

An International Comparison of Strength and Conditioning Coach Education

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ABSTRACT

The paper deals with coaching bachelor degrees for strength and conditioning coaches in selected universities in Canada, Norway, Czech Republic and Slovakia. All participating countries of the research set are full members of the Organization for Economic Co-operation and Development. Based on a content analysis of curricular documents, we identify and describe similarities and differences in approaches to strength and conditioning coaching bachelor degrees. They were apparent primarily in the qualification, content and practicum profile. The study shows that the coach's bachelor's degree has different qualifications, content and practicum profiles. It is even in sharp contrast to the bachelor's level in sports coaching in the Czech Republic and Slovakia, compared to the bachelor's level in kinesiology in Canada and sports science in Norway. The more specifically designed strength and conditioning coach bachelor level of education in the Czech Republic and Slovakia differed from schooling in Canada and Norway. The fundamental difference is the longer duration of the study program and the minor number of credit units at a Canadian institution compared to European institutions. The difference in the number of optional subjects is also striking. In European institutions, they make up a maximum of 16%; in Canadian institution, it represents almost half of all courses in the study program. An automatic CSCS (NSCA) certification program option is available in Canada.

Keywords: strength and conditioning coaching, physical fitness, coach education, bachelor's degree, development of coach profession

INTRODUCTION

The modern way of life in developed countries, where a large part of the population suffers from a lack of exercise, has caused a significant increase in civilization diseases. These claims are also proven by many scientific works, for example, Mavrovouniotis (2012) or Askarova et al. (2020). As a result of these aspects, which hurt human health, the demand for experts in health, fitness, and physical activities, which would help the general population maintain physical fitness in life and ageing, is constantly growing. People in their 30s start losing muscle mass when they are inactive. People at this age lose about one per cent of muscle mass annually unless they compensate with strength training. Loss of muscle mass has severe consequences for daily living activities. As a result of less muscle strength, everyday tasks such as climbing stairs, lifting and handling objects such as shopping bags, or getting out of bed can become a significant challenge. In addition, losing strength also negatively affects the ability to maintain balance. Professional literature also points to these aspects, for example, Lohne-Seiler (2015), Lukáč et al. (2023) or Zatsiorsky et al. (2021). In the hierarchy of human values, health is at the forefront in Western Europe, the Czech Republic, and Slovakia. Interest in various types of training for fitness specialists and strength and conditioning coaches is constantly increasing. Undergraduate coach education will play an important role in the market. The market mechanism incentivizes market participants to pursue a formal bachelor's education.

Theoretical background

People paid attention to the development of physical culture in the ancient period. There is credible evidence that the ancient Greeks, Romans, and Mayans regularly organised athletic competitions, and their active participants were considered heroes. In ancient Greece, sports were a systemic part of life, as well as military training. Gymnastics represented up to half of the physical exercises in general education. In Gymnasiums, paidotribés trained youth, while the gymnastés mainly cared for talented individuals and potential sports participants. Gymnastics was essential in adulthood as the primary tool for maintaining health and fitness. Ancient coaches had to have sufficient knowledge of anatomy, physiology, psychology and medicine because they were also masseurs and therapists (Grexa, 2011).

The emergence of modern professional coaching, among others, was related to the growing importance of sports at North American universities in the USA from the second half of the 19th century. In this context, Jenkins (2005) states that in 1864, the first professional coach began working precisely within North American university sports. However, the specific profession of an independent strength and conditioning coach only appeared an entire century later. In recent years, the term strength and conditioning coach has come to the fore in connection with performance and elite sports and has also become relevant to many recreational athletes who want to gain physical fitness in an effective and health-beneficial way and are already interested in high-quality fitness training.

