PURM
Perspectives on Undergraduate Research & Mentoring

Divisional Trends in Undergraduate Research: A Data-Driven Dialogue in the Creative Arts

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Regarded as a high-impact practice (Kuh, 2008) and the "core" of an excellent undergraduate education (Rowlett, Blockus, & Larson, 2012), undergraduate research (UR) "…speaks to some of our most fundamental educational objectives by providing a personalized education, exemplifying engaged pedagogy and promoting students' intellectual independence and maturation" (Elgren & Hensel, 2006, p. 4). Defined as an inquiry or investigation pursued by undergraduate students in which they seek to make an original intellectual or creative contribution to their disciplinary domain (Rowlett et al., 2012), UR provides opportunities for student researchers and faculty mentors to collaborate on scholarly endeavors and fuel a passion for learning. We assert, liberal arts colleges (LACs) are an ideal institutional setting in which research mentorships can flourish and scholarly interests can be pursued given the educational mission and core institutional characteristics.

Known for developing habits of heart and mind for enrolled students (Baker, in press), LACs have been described as "test kitchens" for pedagogical innovations (Baldwin & Baker, 2009). A curriculum rooted in the arts and sciences, small class sizes, and close student - faculty relationships are just a few of the defining features of a liberal arts college education. Given their defining characteristics and institutional mission, LACs provide a model setting in which best practices in UR can be realized as fundamental to facilitating and supporting faculty and student engagement in these experiences. In this research paper, we highlight the Foundation for Undergraduate Research, Scholarship and Creative Activity (FURSCA) at Albion College.

Albion College, a private residential college in the Midwest with an enrollment of nearly 1600 students, has a long history of engagement and excellence in undergraduate research. FURSCA, an award-winning program, was established with a grant from the McGregor Fund in 1999 after many years of informal student mentoring across the campus. The aim of the program was to create a single office to support faculty efforts in mentoring student scholarship, to centralize the UR activities that were occurring on campus, and to provide funding for student scholarship in all of the academic divisions (Cook & McCauley, 2003). Before the establishment of FURSCA, UR at this college was almost exclusive to STEM fields. Fewer than 20% of students who participated in UR had majors outside of the natural sciences before the establishment of FURSCA in Fall of 1999. Currently, the percentage distribution is 43% natural sciences (NS), 33% social sciences (SS), 15% humanities (H), and 9% fine and applied arts (FAA).

Through its aims and name, FURSCA seeks to engage students from across the four divisional areas represented at the institution (NS, SS, H, and FAA) and to offer programming in which students can

participate in UR experiences beginning with their first year, one of the best practices outlined in the Council for Undergraduate Research's publication *Characteristics of Excellence in Undergraduate Research* (Rowlett et al., 2012). Program components include four opportunities for students: 1) the Student Research Partners Program (SRP) in which first- and second-year students are paired with faculty mentors to pursue faculty-driven research projects in an apprenticeship model, 2) the Semester Grant Funding (up to $600/semester with no limit on the number of semesters) to support scholarly pursuits outside of the classroom, 3) the conference grants to support attendance and presentation participation at an off-campus scholarly conference, and 4) the flagship program of FURSCA, the Summer Fellowship Program (https://www.albion.edu/academics/student-research/fursca/summer-research-grants).

In 2020, FURSCA will celebrate its 20th anniversary. To commemorate this milestone, the program staff felt it an appropriate time to engage in a broader historical investigation and programmatic assessment to 1) better understand student engagement in the four programs administered by FURSCA, and 2) highlight and document the positive outcomes in students' graduate school experiences and/or their careers associated with their participation in the first-year Student Research Partners (SPR) program and the Summer Fellowships. By focusing on these two program components specifically, as experienced by UR student researchers, we are able to examine the extent to which the SRP program serves as a pipeline to later UR experiences at Albion College, which is one of the goals of SRP. Further, a focus on divisional participation provides important insights into determining if the goal of broadening student participation in UR across campus has been achieved. Such knowledge assists Albion College campus leaders and FURSCA administrators to identify future short and long-term action steps to further build on the successes over the past twenty years. The program components, data analysis, and "what's next" discussion provide guidance to other institutions seeking to engage UR researchers across divisional areas as well.

