

Increasing Retention of STEM Students with Financial Need via the NSF S-STEM DESIRE Scholarship Program

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Abstract

We present findings from a focused review of National Science Foundation (NSF) Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) programs, along with interim findings from the Iona College *Development of Excellence in Science through Intervention, Resilience, and Enrichment (DESIRE)* S-STEM scholarship program. DESIRE supports academically talented chemistry and computer science majors with financial need. Data were gathered through focus groups of S-STEM students and surveys of S-STEM students and other students. Our findings suggest that S-STEM and similar programs can maximize chances for retention of diverse undergraduate STEM students by combining scholarships with five sets of strategies, aimed at 1) social support and social connections; 2) academic support, including academic/emotional support (e.g., peer support); 3) meeting the needs of students with work or family obligations; 4) research and professional field engagement opportunities; and 5) supporting new freshmen.

Nationwide, 62.4% of students who enroll in a four-year postsecondary institution in the United States complete a bachelor's degree at their first institution attended within six years (NCES 2019 I). Studies by the Manpower Demonstration Research Corporation (MDRC) found that students pursuing their college degrees whose families have financial challenges face many additional challenges to persisting in college beyond the cost of college education (MDRC, 2018). These other challenges included (1) demands on their time from work or family obligations, (2) not being prepared for college academically, (3) lacking the skills and experiences that other students use to navigate college, and (4) not having the social support and community that can help them overcome challenges in college. Similarly, in a study of students seeking to become first-generation college graduates (Redford & Mulvaney Hoyer, 2017), reasons that students gave for not obtaining a credential within 10 years included the following challenges: (1) could not afford to continue going to school (54%); (2) demands at home (31%); (3) personal problems, injury, or illness (25%); (4) unavailability of classes or inconvenient class scheduling (20%); (5) job or military considerations (18%); and (6) difficulty

completing the program requirements (16%).

Due to racial and income inequities, college students who want to earn a college diploma face unequal chances of realizing that dream. Large gaps exist by race/ethnicity, with six-year graduation rates at the first institution attended of 42.4% for Black students, 56.7% for Hispanic students, and 65.9% for White students (NCES, 2019 II). Large disparities also exist by family income. Among students beginning their postsecondary education (at a two-year or four-year college), 26% of students in the lowest family income quartile obtained a bachelor's degree within five or six years—less than half the percentage among students in the top family income quartile (69%) (Pell, 2020). A gap also exists between first-generation college students and students with at least one parent with a bachelor's degree (Cataldi et al., 2018). Of those who enrolled in college, 56% of first-generation students had graduated or were still enrolled after six years, compared with 74% of continuing-generation students.

The National Science Foundation (NSF) Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) Program supports academically talented students with financial need who are pursuing associate, baccalaureate, or graduate degrees in STEM (NSF, n.d.). This paper is structured with review of other comparable NSF S-STEM programs, overview of our strategy, and summary of interim findings and lessons learned with implications for other programs with similar goals.

Findings from the Literature on S-STEM Programs and College Retention

We reviewed studies of NSF S-STEM programs at four-year postsecondary institutions, as those are the most relevant to the Iona College DESIRE S-STEM program. In the 42 previous S-STEM studies that we reviewed, those that reported retention outcomes for NSF S-STEM participants varied widely in how they calculated retention and the length of time over which retention was measured. Not all of the studies explored the reasons for the retention outcomes, and not all reported details about how retention was measured. This made the drivers of retention uncertain and retention rates not easily comparable across

programs. None of the articles reported long-term retention after the NSF S-STEM grant ended; thus, the retention through graduation rates for scholars in those programs who were still in college at the end of the S-STEM grant period were unknown.

Our synthesis of the literature identified the following design and implementation considerations that appear important to retention among students in NSF S-STEM programs at four-year colleges and universities. Many of these programs recruited incoming freshmen from populations that had been underrepresented in STEM.

