ResearchYOU: A Faculty-Led Undergraduate Co-Curricular Research Experience

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Abstract: ResearchYOU! is a co-curricular research experience designed to improve undergraduate student research skills at a Hispanic-serving institution and provide research mentoring for undergraduate students who may not typically have access to social science research experiences. This multi-faculty capacity-building research experience is composed of three components: (1) learning and development of research skills through virtual synchronous workshops, (2) performing research tasks under the mentorship of faculty members, and (3) submission of a research poster presentation for the University Undergraduate Research Day. In this paper, we describe the inaugural year of the program and present preliminary data that point to initial impacts of the program.

ResearchYOU! is a co-curricular research experience designed to improve undergraduate student research skills and provide research mentoring for undergraduate students who may not typically have access to social science research opportunities at a Hispanic-serving institution. In this paper, we describe the inaugural year of the program and present preliminary data that point to initial impacts. We begin with background literature, then describe the program design, implementation, and preliminary data from the evaluation. Finally, we discuss our lessons learned and next steps for ResearchYOU!.

Background

The design, development, and implementation of ResearchYOU! was motivated by two gaps within the extant literature on undergraduate research experiences. First, an overwhelming number of studies have focused on STEM (science, technology, engineering, and mathematics) related fields, according to a recent systematic review, including 67 studies published between 2011 and 2021 (Ahmad & Al-Thani, 2022). Scholars have called for further research on undergraduate research experiences across social sciences (Haege et al., 2020), including applied fields such as the two represented in ResearchYOU! – human resource development and retailing and consumer sciences. The nature and process of research employed in social sciences differs from research in STEM fields, calling for special designs and activities as demonstrated in ResearchYOU!. Second, most existing research has focused on course-based research experiences to engage undergraduate students. Course-based experiences, however, may be limited in reaching students in fields without required research components, or students from under-served groups with limitations in accessing extra-curricular opportunities (Pierszalowski et al., 2021). As a co-curricular program, ResearchYOU! included workshops and faculty-mentored projects to leverage faculty strengths and tailor the undergraduate research experience to the target student population.

Undergraduate research experiences provide benefits to students, faculty, and institutions. For underrepresented and/or underserved students, undergraduate research experiences serve as important paths for building analytical and social cognitive skills while improving access to professional development opportunities through interactions with faculty mentors. Faculty who mentor undergraduate research students can also reap benefits from student assistance and contributions to research projects. For institutions, undergraduate research participation provides opportunities to increase the representation and success of students in career pathways, maintain a reputation for excellence in research, and meet national needs related to a workforce equipped with research and problem-solving skills.

The ResearchYOU! program is based on the research process, inherently a problem-solving process. Scott's (2017) framework for problem-based learning identified six individual-level outcomes of problem-based learning. Among others, these outcomes include problem-solving skills, collaboration skills, and a flexible knowledge base. According to Scott (2017), achieving these outcomes depends on the authenticity, challenge, clarity, and familiarity of the initial problem. Additionally, the team environment with problem-based learning should be demographically diverse and include effective learning facilitators and scaffolding mechanisms. Finally, the learners, themselves, should be motivated, possessing self-directed learning skills and perceived autonomy in working on the problem. In accordance with Scott's (2017) problem-based learning framework, ResearchYOU! students are expected to learn problem-solving skills, effective oral and written communication skills, and teamwork skills.

Program Design and Implementation

In the ResearchYOU! program, a group of ten students was mentored in small groups by the four participating faculty mentors and experienced the co-curricular program as a cohort, allowing them to benefit from a community of their peers while in the research environment. This collaborative research experience was composed of three components: (1) learning and development of research skills through virtual synchronous workshops, (2) performing research tasks under the mentorship of faculty members, and (3) submission of a research poster presentation for the University Undergraduate Research Day. The program was supplemented with social activities including a kick-off meeting and end-of-the-semester celebration.
The inaugural year of the program commenced in January 2022. The virtual workshops were advertised to the University community to increase participation from across the campus and increase the impact of ResearchYOU!. In total, 140 students attended the workshops in the first year, averaging about 18 students per workshop. Additionally, the ten research assistants who were selected to participate in the mentored research experiences completed the Institutional Research Board (IRB) research ethics training course (18 modules) offered by the Collaborative Institutional Training Initiative (CITI). The learning objectives and activities for each workshop are presented below.