Given the focus of this PURM special issue, this article seeks to add to the conversation about the importance of creative arts and inquiry as an undergraduate research experience, one in which student development is supported. Our aim is to initiate a data-driven dialogue about the importance of employing a divisional lens to the study of UR student participation, with a particular focus on the role of creative activity in a long-standing undergraduate research program. Such an approach provided an opportunity to focus a critical lens on the efforts of creating an inclusive UR culture on campus at Albion College. We present research findings from twenty years of longitudinal data and discuss the identified trends in the paper as we, at Albion College, seek to live up to the aims and ideals of the FURSCA program and to honor the tenets of a liberal arts college education.

Liberal Arts Colleges and the Role of Undergraduate Research

In the following section, we shed light on liberal arts colleges (LACs) with a particular focus on the educational model in this type of institution. Given the focus on undergraduate education and close student-faculty relationships, LACs foster an environment in which scholarly and creative inquiry are cultivated. We also provide a historical overview of the FURSCA program at Albion College and the evolution of the program during its 20-year existence.

Educational Model in Liberal Arts Colleges

Liberal arts colleges play an important role in the US higher education system and add to the diversity of options available to students. Although no formal definition of LACs exist, researchers have suggested two types of LACs: Liberal Arts I (awarding more than half of their undergraduate degrees in the arts and sciences) and Liberal Arts II (awarding less than half of their degrees in arts and sciences; Baker, Baldwin, & Makker, 2012; Breneman, 1990). Although Liberal Arts II institutions award less than half of their degrees in the arts and sciences, they are too small to be

categorized as comprehensive colleges according to the Carnegie Classification system (http://carnegieclassifications.iu.edu/).

In addition to a curriculum based primarily in the fields of arts and sciences, LACs are known for small class sizes and a low student-faculty ratio which results in opportunities for students and faculty to develop close advising and mentoring relationships. Enrolled students pursue full-time residential living and learning experiences with little emphasis on vocational or pre-professional training. Research by Pascarella and colleagues (2005) revealed that "…a strong emphasis on teaching and student development, a common valuing of the life of the mind, small size, a shared intellectual experience, high academic expectations, and frequent interactions inside and outside the classroom between students and faculty" (Pascarella et al., 2005, p. 12) contribute to the unique educational experience that characterizes a liberal arts college education.

Within this educational model, the approach to teaching and learning in LACs focuses on what Baker (in press) described as developing habits of heart and mind. Historically, developing habits of the heart, according to Fong (2004), focused on faith and character formation, which aligns with the original aims of liberal arts colleges as informed by their religious affiliation upon founding. In present day LACs, developing habits of the heart refers to "helping students gain an awareness and appreciation for varying viewpoints, an understanding of the importance of diversity, and to accept one's role in contributing to the betterment of society" (Baker, in press). Habits of the mind focus on skill development in the areas of critical thinking, analytics, strong communication skills, and the pursuit of lifelong learning. Also important to this educational model is an investment in the fine and creative arts. As Oxtoby (2012) so aptly noted, "…fostering creativity as one of the core values of education, the arts disciplines can and must play a central role. We need to understand and articulate both the disciplinary cohesion of programs in the arts and their interdisciplinary value" (p. 36). The educational model, one rooted in the arts and sciences, is one of the reasons why LACs produce more PhDs, proportionally, than any other type of institution, including research universities (Kretzschmar, 2016). In the following section, we highlight the role of research in LACs as a high impact practice in undergraduate education.

Undergraduate Research and Liberal Arts Colleges

Two seminal publications have provided a framework for outlining what contributes to a strong undergraduate education: *Seven Good Practices in Undergraduate Education* by Chickering and Gamson (1989) and *High-Impact Educational Practices: What They are, Who has Access to Them, and Why They Matter* by Kuh (2008). The practices that Chickering and Gamson (1989) and Kuh (2008) outlined focus on the importance of collaboration, strong student-faculty relationships, deep engagement with subject matter, and skill development experiences which foster critical inquiry, information literacy, and strong written and oral communication abilities. As a high-impact practice (Kuh, 2008), UR fosters collaboration and provides a learning experience in which all of these skill development opportunities can be realized.

There are many favorable outcomes of student participation in undergraduate research (Ishiyama 2002; Jenkins & Healey, 2010; Laursen, Seymour, & Hunter, 2012). As a result, institutions of higher education have aspired to increase investment in and visibility of programs that engage students in scholarship and creative activity (Malachowski, Osborn, Karukstis, & Ambos, 2015). Student outcomes include qualitative and quantitative areas, such as communication and data collection, engagement in their discipline, and improved self-confidence and independence (Russell, Hancock, & McCullough, 2007). Students participating in UR are more likely to persist in their academic pursuits, have higher GPAs, graduate at higher rates, and develop skills that are attractive to future employers (Hart Research Associates, 2015). Additionally, engagement in UR results in the pursuit of

graduate study and future research opportunities (Hathaway, Nagda, & Gregerman, 2002; Kilgo, Sheets, & Pascarella, 2015; Linn, Palmer, Baranger, Gerard, & Stone, 2015).