Supporting retention of new (freshmen) students takes extra effort. S-STEM programs consistently found higher retention among students who entered after the freshman year, compared to the students who entered the program as new freshmen. For example, one program reported 5-year rates for students who entered S-STEM as freshmen of 22%, compared to 92% for those who entered S-STEM as existing college students (Eschenbach, Virnoche, & Evans, 2011; Virnoche & Eschenbach, 2011). Another study reported 5-year retention and graduation of 64% for the first freshmen cohort versus 89.7% for scholars who entered as upper-level college students (Jones et al., 2014). Two S-STEM programs that selected existing students at the college or transfer students reported retention rates of 97% to 98.6% (Anderson-Rowland, Rodriguez, & Grierson, 2013) and 100% with the exception of one student on an official leave of absence (Olson et al., 2016).

Scholarships work best when combined with other academic, financial, social, and emotional supports. A previous review found that colleges that had shown the most success in increasing four-year college degree attainment have combined financial scholarships with an extensive set of additional supports (Babineau, 2018). Example supports beyond scholarships included connection to a network of scholars, a computer, and access to webinars and workshops. Similarly, in our review of S-STEM programs, several of the programs provided supports beyond scholarships to help students to succeed and reported increased retention and/or graduation rates. Example supports included cohorts living together in the same dormitory, peer tutoring, peer and faculty mentoring, workshops/seminars, research experiences, social activities, field trips, and others. A table in Appendix B (online

supplemental material) provides a summary.

Advising/coaching/checking in appears vital. Based on research conducted on various interventions over 15 years, MDRC (2018) reported that frequent advising and coaching were vital strategies to increase academic progress. This research suggested that advising or coaching works best when advisers actively and frequently contact students instead of waiting for them to show up, and when each adviser works consistently with the same group of students, MDRC found. Coaching has been described as a form of college mentoring that addresses college attrition through several dimensions, including academic preparation, information gathering, and social integration (Bettinger & Baker, 2014). Coaches may support students in a variety of areas, such as with connecting their daily activities to their long-term goals and with building skills such as time management, self-advocacy, and study skills.

About the Iona College NSF S-STEM DESIRE Scholars Program

Iona College is a Catholic, coeducational institution of learning in the tradition of the Edmund Rice Christian Brothers located in New Rochelle, New York, with a diverse student body reflective of the region's population. Among 2,981 undergraduate students enrolled during the 2019–2020 academic year, 48% percent of students were White, 23% were Hispanic, 11% were Black, and about 3% were of other racial or ethnic background. Ninety-nine percent of students received scholarships or financial aid (Iona College, 2020). Thirty-six percent of first-year students pursuing their education at Iona College received an income-based Pell grant to overcome challenges with college affordability (U.S. Department of Education, 2018) in fall 2019. Ninety-nine percent of students are enrolled full-time; one percent are part-time.

At the time of this study, Iona College's DESIRE Scholars program was in its fourth year of a five-year National Science Foundation (NSF) S-STEM grant. The primary goal of the Iona College DESIRE Scholars Program is "to foster academic and professional excellence among Chemistry and Computer Science students to promote STEM degree completion and inspire students to pursue STEM careers." Specific program goals for the five-year grant are 1) 85% first-year retention rate for DESIRE scholars and 2) 100% six-year graduation rate among scholars who are retained after the critical and vulnerable first year.

Services and Supports Provided

DESIRE scholars receive financial support of \$6,000 per academic year. In addition to resources available to all students at Iona College, DESIRE scholars receive (Iona College, n.d.):

- An academic advisor (faculty) and peer mentor
- Careers in Science at Iona (CSI) Program for career opportunities in STEM

- Research Opportunities: paired with research advisor and paid summer research program (\$2,500 each summer for post-freshman and post-sophomore years).
- Tailored core courses (Cohort activities through freshman class: General Chemistry I and II classes in fall and spring, and Science, Society, and Self class in spring)

Scholar Recruitment and Selection

The DESIRE scholars program partnered with the Iona College Liberty Partnerships Program (ICLPP) to enhance recruitment efforts. ICLPP provides services in three high schools with high percentage of financial need and diverse student populations (over 80% Hispanic and African American). Guidance counselors were provided with DESIRE program materials to disseminate to qualified students. The DESIRE scholars program also recruited applicants through Yonkers Partners in Education (YPIE), a non-profit organization whose mission is to partner with students (about 82% qualify for free and reduce price lunch) to ensure they are ready for, enroll in, and complete college. Additionally, DESIRE partnered with

the Don Bosco Scholars Fist Gen College Access Program, a first-generation college access program for Port Chester, New York youth (60% Latino, 15% African American) who have family income at or below poverty level and who qualify for free lunch. These partnerships provided a pool of qualified students to choose from.

