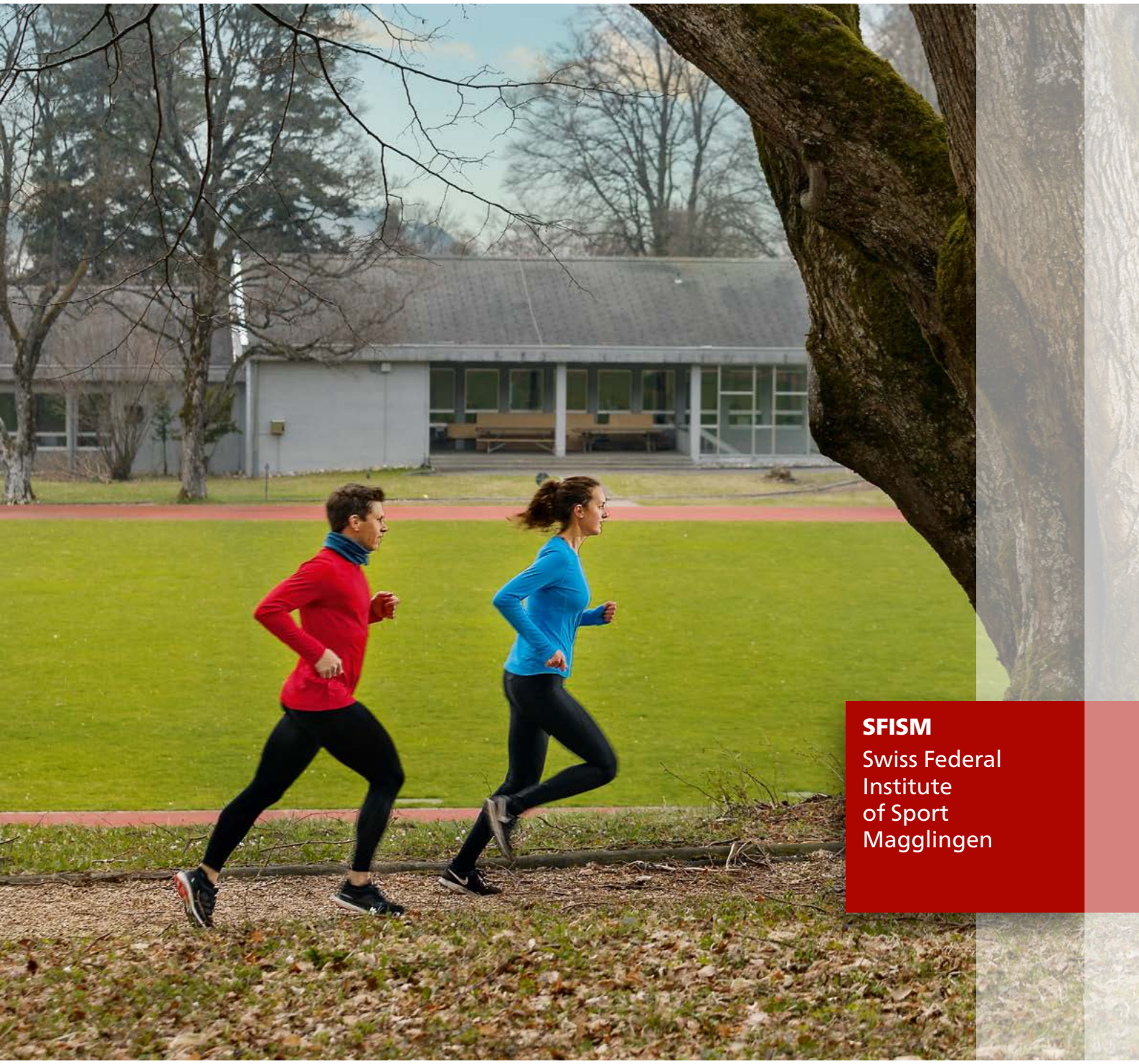
Swiss Federal Institute of Sport Magglingen SFISM

2018 Annual Report



FOSPO
2532 Magglingen

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Office of Sport FOSPO


Hochschule Lärchenplatz
Haute école Place des Mélèzes

Contents

Walter Mengisen (Co-Rector), Urs Mäder (Rector)

An intensive year promoting sport

95 full-time positions

118 employees

Social Media SFISM

There's one small change in behaviour that always comes with the start of a new year: the final date digit used over the previous 12 months needs to be adjusted. This calls for a rethink and a certain degree of flexibility. Staff at the Swiss Federal Institute of Sport Magglingen SFISM experienced far bigger changes than that in 2018, foremost of which was the introduction of the new organization chart. The reorganization had an impact on day-to-day work, resulting in personnel restructuring as well as newly formed teams and organizational units. The successful transition involved the streamlining of processes and responsibilities, including the analysis and description of the tasks, skills and responsibilities attached to staff functions at SFISM as well as the introduction of SFISM management events.