Perhaps Weight (2010) said it best, "…the academic skills and ideals that liberal arts colleges impart are exactly why student research at such institutions can flourish" (p. 9-10). Liberal arts colleges create a learning environment that is student-centered, embodies best practices in undergraduate education, and engenders an increased engagement in high-impact practices as compared to other institution types. Examples of these favorable outcomes include increased quantity and quality of student interaction with faculty and peers both inside and outside the classroom environment, as well as increased participation in extracurricular activities (Pascarella, et. al., 2005). In sum, LACs provide a distinctive learning environment characterized by sound educational practices and developmentally enriching experiences that foster intellectual curiosity. Undergraduate research and creative inquiry experiences are fundamental to a liberal arts college education.

Albion College: FURSCA

In the following section, we describe the FURSCA program in greater detail. We provide historical context and funding structure details followed by a discussion of each of the four main programming components. We conclude this section with a description of the typical FURSCA participant.

"Small colleges are ideally positioned to develop distinguished undergraduate research programs, as they have been built on the principle of close student-faculty relationships that are foundational to helping undergraduates succeed as scholars" (Evans, 2010, p. 31). This ideal has been embodied at Albion College with the establishment of FURSCA to support UR and faculty-student interactions. FURSCA is administered by a part-time faculty director and supported by a half-time staff co-director. There is also an advisory committee that is comprised of volunteer (not elected) faculty representatives from each division (ideally two from each of the four divisions at the College), a representative from the library, and two student representatives. Funding for the program comes in part from seventeen endowed funds (some established as early as 1996) and the rest from the college operating budget. In Summer 2019, money from the endowed funds totaled nearly $250,000. About half of these endowed funds list a preference for NS student research projects, while the remaining funds are unrestricted and can be used to support students in all fields.

Program Details

Students learn about FURSCA in a variety of ways, including informational sessions offered by the Director and/or Co-Director, advertisements through the daily campus-wide email that is sent to all Albion College email addresses, participation in the Honors Program, word of mouth from previous and current FURSCA–supported students and most commonly, direct faculty-recruitment. Work is currently underway to understand the biggest channels through which students first engage with FURSCA and how to better advertise and recruit students from all disciplines.

Once a student has been made aware of the opportunities that are available to them through FURSCA, there are two general areas of scholarship that are supported: 1) student-designed projects and 2) projects that complement a faculty member's already established research agenda. In NS, the latter type of project is most common. Most faculty members recruit several students during the course of the academic year to work with them on a common research project that is faculty designed and is typically several years old. This trend may help to explain the increased FURSCA participation in NS. In the other divisions (FAA, H and SS), student-designed projects are more common and likely reflect the nature of scholarship as guided by divisional norms. However, for all projects and FURSCA programs, a student must have a faculty member who is willing to mentor them for the duration of their project.

As mentioned previously, FURSCA administers four programs to support student-faculty research projects: the SRP program, Semester Grants, conference grants, and the Summer Fellowship Program. These are briefly described below:

Student Research Partners Program: Intended to engage first-year students in undergraduate research and scholarship, all faculty members are contacted and asked to write a one-paragraph description of a project that they are willing to work with an undergraduate student researcher on. These descriptions are submitted to the FURSCA office and the available positions are advertised through email and flyers to classes that have large populations of first-year students. First-year students are asked to complete a one-page application. These applications are submitted to the FURSCA office and the Director of FURSCA forwards them to the appropriate faculty member and the faculty member selects a research partner. In a typical year, there are 20 SRP positions available with approximately 60 applications for these positions.

Semester Research Grants: Students can apply for up to $600/semester to support UR outside of the classroom. Projects can either be student-designed or part of a faculty member's larger research agenda. For both types of projects, the student must prepare a three-page application detailing the background, proposed work, outcomes, and a budget for the project. Each application also requires a letter of support from the faculty mentor detailing their assessment of the project and anticipated engagement. The FURSCA advisory committee reviews these proposals and makes funding recommendations. Students may apply for one grant per semester with no limit on the number of semesters to be funded. In a typical fall semester, there are approximately 10 grants submitted and in the spring semester, the number drops to around five.

