



## Undergraduate Research Participation in Student Athletes: Lessons Learned and What Mentors Can Do

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### Background

Many colleges and universities have begun to think about the creation of academic cohorts to improve retention, graduation, and academic success for students (Lei et al., 2011). These cohorts are thought to lead to positive peer and student-faculty relationships which could be beneficial for academic and social success (Lei et al., 2011; McCabe, 2016). Student-athletes are a common, non-academic cohort present on many college campuses and a cohort that might often be overlooked for the value that they bring to a university (Brand, 2006). However, there is great concern that the business of athletics will interfere with the educational mission of colleges and universities (Beyer & Hannah, 2000). Previous research has found that faculty members typically have different and more negative attitudes related to academic ability and services accessible for student-athletes compared to other students (Baucom & Lantz, 2001; Comeaux, 2011; Engstrom, Sedlacek, & McEwen, 1995). However, some evidence suggests that student-athletes engagement in educational practices is not different from the typical student body (Umbach et al., 2006) and have similar academic achievement as non-athletes (Beron & Piquero, 2016).

Participation in high impact practices has been advocated as an important way to engage students and improve student success and retention (Kuh et al., 2017; Kuh, 2008; Kuh & O'Donnell, 2013). However, we know that not all students have equal access to these high impact practices, especially those from underrepresented and underserved populations, and strategies to support should be implemented (Cole & Espinoza, 2008; O'Donnell et al., 2015; Pascarella & Blaich, 2013; Shanahan, 2018). One such population that might have difficulty in engaging in these high impact practices is student-athletes who have high time demands and resource constraints which may limit their ability to engage in these activities (Ishaq & Bass, 2019). In relation to time demands, the most recent National Collegiate Athletic Association (NCAA) Growth, Opportunities, Aspirations, and Learning of Students in College (GOALS) Study found that the median time student-athletes reported spending on their sport in-season was 28 (Division III) to 33 hours (Division I) per week (National Collegiate Athletic Association, 2020). This includes time for strength and conditioning, practice, individual meetings, film and other activities related to their sport and likely does not consider the travel demands placed upon these student-athletes. In addition to the time demands within a week and a semester, there are additional challenges athletes may face in engaging in high impact practices such as the time demands of the sport overlapping in multiple semesters. In sports that have competitions in multiple semesters, they will have increased practice and travel demands that can make it difficult to engage in academic opportunities outside of classes, especially high impact practices. Many times, the environment student-athletes find themselves in is one where athletics is

prioritized over academics, which can hinder not only academic progress, but also other high impact practices.

Despite the known benefits of these high impact practices, there continues to be the recognition that certain student populations (e.g., underrepresented students and student-athletes) engage in these educational activities at lower rates and strategies need to be used to reach them (Finley & McNair, 2013; Kinzie, 2012; Kuh et al., 2017; O'Donnell et al., 2015). Ishaq and Bass (2019) recently conducted an investigation into the implementation of high impact practices in student-athletes by interviewing academic support staff. They identified that two primary barriers are time constraints of the student-athlete and lack of funding or resources, but also attitudes of coaches and athletic directors regarding their understanding of high impact practices and their value. This lack of understanding or sometimes even blatant disregard can lead to student-athletes identifying more with their athletic identity relative to their academic identity, as that is what their environment is prioritizing. They suggest that utilizing academic staff for athletics (e.g., academic advisors, tutors, and learning specialists) can be one way to help educate student-athletes and coaches about the importance of these opportunities and to build relationships on campus with key stakeholders. The utilization of these academic support people to improve student success has been advocated by others as well (Comeaux & Harrison, 2011).

One high impact practice that has received little attention in student-athletes is undergraduate research. The special issue of this journal aims to provide a call for researchers to further examine this unique high impact practice because of the numerous benefits that are known to come with participation in undergraduate research (Kuh, 2008; Laursen et al., 2010; Linn et al., 2015; Lopatto, 2009). Laursen and colleagues (2010) identified six major gains from engaging in undergraduate research. These included: 1) personal/professional gains (e.g., increasing confidence to do science and developing collegial relationships with professionals and peers); 2) thinking and working like a scientist (e.g., conceptual and theoretical understanding and ability to apply knowledge and skills); 3) becoming a scientist; 4) gains in skills; 5) enhanced preparation for career and graduate school; and 6) clarification and confirmation of career and educational goals. The gains are perceived to be beneficial for students by faculty (Webber et al., 2013). To help achieve these gains, high quality mentoring is important for students (Shanahan et al., 2015; Vandermaas-Peeler et al., 2018; Walkington et al., 2018). However, undergraduate research might be one high impact practice that lends itself better to student-athletes engagement due to the fact that work might not need to be done during one semester and could possibly, depending on the discipline, be extended over semesters and years.

