UNC
CENTER FOR RESEARCH IN INTERCOLLEGIATE ATHLETICS

The Educational Value of Intercollegiate Athletics

Research summary Prepared for the Knight Commission on Intercollegiate Athletics

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Performance Development Experiences | Applied Data Science | Performance Physiology | Performance Nutrition | Strength & Conditioning | Performance Psychology & Neuroscience | Leadership & Group Dynamics | Expertise throughout history | Coaching Science (possibility to have sport specific courses) |Sport Sociology |Sport Analytics

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I. Philosophical Foundations

The high standards and expert training in intercollegiate athletics facilitates education in the pursuit of expertise that is worthy of academic credit similar in form to the performing arts.

- The historic lack of validation for the educational value of sport is rooted in racism and classism.
- If a philosophical and structural paradigm shift occurred that integrated athletics within the academy beyond statements of vision, marketing efforts, and financial streams, detriments to the system would lessen and the educational foundation of sport would resurface from the inside-out.
- The current situation that faculty and coaches offer to students to complete a BA or BS in eight semesters while training year-round, traveling, and competing for national championships is unjust. These demands barely allow well-prepared students to pursue a liberal arts education. For those without rigorous preparation, their collegiate experience can become a struggle to survive and is in no doubt correlated with the current student-athlete mental health crisis.

Curricular Development and the Study of Sport (Modified excerpt from Weight & Huml, 2016)

The decisions about what a society should teach their children is a vexing quandary at the root of many political debates affecting our curricular decisions and educational governance structures (Glatthorn & Jailall, 2000; Marsh, 2009; Walker, 2002). Walker (2002) describes the dilemma in the ever-dynamic American society where the curriculum problem is especially difficult. “As the social fabric is stretched and ripped by change, innovators call for a new curriculum to prepare children for the New World while traditionalists call for repair and restoration. Who are we? Who do we want our children to be? What kind of world shall we prepare our children for?” (p. xiii). The evolution of what fields of study qualify as essential to education have been compared to multiple streams flowing through the system “ebbing at times, then gathering strength and flowing together in a dynamic confluence” (Glatthorn & Jailall, 2000, p. 98).

The political-educational arena is particularly charged in higher education as government scrutiny and control is increasing while funding and support is decreasing (Cullingford & Vkewuttm 2013; Cantwell, Kauppinen, 2014). Simultaneously, the landscape of intercollegiate athletics is under unprecedented scrutiny, as headlines and lawsuits are calling for broad-sweeping reform due to excessive commercialism (Anthes, 2010; Gerdy, 2006; Oriard, 2001; Ross, 2012; Smith 2012), unprincipled behavior (Byers, 1996; Pickerel, 2012), and athlete exploitation (McCormick & McCormick, 2006; Sack & Staurowsky, 1998; VanRheenen, 2013; Zimbalist, 1999). The focus of this research summary is to address the eroding educational experiences of athletes that have been undermined through sham courses (Smith & Willingham, 2015; Southall, 2015) and increasing time demands (Benford, 2007; Hainline, 2015; Huml et al., 2014; Wolverton, 2014).

One approach to strengthening the educational experiences of our athletes is to formalize sport performance as an academic field of study. Building on a foundation of sport management, exercise physiology, and physical education, each of which have battled their

way through the political curricular torrents, the legitimization and formalization of educational experiences that are already transpiring on the court, on the field, or on the track is one avenue to bridge the divide between academics and athletics (Brand, 2006; Colas, 2015; Feezell, 2015; Jenkins, 2011; Pargman, 2012; Weight, 2015).

This approach to philosophical reform was delineated by Myles Brand, NCAA president from 2002 to 2009. A vocal proponent of the educational value of intercollegiate athletic participation and an "integrated view" of intercollegiate athletics within a university, he believed the importance of intercollegiate athletics was significantly undervalued. He condemned the academy for its bias against bodily skills, non-art, and its view on athletics as an auxiliary to the university unworthy of subsidy (Brand, 2006; Feezell, 2015; Sack, 2009; Weight, Cooper & Popp, 2015). Building upon this idea, Washington Post columnist Sally Jenkins posed the question "Why shouldn't we let kids major in sport?" Addressing this question, she argued, "high-performance athletes study a craft, with a science, theory, history and literature, just like music or dance or film majors do. Varsity athletes deserve significant academic credits for their incredibly long hours of training and practice, and if they fulfill a core curriculum they deserve degrees, too" (Jenkins, 2011, para 2).

Others have suggested a more moderate approach through educational enhancements through life-skills developmental programs, leadership training programs specific for athletes, or integrated academic-athletic experiential learning opportunities (Clubb, 2012; Hardcastle, Tye, Glassey, & Hagger, 2015; Weight, Cooper, & Popp, 2015; Weight, 2015).

Institutional Racism & Classism (Excerpt from an unpublished op-ed: Weight, Vaisey & Cooper)

Within the five most visible Division I conferences, only 17% of men's basketball, and 21% of football head coaches are of color compared to 74% of men's basketball and 64% of football athletes. This stark difference between "management" and "labor" paints a damning picture of racial disparity. This disparity is strongly related to the distribution of rewards. The average 2021 salary of head coaches is just over $3 million (basketball) and $4.4 million (football) before significant performance bonuses. The performance bonus for the athletes who make it to the NCAA tournament or a bowl game has historically been a swag bag.

These facts are only a symptom of a far deeper problem related to sport in the United States. A recent experience one of the authors had illustrates this problem. In a faculty meeting at UNC, campus leaders were discussing the epidemic of mental health issues among athletes. One reason for this is that elite Division I athletes report spending 32 hours on athletics and 34 hours on academics. They must manage 70-hour work weeks and carry the mental load of being a public figure.

One participant, noting that a music student can earn 96 academic credits while refining their craft whereas an athlete can earn none, asked, "what is the difference between a singer majoring in vocal performance and a basketball player majoring in basketball performance?" A distinguished professor's quick response cuts to the core of the issue: "I can have an intelligent conversation with one, and I cannot with the other." This bias could stem from an individual faculty members issues with athletes in his classes or perhaps he was bullied as a youth. But this attitude, unfortunately, is supported by very clear systemic factors that provide a clear case study for institutional racism.

Black men are less than 3% of full-time undergraduate students within the five major Division I conferences, while they make up the majority of athletes in the big-money sports of football and basketball. Why do we ask these athletes to balance two nearly full-time jobs? Because race and class biases are part of determining what we deem to be legitimate educational pursuits. Because it seems obvious to us that the pursuit of athletic excellence isn't scholarly, and we cannot count the pursuit of athletic excellence as a part of their education. Music, dance, theater, business, computer science, and internships have also not always been considered intellectual activities, but they are now each accepted as a part of the academy. We believe it is not athletes' intelligence that leads to these biases, but rather the fact that athletes pragmatically detach from some classes to pursue excellence and have any chance at a career in the field they love. This same love is shared by painters, violinists, dancers, and biologists who often spend more time dedicated to their craft than their athlete classmates. The difference is that we have come to accept their passions as academic and have not asked them to balance two full time jobs in their quest for excellence.

Why, then, has the study of sport, a $500 billion-dollar industry, not found a path toward educational legitimacy? There are likely many reasons, but we believe that race-based perceptions of academic ability have been turned into university rules – institutionalized – to exclude athletics as a legitimate academic subject, thereby systematically reinforcing a system that clearly exploits a workforce that is mostly black while those that benefit are predominantly white.

Where do we go from here? First, we need to acknowledge the current structure of college sports is morally unsustainable. We must either make college athletics an integrated part of the university or allow our semi-pro athletes to be branded with the university logo without the "student-athlete" charade.

Second, if we do want to preserve the idea of the student-athlete, we need to recognize that education requires the time and mental space to explore and ponder. Our exile of athletic demands to the "extracurricular" makes that nearly impossible.

We believe we should allow our student-athletes to immerse themselves in the study of sport – physiology, history, analytics, sociology, nutrition, psychology, and more. This will not only yield a rich educational experience but will lead to a new generation of skilled coaches, practitioners, and analysts. It is time for member universities to acknowledge this institutional racism, facilitate pathways for the study of sport similar in structure to music, dance, and theater, and to train future generations of coaches that are more like the demographics of the athletes they teach.

II. What is the academic value of college sport? (Empirical Research Overview)

Collegiate athletes develop an "athlete advantage" through the pursuit of expertise in sport.