1. **Preparing to be a Researcher (2 hours)**
   <u>Learning Objectives</u>: Students will be able to (1) describe barriers to effective communication and group work; (2) identify their communication styles and time management strategies; (3) reflect on ways to improve communication and time

management skills; (4) describe the importance of research ethics and plan to complete the IRB training.
Interactive activities: Online polling, think-pair-share, peer and faculty feedback

2. **Introduction to Research (2 hours)**
Learning Objectives: Students will be able to (1) describe the research process in social and behavioral sciences and the main steps involved in it; (2) describe the inductive and deductive research approaches; (3) distinguish between qualitative, quantitative, and mixed methods research; and (4) formulate a research question and apply the characteristics of good research questions.
Interactive activities: Online polling, panel discussion, peer and faculty feedback

3. **Content Analysis with Qualitative Data (2 hours)**
Learning Objectives: Students will be able to (1) describe content analysis and its different types; (2) describe the components of a research article; (3) code a research article in a literature review matrix; and (4) apply content analysis strategies to artifacts, interview data, and social media data.
Interactive activities: Coding data demonstration, hands-on activity coding data, online polling, think-pair-share, peer and faculty feedback

4. **Survey Development for Quantitative Research (2 hours)**
Learning Objectives: Students will be able to (1) describe appropriate applications of quantitative methodologies; (2) distinguish between qualitative and quantitative methods; and (3) use Qualtrics to create a survey.
Interactive activities: Qualtrics demonstration, hands-on activity creating a survey, peer and faculty feedback

Following completion of the virtual workshops, a selected group of ten students were assigned to one of the four faculty research mentors to participate in mentored research experiences involving hands-on research tasks. These students were chosen based on their workshop attendance, schedule availability, and responses in their application regarding why they wanted to participate in the lab experience and which faculty research areas interested them. The small group research teams benefitted from a low faculty-to-student ratio to offer tailored mentoring for each student. Additionally, the students working in a cohort allowed for the creation of peer mentoring relationships.

The program faculty mentored the undergraduate students in research design, analysis, implementation, and presentation skills. Faculty mentors met with their small group of students once per week to learn and discuss the research process, tasks, and accomplishments. As an outcome of the mentored research experience, students were required to prepare, submit, and present a research poster for a university-sponsored undergraduate research day. Students received coaching from faculty mentors and detailed feedback on their posters and presentations.

Figure 1 shows the detailed schedule for the initial semester of the ResearchYOU! program. The program was on break during the summer of 2022. Resuming in fall 2022, all ten research assistants willingly returned to the program for additional hands-on research experience and final

preparations for Undergraduate Research Day. The program faculty also facilitated the four workshops again, inviting students from the wider university to participate.

Figure 1
Spring 2022 ResearchYOU! Program Schedule
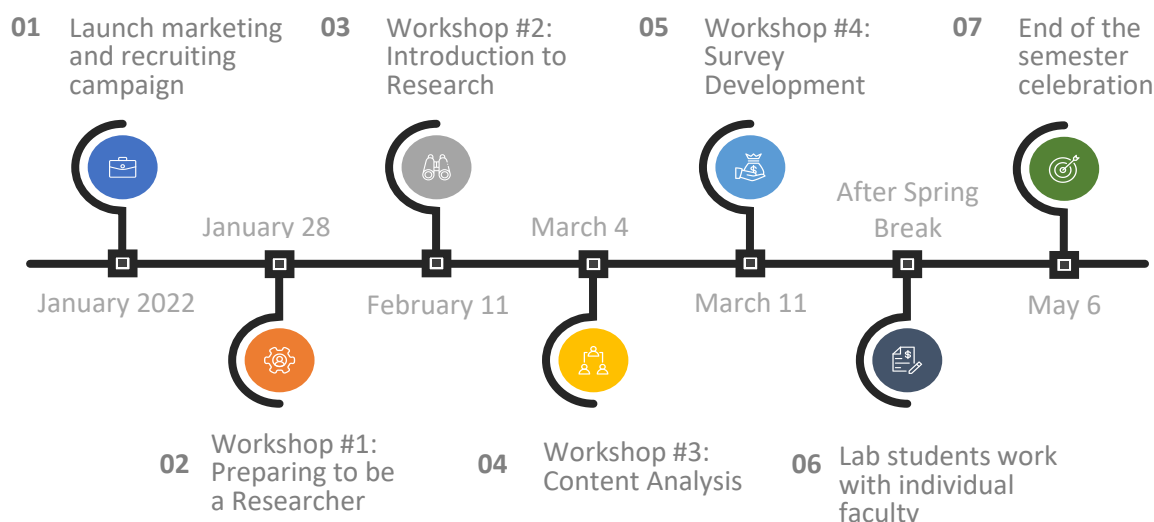
Program Evaluation

Evaluation data were collected via an online survey following each workshop. In this online survey, students were prompted to share demographic information, their level of satisfaction, and what they liked most and least about the workshop. Based on this self-reported data, ResearchYOU! effectively engaged underrepresented racial and ethnic groups and women in co-curricular research experiences. The workshop participants were comprised of 31% Hispanic/Latinx, 29% Asian/Pacific-Islander, 15% African-American/Black, 15% White students and 66% of the participants self-identified as a female. Analysis of the open-ended questions revealed the students described the interactivity (41%) and the content (47%) of the workshops as what they liked most. The length of time (too long) of the workshops is what they liked least (16%) and 33% said there was nothing they "liked least". As shown in Figure 2, most participants were satisfied with the workshop experience.

The ten students who were selected to participate in the mentored research experiences with faculty were invited to complete an IRB-approved survey at the beginning (August) of the fall 2022 semester and at the end (December) of the fall 2022 semester to assess their reactions to the mentored research experiences and their confidence with research competencies that were introduced in the workshop series. Table 1 contains descriptive statistics calculated from their survey responses.