To be selected for a DESIRE scholarship, students must 1) meet academic performance requirements (a minimum of 1100 on their SATs, and had a high school GPA of at least 88); 2) be majoring in chemistry, or computer science; and 3) demonstrate financial need. If a DESIRE scholar loses eligibility, the remaining scholarship funds are awarded to an alternate chemistry or computer science major at Iona College who meets the eligibility criteria. This replacement takes place at the beginning of the semester, as mid-year replacement may interrupt cohort creation, especially given living/learning arrangements offered by the program.

Early Lessons Learned and Program Changes

A number of changes have been or are being made to the DESIRE program based on information collected over the first few years of the program, as summarized in Table 1.

<i>Student Needs and Program Changes</i>	
Student need	Program change
Social support	More cohort activities in freshman year
Academic/emotional support	Peer-led academic and emotional support programs
Personalized recruitment	DESIRE ambassador program to improve recruitment, connection, confidence, and excitement
Professional connections	Diverse guest speakers in "Careers in Science"; industrial partners, providing industry career experiences
Research opportunities	Research opportunities starting in freshman summer; support for conference participation
Faculty mentors	Assigning each scholar to a faculty mentor for one-on-one regular conversation about college life beyond academics
Engaging commuters	Scheduling extracurricular cohort activities between classes and during lunch hours when most students are available
Balancing school and work	Replacing off-campus employment with on-campus employment/campus work-study positions in a field closely matching the scholar's career interests and class schedules

Table 1. Identified Student Needs and Program Changes

Knowledge Generation Methods for the DESIRE Program

DESIRE scholars were asked to participate in a series of four focus groups with 18 scholars over one semester during fall of 2019. Spring focus groups were cancelled due to the school closing because of COVID-19. A semi-structured approach was used to ask students about their perceptions of the DESIRE program and about any factors within their personal life that may influence their academic performance. Specifically, students were asked to share their perceptions of the DESIRE program, how they connect to others within the college community, how they manage their time, and about other general factors that they believe affect their academic performance. The qualitative data gathered from the focus groups served two purposes: 1) making changes for the upcoming year to address student concerns and 2) informing our survey in which we collected further data from DESIRE scholars and a comparison group of non-DESIRE Iona College students.

DESIRE Evaluation Methods

Interim progress toward retention goals for the first four cohorts was assessed through Iona College tracking retention in DESIRE and in college among students who were awarded DESIRE scholarships. An external evaluator selected by Iona College provided formative feedback to inform program enhancements through an online survey of DESIRE scholars and nonparticipants.

Survey sample. Iona College staff who were not associated with DESIRE identified a group of students to receive the survey who had similar academic and financial backgrounds as DESIRE scholars (high school GPA of at least 88 and Pell Grant eligible) to receive the survey and emailed the survey to students. The students also had to be at least 18 years old. A total of 188 students, 162 students not in DESIRE and 26 DESIRE scholars, received the survey. Two email reminders were sent approximately one week and two weeks after the initial request.

Survey instrument. Appendix A (online supplemental material) provides a copy of the survey, which was sent to both groups of students. The survey was intended as a customized tool tailored to the information needs of the project, rather than to serve as a validated tool that other researchers could use to measure the same constructs. The survey questions were developed in collaboration with the DESIRE project team, to collect information that could inform program planning. The questions were reviewed and tested by the evaluator and project team. The Iona College Institutional Review Board (IRB) approved the survey. Similar programs may adapt relevant survey items for their specific program and test the survey with students and team members at their site. The survey was fielded online (in Qualtrics) and included 27 questions. As an incentive to participate, at the end of the survey was a link to a separate one-item survey to enter a raffle for a \$20 gift card.

Survey response. A total of 42 students—22 DESIRE scholars and 20 students in the other group—completed at least some of the survey, an overall response rate of 22%.

Data analysis. For the open-ended survey questions, we developed codes to organize the comments into themes, using NVivo 10 (QSR, 2014) to facilitate coding and data organization.

