

Features of Building Scholars' Summer Research Weeks Towards Student Retention and Graduation

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Title V - Building Scholars is a partnership between Texas A&M International University (TAMIU) and Laredo College (LC) to increase the number of Hispanic and low-income students attaining post-secondary certifications, associate and bachelor's degrees. It aims to prepare students to compete for positions in graduate and professional schools, thus increasing the competency and diversity of our workforce. This paper highlights the extent of faculty intervention in this component of the program, including features, format, and successes of Summer Research Week (SRW). SRW provides incoming TAMIU students, particularly LC transfer students, with discipline-specific research to succeed in entry-level courses at TAMIU.

Keywords: underrepresented, STEM, post-secondary, education, research

PRELIMINARIES

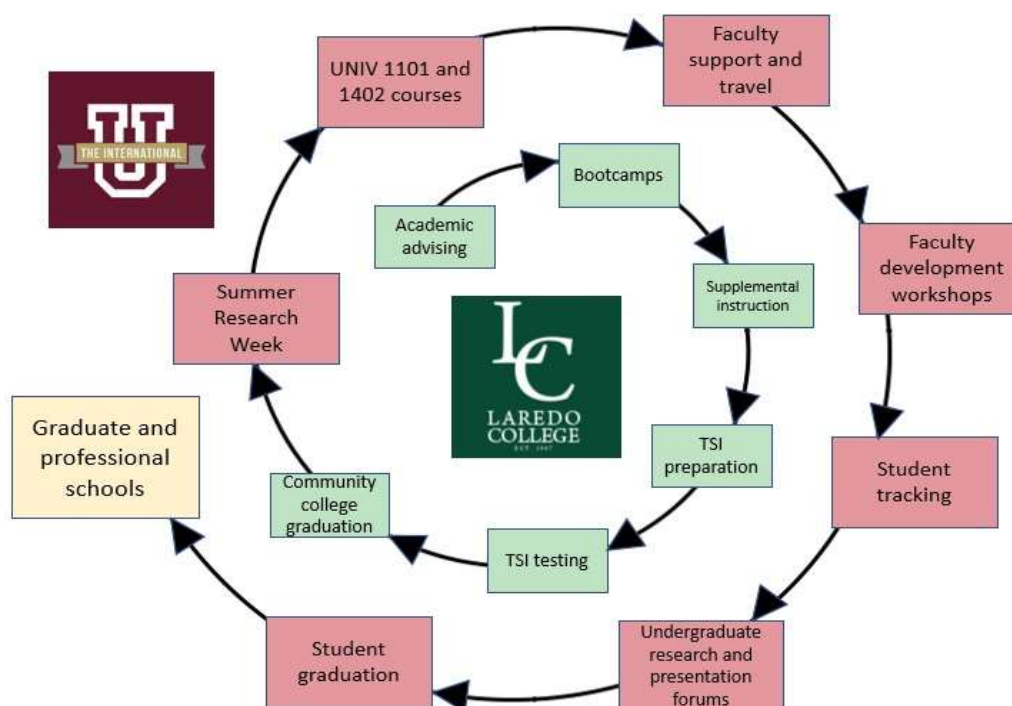
Title V - Building Scholars is a partnership between Texas A&M International University (TAMIU) and Laredo College (LC), formerly known as Laredo Community College (LCC), to increase the number of Hispanic and low-income students attaining post-secondary certifications, associate and bachelor's degrees. It aims to prepare students to compete for positions in graduate and professional schools, thus increasing the competency and diversity of national, state and local workforce.

TAMIU and LC jointly serve the predominately-Hispanic community, a group historically underrepresented in research careers and positions of leadership in the nation. Laredo is a South Texas city, located on the US-Mexico border. Once considered the fastest growing city in the U.S. with a per capita income of \$15,872, compared to \$29,829 nationally, a sustainable workforce is required to serve its rapidly growing population. Laredo has a somewhat young population, 58.7% are under 35 years of age. As a result of its proximity to Mexico, 26.6% of Laredo residents are foreign-born, 95.4% are Hispanic or Latino, and 89.5% are Spanish speakers (U.S. Census Bureau).

The demographic profiles in Laredo, Texas, estimate a huge percentage of Hispanics in this emerging population with a low educational attainment, needing a rigorous intervention in and out of classrooms. Students who are pursuing to enter higher education institutes, such as TAMU and LC, are mostly first-generation college students. This growing population not only needs support to pursue and navigate the academic demands and rigor of a college education, but also to continue with an education endeavor.

The program consists of diverse activities developed by both institutions, as seen in Figure 1. One of the objectives of the Building Scholars program is to increase student preparation, engagement and retention of Hispanic and low-income students. Hence, a bridge component to the program has been developed to strengthen students' navigational knowledge to engage in academically sensitive coursework, thereby succeeding in their courses and, in turn, in the program of study.

FIGURE 1
ACTIVITY MODEL IMPLEMENTED BY BUILDING SCHOLARS



Goonatilake & Maldonado, 2019

LITERATURE REVIEW AND RELATIONS

According to the National Center for Education Statistics between 2010-2016 Hispanic students' enrollment in higher education is lower than that of White students by 10% (NCES, 2018). Similarly, researchers concur that Hispanic and low income students' underrepresentation in two and four year college campuses continues to persist (Yosso, 2005; Valenzuela, 1999; Rendón, Nora, & Kanagala, 2014; Gándara, 2010). Therefore, it is imperative that Hispanic Serving Institutions create innovative academic pathways to recruit and retain Hispanic and low-income students (Rendón & Kangala 2017; Zambrana & Hurtado, 2015). Summer research opportunities for underserved and underrepresented undergraduate students work well because faculty mentors have an opportunity to correlate their respective academic knowledge with students' scholarly inquiries (Raman, Geisinger, Kemis, & de la Mora, 2016). Raman et al. concluded that engaging undergraduate students in summer research explorations that involve more than the traditional

lectures positively impact students' interest in inquiry-based learning and increases college retention rates (2016).

The value of faculty members engaging in direct intimate discussions with future college students is an invaluable commodity (Wilson, Woods, & Gaff, 1974). According to research, students engaged in these types of activities learn the importance of teacher–student interactions related to understanding and engaging in academic problem solving activities related to their future course work (Lopatto, 2007; National Science Foundation, 2013). Relatedly, Baiduc, Drane, Beite & Flores (2017) concluded that undergraduate research programs and opportunities for first-year students increase their persistence. In addition, undergraduate research programs conducted during the summer prior to the students' first year college, or future college enrollment empowers Hispanic first-generation and low income students because they get to make connections with peers with similar cultural backgrounds while at the same time learn about the social norms of their future college (Arbona & Nora, 2007; Bosch, 2017).