Furthermore, to promote employee participation, SFISM personnel founded a staff council and elected seven members for a two-year term to a conference of higher education institutions which serves as a plenary assembly. Besides also devoting time to creating an alumni association, SFISM addressed the topic of bilingualism (German and French) in greater depth at an internal further education event. Staff also enrolled in an internal two-day retreat dedicated to a comprehensive exploration of digitization and related ongoing projects at SFISM.

Personnel changes, new structures and teams

SFISM's fate was steered by Rector Urs Mäder and Co-rector Walter Mengisen. Silvio Lorenzetti took over as head of the Performance sport section in February 2018. The Teaching section witnessed a change as well, with Klaus Frei succeeding Peter Wüthrich as head following the latter's retirement in the year under review. The newly established units gathered pace. Their reflection process on objectives, tasks and areas of activity resulted in a joint mission statement. The Sports studies organization reassigned its leadership tasks. Following the departure of the final batch of graduates of the Bachelor's course under the old structure, going forward there will be only one Bachelor's structure in place, which simplifies organization considerably. The Performance sport section conducted a rigorous review of its strategy. And Sports Coach Education Switzerland embarked on implementing the newly developed education and training philosophy. The media library was also integrated into the SFISM Central Administration.

The sports media library as service provider

As a centre of knowledge transfer and information literacy at SFISM, the sports media library endeavours to deliver an optimum service to students, lecturers and other customers. To that end the media library conducted a user analysis among SFISM staff in the year under review. The findings are being used to optimize services. In 2018, media library staff assumed responsibility for managing the SFISM publication database and worked towards setting up the Bern University of Applied Sciences BFH open access repository and ensuring that SFISM is included in the Shanghai ranking. The sports media library is to become part of the Swiss Library Service Platform, which was also in the development phase. In addition, media library staff are also assisting with the introduction of the Federal Administration's electronic records and process management system at FOSPO by spring 2020 under the GENOVA project.

Institutional accreditation

Steps taken within SFISM to achieve accreditation were broadened in the year under review by making wide-scale preparations for implementation of the quality management system.

All public or private universities in Switzerland wishing to retain the right to designate themselves as a university are required to be institutionally accredited by the end of 2022. This includes SFISM. The institutional accreditation process comprises an assessment of the quality assurance system in place at the university to ensure the quality of its teaching, research and services. Further development work was carried out on the quality assurance system in the year under review. It will be presented to SFISM staff, students, partners and customers in its revised form in 2019. At the same time, SFISM will begin preparations for the accreditation process in 2019. In close collaboration with the Sports Policy and Resources division, SFISM is addressing the necessary legal, strategic and operational measures to ensure it is well prepared to enter the self-assessment phase in 2020.

Services focusing on major international events

Numerous times in the year under review, staff at the Swiss Federal Institute of Sport Magglingen SFISM were instrumental in the successful participation of Switzerland's athletes at major international events such as the Winter Olympic Games in South Korea, the FIFA World Cup in Russia, the Mountain Bike World Cup in Switzerland and the Artistic Gymnastics World Championships in Qatar. The support provided by SFISM is always geared to the needs of the national governing bodies.

Events with a national and international reach

Magglingen hosted a large number of congresses in 2018: The 10th annual conference of the Swiss Society for Sports Science (SGS) examined the topic of performance in sport. Responsible for organizing the conference, the Sports teaching section welcomed sports scientists from all over Switzerland as well as guests from neighbouring countries. Attendees at the two-day event reported on current research findings and discussed innovations in their fields. The conference organized by the Sports facilities unit focused on privately initiated sports facilities, while the Magglingen Coaching Conference examined the impact of coaching. The SwissTopSport (STS) forum discussed the question of what digitization means for the sports community. The Association of Sport Performance Centres (ASPC) held its European Forum in Magglingen and gained an insight into how elite sports funding works in Switzerland. The Summit on Mindfulness and Acceptance Approaches in Elite Sport once again addressed the issue of sport psychology interventions.

R&D projects 38

Cooperations with sports federations

- Swiss Olympic
- Swiss Ice Hockey Federation
- Swiss Football Association
- Swiss Swimming
- Swiss Cycling
- Swiss Ski
- Swiss Triathlon
- Swiss Gymnastics Association
- Swiss Athletics
- Swiss Shooting
- Swiss Handball Association
- International Ice Hockey Federation

Partner universities

International mobility

· 18 in Europe
· 2 outside Europe
· 6 linked to th BFH

Magglingen: 875 m above sea level

High School main building: 880 m above sea level

Lärchenplatz: 933 m above sea level

End der Welt Hall: 961 m above sea level

Students and lecturers on (inter)national exchanges

2018 marked the first year in which SFISM students could spend their immersion semester outside Switzerland, with eight students completing a term and three an internship abroad.