Descriptive statistics were calculated for the quantitative survey data. For the questions with categorical response options, we also calculated crosstabs for questions where the expected cell size was sufficient (5 or more). For questions asking for a number, we conducted a power analysis using G*Power software (Faul et al., 2007) to calculate the probability of detecting statistically significant results (the power). The results showed that, given the maximize sample size of 20 in each group for those questions, using a two-tailed t-test to compare means between the two groups, we would have a 46% chance ($\text{power}=0.4633743$) of detecting a medium effect of the DESIRE program (effect size $d=0.3$) at the 95% confidence level ($p=0.05$). Given that this was short of 80% or higher probability (using the conventional power value = 0.8; Cohen, 1992), t-tests were not performed.

Knowledge Generation Findings from the DESIRE Program: Retention Challenges and Solutions

Based on conversations with students, the Iona College team sensed that a challenge in retaining scholars was that, being Pell Grant eligible and in financial need, scholars had other financial concerns beyond those met by the scholarship. The focus groups indicated three recurring themes: 1) required outside commitments influence academic performance, 2) scholars' interest in more time with one another, and 3) perceived support from other students and faculty.

Required Outside Commitments

Participants acknowledged that their outside commitments influenced their ability to dedicate time towards their academic studies. Outside commitments included both family and work obligations, and sometimes students had to work to help their families financially. Some students commented that they were more committed to their academics to show gratitude to their family for helping them go to college. For example, if their parents never attended college and worked hard so that these students could go to college, the students said they had to do better in school for their parents. Still, they stated that time management was a challenge when they had to attend to familial matters or work outside of school. Some students suggested that one change to the program could be to offer free summer courses to scholars. They explained that having access to take their required courses over the summer would lighten their workload during the school

year, thereby allowing them more time to commit to their studies. Noteworthy, honors students at Iona College may enroll in courses totaling six credits during the summer or winter sessions each academic year at no charge.

Engagement Within the Community

While participants expressed varying levels of desire for increased engagement within the college community, many expressed an interest in spending more time with other DESIRE scholars. Commuter students, for example, reflected a sense of disappointment over times when they had to return home while their friends residing on campus continued to spend time together. Other students explained that committing to extra-curricular activities was important to them in fully enjoying their college experience but recognized there was a tradeoff in their studies. Yet, other students shared that they preferred to be involved with a few activities on campus but return home to their families as soon as they could. When asked what changes students would like to see to the program, many students requested more opportunities to meet with other DESIRE scholars. Suggestions included more informal luncheons, formal study sessions overseen by a faculty member, and a lounge on campus dedicated solely to the scholars.

Perceptions of Support

Participants consistently shared that a benefit of the DESIRE program was that they perceived receiving increased support from other scholars and faculty. Support from their peers included academic support (e.g., help with homework) and emotional support (e.g., an empathic understanding of the challenges associated with majoring in a STEM field). Scholars appreciated that the DESIRE program consists of students majoring in different STEM fields. They explained that if they struggled in a STEM course that was not within their major, thanks to the DESIRE program, they knew another scholar majoring in that field who could assist with the coursework. Thus, scholars were able to utilize the help from other scholars to improve their academic performance. Additionally, participants reported appreciating befriending other scholars who understood the challenges associated with majoring in STEM fields. They turned to one another when feeling overwhelmed with their coursework. When asked about perceived support from faculty, students reported an appreciation for knowing that they could email the program director with any questions and feeling confident they would receive a response quickly. Similarly, scholars became acquainted with other faculty, simply as part of being in the DESIRE program, and explained that it was easier to ask those faculty questions about the coursework. Finally, participants reported faculty demonstrating support by increasing research opportunities, including attending conferences across the country where students were able to network with other students and professionals.

DESIRE Evaluation Findings

DESIRE Scholars Enrollment and Retention

As of summer, 2021, 24 DESIRE scholars were active in the program, six in each of the four cohorts. Over the first four years, six of 24 students left (75% retention). All attrition was during the freshman year, all during the first two cohorts, and due to changing to an unsupported major (five students) or for health reasons (one student). Once scholars passed their freshman year, retention rates were close to 100%. All 12 scholars (100%) in cohorts 3 and 4 have been retained.