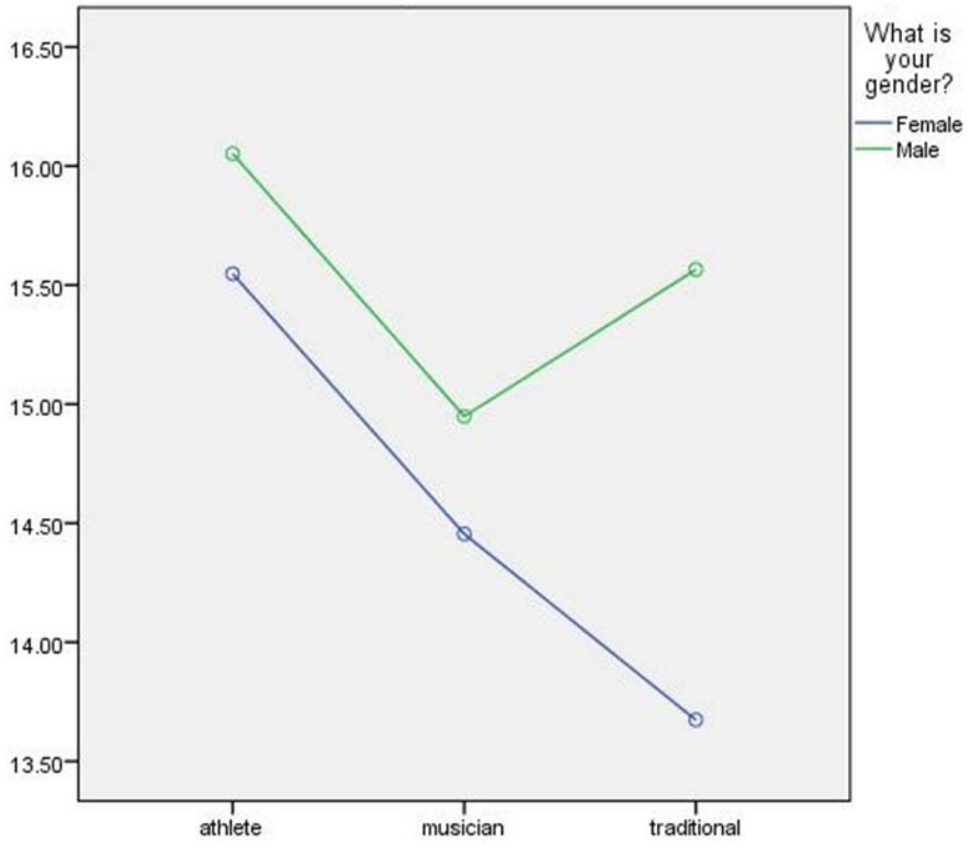
These skills are transferrable to the workplace and beyond and position them for life outcomes significantly better than their non-athlete peers (Weight, Smith, & Rubin, 2022).

The Athlete Advantage: Former athlete's perceived knowledge, skills, attributes, and other qualities developed through sport

- **Drive**
  - Work-ethic
  - Personal accountability/time management
  - Dedication/determination/discipline
  - Goal-seeking/results-driven
  - Consistent pursuit of excellence
  - Seek/embrace feedback
  - Persistence/tenacity
  - Competitiveness
- **Resilience**
  - Ability to overcome obstacles
  - Perspective in failure and success
  - Toughness
  - Humility/coachability
  - Adaptability
  - Ability to perform under pressure
- **Teamwork**
  - Can unite toward a common goal/cause
  - Collaborative
  - Know how to depend on others
  - Care about others success
- **Leadership**
  - Always leading / influential
  - Strong character/ ethical
  - Credibility with others
  - Philanthropic
  - Vision-centric
- **Confidence**
  - Identity/pride
  - Self-efficacy
  - Physical acumen
- **Emotional Intelligence**
  - Communication / social skills
  - Empathy
  - Situational awareness

The development of expertise through music and athletics has a significant positive interaction with overall self-efficacy. Male athletes and musicians demonstrated higher levels of overall self-efficacy (a belief in one's own ability to successfully complete tasks and reach goals). This interaction may be particularly powerful for female athletes. (Weight & Lewis, 2016)

Overall self-efficacy (4-20 scale) of athletes, musicians, and traditional students from five Power Five Institutions: Main effects and interaction effects significant (p <.01):



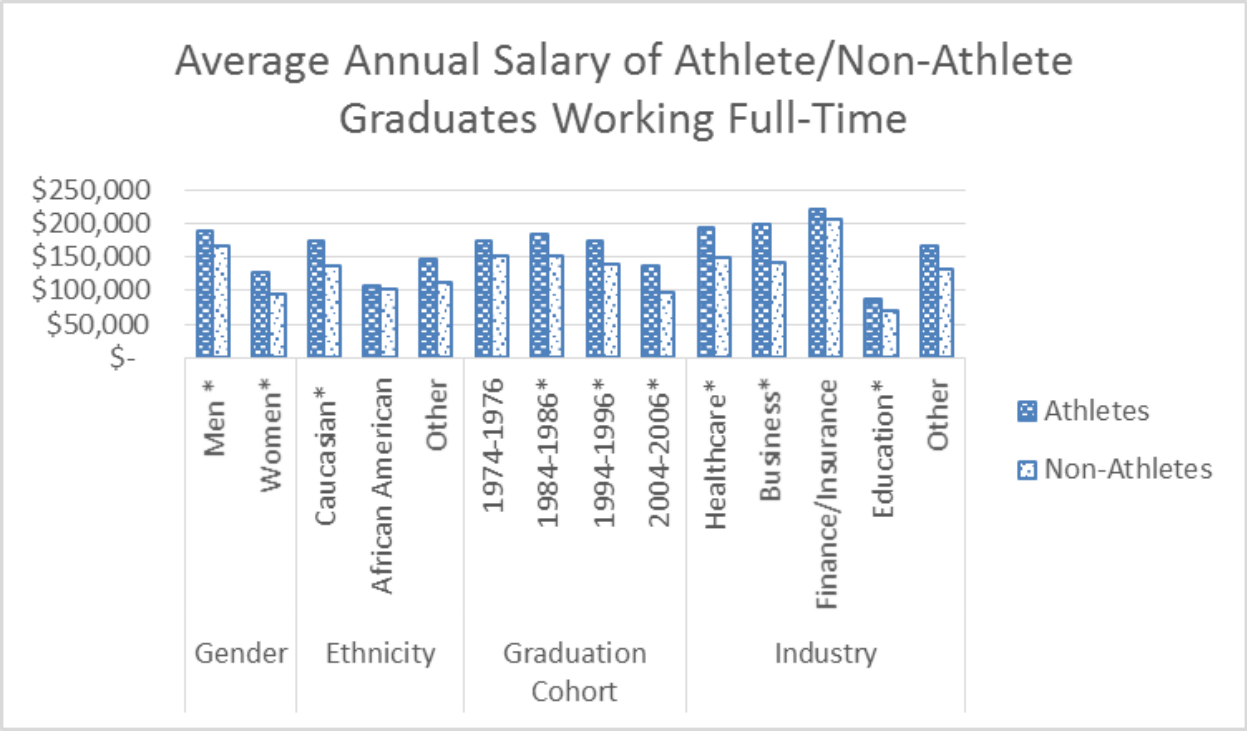
Athletes have have better health and health-related knowledge than their non-athlete peers. In a sample drawn from three Power Five institutions, athletes (n =435) demonstrated significantly greater nutrition, health, injury knowledge, and body awareness than non-athlete peers (n = 914) (p < 0.01), though mean scores for both groups revealed limited knowledge. Athletes also demonstrated overall superior health and lower susceptibility to future metabolic risk factors than their active non-athlete classmates as demonstrated by a significantly lower body fat percentage despite having higher BMI values. **Despite a lack of structured traditional education, it appears that athletes are gaining knowledge and engaging in practices critical to holistic development**. Practitioners must determine how to further cultivate these benefits through structured education for athletes and non-athletes (Weight, Navarro, Smith-Ryan, Huffman, 2016).

Athletes have greater levels of psychological scale measures than their non-athlete peers.

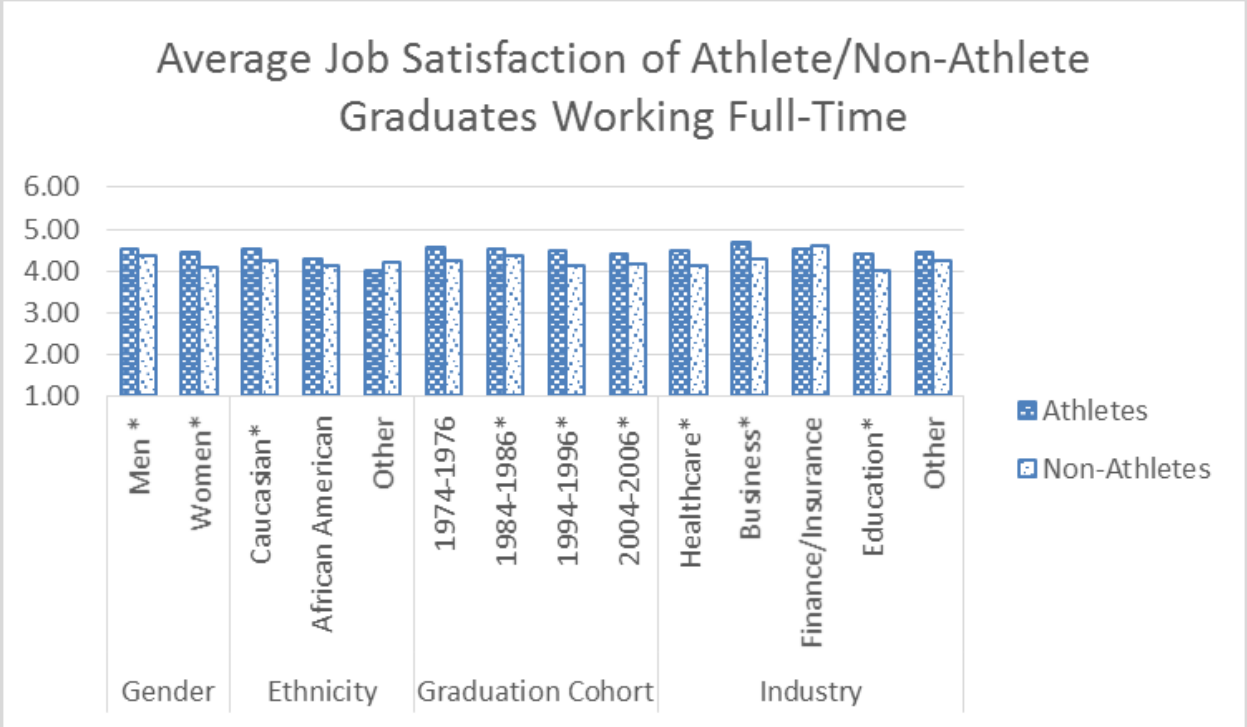
In a sample drawn from three Power Five institutions, athletes (*n* =435) demonstrated significantly greater levels of achievement striving, teamwork, leadership, courage, and perseverance than their non-athlete peers (*n* = 914) ($p < 0.01$) utilizing established psychological scales. The purpose of this research was to explore the legitimacy of athletics as a holistic educational endeavor. In order to demonstrate clear educational legitimacy, one would expect to see marked growth through the class standing variable for both athletes and non-athletes with athletes demonstrating additional growth. Based on the lack of significance in the two-way analysis of variance utilizing independent variables of athlete status and class standing, this conclusion cannot be made based on these non-longitudinal self-measures – there does not appear to be growth in these measures for either athletes or non-athletes throughout their collegiate experience. This lack of athlete change over time could provide evidence of a lack of markable growth throughout their university experiences, but a more realistic conclusion for the lack of change in the short four-year window of time may be explained by research that notes many measures of psychological attributes can be relatively stable over time (Costa & McCrae, 1986; McCrae, Costa, Ostendorf, Angleitner, Hrebickova, Avia, et al., 2000) and it is not realistic to expect change given the sampling and measurement techniques used within this study (Weight, Navarro, Huffman, Smith-Ryan, 2016).