SFISM welcomed two students from the University of Teacher Education St. Gallen in the autumn semester.

Under the lectureship exchange programme, a PhD student from the University of Hamburg spent Kids Week teaching at SFISM. Two staff members from the Deggendorf Institute of Technology (DIT) held classes as part of their one-week summer school and exchanged ideas with various members of SFISM staff.

24 students from the DIT spent a week at the SFISM summer school exploring the topic "IT-based stress monitoring – applied performance diagnostics", and two SFISM students took part in the DIT "block week" at Attersee, examining questions of high-performance and elite sport.

The first BFH-wide Global Days on the theme "Future skills – tomorrow's global job market" took place in March. Peter Wüthrich from SFISM ran the workshop under the motto "Successful communication yesterday – today – tomorrow".

Education and training

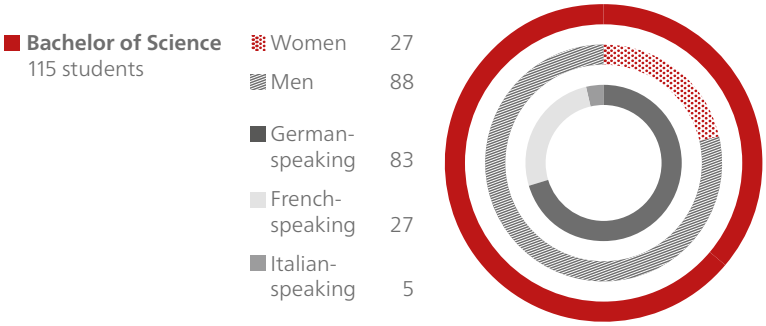
The Sports studies organization saw numerous changes in the year under review: Carolina Oggenfuss took over as head of Bachelor's programmes from Urs Rüdisühli; Martin Rytz succeeded Andres Schneider as head of the Master of Science in Sports Sciences programme. Under the leadership of Patricia Steinmann, the Magglingen university weeks were again incorporated into the Sports studies organization. Urs Rüdisühli heads the entire team. His deputy is Carolina Oggenfuss. Despite all the changes and adjustments, the stringent service quality demands to be satisfied vis-à-vis students and lecturers were met.

SFISM Bachelor of Science in Sports

39 students successfully completed a Bachelor's degree based on the structure established in 2010. Course leader Martin Rytz presented students with their degree certificates at a dignified ceremony. This marked the conclusion of the final Bachelor's course under the 2010 format.

The new aptitude assessment was successfully introduced in June. Of the 132 candidates who registered to take the assessment, 107 completed it, 40 of whom were accepted for the course. In September, 42 students (including 2 elite athletes with a Swiss Olympic Card) commenced their studies.

2018 was the first year in which students in their 5th semester could spend an immersion semester on a 4-month internship or a mobility semester in Switzerland or abroad. Internships abroad as well as in Switzerland with governing bodies, hospitals, schools or sporting event organizations met with considerable interest. The feedback received from students who had gained valuable practical experience and also from internship providers was very positive.



Master of Science in Sports with Specialization in Elite Sport

The programme, offering the two specializations coaching sciences and sports management, is run every two years. In autumn 2018, 41 students embarked on the two-year course, and 24 graduates received their university of applied sciences Master's degree.

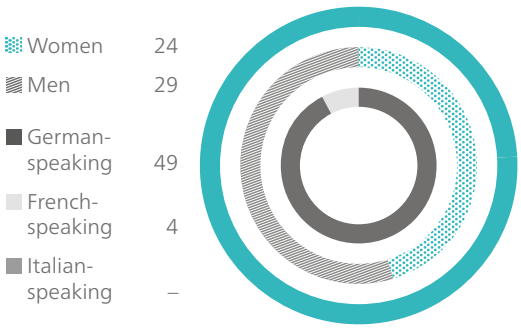
The composition of the new Master's programme intake is remarkable:

- Proportion of women: 17 women (> 40 %) enrolled on this course.
- Bachelor's degrees: 25 students completed their basic academic training (Bachelor's) at a university, 13 at a university of applied sciences, and 3 at a teacher training institution.
- Disciplines: Bachelor's degrees are awarded in 19 different disciplines, ranging from sports sciences, business and communications to teacher training and physiotherapy.

