Title: Considerations in the development of a postgraduate strength and conditioning program: Insights from the US, Australia, the UK and New Zealand

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Abstract

Aspiring and established strength and conditioning professionals are increasingly seeking opportunities to further their knowledge to gain a competitive advantage within the highly competitive profession. Postgraduate degree programs in the discipline are therefore becoming a popular option for academic institutions to meet the demands of the workforce and marketplace. The purpose of this article is to bring together experienced practitioners and applied academics to offer considerations for the prospective strength and conditioning postgraduate student. Furthermore, this piece can be considered by academics that are responsible for the development of such programs. Future students are encouraged to reflect on their strengths and weaknesses, current and intended career trajectory, and work-life circumstances. Students’ needs and wants, industry demands, and teaching and learning processes must be well understood by academics responsible for developing these programs. Finally, factors such as coursework and research content, authentic teaching and learning tasks, professional practice, and accreditation requirements represent key considerations of a successful postgraduate strength and conditioning program.
Introduction

Increasingly, potential and existing strength and conditioning (S&C) practitioners are seeking opportunities to further their knowledge to provide a competitive advantage within the S&C profession (10, 11, 16, 23). Successful coaches are also highly intrinsically motivated and are willing to devote time and resources to professional development (7). Of the multiple roles in high performance sport, the strength and conditioning coach is the most prolific position (8). As such, postgraduate degree programs in the discipline are becoming a popular option for academic institutions to meet both marketplace and workforce demands. Prospective students are therefore presented with an increasing range of postgraduate options targeting their professional development. The purpose of this article is to outline the considerations of developing a successful Master of S&C program that properly supports the development of coaches by bringing together academics and practitioners across multiple countries (US, Australia, New Zealand, UK) to provide insight into the topic. Furthermore, this paper aims to provide some ‘behind the scenes’ insight for existing and aspiring S&C coaches who may be considering these programs with a view to inform their decision making. We present each consideration from the perspective of both the academic and the prospective student.

Academic: ‘Who are we targeting?’ Prospective Student: ‘Where do I want to take my career?’

An initial step in the construction of a Masters of S&C program is to determine the target market. This is important as it will dictate the content of the program and the delivery method. If the academic is unclear on who exactly the program is targeting, there is risk of missing the mark altogether. It can be helpful to decide whether the program is targeting those practitioners already in industry and looking to further their practice or, alternatively,
whether the program is targeting those students who wish to be trained to enter the industry well prepared with practical skills and networks acquired from the course. From a potential student’s perspective, they must ask themselves a similar question – ‘where am I at currently in my career and where would I like to go?’ (25) The needs of two groups can be distinct. For example, those students not already in industry practice may need a greater emphasis on the development of practical coaching skills and pedagogy. Students who are already in industry may benefit more from reflective practice and training science theory. However, this is not to say that a program cannot be beneficial to both groups if well designed.

Academic: ‘How much coursework versus research?’ Prospective Student: ‘I think coursework is for me, as white coats and labs aren’t very exciting’.

A decision must be made as to what distribution of coursework and applied research projects will be contained within the degree. Many students looking to undertake postgraduate studies in S&C will be drawn to tailored coursework components when prospecting for a suitable degree because of the highly applied nature of S&C practice and the external perception of ‘research’ as a white-coat lab-based undertaking. However, in our experience, once students are exposed to applied S&C research via coursework subjects in the early stages of a postgraduate program this perception changes and students are increasingly motivated to explore a research option. This is particularly true of practitioners who can then apply a research-based approach to evaluate their practices and use the process as the foundation of a research higher degree. We refer students and academics to the work of Dr Dan Baker (2) with the Australian professional rugby league team, the Brisbane Broncos, as an example. Students often become interested in the process of an applied project while also finding it rewarding to contribute to the body of S&C knowledge that they themselves have drawn from
to inform practice. Research projects also provide the opportunity for students to develop a range of transferrable skills such as project management, conceptualization of study design, data handling and analysis, alongside written and oral skills. If a research pathway is included to capture these students, it is advisable to structure it in a way that enables eligibility to a PhD program if the student wishes to pursue it. Furthermore, a research pathway is important to permit the students to develop the skills and ability to properly critique published research. Although those that choose to progress to a PhD are few, it is important the size of the project satisfies entry requirements to a doctoral program to provide that as a future option, in cases where it is relevant. For example, in Australia students often have to demonstrate a completed research project equivalent to half a full time annual study load, but these are rarely included in undergraduate programs. As such, the Masters project must satisfy the requirements instead. However, in the UK honors projects are commonplace within an undergraduate degree and therefore a Masters project is not necessarily needed to gain entry to a PhD, although this tends to be a desirable component in an increasingly competitive field. In the US, it is common to first complete a Masters degree with a major research component in the form of a thesis or the completion an independent research study with a faculty mentor before pursuing a PhD. While it is possible to be admitted into a PhD program without completing a Masters degree, it is much less common and those who take this route must often provide evidence of research experience, which may include a record of publication. It is important that academics and students are familiar with these pathways and can make informed decisions that enable opportunities post-Masters.