Conference Grants: Funds are available for students to travel to conferences and present results of UR performed at Albion College. The one-page application requires evidence of either a poster or oral presentation.

Summer Fellowship Program: The application process for the Summer Fellowship Program is similar to that for the Semester Research Grants. Students are required to write a three-page proposal outlining the project. In addition to the sections outlined above, students must include a timeline for the summer. Further, all Summer Fellowship participants are required to present at the Elkin Isaac Student Research Symposium, held every spring on Albion College's campus. Approximately 40 students submit proposals in the spring semester and 85-90% of these projects are funded. Students are limited to two summers of participation in order to allow as many students as possible to have access to the program. Faculty members may support up to three student proposals in order to ensure that access is available to students from all academic divisions.

FURSCA Student Profile

The typical FURSCA student is female (65%) with a major in natural sciences (42%). She participates in the Summer Fellowship Program (61%), but only for one summer. Only about 15% of students participate as a Summer Research Fellow for two summers. The majority of the summer students are rising seniors. It is unlikely that this student has worked with a faculty member as an SRP student, as only 1 in 5 FURSCA students has participated in this program. It is likely that the student wrote a thesis either for Albion College Honors (only available to the students who are members of the Honors Program) or for Departmental Honors (available to all students who graduate with a GPA of 3.5 or higher and also write a senior thesis). She presents at the Elkin Isaac Research Symposium (70%) but is unlikely to have attended a conference off campus to present the results of her work (31%).

Method

In the following section, we provide details about the data sources and analysis efforts that support the research described throughout the remainder of this manuscript.

Participants

Data used for the following analyses were longitudinally collected across the 20-year history of FURSCA in order to glean a holistic understanding of the trends in participation in UR at Albion College. More than fourteen hundred students (n = 1414) were included in the analyses (926 females, 488 males). Each student participated in at least one of the following components of FURSCA: SRP, Summer Fellowship, Semester Grant, conference grant, thesis, or Elkin Isaac presentation. For the purposes of this paper, we focus specifically on SRP and Summer Fellowship program engagement in the fine and applied arts (FAA) division.

Given our focus on student participation in creative arts, we first sought to use simple descriptive statistics to delineate the UR experience of students in the field of FAA. Out of the 1414 student participants in FURSCA, a total of 117 students in some capacity reported FAA as their primary academic division (81 females, 36 males). Table 1 gives the breakdown of the type of FURSCA engagement.

Table 1. *FAA Students' Participation in UR*

UR Activity	Number of Participants
Student Research Partnership	21
Semester Research Grant	14
Summer Research Fellowship	94
Thesis	43
Elkin Isaac Research Symposium	59

Measures

For each student, data were collected, including gender, graduation year, academic division of research project (NS, SS, H, or FAA), the FURSCA program(s) in which the student participated, as well as the year and semester for that project. Participation in Albion College's campus-wide research symposium and thesis completion as outcome measures were also noted per student. Other than the years of participation that were recorded as scale data, the majority of the measures were coded nominally with 0 indicating no participation and 1 for participation.

As our focus for this project is on UR specific to the creative arts and to what extent students are using FURSCA programs as an opportunity to garner research experience in that academic division, much of our analysis focused on trends by academic division. Academic division was represented by the student's major if they only had one reported major or if their two reported majors were from the same division (n = 1,219). For students with two reported majors in different divisions, we coded the division based on the department in which their project faculty mentor resided. If students had a faculty mentor from outside of their reported majors, we looked to the title and disciplinary focus of their project and coded based on the division of the project itself. We had nine students for which we did not have enough of the stated information about them or their projects to accurately code their division. Therefore, they were omitted from further analyses. See Table 2 for an overview of majors by each academic division for student both campus wide as well as within UR participation. Also

included in Table 2 is a participation ratio, defined as the percent of participation in FURSCA compared to percent of majors across campus within each division.

Table 2. *Percentages of Majors of all Graduates and FURSCA Participation by Division*

Source	Natural Science	Humanities	Social Science	Fine and Applied Arts	Other
Majors from 2007-2019 Across the Whole Campus	31.3	11.9	50.4	5.2	1.2
FURSCA Participation	43.3	15.1	33.0	8.6	
Participation: Ratio	1.38	1.27	.65	1.64	

Results

FURSCA participation is open to all students across the four divisional areas. The participation also spans a diversity of academic interests as represented at Albion College. As such, our initial analyses examined the distribution in participation across all academic divisions for the various components of FURSCA, followed by a specific focus on FAA. In the following section, we discuss study results organized by SRP, Summer Fellowship participation, and additional analyses.