ACTIVITY SYNOPSIS AND FEATURES

One of the integral activities of the Building Scholars program at TAMIU is the Summer Research Week (SRW), held every year since the inception of the program. It provides incoming TAMIU students, particularly transfer students from LC, with the necessary skills for discipline-specific research to succeed in the entry-level courses at TAMIU. SRW is a week-long program consisting of 10 modules, that include training in the responsible conduct of research, building basic writing skills and exposing students to science laboratories and research in non-science fields such as language, literature, art, education and criminal justice. Modules are conducted by faculty mentors at an interval of two modules per day: morning modules from 9:00 am to 12:00 pm and afternoon modules from 1:00 pm to 4:00 pm. Selection of faculty mentors is primarily based on their academic expertise and prior experience in past SRWs. The scholars complete 30 hours of lecture and activities to expand their research potential and to experience the discipline-specific research topics unique to their program of study with the guidance of a faculty leader. As some scholars are motivated by collaboration rather than competition, daily breaks are provided for socialization opportunities with faculty mentors and other scholars. Scholars who successfully complete the entire summer workshop will receive a certificate of accomplishment along with equipment and supplies that not only support the workshop, but will also help them during the continuation of their program of study and beyond. Academic supplies delivered to the scholars include a graphic calculator, backpack, notebooks, and smart note taking pen. These are important and necessary items for first generation college students who are already financially and emotionally stressed about successfully completing their first year of college. This bridge program is expected to strengthen scholars navigational knowledge to engage in academically sensitive coursework, thereby succeeding in their courses and, in turn, in the program of study. This will set the institution on a stable footing to improve the retention and graduation among its undergraduate student population, as these measures are now tied to the institutional sustainability.

The goal of this component is to increase the number of Hispanic and low-income students involved in original research. This workshop takes place every summer in the month of July. It is a week-long workshop that includes 10 modules. Scholars will complete 30 hours of lecture and activities to embellish their research experience. Participating in this workshop will expose students to cutting edge research techniques and methodologies that are applicable to a wide range of fields. Scholars were trained in developing testable hypotheses, utilizing technology and critical thinking to analyze data, draw appropriate conclusions, as well as the effective communication of experimental results.

RESULTS AND ACTIVITY SUCCESS

Since 2015, SRW attendance has been increased from the proposed 24 to 36 undergraduates per year from diverse academic fields. Recruitment efforts for the SRW begin early in the year by visiting local high schools, Laredo College, and participating in various collaborative recruitment and orientation events at TAMIU. Potential scholars are asked to complete an application and write a short essay describing their

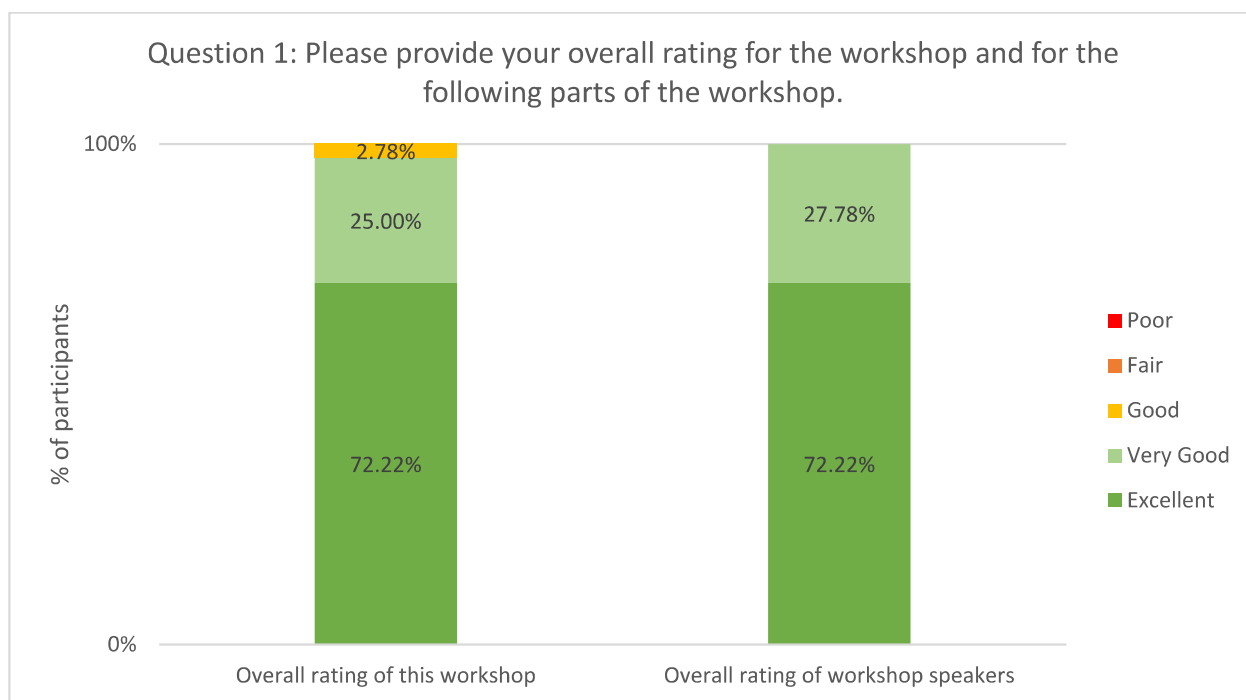
professional goals and career plans. Applications are reviewed by the Building Scholars team and the scholars selected are contacted to confirm their attendance. This year, SRW 2019, a total of 52 applications were received. Out of those, 36 were selected to participate in the workshop. Scholars were divided into two cohorts, conducted simultaneously, of 18 scholars per cohort.

SRW19 consisted of 10 modules from the following main discipline-specific themes for scholars in all majors: 1) Research and the Scientific Method, 2) Introduction to Nanotechnology, 3) Introduction to Statistical Analysis, 4) Writing and the Peer Review Process, 5) Introduction to the Psychology of Language and Bilingualism, 6) Research Safety, Ethics and Compliance, 7) Introduction to GPS, Mapping and Map-Making, 8) Introduction to Problem Solving in Education, 9) Cops, Courts and Intelligence Interrogations, and 10) Introduction to Forensic Chemistry.

At the end of the week, scholars were provided with a voluntary and anonymous survey, composed of a feedback form and a demographics questionnaire. This survey consisted of multiple choice, rating, and open-ended questions.

Both the workshop as a whole and the workshop speakers resulted in a positive impact, as all of the scholars provided “Good,” “Very Good,” and “Excellent” ratings for these two categories, as illustrated in Figure 2.