Student Engagement in Campus Activities, Research, and Professional Field

Quantitative survey findings regarding student engagement in campus activities, research, and their professional field are summarized in Table 2. Compared to students of similar academic and financial background who were not in DESIRE, greater percentages of DESIRE scholars reported all campus engagement activities, such as work study and joining campus clubs. Greater percentages of DESIRE students than comparison students also reported having engaged in research projects other than as part of a class while at Iona College, and more had attended professional conferences compared with students not in DESIRE. Few students in either group had published an article while at Iona College.

In open-ended comments, seven students specifically said that they found their research opportunity through the NSF DESIRE program and its faculty. Many students said that their selves or their own determination to reach their goals was the biggest thing that had helped them persist in college. At the same time, many students commented that their family, friends/peers, professors/counselors, and/or mentors/advisors had helped them persist.

Biggest Challenges as a Student Related To COVID-19

When asked, "What has been your greatest challenge as a student related to the COVID-19 pandemic?" both DESIRE scholars and students not in DESIRE most frequently said online learning/online classes (including focusing during or time management with online classes), mentioned by 33% of students (13 of 40) who answered this question. The second most frequently mentioned challenge was focus/motivation/staying engaged in classes, mentioned by 20% of respondents (8 of 40).

Conclusions and Implications for Increasing Retention of Diverse Students

Our research, along with prior studies, suggests that programs can maximize chances for retention among STEM students from diverse income, race/ethnicity and first-generation college student backgrounds by providing five sets of strategies, in addition to financial scholar-

Type of engagement	DESIRE scholars	Iona College students not in DESIRE
Campus engagement		
Participating in work study	40% (8 of 20)	15% (3 of 20) ¹
Spending any time in online or in-person Iona College related activities, not including class time or work study	85% (17 of 20)	65% (13 of 20) ¹
Joining one or more groups or clubs at Iona College	82% (14 of 17)	61% (11 of 18) ¹
Using campus support services	45% (9 of 20)	13% (2 of 16)*
Engagement in research opportunities and professional field		
Working on any research projects other than as part of a class	100% (20 of 20)	5% (1 of 20) ²
Attending any professional conferences, including virtual conferences	89% (17 of 19)	44% (7 of 16) ¹
Giving one or more presentations	67% (12 of 18)	16% (3 of 19) ¹

*From crosstab data. Statistically significant, chi-square test.

¹ From open-ended question asking for a number. T-test to compare means not performed due to low statistical power, given sample size.

² From crosstab data. Expected cell size < 5 for some cells; too small to calculate chi-square.

Table 2. Campus engagement and engagement in research and professional field

ships. Other programs can use these strategy types and examples that we identified, in combination with other knowledge sources, to inform strategies to maximize retention in their own programs.

1. *Social support and connections*, through strategies such as:

- cohort activities (early lessons learned)
- academic and social network programs centered on peer support (as noted above, these were helpful both academically and as an emotional support system, early lessons learned)
- recruitment events where prospective students can build personal connections with current scholars (early lessons learned)
- potential additional opportunities for students to meet, including informal luncheons, formal student sessions overseen by a faculty member, and a lounge on campus dedicated solely

to the scholars in the program (focus groups)

- one-on-one faculty mentoring/advising/coaching/checking in (early lessons learned, literature review)
 - expanded "Careers in Science" seminar series and partnering with industrial partners to provide scholars with industry career experience, career opportunities, and professional connections (early lessons learned, focus groups)
2. *Academic support, including academic/emotional support*, through strategies such as:
- academic and social network programs centered on peer-led support (these were helpful both academically and as an emotional support system, early lessons learned)
 - academic support services such as the Rudin Center at Iona College where students can receive tutoring (evaluation)

3. *Meeting the needs of students with outside work and family obligations*, through strategies such as:

- summer and winter intersessions (focus groups), scheduling extracurricular activities at times when most students are available (early lessons learned)
- replacing off-campus employment with on-campus employment/work study opportunities in students' field (early lessons learned).