Based on constant interest in applying modern, scientifically proven methods of improving physical fitness in fitness coaching, a new field was formed in the early 1970s – strength and conditioning coaching. This designation is derived from the English phrase fitness trainer, fitness coach, or strength and conditioning coach. The term fitness can mean good physical condition, but

also physical and mental fitness and a sense of vitality. Physical fitness is more accurate; it refers only to physical condition and physical fitness. A fitness trainer, or a fitness coach, is a professional who primarily focuses on the general population who want to gain or maintain adequate physical fitness and health. A strength and conditioning coach primarily emphasises enhancing the performance component of physical fitness preparation and planning. A personal trainer in English-speaking countries usually represents an expert dealing with the health-related fitness component. A fitness instructor is a professional advisor who provides instruction in fitness. Our study will use the term strength and conditioning coach, a sports expert in physical fitness and performance coaching with an undergraduate education in the relevant or related program (Janíková et al., 2019).

The rapid development of sports sciences focusing on physical fitness and strength and conditioning presupposes the innovation of educational programs cooperating with scientific institutions. Strength and conditioning coaching requires high professionalism at the level of undergraduate education. Abroad, we encounter various educational opportunities through courses or undergraduate education focusing on a precisely determined or related issue. Hoffman (2011) states that a strength and conditioning coach should have at least a bachelor's degree in kinesiology. For the sake of continuous improvement of health, physical activity and sports coaching services, it is therefore necessary to streamline the possibilities of formal education of health, fitness and strength & conditioning coaches.

The Collegiate Strength and Conditioning Coaches Association (CSCCa) strongly recommends that individuals interested in working at the school, university, or professional level as a strength and conditioning coach obtain an undergraduate or higher education in human movement and exercise science or related fields. The education will give the individual a solid scientific foundation to develop and implement a safe and effective strength and conditioning program for the general population and athletes (*Educational Degrees, n.d.*). The National Strength and Conditioning Association (NSCA) provides applicants with the internationally recognized Certified Strength and Conditioning Specialist (CSCS) certification training, which is conditional on the completion of a bachelor's degree in sport sciences or related field, e.g. exercise science, kinesiology, physical therapy (*CSCS Prerequisites, n.d.*).

Also, Ratamess (2012) states that strength and conditioning coaches should have at least a bachelor's degree in human movement and exercise sciences combined with an educational program focused on this coaching. Some colleges and universities offer the opportunity to study strength and conditioning coaching as a significant field. Sufficient understanding and mastery of subjects such as biology, physiology, chemistry, health, mathematics and statistics, nutrition, movement and physical education scientific disciplines, sports coaching, and testing are necessary to acquire adequate knowledge and skills in the scientific field of a strength and conditioning coach (Ratamess, 2012).

The motivation for choosing the subject of this study is the current attention to the formal education of strength and conditioning coaches or specialists in the fields of health, physical activity and fitness. Since its establishment in 1997, the International Council for Coaching Excellence (ICCE) has considered the development and support of the professionalization of sports coaching as its primary mission (ICCE, n.d.), i.e. profession in the private, public and state sectors, including the possibility of applying strength and conditioning coaches as teaching staff at the level of primary,

secondary and higher schools. The undergraduate education of strength and conditioning coaches should aim to recognize sports coaching as an adequately defined profession with a significant role in preventing the health consequences of insufficient physical activity for a large part of society.

METHOD

The study compares the bachelor's degree of fitness and strength and conditioning coaches in selected universities in Europe and North America. The choice of universities in Canada and Norway, among the best in the world, reflects this idea. We have included one Czech and Slovak university so that we can map our immediate environment as well. The research set for analysis and comparison consists of:

- a. University of Calgary, Faculty of Kinesiology, Bachelor's program in Kinesiology; within the Shanghai Ranking's Global Ranking of Sport Science Schools and Departments 2023, it ranked 25th.
- b. Norwegian School of Sport Sciences, Oslo, Bachelor program in Exercise, Health and Performance; in the aforementioned global ranking, it was ranked 3rd.
- c. Masaryk University in Brno, Faculty of Sports Studies, Bachelor's program Personal and Fitness trainer; it does not appear in the mentioned global ranking.
- d. Comenius University in Bratislava, Faculty of Physical Education and Sports, Bachelor's program in Coaching, Strength and Conditioning; it does not appear in the mentioned global ranking (*ShanghaiRanking's Global Ranking of Sport Science Schools and Departments, n.d.*).