- Active elite athletes: 9 students continue to engage in elite sports activities while completing their degree course. They are all pursuing international sporting goals such as European or world championships or Olympic Games.
- The 41 students represent a total of 23 different disciplines which have enabled them to socialize themselves in sport.

It is this multifacetedness that characterizes and enhances the 2018/20 programme. With their different backgrounds, the students bring in diverse perspectives and experiences and are already well networked within the elite sports community, which is valuable for the internship component and essential for a successful start to a professional career.

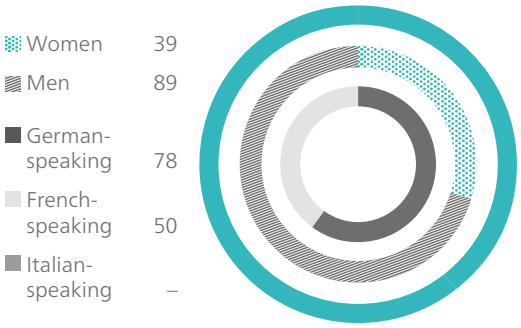
Master of Science in Elite Sport
53 students



Master of Science in Sports Sciences

The number of students in the Master's course conducted jointly with the University of Fribourg rose slightly compared with the past few years. Accounting for 25 Master's students, SFISM graduates are strongly represented. This study programme is very attractive for them: It not only allows them to teach at secondary level 2 (baccalaureate schools and vocational schools), it also provides access to the academic route to a PhD. The Master's programme is at the crossroads between the systematic consolidation of sports scientific knowledge following on from a Bachelor's degree and the methodical and didactic expectations of the majority of students, who intend to work as sports teachers. As of the start of the new semester, the curriculum was modified slightly to lend more weight to the "Specialization" module, and greater focus was placed on teaching. The Master's degree enables students to complete their studies at various teacher training institutions to obtain the qualification required to teach sport in baccalaureate schools.

Master of Science in Sports Sciences
128 students



Sports studies organization (from left to right) Matthias Rohrer, Elodie Bähler, Lilliane Eichenmann, Sandra Orlando, Nathalie Barbezat, Dounia Chervet, Carolina Oggenfuss, Romano Carrara

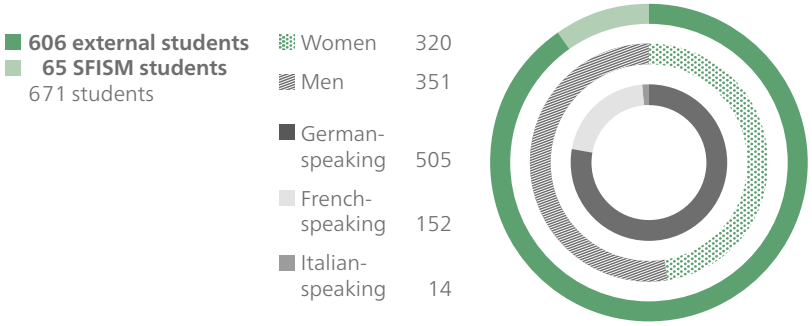
Magglingen university weeks (MHW)

Students from other universities attending SFISM modules

Six universities, two teacher training institutions and SFISM benefited from the programme on offer during the 2018 Magglingen university weeks (MHW). 671 students in all were given an opportunity to get to know the Federal Office of Sport (FOSPO) and Magglingen. Participants were spread over 26 course weeks.

Eight courses were offered focusing on sports teaching as an element of school sports. Students could also earn the Y+S "School Sports Youth Sports" leader certificates. Five of these eight weeks were for German-speaking students, two for French speakers, and one course was bilingual.

Over 18 course weeks, the following disciplines could be selected (some were combined in the same week): windsurfing, stand-up paddling (SUP), sailing (yacht, dinghy), whitewater canoeing, rowing and SwitzerlandMobility.



Further education courses

Inspiring further education courses

Along with teaching the foundations of sports sciences, SFISM also offers further education courses. All the individual courses on offer and the latest information can be found on SFISM's website (www.ehsm.admin.ch/en/home.html) and in the course finder on the Continuing Education web page of the Bern University of Applied Sciences BFH (www.bfh.ch/en/continuing-education/all-continuing-education-courses/).

SFISM has been positioning itself over many years with tried-and-tested further education offerings ranging from sports management, sports facilities construction and sports nutrition through to sports teaching at vocational schools.

As well as its own courses and teaching programmes, SFISM also took the opportunity to cooperate in a number of joint ventures, either through commissioning activities (e.g. swissuniversities, Bern University of Applied Sciences BFH) or by helping to design further education courses, e.g. within the remit of the Swiss Sport Management Centre (SSMC).

CAS Sports Facilities

In four one-week modules, the CAS Sports Facilities course teaches the fundamentals and specialist knowledge required for planning, building and operating sports facilities.