FIGURE 2
SCHOLARS’ OVERALL RATING FOR THE WORKSHOP AND WORKSHOP SPEAKERS

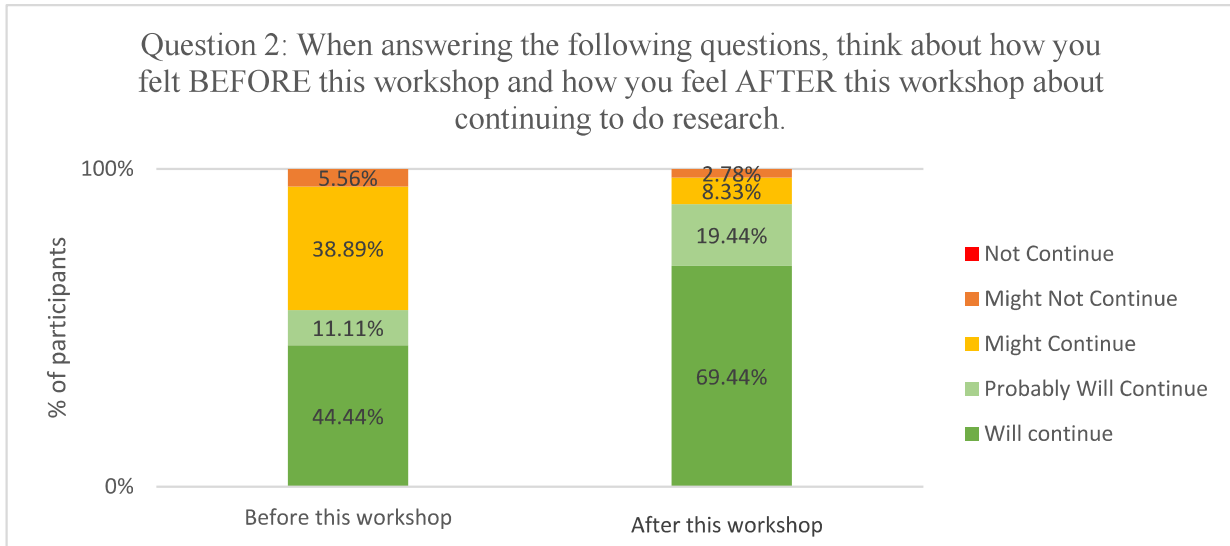


SRW19 Data

The scholars’ willingness (“Will continue” and “Probably Will Continue”) to perform undergraduate research before and after the workshop dramatically increased from 55.55% to a phenomenal 88.88%, as shown in Figure 3.

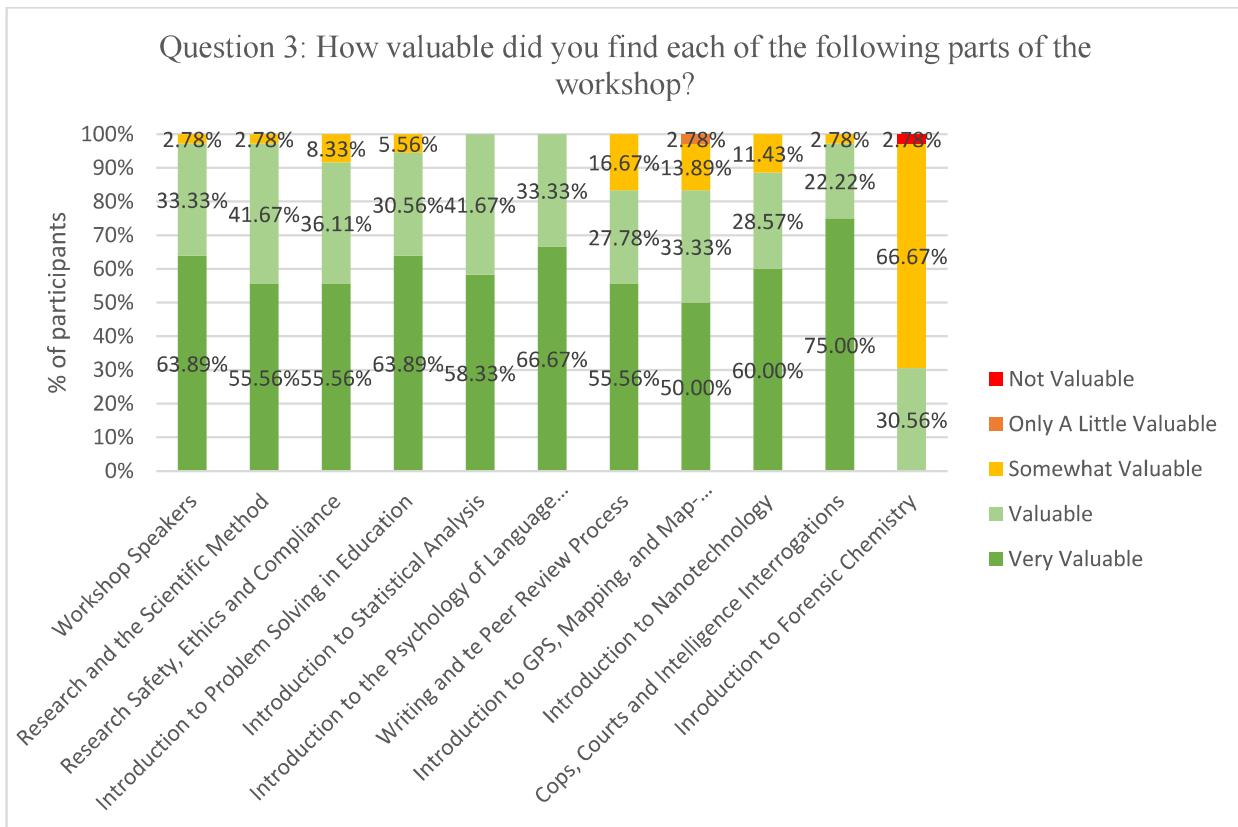
Given the diversity in academic interests, the perceived value of each individual discipline-specific module varied. Nevertheless, as pictured in Figure 4, the vast majority identified at least some value in every single module. The highest rated modules were “Introduction to the Psychology of Language and Bilingualism” and “Introduction to Statistical Analysis”, as they were both found either “Valuable” or “Very Valuable” by every participant. The lowest rated module was “Introduction to Forensic Chemistry.”