Our analysis searches for components and aspects of curricular documents directly related to the undergraduate education of strength and conditioning coaches, i.e., its content, goals, methods and standards. The term curricular documents means lesson plans, curricula, textbooks, didactic texts, methodological manuals for educators, educational standards, requirements for control and evaluation, etc. (Průcha, 2002, p. 250). Presented study under investigation of curricula of bachelor coach education.

The primary research set for analysis and comparison is the curricular documents of the bachelor degree of strength and conditioning coaches at selected universities. According of the OECD (2022) all participating countries of the research group are full members (Canada and Norway since 1961, the Czech Republic since 1995 and Slovakia since 2000). According to the international recommendations of The United Nations Educational, Scientific and Cultural Organization (UNESCO), bachelor's degrees in sports coaching should be structured around learning outcomes, units of learning and credit points (ICCE, n.d.).

We use both qualitative and quantitative procedures in our work. Quantitative research represents the quantification of data, including statistical data analysis. The qualitative part deals primarily with the content analysis of curricular documents within the framework of comparative sports studies (Vlček, 2009). The research study uses a comparative methodology. Sequences of comparative methods include description, interpretation, juxtaposition, and comparison (Bereday, 1964). The primary research methods are the description of the content analysis of texts, the definition of units and the determination of analytical categories (Gavora, 2010, p. 144) and their comparison.

Qualitative areas include, e.g. course name, simple description of the course, prerequisites (prerequisites and previous requirements for joining the course), co-requisites (the content of the course is integrated with the content of another course), and anti-requisites. Quantitative data are, e.g. scope, intensity of educational phenomena, number of course hours, number of learning outcomes, number of teaching units, credit points, European Credit Transfer and Accumulation System (ECTS), total number of lessons, courses, course equivalent, range of required teaching weeks, scope of professional experience and number of hours approved by the university (European Commission. Directorate General for Education and Culture., 2015).

In the following text, we interpret the analysed data. The goal is to reveal themes, regularities, forms, qualities and relationships (Hendl, 2005, p. 223). In the secondary analysis, we focus on comparing the educational system of fitness trainers in individual countries at the level of the International Standard of Classification of Education, level 6 (ISCED 6).

RESULTS

A crucial comparative indicator is achieving the highest tertiary education in selected OECD countries based on the International Standard of Classification of Education 2011 (ISCED 2011). For 2022, in the population aged 25–64 in Canada and Norway, the highest attainment of tertiary level is ISCED 6; in the Czech Republic and Slovakia, the highest attainment of tertiary level is ISCED 7 (Table 1). Canada achieved the best results in this area – 24% in ISCED 6 (Education at a Glance 2023, 2023).

Table 1. Percentage of tertiary educational attainment in selected countries OECD by ISCED 2011 for year 2022 of 25–64 year-olds

Level ISCED 2011	Canada	Norway	Czech Republic	Slovakia	Average OECD	Average EU 25
ISCED 5	26	12	0	0	7	5
ISCED 6	24	21	7	4	19	15
ISCED 7	12 ^d	14	19	24	14	17
ISCED 8	x(12)	1	1	1	1	1
Total	63	48	27	29	41	38

Note. d – include data from another category x (11), x data are included in another category or column of the table (e.g. x means that data are included in Column 2 of the table. OECD (2023).

Table 2 shows the set of countries examined, or universities, which reflects the slightly different Canadian education system in the levels of Regional Qualification Frameworks (RQF), Ontario Qualification Framework (OQF), European Qualification Framework (EQF).