The CAS course is offered by the Swiss Federal Institute of Sport Magglingen SFISM together with the University of Bern's Institute of Sport Science (ISPW) and the University of Applied Sciences in Rapperswil.

Participants acquire the skills
- to initiate the necessary steps prior to actual facility planning,
- to provide expert support for the planning and realization of sports halls, outdoor facilities, swimming pools, ice rinks as well as sports centres, trend and leisure facilities.

The CAS course started in November with 30 participants and runs until June 2019.

Further education courses

· CAS Sports Facilities

· CAS / DAS / MAS Sports Management

· eLearning Sports Management

· Quality and competency in vocational school sports

Sports Coach Education Switzerland

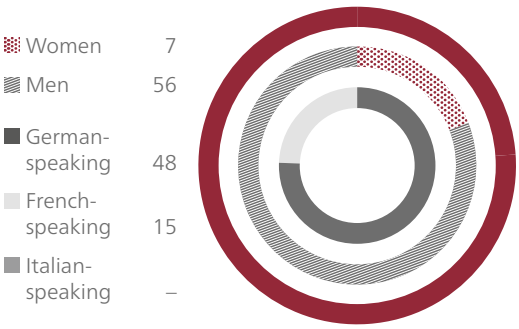
Since 2014 the team at Sports Coach Education Switzerland has been heavily involved in reviewing its current structures, processes and quality characteristics and translating the findings into a new education and training philosophy.

Entering a new era

In January 2018, four years of project work culminated in the starting shot for the new education and training structure, built on five fundamental pillars: lifelong learning, a customisable training route, learning on-the-job, modern learning settings, and competence-based examinations.

The new education and training structure of Sports Coach Education Switzerland includes the two levels performance and elite sports leading to a Federal Diploma of Higher Education or the Advanced Federal Diploma of Higher Education. The courses at performance sport level were introduced in the year under review; from 2019 courses at elite sports level are also to be offered.

Professional coach training
63 students



Self-directed learning was at the core of additional flanking measures, including more intensive supervision of coaches by coach developers (previously sports mentors). Information and communication measures for the courses were increased. The creation of respectful, conducive and stimulating learning environments demands a great deal of energy from the Sports Coach Education Switzerland team. Analogous forms such as learning teams, experience sharing, and supervision and intervision groups were equally key, as was social learning through digital aids.

Sports Coach Education Switzerland (from left to right) Monika Kurath, Adrien Wehrli, Dominik Schmid, Philipp Schütz, Jael Wälti

Coach in Competitive Sports, Federal Diploma of Higher Education

Participants: 45 passed: 37

Elite Sports Coach, Advanced Federal Diploma of Higher Education

Participants: 34 passed: 24

Coaches counseling

· 50 (without case supervision)
· 222 (with case supervision)

Master Coach Programme

Participants: 30

A total of 192 course days in 2018

In the year under review, Coach Education Switzerland provided a total of 192 course days in the areas of sports psychology, coaching theory, conditioning, technique/tactics, sports coaching, sports medicine and leadership, plus advanced options. In addition, 16 assessment days and three professional coach courses took place with 63 coaches overall. In November, the first six graduates successfully completed the Federal Diploma of Higher Education examination under the new diploma regulations. In total, 79 people took the Federal Diploma of Higher Education and Advanced Federal Diploma of Higher Education examinations (under the old and new diploma regulations) in the year under review. Sports Coach Education in Switzerland also certified 33 coach developers.

In addition, the Master Coach Programme "Lausanne 2020" was launched in collaboration with Swiss Olympic in 2018. Designed to assist young coaches as they prepare for the 2020 Winter Youth Olympic Games in Lausanne, teaching focuses on planning, roles and self-management.

Coaching – all a question of impact

On 23 and 24 October 2018, Sports Coach Education Switzerland took 325 coaches on a journey through the diverse field of coaching. In six different areas of activity, coaches not only encountered familiar and less familiar situations, they also had an opportunity to discover unusual approaches. Check points were set up to ensure that coaches never lost their bearings on the journey and were able to distinguish and classify the different measures. At a prominently located marketplace, participants also learned how the digital world is impacting coaching.

This year too, the Swiss Olympic Coach Award was presented at a gala evening held under the auspices of the Magglingen Coaching Conference. In recognition of three outstanding research projects whose findings are relevant to elite and youth sport in Switzerland, the Swiss Olympic Science Award 2018 was likewise presented at the Magglingen Coaching Conference.