SRP Participation by Division

For the SRP program, a FURSCA program designed to get students involved in UR early in their undergraduate career, we examined frequencies of participation by academic division. A cross tabulation reveals that when comparing the number of students who participated in SRP within a particular division (Table 3, Column "Yes") to the total number of students in that division (Table 3, Column "Total"), roughly 20% of students within a division were part of the SRP program. A chi-square test for independence corroborates the cross tabulation, reiterating that there is no statistical difference in participation among divisions, $\chi^2(3, N = 1358) = 4.86$, $p = .20$, Cramer's V = .06.

Table 3. *SRP Participation Cross-Tabulated by Academic Division*

Division	Count	No	Yes	Total
Natural Sciences	Number of participants	460	128	588
	% within division	78.2%	21.8%	100%
Social Sciences	Number of participants	331	117	448
	% within division	73.9%	26.1%	100%
Humanities	Number of participants	156	49	205
	% within division	76.1%	23.9%	100%
Fine and Applied Arts	Number of participants	96	21	117
	% within division	82.1%	17.9%	100%
Total FURSCA	Number of participants	1043	315	1358
	% response	76.8%	23.2%	100%

This finding suggests that although the frequency of SRP participation among students in the natural science division is greater than in other divisions, participation is actually proportional across all divisions.

Summer Fellowship Participation by Division

Whereas SRP is only offered to the first- and second-year students (or the first-year transfer students), a similar analysis of the Summer Fellowship program offered to students of all class years revealed greater variation in participation across academic divisions. As shown by the frequencies cross tabulated in Table 4, participation in Summer Fellowship was not proportionally distributed across divisions, $\chi^2(3, N= 1319) = 41.34$, $p < .0001$, *Cramer's V* = .18.

Table 4. *Summer FURSCA Participation Cross-Tabulated by Academic Division*

Division	Count	No	Yes	Total
Natural Sciences	Number of participants	190	390	580
	% within division	32.8%	67.2%	100%
Social Sciences	Number of participants	198	230	428
	% within division	46.3%	53.7%	100%
Humanities	Number of participants	61	136	197
	% within division	31%	69%	100%
Fine and Applied Arts	Number of participants	20	94	114
	% within division	17.5%	82.5%	100%
Total FURSCA	Number of participants	469	850	1319
	% responses	35.6%	64.5%	100%

This finding suggests that although the overall frequency of summer fellowship participation among students in the natural science division is greater than in other divisions, participation is not actually proportionally distributed across all divisions. Out of all the students that participate in UR as part of the summer fellowship program, students from the FAA division have a higher percentage of participation compared to the other three divisions.

Additional Analyses

We also sought to examine the extent to which a FAA student's early participation in a FURSCA program was predictive of future UR participation during one's undergraduate career. As such, we ran a binary logistic regression. For this analysis, participation in summer research was used as the dependent variable, with SRP and the Semester Research Grant (SRG) participation as predictor variables. The binary logistic regression revealed that SRP participation was a not significant predictor for increased participation in summer research for FAA students. In fact, analyses revealed an inverse relationship for both SRP (β = -2.34, *SE* = .62, $p < .0001$) and SRG participation (β = -2.20, *SE* = .72, $p < .01$) and summer research, meaning that participation in those programs predicted a decreased likelihood of participation in summer research. Despite these reported findings focusing solely on the FAA division, a binary regression including all divisions yielded similar findings.

In sum, the analyses revealed that the number of students with majors from the FAA division who participate in SRPs is proportional to the number of students with majors from each of the other

three divisions who participate in SRPs. In contrast, Summer Fellowship UR did present a strong discrepancy in participation as a function of divisions. This discrepancy was in favor of FAA with the percentage of FAA participation in Summer Fellowships being significantly greater than the participation in each of the other three divisions. These are two noteworthy findings, as they reveal how FAA has developed a strong presence in UR at Albion College after the establishment of FURSCA, before which UR was mostly limited to STEM fields.

While these findings shed favorable light on FAA's presence in FURSCA at Albion College, the binary regression analysis revealed that there was a restricted pipeline between early participation in SRP to summer fellowship participation which was a more pressing concern. As previously stated, engagement in UR results in the pursuit of future research opportunities (Hathaway et al., 2002; Kilgo et al., 2015; Linn, et al., 2015). Therefore, this finding causes us to ponder what possible gaps might be present in FURSCA programming that results in this restricted pipeline of involvement.