4. *Research and professional field engagement opportunities*, through strategies such as early research opportunities and conference participation where students could network with other students and professionals (early lessons learned, focus groups)

5. *Supporting new freshmen*. DESIRE and other S-STEM programs have reported retention loss to take place entirely or primarily in the freshman year. The increased retention rate of DESIRE scholars after the first two cohorts supports the idea that program enhancements worked. Other programs may also benefit from adding supports focused on new students before and during the freshman year, such as those added to DESIRE (e.g., more cohort activities in freshman year, recruitment ambassadors, research activities in freshman year).

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- National Center for Education Statistics (NCES 2019 II), Table 326.15: *Percentage distribution of first-time, full-time bachelor's degree-seeking students at 4-year postsecondary institutions 6 years after entry, by completion and enrollment status at first institution attended, sex, race/ethnicity, control of institution*

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The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. Correspondence concerning this article should be addressed to Bernadette Wright at 1069 W. Broad St., #141 Falls Church, VA 22046. Email: bernadette@meaningfulevidence.com

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Dr. Oksana Huk teaches courses in contemporary issues in school psychology, professional issues and legal requirements, and intellectual and educational assessment. She also oversees students in the School Psychology I & II internship, as well as the School Psychology practicum. Her research interests include resiliency, burnout, and practical applications of Rational Emotive Behavior Therapy.



Appendix A: Survey

Iona College Students Survey 2021

Start of Block: consent form

1 Dear Student, Iona College is interested in learning about your college experiences and your opinions on campus student support services. This survey should take about 9 minutes of your time. Iona College will use the results to plan future enhancements to programs and services for students. Results of this survey will also be used to generate knowledge that will be shared to help other colleges to improve their services for students. This survey is being conducted as part of a study of the NSF DESIRE Scholars program. To thank you for your participation, you will have an opportunity to enter your email address into a lottery for a \$20 Barnes and Noble gift card. Your email address will not be connected to your responses. Any information you provide will be kept anonymous to the fullest extent possible by the technology in use. The project researcher and other Iona College faculty or staff will not know whether you completed the survey or not. The survey is being administered by Meaningful Evidence, on behalf of Iona College. However, no guarantee can be made that the data you submit will not be intercepted by a third party. Therefore, participation in this research is subject to the same risks as those assumed by a typical Internet user. Once submitted, it will not be possible for you to retrieve, alter, or delete any of your responses. In order to participate you must be 18 years old or older. Your participation is voluntary, but strongly encouraged. Your decision to participate or not participate in this survey or not will not affect your relationship with Iona College or with your standing with any scholarship program you may be a part of. Your opinion is very important.

Possible outlets of dissemination may be professional conferences and refereed journals. Although your participation in this research may not benefit you personally, you may benefit from the experience of research participation, and from reflection on the subsequent findings. This may impact how you think about research in your daily lives. If you have questions about this project, please contact:

Dr. Sunghee Lee Board of Trustees Endowed Professor Department of Chemistry Iona College 914-633-2638 SLee@iona.edu Print this page if you would like to keep a copy. By clicking below, you agree that you have read and understood the terms and conditions of

participation and are of legal age to freely give consent to participate. I have read and understood the terms of participation outlined above, and I freely consent to participate in this study. I certify that I am at least 18 years of age and am therefore able to freely consent to participate in this study.

End of Block: consent form

Start of Block: start of survey

Q1 What was the biggest reason you chose to attend Iona College?

Q2 What is your major?

Q3 What was your biggest reason for choosing that major?

End of Block: start of survey

Start of Block: college experience

Now we would like to ask a few questions about your college experience during the past school year (2020–2021).

Q4 Which best describes your experience during the past school year?

Campus resident

Commuter

Other (please specify) _____

Q5 What has been your greatest challenge as a student related to the COVID-19 pandemic?

Q6 In the average week during the past school year, how many hours did you spend in outside employment (not including work study)?

Q7 In the average week in the past school year, how many hours did you spend in employment for work study?

Q8 In the average week in the past school year, how many hours did you spend on online or in-person Iona College related activities, not including class time or work study?

Q9 In the average week in the past school year, how many hours did you spend on family obligations (such as parenting, babysitting siblings, helping family members with online classes/school work, etc.)?