Units

The units at the SFISM provide a cross-section of services for Swiss sport in interdisciplinary collaboration with internal and external partners. They are instrumental in finding solutions to challenges facing society. They are closely engaged in socially relevant fields such as national defence, fitness, health, technology, digitization, integration, prevention, construction and the environment. The units develop, process and disseminate nationally and internationally recognized knowledge and methodologies in the fields of monitoring, evaluation, sports technology, integration and prevention in sports as well as sports facilities.

Monitoring

The first year as Monitoring unit offered a lot of variety. Its largest project mandate was to develop content and training logic for a fitness smartphone application for the Swiss Armed Forces (commando training and recruitment). This training/fitness app offers a customized training programme tailored to the individual's current fitness level and the selected military function or training focus. The exercises were visualized and programmed in collaboration with the Swiss Center for Electronic Media (ZEM) and a software development partner. As part of a concurrent evaluation study of the training app, volunteers from four different recruit schools are questioned about the nature of physical and mental preparations for military service and tested for changes in fitness.

A quality management system was also designed for the army fitness tests (FTA) used on recruits. This year's main focus was on an on-site FTA status review at all six recruitment centres as well as revising directives. The findings and feedback obtained are currently being processed as inputs for quality assurance in the years to follow. Existing services and annual fitness tests for local fire brigades continued to be frequently availed of. In addition, unit staff taught various courses on the SFISM Bachelor of Science and Adult Sport Switzerland (esa) programmes.

Evaluation

The Evaluation unit began its first year with a great deal of vigour and an internal team-developed strategy. Areas covered comprised the impact evaluation of Youth+Sport, the assessment and reporting of site visits, the teaching evaluation, as well as guidance and support for further evaluation projects at FOSPO, including the evaluation of the Magglingen university weeks (MHW). The results of the survey conducted on 618 MHW participants are used as a basis for pending decisions.

Planning for the impact evaluation of Youth+Sport was undertaken together with internationally recognized experts from various universities and in-house professionals at SFISM. The evaluation specialists at the Swiss Federal Audit Office assessed the impact evaluation planned by the unit as fit-for-purpose. Going forward, evaluations will also focus on questions of access and course quality.

The evaluations of site visits – 569 Y+S activities from 23 cantons and in 49 different disciplines – underlined the significance of the positive feedback from Y+S experts to Y+S leaders. The need for a validated tool to measure the quality of Y+S activities has become apparent. It was also made evident how important it is to have a clear didactic objective. Unit staff took on teaching commitments in the subjects acrobatics, scientific reading, and evaluation.

Sports technology

The new Sports technology unit created under the 2018 reorganization supports technological innovations in sport. A) It promotes an exchange between the sports community and the sport tech industry. It was in this spirit that the inaugural symposium of the Swiss Association of Computer Science in Sport was held. Participants included representatives of sports organizations, sports scientists and sport tech proponents. B) The unit supports a digital ecosystem for the sport tech industry in Switzerland. Newly formed working groups discuss measures for closer cooperation between industrial partners and the definition of standard formats. A study entitled "Data Governance in Sport" is being drafted in collaboration with the BFH Business Department. C) It develops generic systems. Working with the BFH Centre for Technologies in Sports and Medicine as well as sports experts, scientists and engineers, it conducts concrete development projects such as StreamTeam, funded by the Hasler Foundation. Run in collaboration with the University of Basel, it is developing a modular data processing system capable of recognizing sport-specific patterns in team behaviour from sensor streams. D) The unit fosters an understanding of sports technology. The course "Measurement technologies and information systems in performance sport" has been added to the SFISM Master's programme in elite sports. It is also being offered as an elective course on the coach training curriculum.

Integration and prevention

The personnel changes seen in the first year as SFISM Integration and prevention unit did not affect teaching, R&D or services schedules.

On the teaching front, the redesigned module "Integration work in sport" and the completely newly created course "Managing diversity – equal opportunities in sport" offered under the Bachelor's programme were successfully conducted for the first time. Students were taught the theory and practice of delivering sports to specific target groups while also incorporating inclusivity.

A key service provided was the professional assistance and support given to Youth+Sport for the development of principles for the integration of people with disabilities. The main questions addressed were the definition of disability, the regulation of supplementary grants, as well as access to management training. Unit staff also attended, supported and implemented various Youth+Sport I-modules in the areas of integration (cultural diversity and sports and handicap) and prevention. A squad day was held on the topic of prevention (violence).

A dissertation chiefly examining the question of integration in sports teaching was completed. The "Keep moving – Fit for life" brochure was published in an additional language (Arabic) with target-group-specific exercise recommendations and updated in the ten existing languages.