Former collegiate athlete graduates who work full-time have significantly higher levels of salary, job satisfaction, salary, and work engagement across demographic variables measured (Weight, DeFreese, Bonfiglio, Kerr, Osborne, 2018).

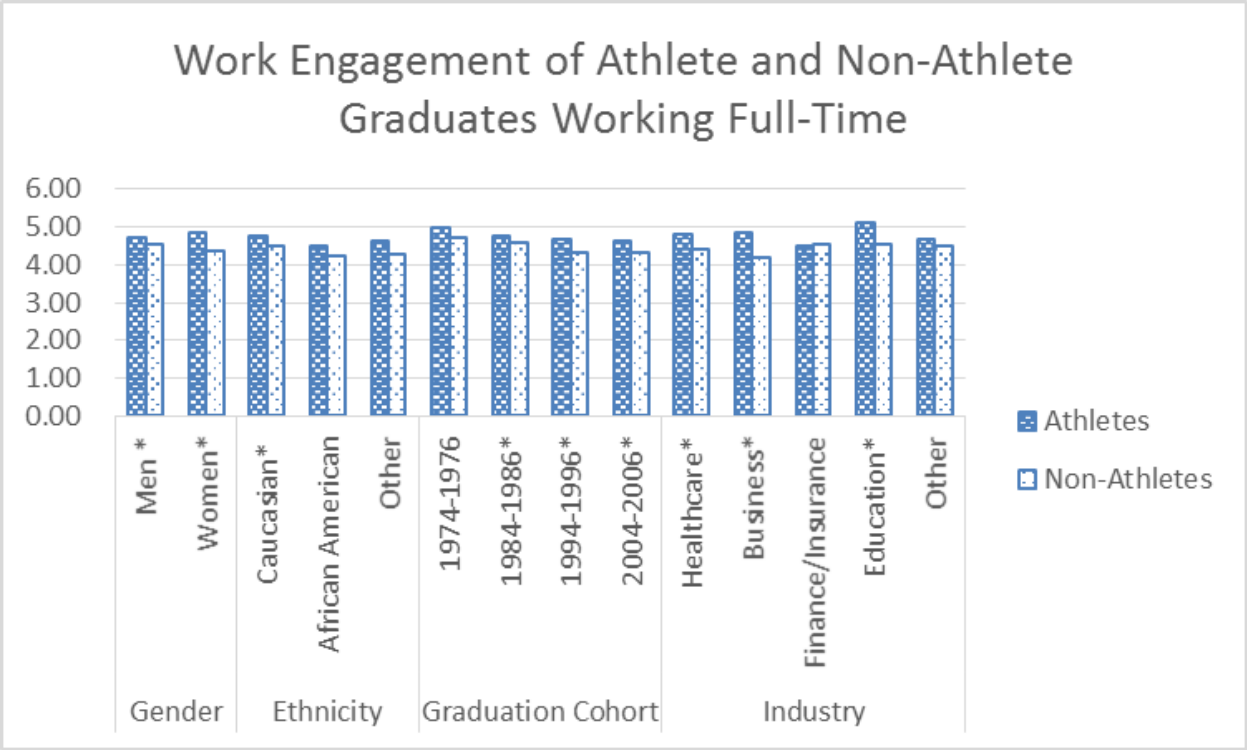
In a one-school sample of collegiate athletes (*n* = 594) and non-athletes (*n* =742) from five university graduation cohorts (response rate 34%, 1,347 / 3,936), the following significant differences ($p < .05$) were detected in salary, job satisfaction, and work engagement:



Salary capped at $400,000 and professional athletes were excluded from the sample.



Scores can range from 1 to 6. Mean scores of 4 or more represent satisfaction, scores of 3 or less represent dissatisfaction, and scores between 3 and 4 representing ambivalence (Spector, 1994)



Scores can range from 0 "never" to 6 "every day" related to frequency of work engagement experiences when employees have a sense of energetic and effective connection with their work and see themselves able to deal well with the demands of their job. Work engagement is often thought of to be the opposite of burnout (Schaufeli & Bakker, 2003).

Employers associate positive skills/qualities with participation in intercollegiate athletics.

Companies seek athletes to fill positions within their organizations and do so because they pair athletic participation with dispositional attributes highly valued within their organizations including a competitive nature, goal-orientation, ability to handle pressure, strong work ethic, confidence, coachability, ability to work with others, self-motivation, mental toughness, and time management skills.

These employers value the team captain (leader) and All-American (winner) status of athletes more highly than mere membership on an athletic team, yet membership on a team was valued more highly than leadership positions in other campus organizations or select part-time vocations. Value of athletic participation was not significantly impacted by sport, gender or level of competition. These findings are a tremendously valuable addition to the literature, public commentary, legal and governance dialogue on the current collegiate model. An understanding of the benefits of intercollegiate athletics participation can help to quantify the value of the current experience and strengthen areas of impact that seem to directly translate into marketable skills (Chalfin, Weight, Osborne, & Johnson, 2015).

Value of extracurricular experiences listed on a candidate's resume

	Overall	
	Mean	SD
Student body president*	3.75	1.047
Editor-in-Chief of the student newspaper*	3.46	1.073
Captain of the DI football team*	3.38	1.076
Captain of the DI women's basketball team*	3.38	1.090
Captain of DI men's tennis team*	3.33	1.066
Captain of DI women's tennis team*	3.31	1.089
Captain of debate team*	3.29	1.009
Captain of the DIII women's basketball team*	3.28	1.069
Captain of the DIII football team*	3.28	1.067
All-American on DI women's basketball team	3.21	1.222
All-American on DI football team	3.19	1.224
All-American on DI women's tennis team	3.18	1.226
All-American on DI men's tennis team	3.18	1.220
Member of student government	3.12	.886
Restaurant manager	3.10	.900
All-American on DIII women's tennis team	3.07	1.164
All-American on DIII men's tennis team	3.06	1.182
Volunteer for Boys and Girls Club	3.04	.964
Treasurer of student organization	2.97	.974
Member of DI women's tennis conf champ team	2.88	1.081
Member of DI women's basketball conf champ team	2.87	1.075
Member of DI conf champ football team	2.84	1.036
Member of DI conf champ men's tennis team	2.81	1.074
Member of DIII women's basketball conf champ team	2.81	1.025
Member of DIII conf champ football team	2.78	1.015
RA of a campus dorm	2.77	1.062
President of a fraternity	2.70	1.125
Concert pianist	2.63	1.172
Member of DI women's basketball team	2.55	.933
Member of DI women's tennis team	2.54	.925
Member of DI football team	2.51	.921
Member of DI men's tennis team	2.49	.908
Member of DIII women's tennis team	2.49	.952
Member of DIII men's tennis team	2.49	.967
Part-time job as a waiter at restaurant	2.15	.939
Played trumpet in the marching band	2.04	.965

*$p < .001$: $\mu > 3$ "valuable" experience

Note: Scale included (1) not valuable at all, (2) somewhat valuable, (3) valuable, (4) very valuable, and (5) extremely impressive and would make this candidate stand out.

Former collegiate athlete graduates report more positive health and quality of life outcomes than their non-athlete peers.

In a one-school sample of collegiate athletes (*n* = 594) and non-athletes (*n* =742) from four university graduation cohorts (response rate 34%, 1,347 / 3,936). Regression analyses showed a model including all study variables as well as student-athlete status to significantly predict participants' overall life satisfaction (R^2 = .43), meaning 43% of variance in the model was predicted and **athlete status was the highest significant positive predictor of overall life satisfaction** (DeFreese, Weight, Kerr, Kroshus, 2021)**.**

Significant overall athlete-non-athlete differences ($p < .01$) meaning the differences in the populations of athletes and non-athletes are less than 1% due to chance:

- Life satisfaction (+)
- Social support (+)
- Depression (-)
- Fatigue (-)
- Social roles difficulty (-)

Study findings were, in some instances, mitigated/reversed when participants endorsed concussion, career ending injury or revenue sport participation histories or were female.

- For revenue sport status, former revenue sport athletes reported significantly higher physical function problems and pain than those not participating in revenue sports.
- For concussion history, those reporting at least one prior concussion reported significantly more physical function problems and higher social support than those with no concussion history.
- For career ending injury history, those reporting a career ending injury reported significantly higher physical function problems, fatigue, social roles difficulty, and pain than those not reporting a career ending injury.
- For gender, women (broadly – not former athlete women) significantly reported higher anxiety, physical function problems, fatigue, and social roles difficulty than men sampled.