Table 2. Levels and products of curriculum documents

Level	Canada	Norway	Czech Republic	Slovakia	OECD
SUPRA	ISCED6	ISCED6	ISCED6	ISCED6	ISCED2011
MACRO	OQF 10	EQF 6	EQF 6	EQF 6	RQF
MESO	(90) 120 units	180 ECTS	180 ECTS	180 ECTS	BKin, BSc
MICRO	15 units	30 ECTS	30 ECTS	30 ECTS	term
NANO	25–30 hours	25–30 hours	26 hours	25 hours	1 credit unit

Note: Adapted from Thijs and Van den Akker (2009).

At the selected university in Canada, we can identify the difference in the length of the undergraduate bachelor's education lasting four academic years in the number of 90-120 credit points (180-240 ECTS) compared to selected European universities in 3 academic years in the number of credit points 180 ECTS. In Canada, it is possible to complete a professional certification program based on a bachelor's degree. The Canadian faculty offers the most optional courses out of the selected universities (Table 3).

Table 3. Comparative analysis of selected educational subjects

	University of Calgary, Faculty of Kinesiology	Norwegian School of Sport Sciences	Masaryk University, Faculty of Sports Studies	Comenius University, Faculty of Physical Education and Sport
Place, Country	Calgary, Canada	Oslo, Norway	Brno, Czech Republic	Bratislava, Slovakia
OECD member	1961	1961	1995	2000
Study program	Kinesiology	Trening, helse og prestasjon	Osobní a kondiční trenér	Trénerstvo
Study program in English	Kinesiology	Exercise, Health and Performance	Fitness and Personal Trainer	Coaching, Strength and Conditioning
Qualification	Bachelor's Degree	Bachelorgrad	Bakalář	Bakalár
Qualification in English	Bachelor's Degree	Bachelor's Degree	Bachelor's Degree	Bachelor's Degree
Degree Titles	BKin/BSc	BSc	Bc	Bc
ISCED 2011	ISCED 6	ISCED 6	ISCED 6	ISCED 6
RQF	OQF 10	EQF 6	EQF 6	EQF 6
The cycle of tertiary education	First-cycle	First-cycle	First-cycle	First-cycle
Thesis required	Regulated by the institutions	Regulated by the institutions	Bachelor thesis	Bachelor thesis
Nominal length	four years	three years	three years	three years
Study modes	Full-time	Full-time	Full-time	Full-time
Credit units	(90) – 120 units	180 ECTS	180 ECTS	180 ECTS
Access requirement	ISCED 4/5	ISCED 4/5	ISCED 4	ISCED 4
Access to further study	Master's Degree	Master's Degree	Master's Degree	Master's Degree
Professional Certifications	CSEP, NCCP, NSCA – CSCS	Top Coach, Elite Coach	SCBL	SCBL
Shanghai Global Ranking 2023	25	3	–	–
Number of program courses	40	(20)19	56	56
Required courses of the program	53,33 %	84 %	100 %	86,67 %
Optional courses of the program	46,67 %	16 %	0 %	13,33 %

According to the Norwegian School of Sport Sciences (Norges Idrettshøgskole – NIH), sports studies in Norway are comprehensively focused. It is divided into several courses and forms of study, where applicants can decide between a study focused more on sports and society or on physical activity, health and improving performance in sports. Undergraduate studies in physical activities,

health and performance enhancement in sports are aimed at understanding the connections between nutrition, exercise, health and performance through training, practical exercises, laboratory work, projects and professional experience.

The study programme aims to prepare qualified consultants, supervisors, coaches and motivators in sports work with children, youth, adults, seniors, top athletes or the general population. The study is designed to acquire knowledge of the musculoskeletal system's anatomy, physiology and function, which will help them understand the relationships between the acute and long-term physiological effects of training and physical activity on the human organism. Undergraduates need to know how training and physical activity affect performance and the physical prerequisites for people to be active and have good health. The study programme are also aimed at understanding the connection between nutrition, health and performance so that graduates can apply this knowledge in prevention and health-beneficial activities, emphasising physical activity for different population groups.