Figure 2
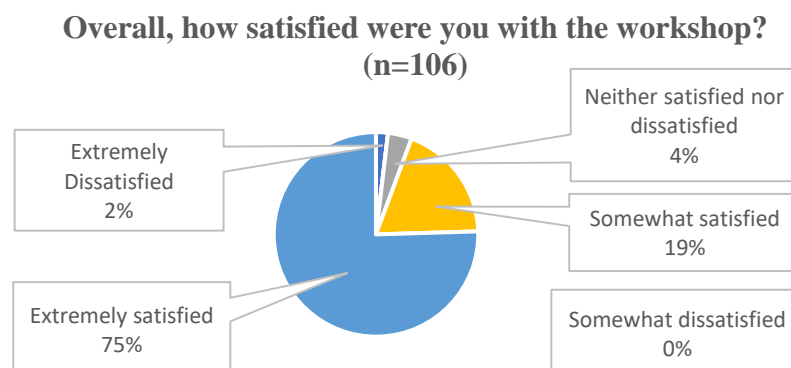*Satisfaction of ResearchYOU! Workshop Participants*

Overall, how satisfied were you with the workshop?
(n=106)

Extremely
Dissatisfied
2%

Neither satisfied nor
dissatisfied
4%

Somewhat satisfied
19%

Extremely satisfied
75%

Somewhat dissatisfied
0%

Table 1
Preliminary data from ResearchYOU! Undergraduate Researchers

Survey Measures (1=strongly disagree; 5=strongly agree)	Average for August 2022	Average for December 2022
ResearchYOU! Experience		
Satisfied with research experiences	4.5	4.67
Increased interest in research	4.25	4.67
Faculty interactions positively influenced personal growth	4.5	4.67
Faculty interactions positively influenced intellectual growth	4.5	4.67
Faculty interactions positively influenced interest in research	4.5	4.67
Confidence in Research Competencies		
Find an adequate research question	3.5	4.0
Plan a research project	2.5	4.0
Identify the limitations of my research	3.5	3.7
Plan qualitative data collection	3.25	4.0
Interpret qualitative data	3.75	4.0
Develop instruments for a quantitative study	3.25	3.67
Infer relevant conclusions from quantitative data	2.5	4.0

Discussion

The primary goal of ResearchYOU! is to engage undergraduate students in a co-curricular social science research experience at an HSI. The program was targeted towards underserved students with potentially less access to social science research opportunities (Haege et al., 2020). This focus addressed gaps within the extant undergraduate research literature. Next, we discuss the lessons learned from designing, implementing, and evaluating ResearchYOU!.

Program Design and Implementation
The series of virtual workshops proved to be an effective primer for the mentored undergraduate research experiences. Notably, the workshops were centered on selected learning objectives aligned with faculty expertise and research needs. The workshops were designed to be hands-on,

interactive, and engaging while preparing students with skills they needed to immediately put into practice when working with faculty mentors on research projects (Scott, 2017).

Maintaining a small faculty-to-student ratio during the mentored research experiences enabled faculty to build relationships with individual students and provide authentic mentoring experiences to students. The multi-faculty model also allowed the students to benefit from a synergy emerging from collaboration among faculty. This arrangement also provided students access to multiple mentors and exposed them to different types of research studies, which enhanced their appreciation for social science research. Finally, activities such as the kickoff meeting, end-of-the-semester celebration, and regular meetings with faculty and other students helped to build a community where students felt they belonged to a community of researchers and that research is within reach and something possible for them to pursue.

Program Evaluation

The workshop data gave a broad perspective about participants' initial reactions, their likes, and their dislikes. These data largely indicated that students perceived the workshops to be worthwhile, though most of them had very little previous experience with research. In general, students' responses indicated that they liked the content and interactivity and most students replied that they disliked "nothing". As a result, very few changes were made to the workshop structure or content between semesters.

The quantitative data collected from the mentored students suggested that the students may have increased their confidence in various research skills between August and December 2022 as they worked on research projects with their faculty mentors. The data cannot be analyzed using inferential statistics due to the small sample size; however, continued evaluation efforts with future ResearchYOU! students can contribute to a larger dataset on which to base the purported student outcomes. Additionally, we recognize that some of the survey items may be more or less applicable to individual students, depending on which research skills are required for their mentored research projects. Some of the students focused on qualitative and social media data analysis, while others focused on literature reviews and quantitative data analysis. Consequently, going forward, it will be relevant to know which projects each student worked on to fully understand the context for their survey responses. Qualitative data could also build this context.

Next Steps

At the conclusion of the first year of ResearchYOU!, the program team is committed to securing additional funding to offer workshop incentives and stipends for ResearchYOU! research students. The first year of implementation showed promise for this collaborative learning community program design (e.g., Rae et al., 2006). In the second year of implementation, two additional faculty mentors will be added to the multi-faculty model, allowing the program team to increase the number of mentored research students and maintain a low student-to-faculty ratio. Finally, the team plans to explore opportunities to collaborate with other higher education institutions to expand social science research opportunities for underserved students.

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