_Academic: What content is suitable? Prospective Student: What am I going to learn?_
As an applied science, the field of S&C covers a broad range of scientific and pedagogy disciplines (Figure 1). This can include ‘hard’ disciplines like biomechanics, physiology and motor control alongside subdisciplines like data science, pedagogy for coaches, coaching science, leadership and management skills (21). For this reason, there are many possible approaches to deciding on what content to include. However, the fundamental role of the S&C coach should always be front of mind and emphasize the sports and coaching sciences over exercise sciences. This is an important distinction as the primary objective of the former is to improve sports performance, which is not the case in the exercise sciences which typically emphasize health related outcomes. Historically there have been criticisms that too many strength and conditioning graduate programs overemphasize exercise science at the expense of sport science-based curricula (22). Fortunately, with the rise in professionalism of S&C there has also been a positive shift to more bespoke training and coaching science centered programs to better prepare students to the realities of the industry.

*** Place Figure 1 About Here***

When making decisions on what content to include it can be helpful to consider the end user described earlier – are they looking to successfully enter industry from this program, or are they already embedded? For those looking to enter industry then practical content surrounding coaching, communication, the delivery of training to large groups, industry placement may feature heavily. Programs targeting existing practitioners may include a greater focus on reflective practice or, alternatively, a greater focus on the science underpinning the training they deliver. For the latter, subjects may be structured based on the subdiscipline (i.e., biomechanics for S&C). Conversely, for programs targeting aspiring
coaches, subjects may be classified by the physical quality (i.e. developing strength qualities, developing endurance qualities). Prospective students must also consider what they wish to take from a postgraduate program. Do they wish to improve their practical skills? Do they wish to enhance their knowledge of training science? Do they wish to reflect on their professional practice to identify areas for improvement? Furthermore, as coaches progress in their organization they are often called upon to undertake management, leadership and human resources tasks, which they feel underprepared for (9). It can therefore be beneficial for programs to have a degree of freedom by way of elective subjects alongside core, non-negotiable subjects. This will give the student choice to tailor their learning experience to their individual career goals.

*Academic: ‘What should the assessment tasks look like?’ Prospective Student: ‘I am/want to be a practitioner, I hate written exams.’*

Historically, some graduate programs have not adequately developed the pedagogical skills necessary to communicate newly acquired knowledge to their athletes in a practical setting (17). To remedy this, assessment tasks must be aligned with the learning outcomes of the course and these learning outcomes must reflect the requirements of the workforce (4) (Figure 2). In postgraduate programs these assessment items must also assess higher level cognitive domains such as creating, critical thinking and extended abstract thought (1). The transfer of recollection-based knowledge to applied-expression of knowledge are effectively assessed by practical based scenario assessments and applied case studies. For example, a student may be presented with an individual at a particular stage of training development (e.g., novice or experienced) at a particular stage of the season (i.e., pre-competition) in a given sport, and are required to deliver a live training session. This is clearly essential for
those students looking to enter industry for the first time but it is also important for currently practicing coaches who have not had their coaching thoroughly critiqued by peers or external experts, or who have had coaching experience in a limited number of scenarios. Appropriate understanding of progressions and regressions of tasks can also be explored, rationalized and critiqued. Such assessment tasks are also high in authenticity (i.e., have face validity) and therefore encourage buy-in from the student (13). Furthermore, practical evaluations lend well to peer evaluation from other students, with regular formative peer feedback of this nature enhancing student achievement during summative assessments (5). For example, learning tasks and formative assessments can involve the delivery of training while peers assess the delivery based on quality coaching standards and their personal experiences in practice.