Graduates of this form of sports education will learn to perform tests of physical condition and function (strength, endurance, mobility) and interpret them for a wide range of clients. They will also study the basics of scientific methodology and learn to use resources critically to publish the results of tests achieved in scientific papers correctly. In the first year of study, which is more general, students focus on an introduction to anatomy, physiology, exercise theory, nutrition, practical and theoretical knowledge of various sports and the social significance of sports. When entering the second year, students can choose between studying different courses that will allow them to specialise more in their chosen fields, according to their interests – for example, specialisation in physical activity and health or training and performance. The courses in the second and third years of study depend on the student's specialisation. In the third year, students must also complete an internship related to their field of research and write a bachelor's thesis. After completing a bachelor's degree, students can apply to continue their studies at the master's and doctoral degrees, which have the character of a high degree of specialisation in the chosen field and focus more on scientific research in the chosen field (*Bachelor I Trening, Helse Og Prestasjon – Norges Idrettshøgskole, 2023*).

The Faculty of Kinesiology, University of Calgary, proposes two-degree programs: A Bachelor of Kinesiology (BKin) and a Bachelor of Science in Kinesiology (BSc). Each bachelor's degree requires 40 courses, and both programs have the same 18 core courses that incorporate the natural and medical sciences, social sciences, and humanities. To earn a BSc in Kinesiology, 21 of 40 courses must be science-based – the program aims to address the physiological, sociological, and psychological aspects of movement and health. Students will also learn about anatomy, biomechanics, nutrition, the fundamentals of movement, human growth and development, and neuro-motor behaviour. A major in Kinesiology provides greater flexibility in choosing optional courses. Motor and Psychosocial Aspects of Movement study the neural, cognitive and psychosocial concepts to understand human behaviour in physical activity, sport and health. Leadership and coaching examine the foundations for leadership in physical literacy in various settings. Faculty of Kinesiology offers students external professional certification, for example, The Canadian Society for Exercise Physiology (CSEP) Health and Fitness Program, National Strength and Conditioning Association – Certified Strength and Conditioning Specialists (CSCS) and Canada's National Coaching Certification Program (NCCP), *Our Programs, (n.d.)*.

Fitness and Personal Trainer – The bachelor's sports coaching program at Masaryk University, Faculty of Sports Studies, is taught only in Czech (www.fsps.muni.cz). The sports coaching bachelor's level is a well-balanced combination of theoretical knowledge and practical experiences. It aims to offer opportunities for developing professional competencies for counselling and organization of physical activities for the general population or its specific groups – children, youth, adults or older people. The program shows how fitness training, physical activities and regeneration affect the human body about age, the stages of sports training or different types of sports performances. The theoretical study includes sports training principles, medical-biological foundations, pedagogy and psychology. In the practical lesson, it would be the elements and techniques of various sports disciplines, working with individual clients, managing sports teams in groups, and preparing, analysing, and evaluating the clients' coaching plans (University, n.d.).

The Sport Coaching Bachelor program at Comenius University, Strength and Conditioning specialization, Faculty of Physical Education and Sport, is a full-time sports sciences program taught in the Slovak language (www.fsport.uniba.sk). The standard length of study is three years. The educational goals of the study program are a specialized expert to the performance and elite sports training process. The Graduate has the second highest level of coaching qualification, he knows the concept of biological, motor and psycho-social human development, the physical, psychological and social essence of the human organism. The Graduate also masters the pedagogical and psychological foundations of education and training in sports training, the didactics of the physical education process and the foundations of sports sciences. Graduates will also gain knowledge about the sports system, the theoretical and didactic foundations of sports training, the structure of sports performance, the theory of movement activity, the acquisition and improvement of movement techniques in their own sports specialization, and information about the most modern theoretical foundations of sports and a healthy lifestyle. They will learn practical skills to be able to manage the training process of their clients in sports practice and to implement the latest principles of creating training plans to increase the performance of clients and achieve their specific goals, as well as to diagnose talent, functional disorders of the movement system, performance and changes in training. The graduate will also be able to collect and interpret relevant data and, through professional communication, provide this information to clients, experts, and non-specialists in sports (*Trénerstvo*, n.d.).