Units (from left to right): Alain Dössegger, Niklaus Schwarz, Raffaela Léchot, Petra Kupferschmid, Fabian Studer, Christiane Beuchat, Corinne Zurmühle, Thomas Wyss, Regina Oeschger, Lilian Roos

Series of publications for planning, building and operating sports facilities

· 25 (German/French)
· 3 (German/French/Italian)
Total: 28

The documents can be ordered in print or downloaded in PDF-format for free on www.basposhop.ch.

Sports facilities

This year, too, the work of the Sports facilities unit focused on education and training. The sports management specialization offered under the new SFISM Bachelor's course lends additional weight to the topic of sports facility construction. Attracting some 100 participants, the unit's annual visit to a sports infrastructure met with huge interest. The chosen destination, the Zurich Allmend bike and skate park, is a pioneering example of how to utilize open space in an urban environment. The itinerary also included the Heuried Sports Center, an ice rink and swimming pool facility from the 1960s that was fully refurbished in 2015–2018 and today represents the state of the art in architecture and energy technology. Attendance was very high at this year's conference in Magglingen addressing the issue of whether private sports halls can provide a solution to offset the absence of public facilities. The initiators presented six of the nine private sports halls themselves. These were displayed on posters.

November saw the start of the 6th CAS Sports Facility course. The inaugural module in Magglingen attracted a record 29 participants. Marking a first, the 2019 CAS will also be offered in French.

Research and development collaboration with the Department of Architecture, Wood and Civil Engineering (AHB) of Bern University of Applied Sciences BFH was further consolidated. The construction costs for sports hall projects over the past five years are being analysed in cooperation with the management and market research experts at the AHB. Together with the BFH, the unit conducted extensive material tests for the construction of a new mobile track at the National Sports Centre in Magglingen.
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Publications

Factors That Influence the Rating of Perceived Exertion After Endurance Training

Authors: Lilian Roos, Wolfgang Taube, Carolin Schulze, Klaus Michael Frei, Thomas Wyss
Affiliation: Swiss Federal Institute of Sport Magglingen SFISM, Magglingen, Switzerland and Department of Medicine, Movement and Sport Science, University of Fribourg, Fribourg, Switzerland
Journal: International Journal of Sports Physiology and Performance, 13(8), 1042-1049. doi:10.1123/ijspp.2017-0707

Session rating of perceived exertion (sRPE) is an often used measure to assess athletes' training load. However, little is known which factors could optimize the quality of data collection thereof. The aim of the present study was to investigate the effects of (i) the survey methods and (ii) the time points when sRPE was assessed on the correlation between subjective (sRPE) and objective (heart rate training impulse; TRIMP) assessment of training load. In the first part, 45 well-trained subjects (30 men, 15 women) performed 20 running sessions with a heart rate monitor and reported sRPE 30 minutes after training cessation. For the reporting the subjects were grouped into three survey method groups (paper-pencil, online questionnaire, and mobile device). In the second part of the study, another 40 athletes (28 men, 12 women) performed 4 × 5 running sessions with the four time points to report the sRPE randomly assigned (directly after training cessation, 30 minutes post-exercise, in the evening of the same day, the next morning directly after waking up). The assessment of sRPE is influenced by time point, survey method, TRIMP, sex, and training type. It is recommended to assess sRPE values via a mobile device or online tool, as the survey method "paper" displayed lower correlations between sRPE and TRIMP. Subjective training load measures are highly individual. When compared at the same relative intensity, lower sRPE values were reported by women, for the training types representing slow runs, and for time points with greater duration between training cessation and sRPE assessment. The assessment method for sRPE should be kept constant for each athlete and comparisons between athletes or sexes are not recommended.

Energy expenditure estimation from respiration variables

Authors: Gilgen-Ammann Rahel, Koller Marcel, Huber Céline, Ahola Riikka, Korhonen Topi, Wyss Thomas
Affiliation: Swiss Federal Institute of Sport Magglingen SFISM, Magglingen, Switzerland
Journal: Scientific Reports

The aim of this study was to develop and cross-validate two models to estimate total energy expenditure (TEE) based on respiration variables in healthy subjects during daily physical activities. Ninety-nine male and female subjects systematically varying in age (18-60 years) and body mass index (BMI; 17-36 kg*m-2) completed eleven aerobic activities with a portable spirometer as the criterion measure. Two models were developed using linear regression analyses with the data from 67 randomly selected subjects (50.0 % female, 39.9 ± 11.8 years, 25.1 ± 5.2 kg*m-2). The models were cross-validated with the other 32 subjects (49 % female, 40.4 ± 10.7 years, 24.7 ± 4.6 kg*m-2) by applying equivalence testing and Bland-and-Altman analyses. Model 1, estimating TEE based solely on respiratory volume, respiratory rate, and age, was significantly equivalent to the measured TEE with a systematic bias of 0.06 kJ*min-1 (0.22 %) and limits of agreement of ± 6.83 kJ*min-1. Model 1 was as accurate in estimating TEE as Model 2, which incorporated further information on activity categories, heart rate, sex, and BMI. The results demonstrated that respiration variables and age can be used to accurately determine daily TEE for different types of aerobic activities in healthy adults across a broad range of ages and body sizes.