Discussion: Where to Go from Here?

The goal of this manuscript is to initiate a data-driven dialogue about the role of the creative arts in a robust undergraduate research program. We argue that it is imperative to have knowledge about UR student participation across all divisional areas and to identify which UR experiences encourage that participation. Further, one must examine the extent to which, if any, early participation in UR experiences influences participation in more advanced UR experiences by divisional area. The data analysis presented in this paper provides an example of what such an initiative can look like and the organizing questions that drive that effort. Guided by Oxtoby's (2012) observation, "If fostering creativity is a goal of a liberal education, we should ask whether our institutional cultures and structures support that goal" (p. 39), we highlight UR student participation in FAA at Albion College in SRP and Summer Fellowship programming. We will use the findings to pose further questions that can inform future research and practice at Albion College and for other institutions interested in assessing and better understanding UR student engagement on their respective campuses.

Implications

Our analyses revealed that many of the aims agreed upon at the founding of FURSCA are being met. Participation in the Student Research Partners (SRP) program is attracting and engaging students proportionally across all four divisions at Albion College (see Table 3). Programmatic efforts to recruit and engage students and faculty across all four divisions are proving fruitful to the success of the program, and thus confirms the need for early UR experiences that are available to students across all divisional areas as part of a robust portfolio of UR programming.

Surprisingly, FAA students have a much higher percentage of participation in the Summer FURSCA program than students from all other divisions, with 82% of the FAA students participating in at least one summer fellowship (see Table 4). This finding was somewhat unexpected given the strong STEM and social science presence at Albion College, with over 80% of majors at the college are in the NS and SS fields. The role of creative inquiry was integral to the aims and ideals of FURSCA at its founding and we are pleased to confirm that, twenty years later, the presence of FAA in UR experiences at Albion College is strongly represented. FAA students are taking advantage of the FURSCA summer opportunities at higher rates than their peers. This is also supported in the participation ratio given in Table 2. The FAA students are overrepresented in the summer program as compared to the number of majors awarded over the past 10 years (ratio = 1.64). Future research could qualitatively explore FAA students' experiences in UR to learn more about why the summer program is such a draw and how, if at all, their participation helps to advance their disciplinary and/or career goals. Knowledge can also be gleaned about how to further support FAA students during the summer to maintain and even increase engagement.

The most pressing need revealed through our analyses is the restricted pipeline between SRP and the Summer Fellowship Program. This restricted pipeline is problematic across all divisions, including FAA, despite the proportional representation of FAA in SRP and the Summer Fellowship program components separately. As originally conceived, SRP is to serve as a gateway or feeder to future UR experiences, particularly the Summer Fellowship, the flagship program of FURSCA. However, the binary regression analysis highlighted a restricted pipeline between participation in SRP and the Summer Fellowship Program across all divisions. Anecdotal evidence from informal discussions with faculty and students alike suggest that the restricted pipeline problem is partially a funding issue that affects STEM and FAA fields most directly, given that the needed equipment and material expenses in those fields extend far beyond those available through programming. For example, available summer fellowship funds are capped at $500 per student for purchasing needed equipment and materials to support scholarship efforts. In many cases, these funds are inadequate to meet the equipment and materials needs of student summer scholarship, as many departments are forced to supplement the supply budgets for student projects. This limited funding in turn makes it challenging for all the students who participated in an SRP to continue their UR endeavors into the summer, thus circumscribing the continuous progression of UR involvement. FURSCA Student stipend levels are also well below those provided by comparable programs like Research Experiences for Undergraduates (REUs) or Summer Undergraduate Research Programs/Summer Undergraduate Research Fellowships (SURP/SURFs) and are restricted to ten out of the 15+ weeks of summer break, creating unintended financial barriers to summer participation. Future research could include primary data collection with FAA (and STEM) students specifically to learn more about their financial needs and obtain perceptions and feedback about existing financial support provided. Additionally, secondary data collection of FAA industry trends and best practices in UR could supplement knowledge gleaned from FAA students.