FIGURE 3
SCHOLARS' WILLINGNESS TO PERFORM RESEARCH



SRW19 Data

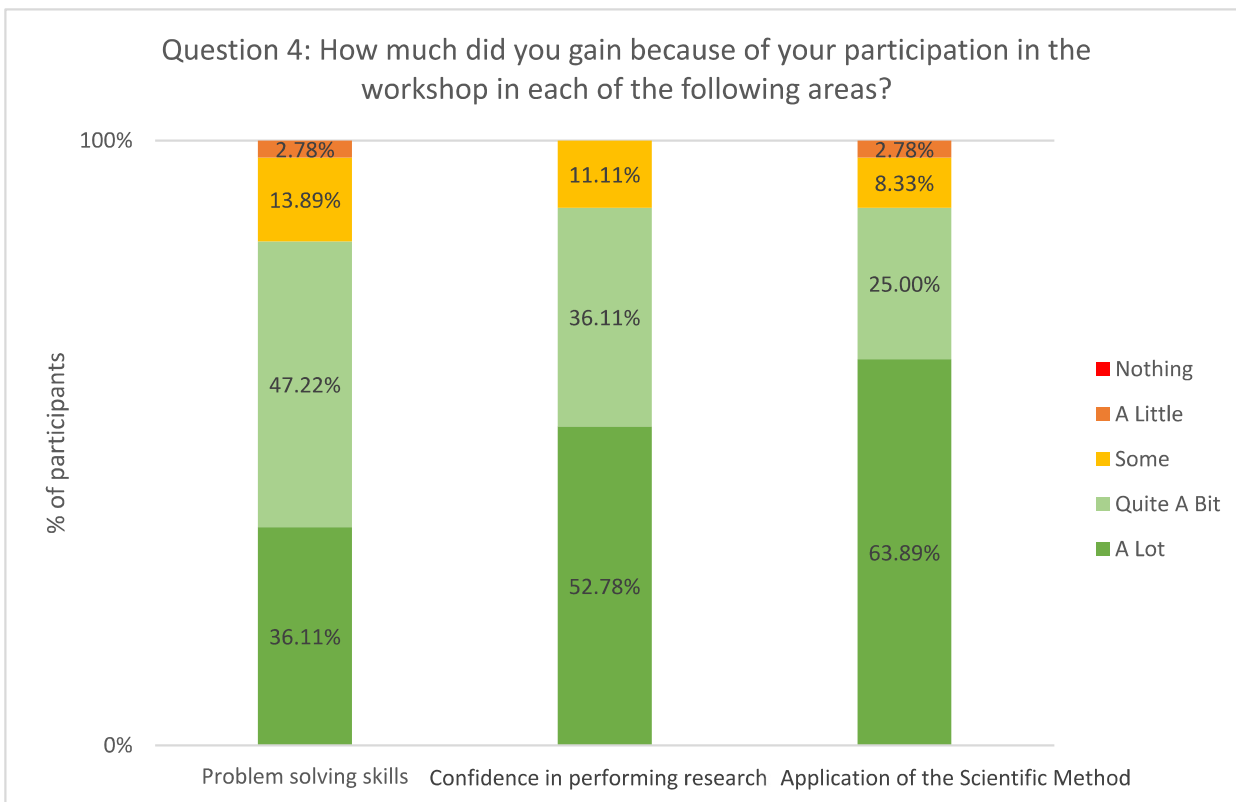
FIGURE 4
SCHOLARS' PERCEPTION OF VALUE FOR EACH INDIVIDUAL DISCIPLINE-SPECIFIC MODULE



SRW19 Data

A significant majority of the scholars felt that they gained “Quite a Bit” and “A Lot” of confidence in problem solving skills (83.33%), performing research (88.89%), and application of the Scientific Method (88.89%), as seen in Figure 5.

FIGURE 5
SCHOLARS’ PERCEIVED GAIN IN PROBLEM SOLVING SKILLS, PERFORMING RESEARCH, AND APPLICATION OF THE SCIENTIFIC METHOD



SRW19 Data

Question 5 invited scholars to express their favorite thing about the workshop. The majority highlighted a specific module that they enjoyed and the networking relationships created amongst the faculty peers.

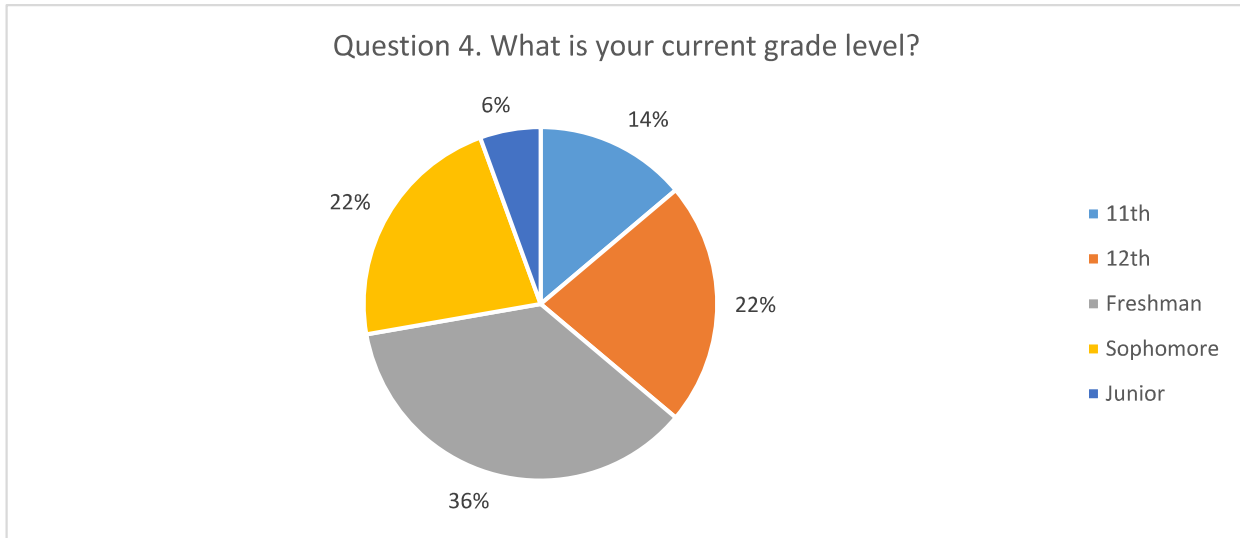
Scholars unanimously agreed on Question 6 that the SRW experience was worthwhile, as they all would recommend other students to attend.

Finally, in Question 7, scholars were asked for any additional comments or suggestions to be taken into consideration in the future.

In regards to the demographics Questions 1-3 revealed that more than half, 53%, were females, 92% Hispanic, and 19% identified Spanish as their primary language.

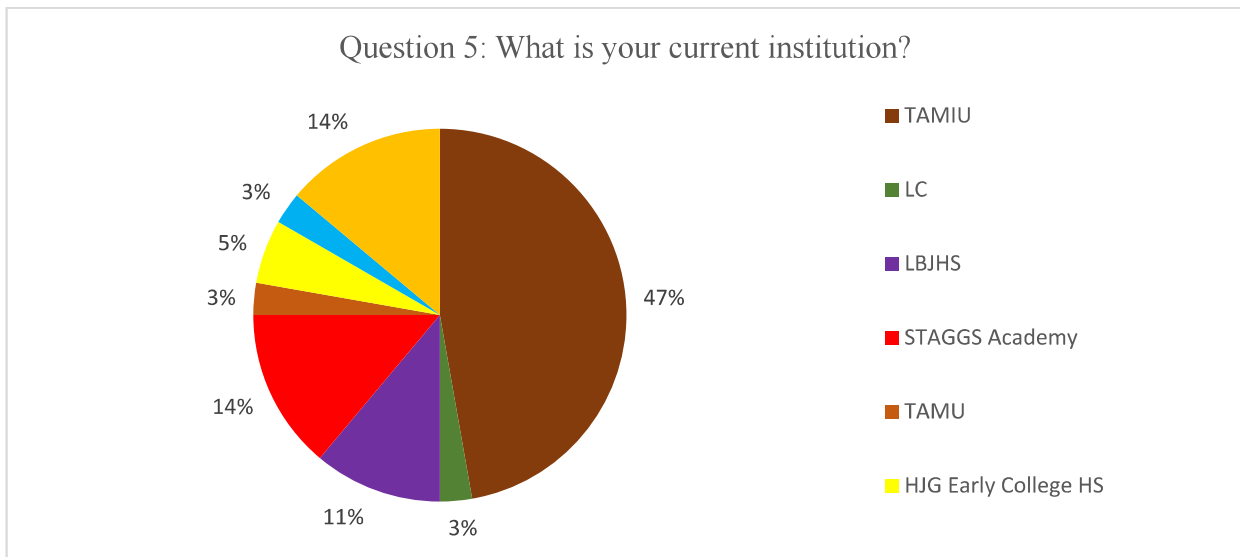
The grade level of the scholars ranged from 11th graders in high school, up to Juniors in college, as depicted in Figure 6. Some of the high-school level scholars were enrolled in dual credit schools such as early colleges and/or magnets. Hence, they could also be classified as Freshmen and/or Sophomores in college. Figure 7 shows that half of the scholars were college students, from either TAMIU or LC.