Division I coaches are educators.

In a study of NCAA Division I coach (*n*=661) perceptions about their roles as educators and how this role could be altered through structural and philosophical changes within the academy, 98.5% cited teaching as their primary responsibility, yet only 69% believed this education was valued by their administration (Weight, Cooper, Popp, 2015). Despite this near-uniform belief in their educational role, the coaches were split on whether they would like to have an organizational structure and educational goals that recognized their role as educators. Rationale supporting both perspectives are included in the tables below. Coach perspectives from for and against formalization of athletic curricula underscore their passion for education through athletics in addition to a lack of understanding relative to faculty responsibilities.

Narrative responses - Athletics should be structured similarly to academics (to):

	n	%
Achieve academic mission through athletics	99	24.4%
"We are all educators, we just have different classrooms"		
"The athletic unit is a multidisciplinary learning environment"		
"As much learning happens in athletics as in the classroom"		
"I am first and foremost an educator"		
Provide greater job security to coaches	48	11.9%
"Coaching is a high risk profession where coaches are at the mercy of athletes and fans"		
"Professors do not have to worry about losing their jobs after a semester of "sub-par" performances in the classroom"		
Build relationships with academic departments	21	5.2%
"We are all part of the university and this model would build more cooperation between all units"		
"It would tie everyone together closely I think and bridge a unnecessary gap that exists"		
Correct the W/L, revenue-sport dominating culture	14	3.5%
"In athletics, the public tends to view a W or a L as the only criteria for evaluating coaches, so a different organizational structure could be useful because not everyone can win every year."		
"Coaches are held to a double standard. We are told that great value is placed on doing things the right way and building leaders, but we are judged on winning or on individual mistakes made by players."		
Validate the coaching profession	13	3.2%
"It would validate what I do at a university setting as valuable"		
"Brings more credibility to what we do as a perception of the public"		
Total	**195**	**48.1%**

Narrative responses - Athletics and academics require unique organizational structures (to):

	n	%
Focus facilitating athletic excellence	68	16.8%
Coaches are held accountable for student performance whereas professors just show up and teach. Our structure facilitates fostering athletic excellence.		
They are apples and oranges and require different structures. Professors don't have a win-loss record that affects their job security. They also don't recruit their students.		
Be compensated for extra responsibilities	30	7.4%
Coaches should be making more because of the hours they work.		
I work many more hours than any faculty member. I should make much more - including bonuses.		
Protect expert athletics control & flexibility	29	7.2%
The educational system is broken…why would we want to model it?		
When the music teacher can understand the physical and mental demands of obtaining a degree while participating in athletics then they can have their input.		
Avoid additional responsibilities	22	5.4%
We already work nights and weekends, there is no room for an additional workload.		
We have far too much on our plate already.		
Generate publicity, funds, and entertainment	13	3.2%
Athletics is a completely different beast because we are in the business of entertainment		
Although the moral value of education is the emphasis, athletics is still a business driven by revenue that is gained through winning. The underlying goal should be enforced by leadership and not by anything else.		
Build character/teach life lessons	12	3.0%
Athletics provides a rare opportunity to teach life lessons in ways that can't be done in traditional educational settings.		
Total	**174**	**43.0%**
Other	14	3.5%
I don't know/don't understand.	22	5.4%

Division I coaches utilize transformative teaching methods that enhance athlete self-efficacy

From a random sample of n = 184 junior and senior athletes from five Power5 institutions (29.3% response rate), athletes noted studying with both transformative (69%) and destructive (37%) coaches throughout their athletic careers. Transformative coaches were associated with significantly higher levels of athletics self-efficacy belief $F(1, 183) = 16.225$, $p < .001$.

Transformative coaching methods (outlined below) mirror teaching methods described by musicians and traditional students who were also included in this study (Weight, Lewis, Harry, 2020).

Table 4
Transformative Coaching Methods

	%	*n*
Verbal/Social Persuasion	**65%**	**92**
Consistent belief in/confidence of athlete's ability/potential	26%	24
High expectations, relentless pushing beyond our limits	17%	16
Positivity/encouragement/motivation/trust	14%	13
Specific challenging goals, accountability	8%	7
Personalized, clear, logical communication/instruction	7%	6
Care for athletes lives beyond the field/track/pool/court/mat	7%	6
Dedication/knowledge/competency/genius	7%	6
Listened and respected athlete feedback	4%	4
Constructive detailed feedback	4%	4
Motivational speeches/quotes	3%	3
Connects failures/trials/successes/training to life outside of athletics	3%	3
Mastery Experience	**14%**	**19**
Set realistic, achievable goals to facilitate feelings of accomplishment	53%	10
Focus on breaking personal bests/records and not comparing ourselves to others	21%	4
Provides opportunities/encouragement to compete/challenge myself often	16%	3
Provides resources to facilitate self-analysis (record and analyze practice)	11%	2
Physiological and Affective States	**11%**	**16**
Uplifting/fun/safe training environment	38%	6
Visualization/mediation	19%	3
Facilitates environment conducive to athletic-academic balance and well-being	19%	3
Works with athletes until they feel exactly how proper technique should feel	13%	2
Connects the feelings of failures/trials/successes to life outside of athletics	13%	2
Vicarious Experience	**10%**	**15**
Creates a culture where we respect, learn from, and hold each other accountable	33%	5
Facilitates demonstrations of skills/technique for athlete to emulate	20%	3
Leadership by example - a great role model for life as an athlete and human	20%	3
Coach success as an athlete/Olympian led to trust/respect of knowledge	13%	2
Outside speakers/resources utilized to exemplify how we should live/train	13%	2

N = 101 (142 Themes expressed)

Self-efficacy beliefs related to the performance of a task have been identified as a strong predictor of performance success. Practitioners can utilize the data and experiences of athletes in this study to cultivate stronger coach-athlete relationships that foster self-efficacy development. This study may serve as a foundation for coaching seminars, symposiums, and trainings to assist coaches in utilizing the four sources of self-efficacy to build athletes'

confidence and performance skills. Additionally, athletes may be empowered to exercise agency as they filter the information and experiences associated with collegiate athletics to support a personal mindset of self-belief.

The pursuit of expertise through sport promotes brain electrical network topologies.

There is a growing body of research that links skill mastery with brain function stimulation and cognitive development. As athletes engage in deliberate practice, they develop circuits of networking in the brain that become basic and natural. This-brain body function promotes cerebellum development which is crucial for physical coordination, attention, memory, reading, emotional control, and social skills. **Physical skill development may be superior for neuropathway (e.g. myelin) development than traditional intellectual development because of the length of neural pathways between the brain and limbs.** There is tremendous potential for research in this area only recently possible due to the advancements of mobile EEG neuroimaging technology.

An example of research in this area comparing expert and elite archers is below (Gu et al., 2022). Compared with the expert archers, the elite archers had stronger functional coupling in beta1 and beta2 bands, and the difference was evident in the frontal and central regions; in terms of global characteristics of brain network topology, the average clustering coefficient and global efficiency of elite archers were significantly higher than that of expert archers, and the eigenvector centrality of expert archers was higher; for local characteristics, elite archers had higher local efficient; and the brain network characteristics of expert archers showed a strong correlation with archery performance.

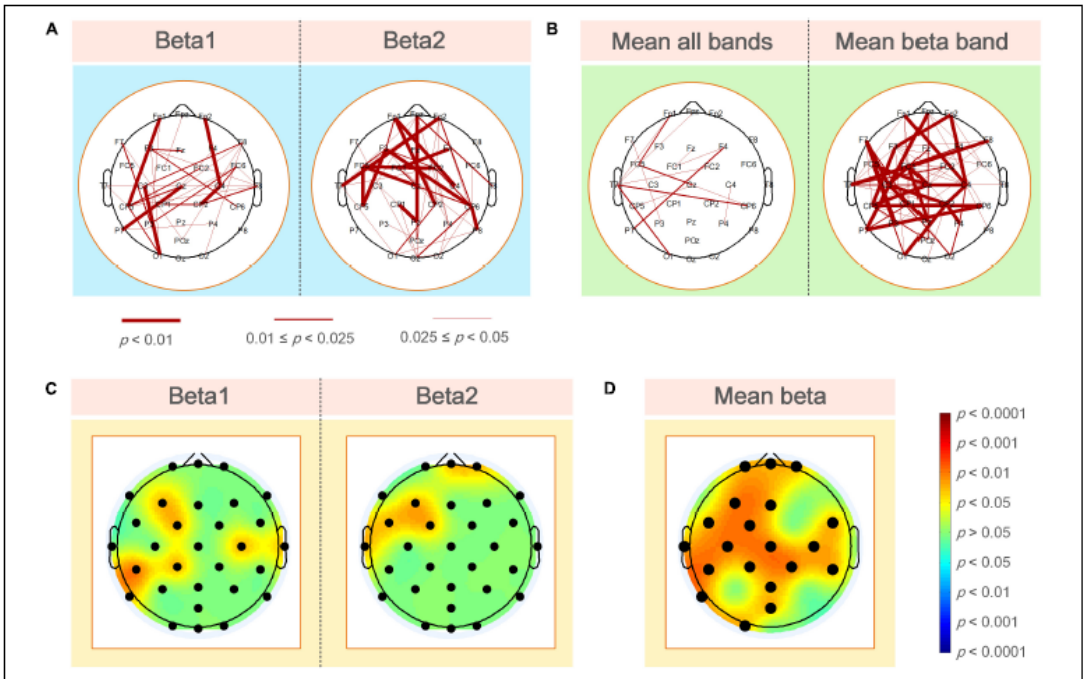


FIGURE 4 | (A) WPLI couplings of the elite and expert groups had a significantly different connection in the analyzed frequency bands. Nodes represent electrode positions, and connections between nodes represent statistically significant differences between the two groups ($p < 0.05$). The red connections indicate that the elite archer is stronger than the expert archer, and the thicker lines indicate that the connection is more significant; **(B)** the elite and expert groups had significantly different connections in the average WPLI of all frequencies and analyzed frequencies; **(C)** the average WPLI couplings of each node in the elite and expert groups showed significant differences in the analyzed frequency bands of the brain topographic map, with black nodes representing electrode positions; the darker the color in the map, the more significant the difference; **(D)** the average WPLI connections of the elite and expert groups' nodes have a significant difference in the average beta band connection value of the total connection strength difference graph. The black nodes are the electrode positions with a significant difference in connection.