*** Place Figure 2 About Here***

Written examinations and multiple-choice assessments are typically unpopular with students as they appear far removed from the reason they chose to pursue further study in S&C. They should be used sparingly in these programs as they tend to assess the unistructural learning outcomes (select, explain, identify)(1), when higher order concepts are generally more relevant and hold greater face validity to the student. However, when these assessments methods are well designed, they can align with that of accreditation requirements (NSCA) or part of the requirements, (UKSCA) for governing bodies, and therefore can posses a degree of authenticity.

S&C coaches must also construct training plans to meet the demands of a sport under the constraints of sport. This requires considerable creative thought and can be effectively
assessed via well designed case studies that provide an opportunity to assess higher order thinking that is in alignment with S&C practice demands. Case studies provide an avenue for students to be assessed on application of key concepts in a more controlled workplace setting than that of a live practical assessment. These forms of assessment also expose students to a breadth of athlete scenarios that consider factors such as gender, age, able/disabled, individual/team settings, for example. To perform well students must show a strong capability in both recalling basic knowledge and creatively manipulating principles in a way that meets the constraints of the case study, which may not always allow for straightforward application of training guidelines. Therefore, there is a high degree of cognitive complexity as students navigate around the case study’s situational constraints to find solutions that are beyond recollection of facts or principles (1). Furthermore, because of the creativity involved in these tasks, there are multiple correct ways to solve the case study via the appropriate application of training science. This provides a great range of choice in potential solutions, and the opportunity to learn from the solutions proposed by others, which promotes an increased engagement with the task (20).

*Academic:* ‘What mode of delivery is suitable?’ *Prospective Student:* ‘How much is face-to-face versus online?’

Contemporary teaching and learning techniques promote a blended approach to content delivery whereby a combination of face-to-face and online learning activities are used to set the learning environment (12). However, the distribution between these two modes is an important question to be addressed. Is the program mostly online with one or two blocks per year of face to face delivery? Is it weekly face-to-face interactions supplemented by online content? Is it somewhere in between? The decision will largely be dictated by the target
demographic and the flexibility of their schedules. It is not surprising that performance gaps between online and face-to-face learning are greatest in the applied professions (24). Therefore, for programs targeting recent undergraduates who are looking to complete the program well prepared for the field while acquiring industry connections and placement opportunities, then a greater volume of face-to-face is necessary. Such a structure will develop the practical skills of coaching, managing large groups, communication and the challenges of applying best practice in the constraints of a sporting environment. In contrast to this, if a program is targeting practitioners already working within the industry then there may be greater freedom to deliver more online content as the student’s practical skills and networks will be more developed than those not currently practicing. The added benefit of this mode for existing practitioners is the flexibility it offers around work and other life commitments, and may lend better to a part-time enrollment. However, such delivery modes then limits the potential for practical skill development, which is a cornerstone feature of S&C.

Expert knowledge of strength and conditioning is widely recognized as an important attribute of effective strength and conditioning coaches and has been identified as a core quality of expert coaches (3). The athletes’ interviewed by Becker emphasized how their coaches were knowledgeable about the most up-to-date techniques, strategies, and tactics of the game. The importance of gaining knowledge through formal and informal methods was highlighted by Hanratty and O’Connor (14) who investigated expert knowledge of elite strength and conditioning coaches as they found that elite coaches developed their knowledge through formal (i.e. University education) and informal (i.e. on the job experience) learning situations. This was supported by Dawson and colleagues (10) who investigated the career experiences of strength and conditioning coaches and found that learning through experience, supported by tertiary education, are the primary learning situations. Similarly, it is well
documented coaches develop their skills and knowledge primarily through actual coaching experience (6). As such, to develop students’ knowledge and skills, a Master’s degree program must incorporate the correct balance of formal (e.g. seminars and practical sessions) and informal learning (e.g. professional practice/internships). Alternating periods of knowledge and application can be an effective structure to promote knowledge translation into practice.