FIGURE 6
SCHOLARS' CURRENT GRADE LEVEL



SRW19 Data

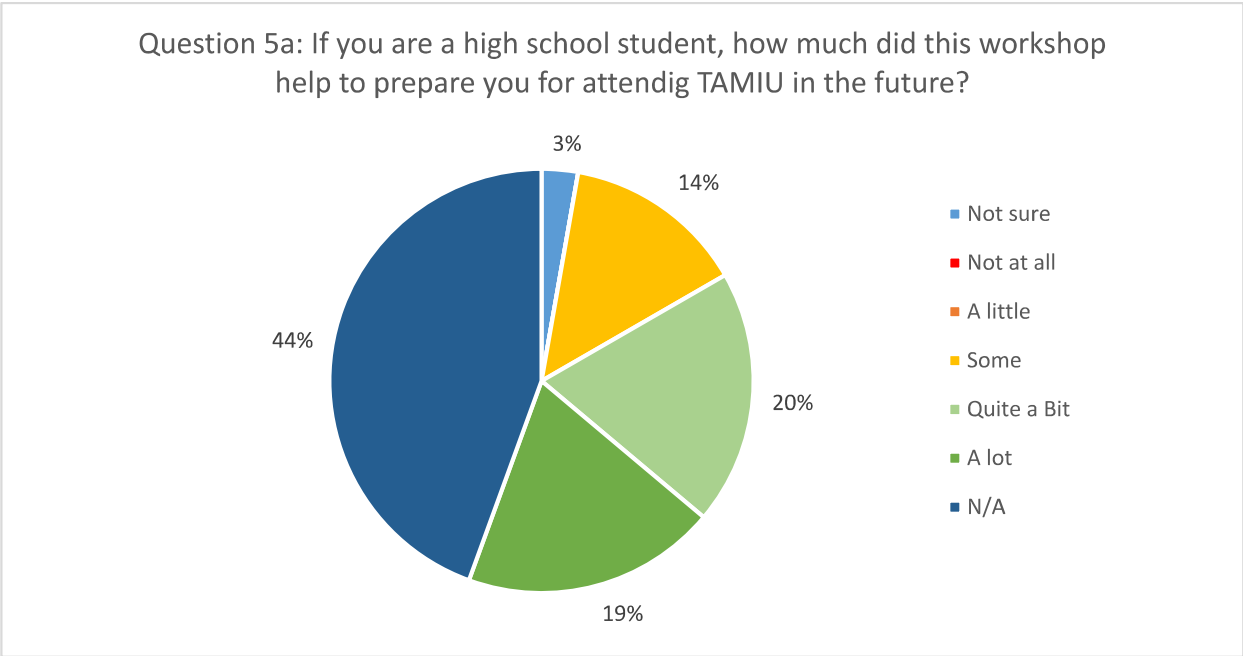
FIGURE 7
SCHOLARS' CURRENT INSTITUTION



SRW19 Data

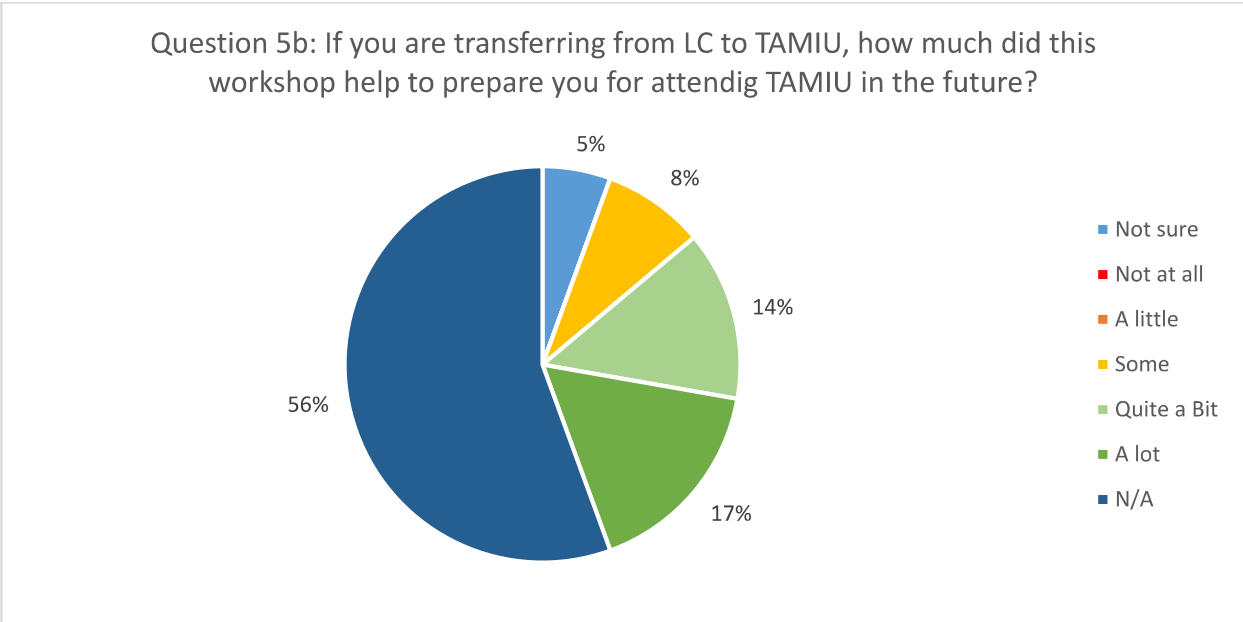
One of the purposes of the SRW is to bridge the transition of incoming Freshman (Figure 8) and transfer students (Figure 9) into a 4-year institution, such as TAMIU. Where applicable, the majority of the scholars agreed that, indeed, the SRW helped them prepare “Quite a Bit” and “A lot”.