Athletes and coaches collect, process, analyze and visualize tremendous amounts of data.

The increasing prevalence of data analytics in sports presents a unique opportunity to authentically support athletes' skills in the technical aspects of critical data literacy through everyday sports engagement, leveraging ongoing data practices. Advances in technology over the last decade have prompted exponential growth in sport-related data. Integrated devices can chart all aspects of biophysiological, mechanical, and psychological loads in real time. Team analytics are used to understand group movement, and generate insights into performance, strategies and tactics, and event-related data. Automatic and interactive data analysis is increasingly important.

In pilot interviews with 22 athletes and 22 staff across the University of Maryland (UMD, 17 athletes, 8 staff) and the University of North Carolina (UNC, 5 athletes, 14 staff), findings show that data are an integral part of athletes' lives, as coaches, trainers, and medical staff constantly collect, analyze, and make decisions about their activities based on these data (Greene et al., 2022; Clegg et al., 2022). Our findings indicate extensive data collection and monitoring tools are developed specifically for coaches and administrators. Athletes, however, expressed frustration with the limited mechanisms for accessing, exploring, managing and sharing their data. Football players and athletics staff in our studies and in partnership meetings have described players' primary access to training and nutrition data (e.g., speeds, lifting, calories, body weight and composition) as provided only upon request via physical paper printouts that do not facilitate further analytics, nor tracking over time.

Data practices in athletics influence and are influenced by complex power dynamics between and among athletes and coaches, privacy considerations around health and performance data, and data ownership rights. Formalized education will help athletes discuss and navigate such tensions; manage and share data according to their preferences and organizational rules, while critically reflecting on these preferences and norms.

Currently, approximately 34% of NCAA Universities offer credit for athletic participation and 20% offer academic courses specifically for athletes.

This distribution is not significantly different between DI-III or public/private institutions but does significantly differ based on geographic location with 66% of institutions in the West facilitating athlete-centric education compared to 18% in the Southeast, 25% in the Northeast, and 36% in the Midwest (Weight & Huml, 2016). Most of the athlete-specific courses offered were based on life-skills topics designed for freshmen to assist with a successful transition to college. Credits offered for these courses ranged from one-half to six credits. Athletic academic advisors (n = 240) provided insight relative to why or why not they believed courses should be offered for or tailored specifically for athletes:

Rationale to support why courses should be offered for or tailored specifically to athletes (n=73)

	%	*n*
To discuss unique challenges and opportunities they face	32%	23
To provide a unique opportunity to review and apply lessons learned through athletics	22%	16
Freshmen athletes need a life-skills course to facilitate an optimal transition to college	15%	11
Credit should be given for activity classes only	12%	9
Special sections of courses should be offered that do not conflict with practices schedules.	10%	7
Credit should be given for leadership training because there is limited time for these needed opportunities	4%	3
Where education is offered that requires participation and assignments, credit should be given.	3%	2
Remedial education is needed for athletes who do not meet the academic profile of regular admits	3%	2

Rationale to support why respondents believe courses should not be offered for or tailored specifically to student-athletes (n=108)

	%	*n*
Athletes should be integrated and experience college life like all others	59%	64
Shouldn't offer special privileges or limit opportunities - all courses should be open to the general student-body	19%	21
Against NCAA philosophy / legislation	7%	8
Athletics is not a major and not academic - it is extra-curricular	7%	8
Bad for institutional image to give athletes preferential treatment - would be perceived as a "jock class"	6%	6
Not an option at a small college	1%	1

Commentary on the fairness and disparate experiences of athletes across institutions:
With the increasing oversight and regulation in the NCAA, the list of mandated and recommended trainings have skyrocketed encroaching further and further into the athlete's time (Benford, 2007; Hainline, 2015; Huml, Svensson, & Hancock, 2014; Wolverton, 2014). The attitudes, beliefs, and intentions of some schools over others offered an interesting insight into how disparate the athlete-experiences can be depending on how the schools incorporate the educational requirements requisite to being an NCAA athlete. One respondent from a school with a 6-credit hour onboarding course mentioned, "this course is pretty much offered at every other Division I institution to help students transition into college life and specifically address the expectations of being a student-athlete" (Division I-FCS Respondent 82). Several others echoed the courses provide an academic forum to discuss many of the NCAA leadership training mandates that are fundamental to success of all students, but particularly important to student-athletes. Interestingly, others thought offering this type of course was against NCAA rules, and would be seen as a "jock class" bad for institutional image (Smith & Willingham, 2015; Southall, 2015). Hundreds of training-hours in some institutions are embedded into the academic experience and integrated into the university, while others are done independent of

for-credit academic structures, adding additional commitments to the athletes who already have academic and athletic time commitments averaging just under 80 hours per week (Benford, 2007; Hainline, 2015; Huml, Svensson, & Hancock, 2014; Wolverton, 2014).

An interesting case study could be drawn from the experiences of athletes at the University of North Carolina, a southeastern school that has drawn tremendous attention for a "paper-class" scandal affecting over 3,100 students of which 47% were athletes enrolled over nearly two decades in courses overseen and graded by an administrator in the Department of African and Afro-American Studies (Smith & Willingham, 2015). This is an institution that offered no credit for athletic participation and no athlete centric courses (on par with the regional findings in this study), yet it has one of the leading leadership academies for athletes in the nation (Weight, 2015). This four-year program facilitates hundreds of hours of academic leadership training on top of the NCAA training mandates and life-skills seminars. These no-credit educational experiences at some peer institutions would equate to a minimum of 18 credit hours if formalized into curricula. This illustration of the stark variance in institutional philosophy regarding education through athletics raises important issues of equity, and possible consequences for institutions that do not facilitate educational opportunities, where time-sapped athletes and sympathetic staffers might strive to find the path of least resistance to survival.

III. How do you provide academic credit for sport? What models currently exist to demonstrate how this can be done?

The (Donor Named) Program in Expertise

Below is a proposal in the launching stage at The University of North Carolina at Chapel Hill. The Art & Science of Expertise (IDST 190) core course is being taught for the first time in the Spring, 2023 by Erianne Weight (Education through Athletics), Jeff Greene (Learning Science), and Anson Dorrance (Hall of Fame Soccer Coach / Leadership Expert) to *n* =333 students. The course filled on the first day of registration.

(The _____) Program in Expertise

"The Art & Science of Maximizing Human Performance"

PDE = Performance Development Experience (1 Cr)

15 Credit Minor: Core course (3 Cr), Selection of 3 Enhancement Courses (9 Cr), and 3 1-Cr PDEs (3 Cr)

This minor proposal could easily be expanded to a major including the following courses:

- Performance Development Experiences (Individual / Group Lessons)
- Applied Data Science (Film, Applied Analytics, Data Visualization)
- Performance Physiology
- Performance Nutrition

- Strength & Conditioning
- Performance Psychology & Neuroscience
- Leadership & Group Dynamics
- Creativity
- Elite Performance throughout history
- Coaching Science (possibility to have sport specific courses)
- Personal Branding
- Financial Literacy
- Sport Analytics
- Sport Business
- Sport Sociology
- Applied anatomy/biomechanics
- Applied injury, & injury rehabilitation

Commentary on a Concrete Approach (From Huml & Weight, 2017)

The athlete-educational experience that has been a concern since the inception of intercollegiate athletics has led many faculties to fear athlete-centric programming for reasons including an exacerbation of social isolation or the perceived non-academic collective hubris and entitlement of athletes. Although there is a degree of isolation within every academic discipline with major-only courses and experiences that do not require justification, the unique nature of the athlete experience may necessitate additional consideration due to the social, commercial, and administrative pressures that could lead to academic clustering and athlete-segregation. Social isolation is a major contributing factor to athletic role-engulfment, academic disengagement, and institutional detachment (Adler & Adler, 1991) and should be a concern when conceptualizing exclusive access for courses. For this reason, **a practical approach to athlete-centric educational experiences should be conscious of these realities and address concerns judiciously through credit limitations, cross-disciplinary faculty involvement, and the inclusion of non-athlete elite performers in the programming.**

Along this vein, a concrete approach to facilitating equitable educational opportunities might include three distinct elements. First**, a 3-credit "onboarding" course** specific for athletes in order to institutionalize many of the first-semester mandatory NCAA trainings in addition to life-skills initiatives which may be similar to other first-semester courses offered to the general student-body. Ideally, the course would connect a broad array of cross-disciplinary faculty and campus support units to participate on a rotating basis to expose the new students to educational opportunities throughout campus, while bringing faculty into athletics discussions and informing them of NCAA regulations. Depending on the content of this course, it could include all incoming students to address the possibility of athlete-isolation, however, special break-out sessions to allow adequate discussion of specific NCAA material may necessitate some degree of athlete centricity.