Programmatic component goals and focus may also be contributing factors to the restricted pipeline, particularly those related to students' abilities to generate research ideas. Through conversations that the Director of FURSCA has had with participating faculty, the premise of SRP projects is that they are *faculty* driven projects that offer students the ability to engage in scholarship at the onset of their undergraduate career prior to having narrowed-down research interests of their own. With that being said, the function of SRPs is two-fold in that it introduces students to the process of research as well as provides a research focused mentorship between the student and faculty advisor. Many times, the incorporation of the student through SRP in the project is linked to short-term goals and might not translate to a longer-term research project that is student directed.

Next Steps

While our primary goal was to initiate a data-driven dialogue about UR in creative activity, the institutional case study of Albion College and subsequent analysis of our FURSCA program, shed light on needed programmatic improvements and future research that engages students and faculty. In this section, we briefly discuss those next steps which will serve as a guide to campus administrators and those who involved in UR at Albion College. Additionally, the outlined next steps can support others as they seek to enhance UR offerings at their respective campuses.

Of primary importance is targeting research and practice efforts on the restricted pipeline between SRP and the Summer Fellowship Program. Specifically, we need to evaluate the programmatic barriers and constraints that might be contributing to this restricted pipeline and address the question of why these "gateway" experiences are not acting as expected. Such understanding requires engaging SRP and Summer Fellowship students in quantitative and qualitative data collection efforts to learn more about their perceptions, satisfaction, and recommendations for improving experiences across divisional areas. The bottom line is that we need to be able to

objectively understand and explain why SRP students are not continuing to participate beyond that initial UR experience.

A subsequent step includes engaging faculty mentors in this process to learn more about their experiences with the four program components discussed in this paper. Faculty mentors play a critical role in the success of UR programs and the student experience (Baker, Pifer, Lunsford, Greer, & Ihas, 2015). Despite their importance to supporting UR at their respective institutions, much less research and practice has sought to understand how UR can provide professional development opportunities to participating faculty or how such engagement can serve to attract and retain faculty (Baker et al., 2015). Based on the findings of this study, those tasked with leadership of FURSCA need to specifically focus on the role of faculty in SRP and how that mentoring relationship can be used to encourage students to pursue more advanced UR experiences.

Finally, our divisional focus also highlighted an inadequacy in our data, namely the need for additional demographic records that include ethnicity and race. Over the past five years, Albion College has increased student diversity on campus as part of a strategic imperative. That diversity is becoming visible in terms of student participation in FURSCA. However, the current data collection efforts do not include that information. Future data collection efforts need to broaden the demographic information collected, such as including records of minority and first-generation student statuses, in order to glean a more comprehensive demographic profile of students participating in the various UR programs and how to better support underserved students in the capacity of UR.

Conclusion

Albion College has created and fostered a vibrant UR community among all divisions on campus. Participation is strong across campus, but particularly in the creative arts. We believe that is a result of deliberate efforts agreed upon at the founding of FURSCA. Equal representation on the advisory committee of the FAA division has ensured proportional access to funding and other opportunities for students. Many of the program requirements align with best practices as outlined by CUR: 1) the SRP program is designed to engage students (and faculty) early in their collegiate experience; 2) the dissemination of results is supported by requiring participation in the campus-wide celebration of URSCA through the Elkin Isaac Research Symposium; 3) funding is available to present at off campus conferences; 4) the Summer Fellowship Program provides stipends to both students and faculty; and 5) FURSCA has recently started offering summer professional development opportunities like resume and thesis workshops (Rowlett et al., 2012). The research presented here is the beginning of one of the more difficult and challenging steps: longitudinal programmatic assessment. We are already engaged in additional data collection with the SRP student participants to better understand their engagement with UR, given that SRP is the gateway UR experience in the FURSCA program. This is an important next step to ensure that FURSCA is available to and benefitting the entire Albion College community. Through the current study as well as with deeper analyses of the programmatic challenges to address areas in need of improvement, we aim to demonstrate how the Albion College model of UR can be expanded to other institutions as a usable framework for other UR programs.

Acknowledgements

We thank Andrew Christopher and Renee Kreger for their data assistance and friendly review during the writing of this manuscript. We also thank Adam Jarvis and Sadie Wayman for their data coding contributions. This research was supported by the Hewlett-Mellon Fund for Faculty Development at Albion College.

References

Baker, V. L. (in press). Liberal arts colleges. In M. E. David and M. J. Amey (Eds.), *The Sage Encyclopedia of Higher Education* (Vol.5). Thousand Oaks, CA: Sage Publishing.

Baker, V. L., Baldwin, R. G., & Makker, S. (2012). Where are they now? Revisiting Breneman's study of liberal arts colleges. *Liberal Education*, *98*(3), 48-53.