FIGURE 8
INCOMING FRESHMAN SCHOLARS' PREPAREDNESS FOR ATTENDING
A 4-YEAR INSTITUTION



SRW19 Data

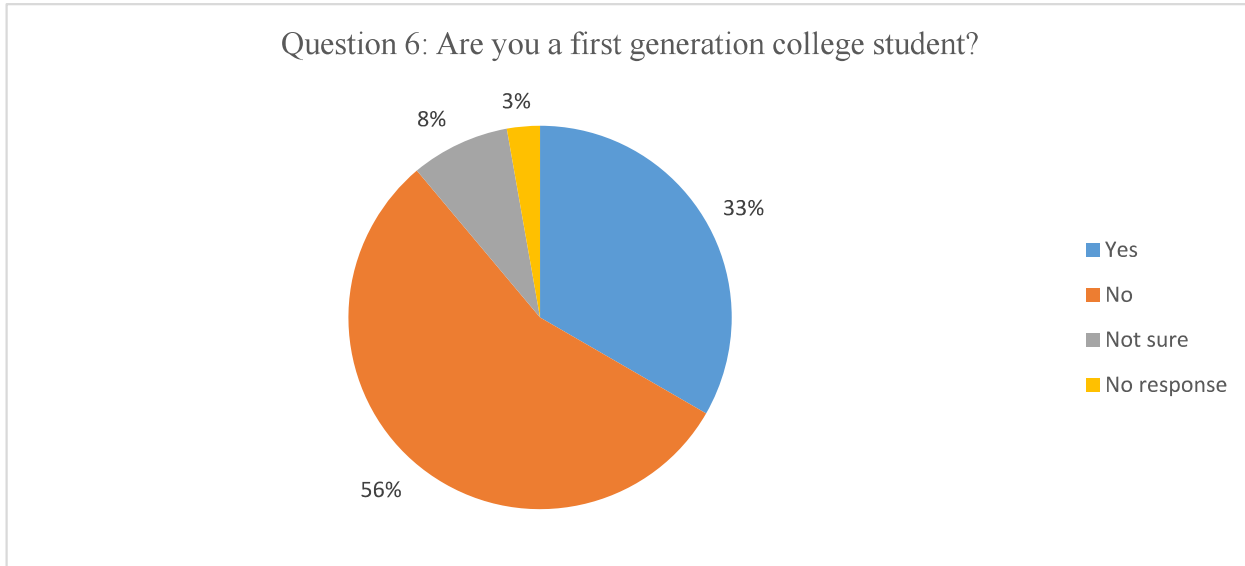
FIGURE 9
TRANSFER SCHOLARS' PREPAREDNESS FOR ATTENDING A 4-YEAR INSTITUTION



SRW19 Data

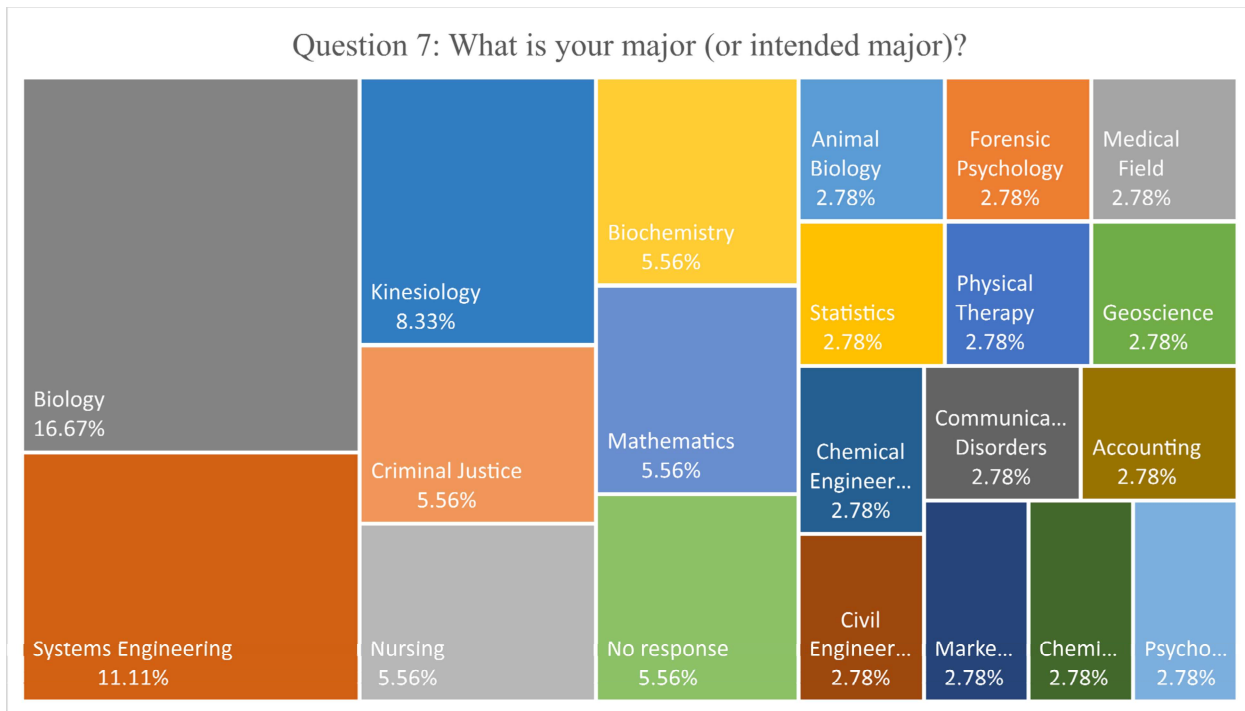
One-third of the scholars identified themselves as being first generation college students, as indicated by Figure 10. Even though their majors of study (or intended majors of study) varied, Figure 11 reveals that the majority were interested in biology/medical field and engineering.