A second possibility would include offering **credit for participation but infusing the traditional athlete-participation experience with educational elements**. For instance, perhaps in a school with a physical education requirement, faculty that might normally teach a strength training course could supplement strength training practices the athletes are already required

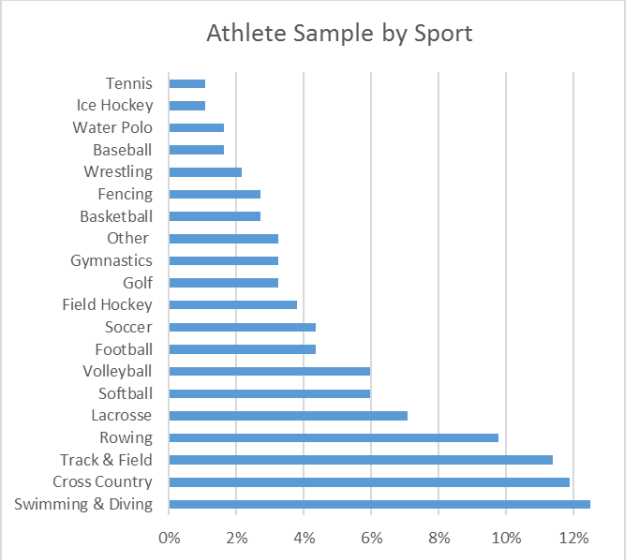
to do with lectures on physiology, nutrition, or training principles. This could be incorporated into campus physical education requirements, but special 1 or 3-credit sections (dependent on existing campus structures) could be taught to build upon the unique training varsity and possibly elite recreational or club-sport athletes already receive. The allocation of credit and academic structure of these participation-centric courses should match institutional academic philosophy, though norms should be recommended in order to facilitate competitive parity. A series of four 1-credit courses over four years, or a 3-credit course and additional 1-credit course over two years integrated within the physical education, nutrition, health, kinesiology, exercise and sport science, or physiology department are two possibilities that emerged.

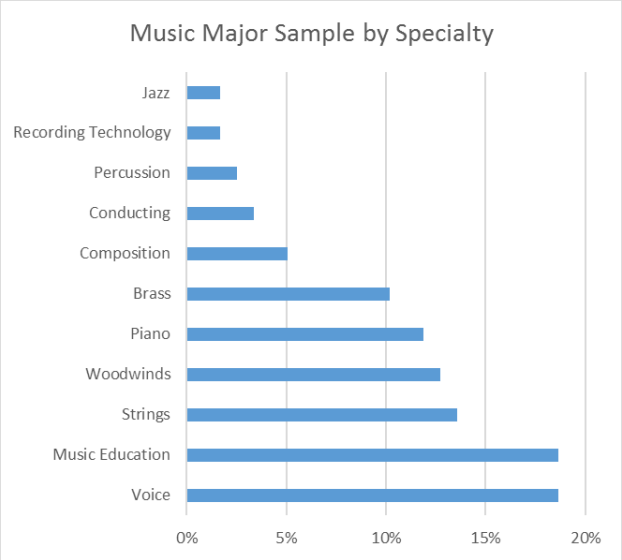
A final educational possibility would be a **field of study related to expertise development**. This could include varsity athletes, musicians, orators, dancers, thespians, etc. This major or minor could infuse the elite performance experiences students are having with material designed to build upon those experiences. Courses might include performance psychology, leadership and group dynamics, performance nutrition, media training, entrepreneurship, etc. in addition to two 3-credit "field experience" opportunities that allow the students to reflect upon their elite experiences, apply literature to their (on-the-court) study, meet with a faculty and field supervisor (coach) to set and track learning goals, and infuse institutionalized scholarship and educational legitimacy into their traditionally "extracurricular" endeavor. Perhaps as the body of literature centered on the educational outcomes of intercollegiate athletics participation grows, we will embrace the unique laboratory of learning possible through NCAA competition and commercial opportunities, integrate faculty and coaches to bridge theory and practice on the field, on camera, in the training room, and in the classroom, and reverse the centuries of bias that view athletics as an auxiliary to the university (Brand, 2006; Feezell, 2015; Sack, 2009; Weight et. al., 2015).

Models in the performing arts can be easily adapted to sport.

In a survey of junior and senior undergraduates from five Power Five athletics (*n* = 184), First-Tier music, (*n* = 83), and traditional student (*n* = 72) programs, structural similarities between music and athletics were revealed (Weight, Harry, Navarro, Lewis, 2020):

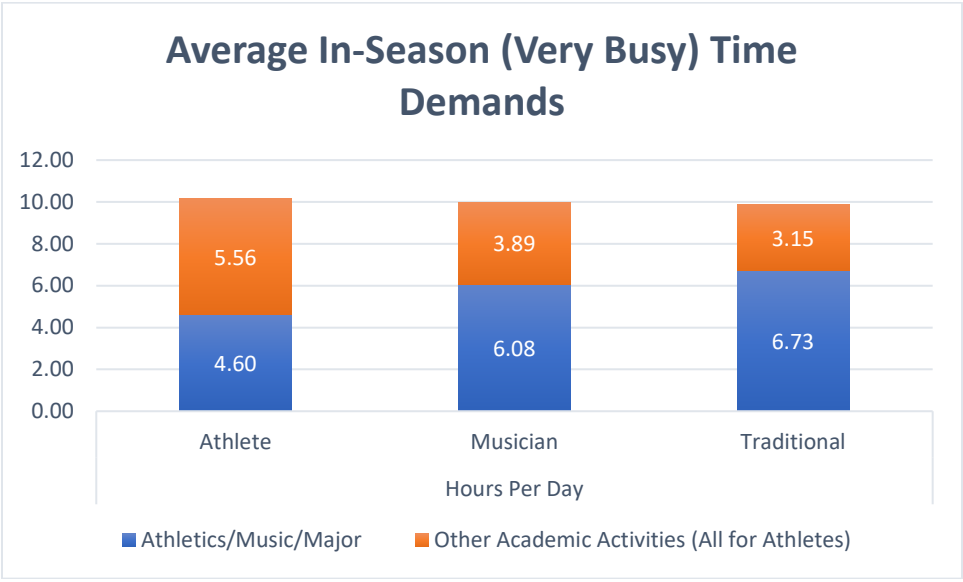
Specialties:





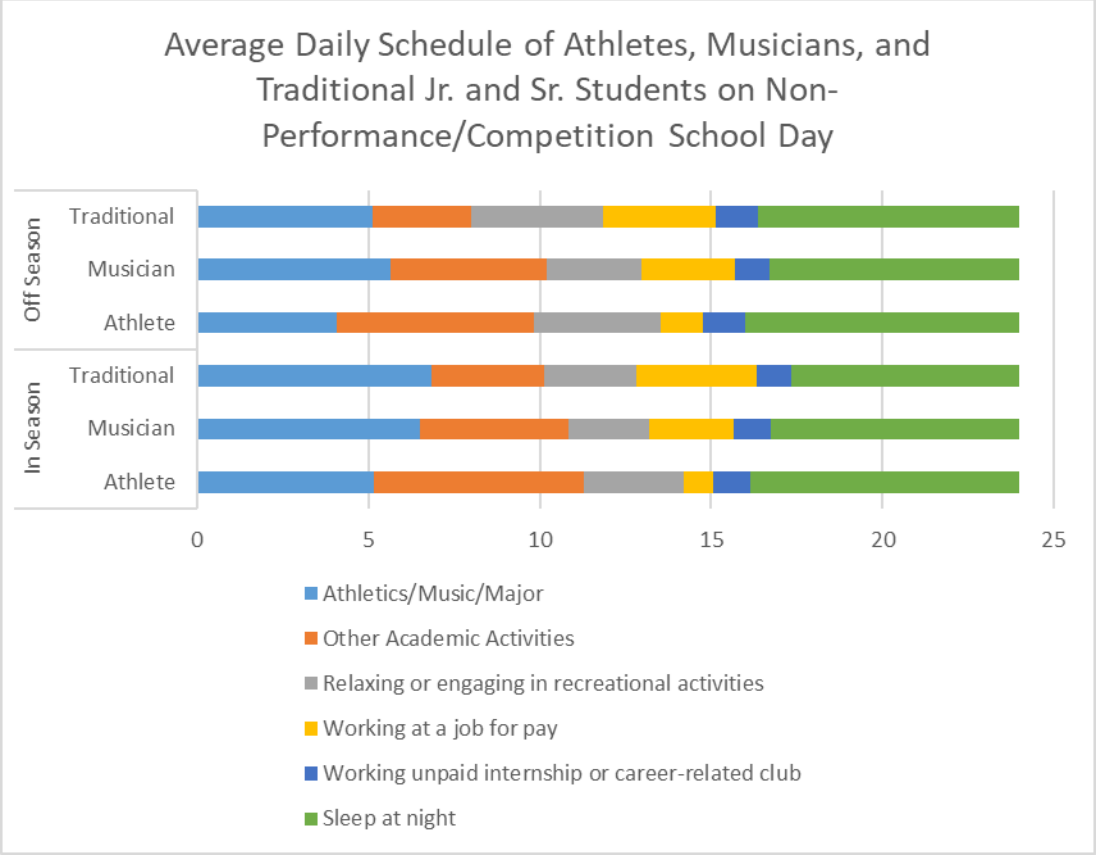
Self-Reported Time Demands:

Athletes, musicians, and traditional students each reported ~10 hours spent per school day (M-F) when they are "very busy" on their specialty and academic demands. Musicians and traditional students receive some form of credit for all ~10 hours devoted to these areas while athletes only receive credit for the time they spend on "other academic activities" noted below in orange. **Musicians and traditional students reported spending significantly more time on their specialty-area (music or major) than athletes spent on their sport.**



