those same courses (Freng, 2020; Onwuegbuzie & Wilson, 2003; Papanastasiou & Zemblyas, 2008). Student confidence in these subjects may be increased by providing ample scaffolding and designing a curriculum that provides multiple opportunities to practice and apply concepts across courses. Additionally, through two-semester supervised research projects, students develop one-on-one relationships with their faculty mentors (Kuh, Kinzie, Schuh, & Whitt, 2010).

Studies have shown that students' beliefs about psychology as a science are associated with better grades in psychology courses (Friedrich, 1996) and performance on the Psychology Assessment Test (Freng, 2020). Research suggests that creating an early understanding and appreciation of research methods and scientific inquiry will result in better performance in upper level courses (Freng, 2020). We believe that curricular design is important for achieving these goals, but opportunities for undergraduates to see research in practice, including attending conferences and research talks, may also be valuable learning experiences. The performance gains of early understanding of research methods may have far-reaching implications: Not only might students have a more intellectually fulfilling academic experience, but better grades may improve graduate school and career opportunities.

Limitations

We must acknowledge several limitations of this case study and assessment. A major issue is the limited assessment of student learning outcomes. We do use program assessment results to guide curriculum design, and we recommend the collection and use of assessment data in understanding the role of high-impact practices such as undergraduate research in programs. We plan to revise our program assessment to more systematically evaluate these outcomes. Our survey data on student perceptions support our sequencing and course design, but more data collection is needed. Additionally, our assessment compares graduates in psychology to current students, and these groups differ not only on their current enrollment status, but also on the recency of their course experiences and their ability to use hindsight in evaluating our program. Nonetheless, these groups showed similar and expected patterns in their attitudes toward the research sequence in psychology.

Remaining Challenges and Future Directions

In reflecting on the research/inquiry program, psychology faculty have generally been satisfied that program changes have addressed the initial challenges we outlined above. However, we continue to engage in assessment, reflection, and dialogue in efforts to increase student learning. Based on observations of student performance, we have identified three areas for further curricular improvements. First, although writing literature reviews in APA style is emphasized in a required writing course, the Introduction to Psychological Inquiry and Experimental Psychology courses, and several other upper level courses, some students still struggle in this area. We have recently been collaborating with faculty in English to provide students with more background in APA style and literature reviews. Second, even when students have successfully learned research methods and

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statistics concepts, they often have difficulty identifying which statistical procedures are appropriate for which types of questions (i.e., knowing "when to do what"). Third, although students may learn to be able to think critically when asked to do so in class, these skills do not always generalize as a critical inquiry orientation to other classes or beyond academic contexts. It should be noted that we see a similar lack of critical thinking and evidence-based reasoning in a surprisingly large proportion of the general public. However, we seek to continue to promote these skills, essential for students' success as professionals and for responsible citizenship in a pluralistic democracy.

Recommendations

In closing, we have several recommendations for other programs wishing to examine and revise their undergraduate research sequence. First, in the "Summary and Generalizability Across Disciplines" section, we provide a framework with some structure but enough flexibility to accommodate undergraduate research in a variety of disciplines (though particularly focused on more empirical methods). Mapping these levels onto your discipline and curriculum should help determine where your program may contain gaps to be addressed in program development. For example, we determined that students needed additional time for guided research development, and thus we added a lab component to our upper level methods course. A coordinator for undergraduate research can take the lead in identifying and revising the curriculum to enhance student learning and self-efficacy in the research process.

Additionally, we recommend developing a plan to request funding, and to seek out funding from a variety of sources. In psychology, the costs to perform research vary widely, but they may include payment for participants, access to materials such as tests and software, technology costs, and travel to conferences or field sites. In other disciplines, research may be more or less expensive, but it is unlikely to be free. To secure necessary funding, we have had to be willing to apply for funding from a wide variety of sources (mostly internal to the university). In addition to the Office of Academic Affairs, some of our travel funding has come from the Office of Student Affairs and from our campus's funding for experiential learning, the KEY program. Although your institution may not have these particular types of funding available, being able to connect undergraduate research to your institution's mission and goals can enable you to demonstrate the value of undergraduate research and better advocate for needed financial and administrative support.