FIGURE 10
FIRST GENERATION COLLEGE STUDENT SCHOLARS



SRW19 Data

FIGURE 11
SCHOLARS' CURRENT OR INTENDED MAJOR



SRW19 Data

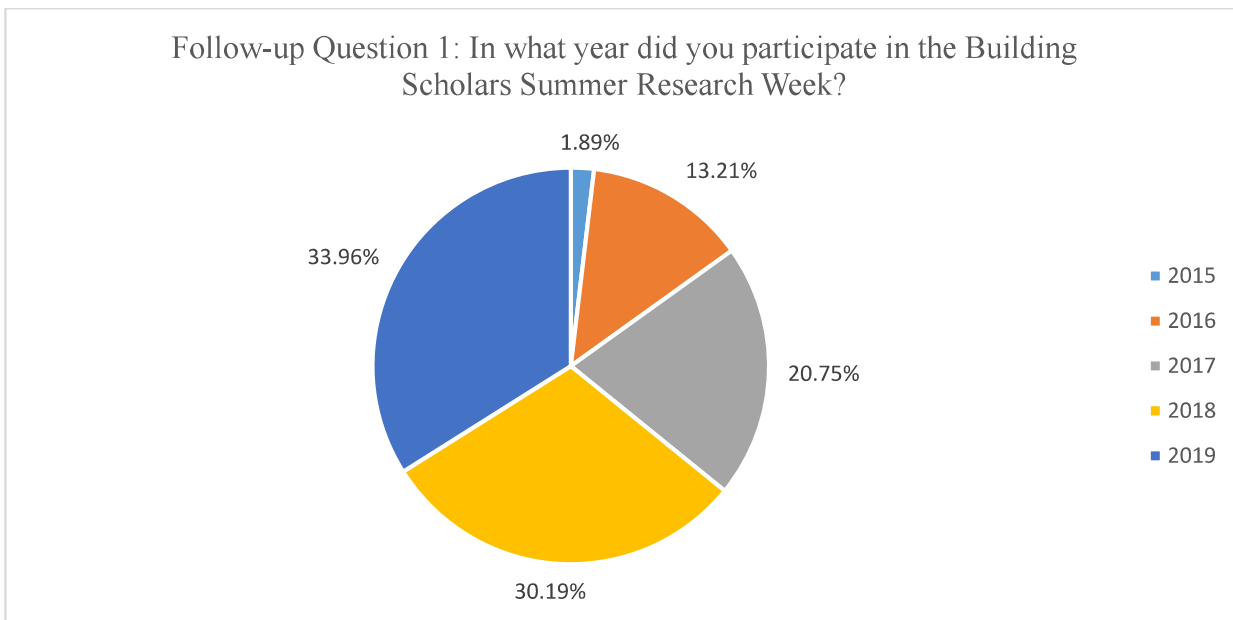
Last but not least, in Question 8, scholars conveyed their main reason(s) for joining the SRW. Most of them did it to experience the different academic fields and gain new insights.

The SRW has served 146 students since 2015. According to the aggregated data throughout the years, the scholars' willingness to perform undergraduate research before and after the workshop dramatically increased 40.5% (from 46.9%, less than half of the participants, to 87.4%). The overall increase is higher than that of this year's SRW19 alone, as illustrated earlier in Figure 3.

A follow-up questionnaire was sent out this year with the purpose of tracking former scholars who have participated in any of the SRWs. Of the 146 participants, 36.3% responded.

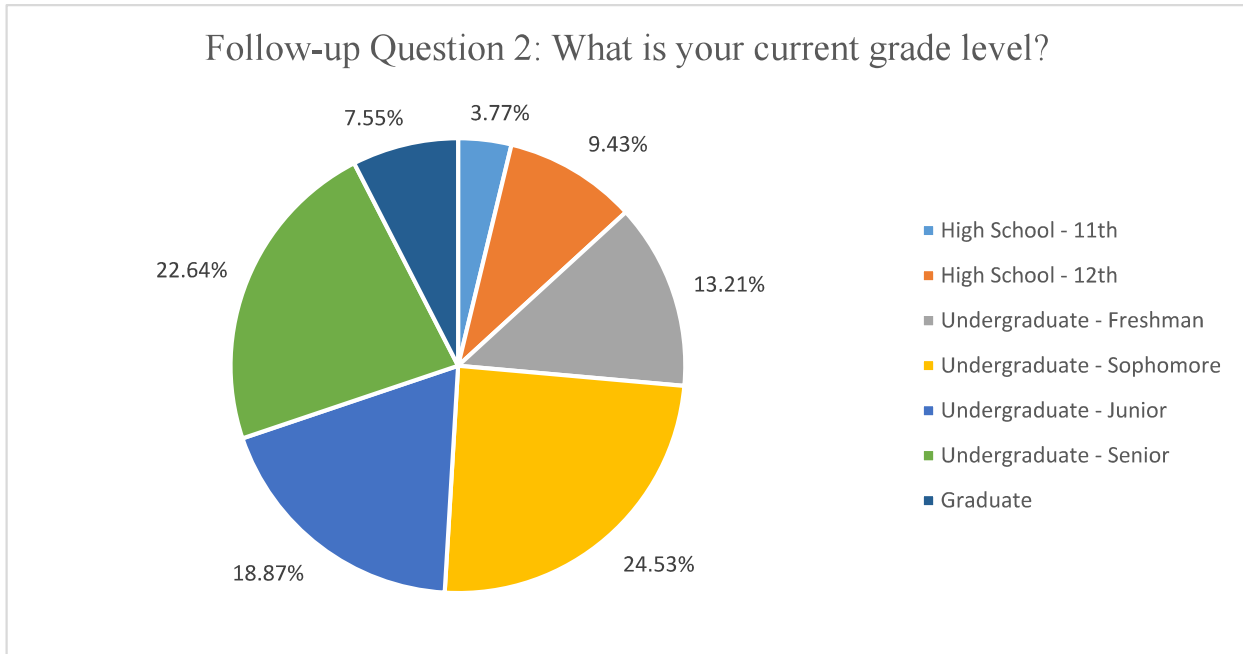
Follow-up Questions 1 and 2, in Figures 12 and 13 respectively, indicate that most of the respondents are recent SRW graduates between the sophomore to senior year.

FIGURE 12
FORMER SCHOLARS' YEAR OF PARTICIPATION IN SRW



Building Scholars Data

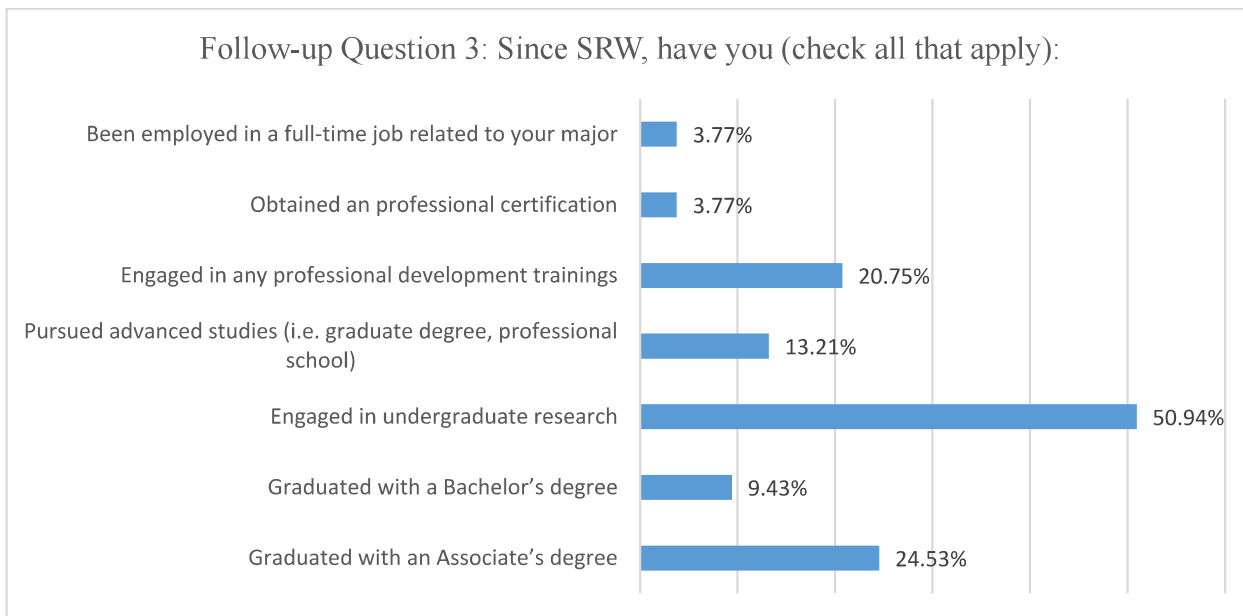
FIGURE 13
FORMER SCHOLARS' CURRENT GRADE LEVEL



Building Scholars Data

Since attending the SRW, half of the respondents (50.94%) have engaged in undergraduate research, according to Follow-up Question 3 in Figure 14.