In-season (very busy) daily schedule on a non-performance/competition school day (in hours)

	Athletes (1)			*Musicians (2)*			*Traditional Students (3)*					
	Mean	*SD*	*%*	*Mean*	*SD*	*%*	*Mean*	*SD*	*%*	*F* (2,343)	*p*	*Tukey's HSD*
Focus Comparisons (# of Hours)										29.84	.000	1 < 2,3
Athletics-related activities	4.60	1.49										
Music-related activities				6.08	2.43							
Major-related activities							6.73	3.23				
"Other" Academic Activities										40.00	.000	1 > 2,3
Non-athletics academic activities	5.56	1.95										
Non-music academic activities				3.89	1.97							
Non-major academic activities							3.15	2.42				
Relaxing or engaging in recreational activities	2.35	1.62		1.94	1.75		2.59	1.84		2.85	.059	
Working at a job for pay	.29	1.03	12%	2.03	2.42	59%	3.38	3.61	61%	53.28	.000	1 < 2,3; 2 < 3
Working unpaid internship or career-related c	.49	1.06	28%	.68	1.75	26%	.90	1.56	41%	2.43	.090	
Sleep at night	7.30	1.08		6.83	1.30		6.52	1.31		12.65	.000	1 > 2,3
Total academic activities	5.56	1.95		9.90	3.17		9.35	3.90		92.04	.000	1 < 2,3
Total academic (& athlete athletic) activities	10.15	2.51		9.90	3.17		9.35	3.90		1.57	.210	
Total Hours Accounted For	20.58			21.44			23.26					



Comments regarding schedule as a musician/athlete in comparison with traditional students

Athletes			Musicians		
Theme	*%*	*n*	*Theme*	*%*	*n*
Immense time commitments	36%	48	No-credit music major obligations	40%	24
Little social, free, or down time	21%	28	Low-credit classes with high workload	27%	16
Difficulty balancing sport and academics	18%	24	Difficulty balancing life demands	22%	13
Fatigue	11%	14	More classes required for music major	12%	7
Difficulty scheduling courses	10%	13			
Missing classes when traveling	4%	5			

Transferrable skills learned through athletics/music applicable to future career

Athletes			Musicians		
Theme	*%*	*n*	*Theme*	*%*	*n*
Hard work	23%	64	Hard work	31%	8
Teamwork	22%	62	Teamwork	19%	5
Time management	18%	52	Critical thinking	15%	4
Leadership	16%	45	Time management	12%	3
Communication skills	9%	24	Performance skills	12%	3
Setting & achieving goals	6%	16	Creativity	12%	3
Critical thinking	4%	11			
Healthy life habits	3%	8			

Additional time demands: Non-athletic/music additional requirements

Athlete Addl Requirements	*%*	*n*	Musician Addl Requirements	*%*	*n*
Community service	58%	83	General Education Classes	67%	16
Leadership/life skills seminar	25%	36	Language/Business/Religion Courses	21%	5
PR/fundraising appearances	8%	11	Service	13%	3
SAAC meetings	5%	7			
NCAA rules training	3%	4			
Study table	2%	3			

Note: Average Music requirement 2-3 times per week, average athlete requirement 2-3 times per month

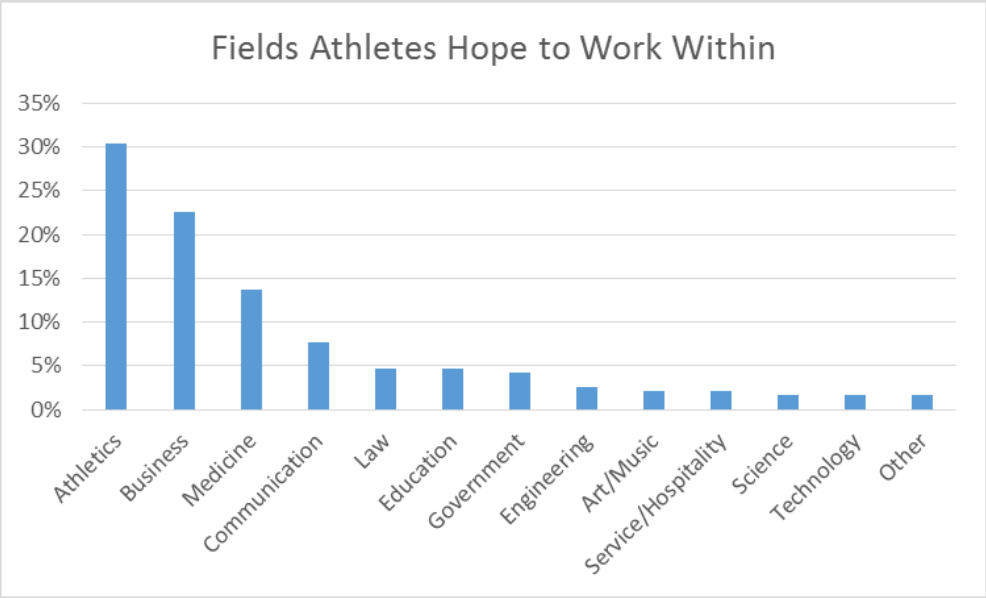
Career expectations beyond music/sport:

Musicians expressed significantly more of a desire/expectation to pursue a career related to music than their athlete classmates, though 24% of the music majors did not plan to pursue music professionally. Despite minimal educational pathways for a career in sport, 37% of athletes in the sample indicated plans to pursue some type of career related to sport.

Plans to pursue a career related to athletics/music

	Athlete	Musician	χ^2	*p*
Yes	71	65	36.766	0.000
	37%	76%		
No	121	20		
	63%	24%		

Adjusted Standardized Residual = 6.1



Example curriculum from music

From Stanford University Department of Music (music-sport comparisons theorized).

The Department of Music at Stanford brings together music-making and scholarly research in composition, conducting, performance, music history, ethnomusicology, music theory, cognitive science, intermedia, and computer-based technologies.

*The Department of **Athletics** at Stanford brings together the **pursuit of championships** and scholarly research in **expertise development, leadership,** performance, **sport** history, **sport** sociology, **physiology, nutrition, psychology,** cognitive science, **sport analytics,** and computer-based technologies.*

The undergraduate major in Music is based on a course of study that combines breadth of musical experiences across multiple dimensions with depth in a chosen area, allowing students to develop an array of tools as part of their aesthetic and musical formation. Theory, performance, history, cultural contextualization, technology, and science all contribute to a curricular foundation for all majors.

*The undergraduate major in **Athletics** is based on a course of study that combines breadth of **athletic** experiences across multiple dimensions with depth in a chosen area, allowing students to develop an array of tools as part of their **scientific and athletic** formation. Theory, performance, history, cultural contextualization, technology, and science all contribute to a curricular foundation for all majors.*

Of the required **62 units**, 42 comprise the shared foundation. The remaining 20 minimum required units can be devoted to any area of focus (strings, keyboard, vocal, woodwind, brass, percussion concentrations), including self-defined exploration. Mentorship under the guidance of a faculty advisor is an indispensable component of this 20-unit requirement.

*Of the required **62 units**, 42 comprise the shared foundation. The remaining 20 minimum required units can be devoted to any area of focus (**football, track, basketball, field hockey, soccer**), including self-defined exploration. Mentorship under the guidance of a **coach** is an indispensable component of this 20-unit requirement.*

Lower-Division Music Theory (12)
Lower-Division Music History (12)
Upper-division Music Theory & History (12):
Performance (3) • Ensemble • Conducting skills • Play/perform electronic/improvised/contemporary music
Composition/orchestration (3)
Performance Requirements (20 Units) • Private lessons (2/ 6 Quarters = 12) • Solo recital project (2) • Vocal repertoire (3) • Vocal pedagogy (1) • Stage performance (2)

IV. What are the barriers to faculty recognizing college sport as a potentially rigorous opportunity for academic study? How will faculty and others be convinced that this is an academically rigorous pursuit and not credit to "play" a sport?

Responses to potential critiques

We are here to educate students, not win championships.

- Check your biases. Championships are in many ways synonymous with excellent education. Align the research on experiential education – the pursuit of excellence in music/art/dance/ROTC -- with that of athletics. If our music or art programs were gaining national recognition for their excellent performance, would you feel they are receiving tremendous education or that they have their priorities out of line?
- Research demonstrates there is educational value within athletics. We are urging a formalization of this.

Is this a replacement for "paper classes" so athletes can "major in eligibility"?

- The courses entail standard workloads, high visibility, and oversight.

Will this further facilitate athlete isolation?

- Every course is open to athletes and non-athletes, designed to bridge theory and practice. One of the conditions of implementation student-support, residential, and recreational spaces are integrated across athletes and non-athletes so friendships and liberal arts connections can naturally occur.

How will already financially limited universities facilitate this additional curriculum?

- Many of the recommended courses are already being offered.

How do we implement in the current environment?

- Reflective of the historic classist and racist evolution of educational curriculum compounded by some of the byzantine rules we've enforced and ascribed to historically through the NCAA structure, to be "athlete-friendly" often is interpreted as synonymous with anti-academic, which is the heart of the problem.
- Because of this prevailing fear, leadership and leadership committees will likely offer tempered support with hesitancy to overtly endorse. Pieces of a robust curriculum will be pulled apart which downgrades the impact of the educational proposal.
- Advocacy at the national level addressing some of the deep institutional biases rooted in racism and classism will pave the way for campus dialogue.
- An academic donor and faculty champion with university influence (e.g. a full professor / dean) who also has strong relationships with the athletics.
- National curriculum development in niche areas with course content packages developed by education and content experts to ease broad adoption.