**Professional practice**

An important part of a student’s development within the S&C field are the practical experiences that they complete. While in some cases, fundamental practical skills are developed within formal class structures, there is still an experience gap that must be bridged for a successful transition into the profession. Professional practice (or internships) provide an opportunity for students to bridge the gap between knowledge and application while also enabling exposure to the constraints and demands of a coaching environment (18). In Australia (10) and the UK (19), universities typically establish formal and informal arrangements with elite and sub-elite sports clubs and institutes of sport to provide placement opportunities for students. These are generally embedded within the curriculum and run concurrently with coursework. Many master’s programs in the US require students to complete an internship at the end of their coursework. In addition to an internship experience, other master’s programs in the US include practicum experiences within the entire curriculum where students work directly in an S&C capacity with student-athletes at their university. It should be noted that the latter is less common.

Regardless of the country, potential students should seek programs that contain professional practice across a range of elite, sub elite and academy environments as these will present a
range of experiences and opportunities to them. Building relationships with teams and leveraging existing partnerships into a formal placement arrangement will be important for academics when designing a master’s program. The university in partnership with the placement provider also has a responsibility to ensure the student is not exploited for their time and labor, such that key roles and responsibilities are established that facilitate the students professional development, the student is well supervised and mentored, and evaluation strategies are constructively aligned, clear and pre-established (15).

Self-awareness, critical reflection, industry awareness and mentorship are also fundamental components of a professional practice program, assisting students to distinguish their own personal brand. In S&C, leadership attributes and the coach and athlete/client relationship are essential elements of a positive personal brand that are likely to influence a practitioner’s level of success within the industry.

*Academic:* ‘Should we make sure our course is accredited/certified with professional bodies?’ *Prospective Student:* ‘Will I finish my Masters with any extra qualifications or certifications?’

Accreditation is identified by practitioners as a key component driving the professionalization of sports science disciplines (25). To provide a degree of quality assurance, in many jurisdictions (Australia, US, UK), practitioners must be accredited by their governing body to work as an S&C coach. It is therefore important that Masters programs strongly consider the alignment between the learning outcomes of the course and those required by the governing body. When weighing up alignment with different governing bodies, academics need to consider whether they are preparing students for the national or international job market. Governing bodies like the NSCA, ASCA and the UKSCA can work closely with academics
to map competencies and discuss arrangements for accrediting the course. They can also provide information on whether one accreditation is recognized in another country or by another accrediting body. However, consideration needs to be given regarding the cost/benefit of ensuring that the course itself is accredited with governing bodies, as opposed to ensuring that the course will allow students to be eligible to apply for accreditation on completion. Further thought is also needed to ensure ongoing alignment with the requirements of industry. This can be achieved in numerous ways. For example, involving a steering group of industry professionals and gaining insight into the ever-evolving S&C industry and ‘coal-face’ skills and knowledge requirements would allow for yearly updates to course content. Cross-referencing these requirements with current job adverts and job descriptions would solidify that the Masters program stays relevant with the job market, enhancing the overall employability of students.

**Conclusion**

Prospective students considering a Masters S&C program must consider several factors to properly select a program that is suitable for them (Figure 3). This includes their current capabilities, personal work-life circumstances and their intended career trajectory. Similarly, academics responsible for designing these degrees must also have a clear understanding of students’ needs and wants, industry demands, and teaching and learning processes. Factors such as career goals, coursework and research content, authentic teaching and learning tasks, professional practice and accreditation requirements represent key considerations of a successful postgraduate S&C program.

*** Place Figure 3 About Here***
References


20. Rust C. The impact of assessment on student learning: how can the research literature practically help to inform the development of departmental assessment strategies and


Figure Legends

Figure 1: Subdisciplines of strength and conditioning

Figure 2: An example of constructive alignment within a postgraduate strength and conditioning program

Figure 3: Factors to consider by both potential students and academics when considering a postgraduate strength and conditioning degree program.