Q10 What (if any) groups and/or clubs have you been involved in (for example, participating in online events, Careers in Science seminar series) in the past year at Iona College?

Start of Block: support services

Please answer a few questions about campus support services.

Q11 In the past year, have you used campus student support services, such as Rudin Center and online tutoring, at Iona College?

Have not used campus support services

Used campus support services

Don't know

Skip To: End of Block If In the past year, have you used campus student support services, such as Rudin Center and online... != Used campus support services

Q12 What campus student support services at Iona College have you used?

Q13 What was the biggest way that those campus student services were helpful for you?

Q14 What would have made the campus student support services more helpful for you?

End of Block: support services

Start of Block: research opportunities

The next questions ask about your experience with research opportunities during your time at Iona College.

Q15 Tell us about your experiences with research opportunities (other than as part of a class) while at Iona College.

Not interested in research opportunities

Interested in, but have not looked for, research opportunities

Looked for, but did not get, a research opportunity

Have experienced a research opportunity

Skip To: End of Block If Tell us about your experiences with research opportunities (other than as part of a class) while... != Have experienced a research opportunity

Q16 How many research projects have you worked on other than as part of a class while at Iona College (including current projects)?

Q17 How did you find that research opportunity or opportunities?

End of Block: research opportunities

Start of Block: conferences etc

Q18 How many professional conferences, including virtual conferences, have you attended while a student at Iona College?

Q19 How many presentations at professional conferences including virtual conferences have you given while a student at Iona College?

Q20 How many articles have you published while a student at Iona College?

End of Block: conferences etc

Start of Block: persist in college

Q21 What is the most important thing that has helped you to persist in college?

Q22 What new service or support could Iona add that would be helpful for you?

End of Block: persist in college

Start of Block: demographics

The following demographic questions will be reported in aggregate only. This information is needed so we can describe the study population when we share the results in scholarly journals.

Q23 What year of college are you in?

Freshman

Sophomore

Junior

Senior

Q24 What is your gender?

Male

Female

Click to write Choice 3 _____

Choose not to respond

Q25 What is your ethnicity?

Hispanic or Latino

Not Hispanic or Latino

Choose not to respond

Q26 What is your race? Check one or more.

American Indian or Alaska Native

Asian

Black or African American

Native Hawaiian or Other Pacific Islander

White

Click to write Choice 6 _____

Choose not to respond

End of Block: demographics

Start of Block: Final comments

Q27 Your opinion is very important. Please add anything else you would like for us to know.

End of Block: Final comments

Appendix B: Reports Beyond Scholarships

Example studies of S-STEM programs providing multi-faceted supports in addition to financial scholarships

Study of S-STEM program	Example supports beyond scholarships provided	Retention and/or graduation rate reported
Chang et al., 2015	Group study, peer-tutoring, summer workshops, applying for internships and research programs	100 percent graduated or continued with original majors after being in program at least one semester
D-Souza et al., 2018	Cohort community building, intrusive coaching and mentoring, alignment with student support structures	93.5 percent for third year
Cole, 2014	First semester seminars, academic guidance, each cohort living in same residence hall in a living-learning community, bi-weekly lunches with presentations	92 percent among students who entered three to four years earlier
Kalevitch et al., 2012, 2015	Scholars living in a specific dormitory on the same floor, orientation two weeks before start of semester, taking several classes together the first year	85 percent
Ferguson et al., 2018; Ferguson et al., 2016	Extensive peer and faculty mentoring, Project Based Learning, undergraduate research experiences	82 percent retention rate in first three years
Ononye, 2018	Mentoring program, tutoring services, STEM seminars and monthly socials, a summer program in physics and math, field trips, professional development activities	77 percent six-year graduation or retention rate
Wilson et al., 2012	Academic support, professional development, mentoring, optional research training opportunities, workshop seminars	6-year graduation rate of 94 percent
Steinbrink et al., 2018	Service-learning projects, intrusive advising, informal tutoring	85 to 100 percent across years and programs
Mahatanankoon et al., 2018	Active learning community, faculty mentors, peer mentoring, industry field trips, IT student club, professional and social gatherings, mandatory student-faculty interactions	63 percent graduated, plus six percent still active in programs (31 percent left the program)