Developing a culture of research takes time, but it can be encouraged by offering regular and flexible opportunities for students to participate in research and attend conferences. In this regard, it is important to involve as many students as possible. Students may not be able to afford the time and money needed to travel to a research conference, but they may go to an on-campus presentation by a faculty member or advanced undergraduate student, particularly if the presentation can be incorporated into a class assignment. We have also found that involving students earlier in their college careers can help them get interested in or even excited about research. When we added a day trip to an undergraduate research conference as an option in our lower level inquiry class, students reported being less intimidated by the research process. Trips to conferences also provide students with opportunities to connect with other students and faculty outside of the classroom. Faculty and upper level students expressing their excitement about conducting and learning about research can enhance student interest in undergraduate research as well. Not only does this model how most faculty feel about research, but it can lead to greater connection between faculty and students, which is an outcome connected to greater student success (Kuh et al., 2010). While your institution will differ in the particulars from our experience, engaging in a thoughtful evaluation of your research program can help maximize student learning and success in relation to research and inquiry knowledge and skills.

Acknowledgments

Appendix

Appendix 1. IU Kokomo Research-Related Program Goals and Learning Outcomes.

Goal 1: Knowledge Base
- Demonstrate understanding of basic terminology relating to research methods.
- Demonstrate basic psychological literacy in statistics.

Goal 2: Research Methods
- Explain the role of research in psychology.
- Demonstrate understanding of basic terminology relating to research methods.
- Place research in context of earlier work.
- Evaluate appropriateness of conclusions derived from psychological research.
- Design basic studies to address psychological questions.

Goal 3: Critical Thinking
- Question unsupported claims.
- Recognize psychological issues that have varying viewpoints.
- Formulate one's own viewpoint.
- Recognize alternative viewpoints.
- Evaluate quality of supporting evidence.
- Describe implications and consequences that result from proposed conclusions.

Goal 5: Ethics
- Recognize necessity of having ethical standards/acting ethically.
- Understand what it means to be ethical in writing.
- Understand what it means to be ethical in research.
- Apply ethical standards in either research or practice.

Goal 6: Writing
- Communicate ideas effectively.
- Write an effective literature review.
- Use APA style documentation that is appropriate to the assignment.
- Use APA style formatting that is appropriate to the assignment.

Goal 7: Quantitative Literacy
- Evaluate appropriateness of conclusions derived from psychological research.

- Select appropriate statistics.
- Conduct statistical analyses.
- Interpret statistical results.
- Decide how results should be presented.

Goal 8: Career Planning and Development [related to broader personal and career inquiry]
- Demonstrate basic knowledge of careers in psychology.
- Demonstrate understanding of careers in psychology.
- Evaluate personal suitability for careers of interest.
- Develop a personal plan that addresses discrepancies and next steps.

Appendix 2. Introduction to Psychological Inquiry (PSY P259) Curriculum (Spring 2020).

Week	Topic	Brief description
1	Introduction to Psychological Inquiry	Introduction to the general inquiry process; psychological subdisciplines and perspectives
2	Characteristics of Scientific Inquiry	Characteristics of scientific inquiry and theories; falsifiability and measurement (reliability, validity)
3	The Psychology Major & Careers	Psychology major/minor requirements; careers in psychology; student subdisciplines poster session
4	Learning Strategies for Academic Success	Study skills and effective learning strategies; growth mindset (Dweck, 2006)
5	Descriptive & Correlational Research	Descriptive research (e.g., naturalistic observation, case studies, surveys); correlational research
6	Analyzing Qualitative & Quantitative Data	Types of data and variables; summarizing data with narratives, tables, graphs, and descriptive statistics.
7	Experimental Research	Characteristics of experiments; internal and external validity; interaction and converging evidence
8	"Meet the Faculty"/Making the Most of Your Education	"Meet the faculty" days; taking an active student role; considering graduate school
9	Evaluating Research Articles	Review of types of research, claims, and validity; evaluating research articles; research ethics
10	Confronting Myths & Pseudoscience	Pseudoscience and myths (causes and impact); critiquing common myths in psychology
11	Information Literacy: Finding Credible Sources	Finding scholarly sources; using library databases (e.g., PsycInfo); identifying credible sources
12	Career Presentations	Student presentations of psychology-related careers; student resume writing/update
13	Writing Literature Reviews & APA Style	Writing literature reviews; introduction to APA style; student literature search and annotated bibliographies
14	Sampling, Bias, & Probabilistic Reasoning	Sampling and sampling bias; probabilistic reasoning; role of inferential statistics
15	Lifelong Learning and Inquiry	Mindset revisited; importance of lifelong learning and inquiry; sharing student learning interests
16	Conclusion	Student literature review papers due; final exam

Note. APA = American Psychological Association.

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