The purpose of this manuscript is to discuss and address the lack of participation in undergraduate research in student-athletes. To better understand these issues, this paper examined recently collected data from a grant examining high impact practices (HIPs) in schools in the Colonial Athletic Association and then did a deeper dive into data at Elon University as a case study where undergraduate research is highly mentored and valued on our campus as a high impact practice. The paper closes with a section about how mentors can increase participation in undergraduate research through recruitment, creating relationships, and demonstrating the benefits of undergraduate research for student-athletes. It also discusses the salient practices framework (Shanahan et al., 2015; Walkington et al., 2018) in an effort to best mentor the needs of student-athletes.

### **Colonial Athletic Association - Conference Data**

The data described below come from a larger, grant-awarded study examining the barriers and participation of high impact practices in the Colonial Athletic Association. The work was partially funded by a grant from the Colonial Academic Alliance. Athletic conferences can be a useful entity to use and compare data between schools because there are often similar expectations and

constraints across schools within the conference (Covell & Barr, 2010). Thelin (1996) states that conference members “agree to work together yet compete against each other while showing mutual respect and comparable academic standards” (p. 129). The Colonial Athletic Association is made up of ten universities on the East Coast of the United States with four private and six public institutions. As part of the grant, the investigators, with the help of provosts at each institution, were able to identify contact people at nine of the ten institutions to help with data collection and topics of research interests related to high impact practices. These contact people were first asked to collect, if possible, participation rates across the ten high impact practices at their institution for students and student-athletes. This paper focuses on the undergraduate research portion of this data collection.

Six of the nine schools provided data related to participation rates of high impact practices. Of those only three schools were able to identify participation rates for student-athletes separate from students for participation excluding those that were required within the curriculum. For undergraduate research, only one institution was able to report participation rates for student-athletes separate from those of the whole student body. As can be expected, the participation rates for undergraduate research varied across schools with those that require it reporting 100% access and participation and most other schools reporting much lower rates. This suggests that there are different definitions of undergraduate research across these institutions, which makes it difficult to compare between schools. This is important, as high impact practices must be done well in order to add value to students. How can we know if they're being done well if there are multiple definitions, and no single standard, of what "well" looks like?

Therefore, we recommend universities to 1) do a better job of tracking participation in high impact practices, specifically undergraduate research, in their student population, as well as, in their student-athletes; 2) develop a common definition of undergraduate research; and 3) better assess whether it was in the curriculum (lasting one semester) or something ongoing over a couple semesters. The Council on Undergraduate Research, the leading organization in the United States, defines undergraduate research as “an inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline” (Council on Undergraduate Research, n.d.). Since this is the definition of the leading organization relate to undergraduate research, the definition or the key elements of this definition could be adopted by most schools when considering participation rates in undergraduate research. This is also the definition adapted and used by Elon University presented in the case study below.

### **Case Study – Elon University Data**

In our work we realized that Elon University was one of the few schools that tracked participation in high impact practices for students and student-athletes. In our initial request to the Provost Office for participation rates, the Provost's Office reported that 23% of the student population participated in undergraduate research during their time at Elon, but only 5% of student-athletes did that. As was previously mentioned, definitions matter when it comes to defining high impact practices such as undergraduate research. Therefore, for context, it is important to understand the definition used by Elon. Elon University (n.d.-a) defines it as:

Undergraduate Research and Creative Endeavors include activities undertaken by an undergraduate student with significant faculty mentoring that: 1) lead to new scholarly insights and/or creation of new works; 2) add to the discipline; and 3) involve critical analysis of the process and/or outcome of the activities.