Moderate support for an athletics performance minor with measurable education outcomes was found in a pilot study of three ACC institutions.

A pilot study survey distributed to FBS Division I college varsity athletes, coaches, athletics administrators, and faculty from three Atlantic Coast Conference institutions, explored the interest in an athletics performance minor through the lens of the Integrated View of intercollegiate athletics (Harry & Weight, 2019). The results demonstrate a moderate interest in an athletics performance curriculum, with 66% of those surveyed voicing support. Those most supportive were varsity athletes and coaches, while faculty were the least supportive.

The following description of an athletics performance minor was provided with the goal of distinguishing this type of curriculum from other similar areas such as exercise science and sport management:

> Research over the past decade has provided insight into positive educational outcomes associated with participation in intercollegiate athletics. There appears to be education that happens through athletics that translates into increased marketability, satisfaction with life, occupational success, and health. This education is something many in athletics have felt, seen, or experienced, but little has been measured. As we seek to enhance the educational experiences of intercollegiate athletes, we are hoping to explore the possibility of designing an athletics performance minor that will pair a lot of the on-the-field knowledge gained (strength training, for example), with applied education (exercise physiology, for example), and facilitate credit for education that occurs outside of the traditional structures of the academy (viewing athletics similar in form to music, or dance, for example).

Overall levels of support for the proposed curriculum in addition to both supportive and unsupportive rationale are listed in the tables below.

Support for implementing an athletics-centric curriculum

	Overall		*Athlete/Coach/ Admin*		*Faculty*		*Mean Diff*	*F*	*p*
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*			
Support for implementing an athletics-centric minor	3.72	1.08						6.51	0.000
Athlete v. Faculty			4.00	0.79	2.84	1.17	1.16		
Coach v. Faculty			4.00	0.78	2.84	1.17	1.16		
Admin v. Faculty			3.72	1.36	2.84	1.17	0.88		
Credit for participation as currently organized	3.33	1.31						8.27	0.000
Athlete v. Faculty			3.86	1.22	2.21	0.98	1.65		
Coach v. Faculty			3.46	1.06	2.21	0.98	1.25		
Admin v. Faculty			3.28	1.41	2.21	0.98	1.07		
Credit for participation with clear educational outcomes	3.8	1.18						4.28	0.007
Athlete v. Faculty			4.11	1.04	3.00	1.20	1.11		
Coach v. Faculty			3.88	1.04	3.00	1.20	0.88		
Admin v. Faculty			3.80	1.31	3.00	1.20	0.94		

Scale ranged from (1) Very unsupportive to (5) Very supportive

Initial thoughts on an athletics performance minor

	n	%
Supportive	32	41.6%
Athletics is worthy of class credit	22	28.6%
Transferable skills/experiential learning	14	18.2%
This could help prepare student-athletes for life after sports	12	15.6%
Curriculum needs to be very structured	11	14.3%
Unsupportive / Skeptical	6	7.8%
Curriculum offers potential for easy credit	5	6.5%
Want more information on the concept	5	6.5%
College athletics is a racket	5	6.5%
Athletics is similar to dance and theater so this curriculum should be an option	4	5.2%
Poses great opportunity for future coaches	4	5.2%
Campus is already too focused on athletics and this will further marginalize academics	4	5.2%
Athletics is purely extracurricular and should remain as such	3	3.9%
Bad optics for campuses	3	3.9%
This curriculum could help solve the disconnect between the academy and athletics	3	3.9%

n = 77

V. How can we protect from abuse?

1. **Team by team evidence of academic breadth and achievement.** Monitor selection of majors and pursuit of honors. Hold coaches accountable for academic culture of team.
2. **Integration of non-Athletes and Athletes** across student support, residential and recreational spaces so that liberal arts education can be sustained through friendships and student-to-student emulation.
3. **A vetting of "Education through Athletics" proposals** in campus discussions among faculty, coaches and students. The problems, the proposals, their purposes, and the requisites for their success need to be engaged collectively if we are to arrive at a workable solution.

VI. What should we be studying and who might we bring together to evaluate and justify a case for university faculty to develop curriculum for this purpose?

Just before his passing, Anders Ericsson (pioneer in expertise research) expressed tremendous enthusiasm about the idea of developing curricula relative to the educational value of college sport, expertise, and the art and science of maximizing human performance as outlined above. He recommended beginning with a conference, website, op-ed, then book:

> *When I planned my conference in 1994, I started by contacting the key people. I started by asking my mentor and collaborator Herbert Simon (Nobel Prize winner) when*

he would like to come to Florida. Once I had him on board I contacted people with the constraints on dates and other issues and eventually the remaining people were invited with the dates that had been agreed upon by the earlier invitees.

The science of expertise development is quite robust. Anders Ericsson as the father of the field would have been an ideal champion, but he has many mentees that have continued his legacy. He recommended the following articles to launch the academic advancement of the science of sport:

Ericsson, K. A. (2020). Towards a science of the acquisition of expert performance in sports: Clarifying the differences between deliberate practice and other types of practice. *Journal of sports sciences*, *38*(2), 159-176.

Haugen, T., Seiler, S., Sandbakk, Ø., & Tønnessen, E. (2019). The training and development of elite sprint performance: an integration of scientific and best practice literature. *Sports medicine-open*, *5*(1), 1-16.

Hunter, P. (2019). The evolution of human endurance: Research on the biology of extreme endurance gives insights into its evolution in humans and animals. *EMBO reports*, *20*(11), e49396.

Li, P. L., Ko, A. J., & Begel, A. (2020). What distinguishes great software engineers?. *Empirical Software Engineering*, *25*(1), 322-352.

Wicker, P. D. P., Dallmeyer, S., & Dvořák, J. The economic "return on investment" in physical education, physical activity and sport.

Zuk, J., & Gaab, N. (2018). Evaluating predisposition and training in shaping the musician's brain: the need for a developmental perspective. *Annals of the New York Academy of Sciences*, *1423*(1), 40-50.

Knight Commission Next Steps

If the Knight Commission on Intercollegiate Athletics believes this is area of emphasis for 2023 and beyond, the following next steps would be transformative:

- Develop a report/website outlining the rationale for a curriculum in expertise development – outline the vision.
- Socialize the idea with groups of presidents, provosts, faculty, athletics administrators, coaches, and athletes.
- Publicize an op-ed referencing the report/website – popularize the vision.
- Partner with a university / center to put the idea into practice.
- Fund the development of high-quality curriculum and easy to adopt course material developed by experts to be launched/shared at no cost with other universities.

VII. References

Chalfin, P., Weight, E.A., Osborne, B., Johnson, S. (2015). The value of intercollegiate athletics participation from the perspective of employers who target athletes. *Journal of Issues in Intercollegiate Athletics. 8,* 1-27.

Clegg, T., Cleveland, K., Weight, E., Greene, D., Elmqvist, N., *In Press.* Data Everyday: Athletes' Critical Data Literacy Practices in Collegiate Sports Contexts. *Journal of Research in Science Teaching.* (IP =4.89)

DeFreese, J.D., Weight, E.A., Kerr, Z., Kroshus, E. (2021). Health and well-being measures of collegiate athlete and non-athlete graduates. *Journal of Intercollegiate Sport.*

Greene, D., Beard, N., Clegg, T., Weight, E. *In Review – December, 2021.* The Visible Body and the Invisible Organization: Information Asymmetry and College Athletics Data. *Big Data and Society.*

Gu, F., Gong, A., Qu, Y., Bao, A., Wu, J., Jiang, C., & Fu, Y. (2022). From Expert to Elite?—Research on Top Archer's EEG Network Topology. *Frontiers in human neuroscience*, *16*.

Harry, M.*, Weight, E.A. (2019). Education through athletics: Interest in an athletics performance curriculum. *Journal of Applied Sport Management. 11*(4), 15-28.

Weight, E.A., Cooper, C.G, Popp, N. (2015). The Coach-Educator: NCAA Division I Coach Perspectives about an Integrated Organizational Structure. *The Journal of Sport Management. 29,* 510-527.

Weight, E.A., DeFreese, J.D., Bonfiglio, A.*, Kerr, Z., Osborne, B. (2018). Occupational measures of former NCAA athletes and traditional students. *The International Journal of Sport Management. 19*(2), 1-26.

Weight, E. A., Harry, M., & Navarro, K., Lewis, M. (2020). Integrating athletics within the academy: Educational experiences of athletes, musicians, and traditional students. *Journal of Issues in Intercollegiate Athletics, 13,* 143-169.

Weight, E.A., Huml, M.* (2016). Facilitating education through athletics: An examination of academic courses designed for NCAA athletes. *Journal of Intercollegiate Sport, 9*(2), 154-174.

Weight, E. A., Lewis, M., Harry, M.* (2020). Self-Efficacy Belief and the Influential Coach: An Examination of Collegiate Athletes. *The Journal of Athlete Development and Experience, 2,* 198 – 216.

Weight, E.A., Navarro, K., Huffman, L., Smith-Ryan, A. (2014). Quantifying the psychological benefits of intercollegiate athletics participation: Implications for higher education policy and practice. *Journal of Issues in Intercollegiate Athletics. 7, 390-409.*

Weight, E.A., Navarro, K., Smith-Ryan, A., Huffman, L. (2016). Holistic Education through Athletics: Health literacy of intercollegiate athletes and traditional students. *The Journal of Higher Education Athletics and Innovation. 1,* 38-60.

Weight, E.A., Smith, A.B., Rubin, L. (2022). The athlete advantage: Human capital resource emergence through sport. *Journal of Issues in Intercollegiate Athletics.* 15: 442-458.