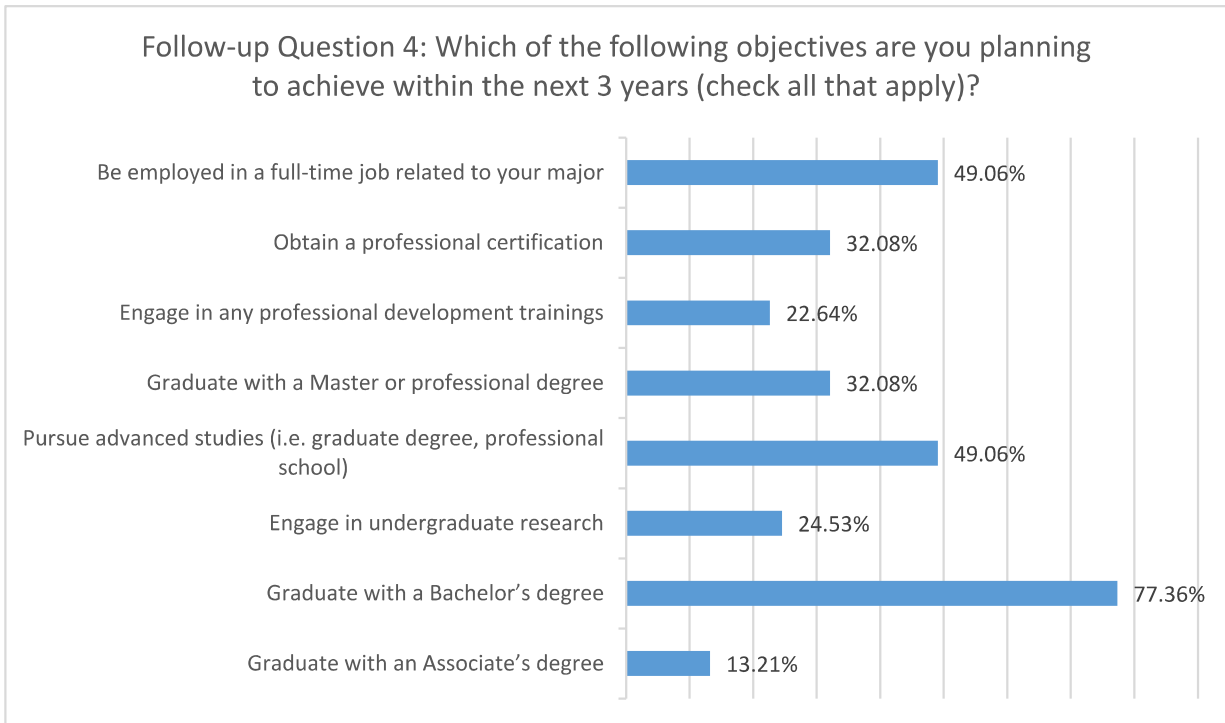
FIGURE 14
FORMER SCHOLARS' ACCOMPLISHMENTS SINCE PARTICIPATION IN SRW



Building Scholars Data

Within the next three years, a great majority of the respondents plan to graduate with a Bachelor's degree and almost half plan to pursue advanced studies and be employed in a full-time job related to their majors, shown by Follow-up Question 4 in Figure 15.

FIGURE 15
FORMER SCHOLARS' SHORT-TERM OBJECTIVES



Building Scholars Data

Lastly, Follow-up Question 5 was open-ended for respondents to add any comments. All of the responses were positive, emphasizing on how the SRW promoted their interests, introduced them to the college experience, and prepared them with supplies that are useful to this day.

CONCLUSION

This is the fifth SRW conducted for the Building Scholars program. Overall, the SRW19 was effective, yielding to positive results. At least one-third (33.33%) of the scholars changed their minds in terms of the possibility of engaging in research activities, as determined from the survey findings. Given the demographic profile of Laredo, Texas, its proximity with Mexico, combined with the fact that one-fourth (25%) of the scholars' primary language is different from English and 92% are of Hispanic origin, the "Introduction to the Psychology of Language and Bilingualism" module was the highest rated, as many may have felt a connection with this topic. There were a total of 21 different majors (or intended majors) identified among the scholars allowing them to expand their research potential and experience to perform a wide range of discipline-specific research unique to their chosen program of study, as a result of the knowledge gained from this workshop. Retention for the SRW was 100%, as all of the scholars successfully concluded the workshop. The average hours completed per student were 28.5, out of 30. Only 64% of the scholars achieved perfect attendance. This was mainly due to the fact that a few were excused for taking summer classes. In addition, there were a few no-shows on the first day, resulting on the admittance of

waitlisted applicants and new recruits. Interactions between the scholars and the research leaders was high and visible throughout the SRW.

Low overall follow-up response rate was mainly due to graduating participants, especially those from SRWs 2015 and 2016, not checking their student email. Results demonstrate that the program has been successful as the majority of SRW scholars already have or plan to engage in research activities, attain post-secondary certifications, associate and bachelor's degrees, positions in graduate and professional schools, and join the workforce. As Title V - Building Scholars comes to an end on September 2020, the sixth and last SRW is scheduled from Monday, July 6, 2020 to Friday, July 10, 2020.

The success of the instructional programs is determined based on the rates in which the scholars graduate, their sustainability, and higher retention. Towards this, TAMIU recently announced that its 6-year graduation rate increased from 45% to 55% over the last ten years. TAMIU's four-year graduation rate also has increased during this period from 17.5% to 28% (TAMUS, 2019), concluding that programs similar to Building Scholars have had some effect on maintaining these ongoing undergraduate retention and graduation accomplishments.

ACKNOWLEDGEMENTS

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The preliminary work of this project has been presented at the 2020 Western Hemispheric Trade Conference held on April 15-17, 2020 at Texas A&M International University (TAMIU), Laredo, Texas, USA (see, <http://freetrade.tamui.edu/pdf/conf/24ConfSessions.pdf>).

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