The statement goes on to say, “Quality undergraduate research and creative activity result in a product that has potential for peer-reviewed dissemination in the form of presentations, publications,

exhibitions or performances (Elon University, n.d.-a).” It should be noted that two key aspects of this definition, as it differs from many, are that it focuses on faculty mentoring and dissemination of the research. The inclusion of both of these components documents the high quality that is expected of undergraduate research at Elon University and may help explain the low participation rates for students and student-athletes. It also demonstrates that mentors will need to dedicate more time to the mentoring relationship and process to achieve these goals and may need university support to achieve the desired outcomes (Baker et al., 2018)

As a result of this, we decided to do a deeper investigation into where student-athletes are engaging and how our university might be able to increase the percentage of student-athletes who engage in research and get the benefits from this participation. We collected data in undergraduate research from the academic years 2012-2013 to 2018-2019 to better understand how our student-athletes engage in research on our campus. We decided to track participation by three primary undergraduate research activities on our campus that include a mentor for the student: enrollment in a disciplinary, undergraduate research course, participation in an on-campus undergraduate research conference, and participation in a nine-week summer research program. For the undergraduate research course participation, we were able to get reports from the Registrar's office of those who participated in 498/499 research for credit. For participation in the on-campus undergraduate research conference and summer research program, participants were identified by going through documents showing those who took part in the programs and identifying them as student-athletes.

The first program we discuss is one in which students have the opportunity to enroll in a course (498/499 level) by discipline of the mentor to gain research credit (Elon University, n.d.-b). This can be done during any semester and students can re-enroll in this course with up to eight credits counting towards graduation. It should be noted that the Honors Program has a slightly different registration process for 498 credit. For 499 credit, students must have a 3.0 GPA to be able to enroll in this course. This is the most common way that students and student-athletes engage in undergraduate research on Elon University's campus. Table 1 shows that in a typical year, 15 - 20 student-athletes engage in undergraduate research through 499 or research credit.

Table 1. *Student-Athlete Participation in Undergraduate Research from 2012-2013 to 2018-2019*

Program	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Course for Credit (499)	16	17	21	33	34	17	19
Spring Undergraduate Research Forum (SURF)	12	7	6	11	15	7	11
Summer Undergraduate Research Experience (SURE)	3	5	3	3	3	2	3

A closer investigation of these data shows some interesting trends with spring semester having a slightly higher rate of percentage (48%) compared to the fall (39%), with the rest happening during winter (5%) and summer terms (7%). Another interesting finding was that the top five sports to engage in research (by numbers over 7 years) were: 1) Women's Soccer (n = 29); 2) Women's Track and Field (n = 18); 3) Women's Cross Country (n = 16); 4) Football (n = 16) and 5) tied between Women's Lacrosse and Volleyball (n = 11). When looking at discipline, the top five disciplines that were represented were Exercise Science, Biochemistry, Chemistry, Psychology, and a tie for

Economics and Sport Management. It should be noted that at Elon, Chemistry and Economics have a requirement for students to do research for graduation, while many of the other departments allow the course credit to be a substitute for required classes or as electives within the major. However, many students and student-athletes in STEM disciplines are considering pre-health professions and graduate school, thus understanding that undergraduate research may look good for applications.

While there is some variability, annually approximately 10 student-athletes (69 presentations over 7 years) presented at the Spring Undergraduate Research Forum (SURF). This is a peer-reviewed event in which classes are canceled for a day so that students can do typical oral or poster presentations, as well as performances for those in creative disciplines. Similar to the data on research for credit, Exercise Science and Biochemistry are the top majors represented, with Women's Track and Field, Women's Soccer, and Women's Cross Country as the most represented sports.

For the Summer Undergraduate Research Experience (SURE), on average, about 3 student-athletes (22 over the past 7 years) annually engaged in this nine-week mentored research experience. The top two majors represented in this experience are Sport Management and Exercise Science. The top two sports involved were Women's Track and Field and Football.

### **Lessons Learned from Elon University**

Not surprisingly, the rates of participation in undergraduate research is much lower in student-athletes than in the whole student population. It is known that time and resources are common issues in engaging in high impact practices (Ishaq & Bass, 2019). However, working with academic advisors to promote the benefits of undergraduate research and working to explain to coaches and athletic administrators the benefit of undergraduate research and other high impact practices may be one way to open access and increase participation in undergraduate research (Comeaux & Harrison, 2011; Ishaq & Bass, 2019). Recently at Elon, we have begun working with our academic advisors for athletics to help identify students who might be interested and have sufficient GPA to engage in undergraduate research to make sure that they know about this opportunity. If students are interested, they then start having discussions with other athletic staff and faculty to identify potential mentors. This model is currently being used for other high impact practices at Elon University, such as internships, service learning and leadership.

Another interesting finding was that there was a higher participation in undergraduate research credit in the spring compared to the fall. The exact reason behind this is unknown, but could be because students are asked to continue with research more often based on their performances in the fall class. It could also be because of the decreased time demands for fall sports in the spring, which allows them to have greater engagement in the spring semester and to seek out or be sought out for these opportunities.