DISCUSSION

Based on the curricular documents of the bachelor program at selected universities, we can conclude that at Canadian and Norwegian universities, this education mainly focuses on the exercise, sport science and kinesiology in combination with certification program focused on strength and conditioning coaching. After completing the bachelor's degree, graduates can continue in a professionally or scientifically oriented master's program (e.g. exercise and sport science, kinesiology, exercise and sport physiology).

The Faculty of Sports Studies of Masaryk University provides a study program for personal and fitness coaches with the possibility to continue in a professional physical education program for primary and secondary schools or in a scientifically oriented program of applied kinesiology

with a specialization in strength and conditioning coaching. The Faculty of Physical Education and Sports of the Comenius University in Bratislava offers a bachelor's education in coaching with a strength and conditioning major with the subsequent possibility to continue in a professionally or scientifically oriented program. All investigated institutions correspond to the requirements of a bachelor's education and the requirements and prerequisites for the performance of a strength and conditioning coach.

In terms of the focus of the study, the objectives of all the selected institutions under study appear to be compatible. Through their curriculum, they aim, both theoretically and practically, to train a qualified professional who is able to act through the knowledge acquired through study and his/her practical skills on a wide range of clients, such as children, adolescents and adults, as well as the elderly. This professional should be able to find employment as a trainer or coach of elite and performance athletes, but should also be able to navigate the issues of training for the general population, such as identify errors in posture and movement patterns of clients, know how to correct the simpler ones, or refer the client to a more specialized professional who could help correct these errors, such as a physical therapist. The graduate should be able to advise their clients on healthy lifestyle matters and set them up with a suitable training or movement programme appropriate to their level of fitness and coordination, one that will promote their health. The professional should also gain an overview and understanding of the sport sciences through his/her studies, to the extent that he/she is able to navigate scientific papers, communicate professionally with scientists and be able to pursue further studies of a more theoretical-scientific nature.

The fundamental difference is the longer duration of the study program and the minor number of credit units at a Canadian institution compared to European institutions. The difference in the number of optional subjects is also striking. In European institutions, they make up a maximum of 16%; in Canadian institution, it represents almost half of all courses in the study program. An automatic CSCS (NSCA) certification program option is also available in Canada. The bachelor's program in Norway shows the smallest number of study courses. We can classify bachelor's programs in the first level of tertiary education with identical features within the comparison. Based on the International Standard of Classification of Education 2011, all institutions are classified into ISCED level 6. Research subjects focus on similar exercise and sports science profiles.

A more detailed analysis of the bachelor's education of fitness trainers in selected universities requires further and more specific research, in which, in addition to the examination of curricular documents, we could focus more specifically on some aspects of the concept of the bachelor's education system of strength and conditioning, the achieved level of knowledge base and practical skills of graduates. It would be interesting to compare the content of individual study programs in selected educational subjects and their theoretical, practical and scientific starting points.

CONCLUSION

Theoretical conceptions and research of coaching education represent a vast, multifactorial, determined topic that is extremely important for sports practice and theory. Based on this, the mentioned issue will require further and more systematic attention in the coming years.

International comparison of educational programs can be inspiring for educational institutions in the Czech Republic and Slovakia. Developments in the developed countries of the world confirm that the creation and all-round development of the coaching profession is, in the 21st century, an essential component of primary prevention in the field of a healthy lifestyle, physical activity and nutrition of the population. Additional publications will present the percentage of physical fitness and strength and conditioning science-oriented courses, according to Petry et al. (2006) and ICCE, ASOIF, & LBU (2013) analytical categories of applied professional courses according to the recommended bachelor model for coaches published by the organizations Aligning a European Higher Structure in Sport Science (AEHESIS), ICCE – Sports Coach at Bachelor Level (SCBL). We believe that our analysis and comparison results will serve as a starting point for further similar research on formal education in health, fitness, strength & conditioning, and sports experts.

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