Baker, V. L., Pifer, M. J., Lunsford, L. G., Greer, J., & Ihas, D. (2015). Faculty as mentors in undergraduate research, scholarship, and creative work: Motivating and inhibiting factors. *Mentoring & Tutoring: Partnership in Learning*, *23*(5), 394-410.

Baldwin, R. G., & Baker, V. (2009). The case of the disappearing liberal arts college. *Inside Higher Education*, *9*. Retrieved from https://www.insidehighered.com/views/2009/07/09/case-disappearing-liberal-arts-college

Breneman, D. W. (1990). Are we losing our liberal arts colleges? *AAHE Bulletin*, *43*(2), 3-6.

Chickering, A. W., & Gamson, Z. F. (1989). Seven principles for good practice in undergraduate education. *Biochemical Education*, *17*(3), 140–141.

Cook, J. A. & McCauley, A. M. (2003). Summer research at Albion College: The Impact of the Foundation for Undergraduate Research, Scholarship and Creative Activity. *CUR Quarterly*, *23*(3), 121-125.

Elgren, T., & Hensel, N. (2006). Undergraduate research experiences: Synergies between scholarship and teaching. *Peer Review*, *8*(1), 4–7.

Evans, D. R. (2010). The challenge of undergraduate research. *Peer Review, 12*(2), 31-33.

Fong, B. (2004). Looking forward: Liberal education in the 21st Century. *Liberal Education*, *90*(1), 8-13.

Hart Research Associates. (2015). Falling short? College learning and career success. *Association of American Colleges and Universities*. Retrieved from https://www.aacu.org/sites/default/files/files/LEAP/2015employerstudentsurvey.pdf

Hathaway, R. S., Nagda, B. A., & Gregerman, S. R. (2002). The relationship of undergraduate research participation to graduate and professional education pursuit: an empirical study. *Journal of College Student Development, 43*(5), 614-631.

Ishiyama, J. (2002). Does early participation in undergraduate research benefit social science and humanities majors? *College Student Journal, 36*(3), 380–386.

Jenkins, A., & Healey, M. (2010). Undergraduate research and international initiatives to link teaching and research. *Council on Undergraduate Research Quarterly, 30*(3), 36–42.

Kilgo, C. A., Sheets, J. K. E., & Pascarella, E. T. (2015). The link between high-impact practices and student learning: Some longitudinal evidence. *Higher Education, 69*(4), 509-525.

Kretzschmar, M. (2016). 50-50 Highlights: Colleges producing the most PhD degree. *DIY College Rankings*. Retrieved from http://www.diycollegerankings.com/50-50-highlights-colleges-producing-the-most-students-receiving-phds/11028/

Kuh, G. D. (2008). *High-impact educational practices: What they are, who has access to them, and why they matter*. Washington, DC: AAC&U.

Laursen, S., Seymour, E., & Hunter, A. B. (2012). Learning, teaching and scholarship: Fundamental tensions of undergraduate research. *Change: The Magazine of Higher Learning*, *44*(2), 30-37.

Linn, M. C., Palmer, E., Baranger, A., Gerard, E., & Stone, E. (2015). Undergraduate research experiences: Impacts and opportunities. *Science, 347*(6222), 1261757.

Malachowski, M., Osborn, J. M., Karukstis, K. K., & Ambos, E. L. (Eds.). (2015). *Enhancing and expanding undergraduate research: A systems approach. New directions for higher education* (Vol. 169). San Francisco, CA: Jossey-Bass.

Oxtoby, D. W. (2012). The place of the arts in a liberal education. *Liberal Education, 98*(2), 36-41.

Pascarella, E. T., Wolniak, G., Cruce, T. M., Seifert, T. A., & Blaich, C. F. (2005). *Liberal arts colleges and liberal arts education: New evidence of impacts*. ASHE Higher Education Report. Hoboken, NJ: Jossey Bass

Rowlett, R. S., Blockus, L., & Larson, S. (2012). Characteristics of excellence in undergraduate research (COEUR). *Characteristics of excellence in undergraduate research* (pp. 2-19). Washington DC: Council on Undergraduate Research.

Russell, S. H., Hancock, M. P., & McCullough, J. (2007). Benefits of undergraduate research experiences. *Science, 316*(5824), 548-549.

Weight, G. (2010). The integrity and integrality of student research at a liberal arts college. *Peer Review, 12*(2), 9-12.