Another interesting finding was the high participation in undergraduate research in the disciplines of Exercise Science and Sport Management. These two majors at Elon not only have a high number of student-athletes in the major, but also have content that might provide an overlap between their academic and athletic identities which might make it more conducive to do research on as well. Other departments may also want to consider the overlap between these academic and athletic identities of student-athletes with possible undergraduate research projects to help increase access and participation (e.g., business, economics, psychology, public health, etc.) Additionally, we did observe a higher percentage of participation in STEM disciplines. We think this is because many students in these disciplines are considering pre-health professions or graduate school and undergraduate research is likely looked highly upon by those graduate schools.



## How to Enhance the Experience for Student-Athletes

In addition to increasing access and participation in student-athletes, it is important to think about the quality of the experience that they have. One variable found to have a significant impact on academic achievement is the relationship with faculty (Comeaux, 2005). In the context of undergraduate research, we advocate that it needs to be a high-quality mentored experience. The mentor needs to be understanding of the student-athlete's responsibilities and intersecting identities of both a student and a athlete. Being understanding and flexible is essential to a proper, beneficial mentor/mentee relationship and partnership. One mechanism that can be used to implement high quality mentoring is the salient practices of undergraduate mentoring framework (Shanahan et al., 2015; Walkington et al., 2018; Center for Engaged Learning (n.d.)). This framework has been applied to undergraduate research in the global context (Hall et al., 2018), theater and dance (Shawyer et al., 2019), and writing studies (Moore et al., 2020).

While we won't focus on all ten of the salient practices, we have identified some that may have direct implications to student-athletes and their mentoring or should be considered by mentors. We have mentioned repeatedly that time might be perceived as an issue for both the student-athlete and the mentor. However, because undergraduate research is a high impact practice that can be engaged over multiple semesters and over years as opposed to a one-time shot, it may lend itself to being actually more accessible for student-athletes. The importance of *strategic pre-planning* (Salient Practice #1) should be taken into consideration. Students and mentors should take advantage of non-championship seasons when student-athletes have less athletic demands, as well as summers when many student-athletes are on campus or have more free time to engage in undergraduate research through programs like Elon University's Summer Undergraduate Research Experience.

Another practice that may be more important for student-athletes is *balancing rigorous expectations and providing appropriate emotional support* (Salient Practice #4). It is known that social support is an important aspect of the mentoring relationship (Palmer et al., 2018). However, this can be more complex in student-athletes who are attempting to juggle both their academic and athletic identities. The emotional support that mentors may offer might need to extend beyond the undergraduate research project but could be important in helping student-athletes navigate issues around injury, lack of playing time or struggling to balance time demands. Therefore, discussions may need to extend beyond the research project because these other issues may influence their ability to complete the tasks asked of them in undergraduate research.

In our research, we found that there could be a culture within certain sports to engage in undergraduate research. This is likely created by both coaches and student-athletes within the team. Coaches may be using the undergraduate research of their student-athletes to help recruit future student-athletes into their program and student-athletes might be recruiting teammates into helping with their research projects, as well as promoting the benefits of undergraduate research to their teammates and encouraging them to become involved in undergraduate research. These behaviors are very much tied to *building community amongst researchers* (Salient Practice #5) and *creating opportunities to learn mentoring skills* (Salient Practice #9). Utilizing the resources of the student-athletes may provide an important cohort effect that may expand access to undergraduate research in underserved and minority populations.

A final practice that may warrant special mention is the Salient Practice #10, which focuses on *dissemination of the research*. At the conclusion of a research project, the ultimate goal is often to have students do a presentation or performance related to their work. However, the timing of conferences may fall within the main competitive season of the student-athlete. Student-athletes and their coaches, do not want to possibly miss competitions. Therefore, mentors may need to think

about other ways to have this happen, especially if universities do not have an on-campus option for dissemination.

## Conclusion

Student-athletes engage in undergraduate research at lower rates than their peers and thus may not obtain the many benefits that we know come from engaging in this high impact practice. Therefore, we need to think about ways to increase access and participation. Student-athletes need to be educated about the value and benefits of partaking in undergraduate research. But the environment needs to be conducive for participation, meaning buy-ins from other teammates, coaching staff, professors, and support services, such as academic advisors. Once student-athletes decide to become involved in undergraduate research, it is important that mentors understand the demands of student-athletes and to utilize best practices of mentoring so that mentoring is high quality and maximizes the benefits for the student-athlete.

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