Performance sport

The Performance sport section can look back on an intensive year. Working closely with the governing bodies is proving its value. A large number of the competitors participating in the Winter Olympic Games in South Korea availed of the section's services ahead of the competitions. Staff were highly delighted at the athletes' success. The Lärchenplatz new build and the relocation to provisional premises that this necessitates are currently in the planning phase.

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Sports medicine

Sports medicine staff attend to top and young athletes from various governing bodies and elite sports army recruit schools on a daily basis when they experience acute or long-term injury and illness. They also provide advice on prevention and answer questions about elite sports. In the year under review, over 150 athletes from 15 different disciplines were given sports medicine assessments and underwent preventive tests.

Multilingualism goes without saying. Staff conducted over 90 sports-medical check-ups in German, 60 in French and at least one in Italian.

Collaboration on a variety of projects in different disciplines was another key component of the unit's activities. Topics included biological age, health and fitness, electrocardiograms for children and adolescents who do sport, as well as the impact of heat on performance.

Sports medicine teaching is invariably concerned with the prevention and awareness of acute and, above all, chronic injuries and illnesses connected with sporting activities. The objective is to sensitize everyone involved in sport and ensure that injuries can as far as possible be avoided with the aid of preventive measures.

Individual members of the medical support team were able to witness up close the success of the supervised elite athletes in a number of disciplines.

Sports physiology (strength)

In the year under review, the organizational unit Sports physiology (strength) worked symbiotically on the performance diagnostic supervision of athletes/ coaches in numerous disciplines, on applied research and development, as well as on the incorporation of new scientific and practical findings into the various teaching formats.

- Services: Staff tested and coached 12 national teams (Alpine skiing, ski cross, artistic gymnastics, athletics, ski jumping, BMX, cross-country skiing, aerial skiing, freestyle skiing such as slopestyle, halfpipe, boardercross, bobsleigh and Swiss wrestling). Representing 42.2 % of the Swiss contingent, 70 of the athletes taking part in the Pyeongchang Olympic Games – the sporting highlight of the year – were supported by group staff. The organizational unit, together with the Game sports group, also supervised over 200 youth athletes from 10 disciplines at the talent meet in Tenero.
- Research and development: 1 abstract, 3 posters and 3 original articles were accepted for publication in the year under review. Two research projects (artistic gymnastics, BMX) funded by Swiss Olympic are underway.
- Teaching: 17 ECTS credits were achieved on the Bachelor's and the two Master's degree programmes. Group staff supervised 3 Master's and 1 Bachelor's dissertation
- They contributed over 20 lessons for various courses (>50h).

Sports physiology (endurance)

In the year under review, the organizational unit Sports physiology (endurance) provided extensive sports scientific support to the various national teams of the governing bodies Swiss Ski (cross-country skiing, biathlon), Swiss Cycling (mountain biking, track cycling), Swiss Triathlon and Swiss Athletics (middle-distance and marathon). In addition to carrying out traditional performance tests, the team also developed new test formats and conducted diverse sports scientific projects in collaboration with the governing bodies and Swiss Olympic to prepare the different athletes specifically for the various major events: Pyeongchang Winter Olympics (Swiss Ski), European Championships in Glasgow (triathlon, Swiss Cycling) and Berlin (Swiss Athletics) as well as the MTB World Championships (Swiss Cycling) at Lenzerheide. Together with the governing bodies and Swiss Olympic in readiness for the 2020 Summer Olympics in Tokyo, the group also did some valuable groundwork in the heat and humidity lab in the area of heat acclimatization.

The unit carried out a major research project in collaboration with the Beijing Sport University. Articles from four further research projects were published in peer-reviewed journals. Representing a further highlight, the group also presented seven abstracts at the annual conference of the Swiss Society of Sports Science and the annual congress of the European College of Sport Science. It also conducted seven courses for the Master's programme in elite sports and supervised nine Master's and Bachelor's dissertations.

Sports physiology (game sports)

Just under 500 athletes from the youth and national A teams of the football (50 %, ⅓ of which were women), ice hockey (47 %) and handball (3 %) governing bodies took part in a discipline-specific test battery used to create a physical performance profile from which training recommendations were made. A newly developed test battery for football goalkeepers was used for the first time. In the case of players participating in the talent promotion projects for football (Footura/o) and handball, the performance tests are part of an interdisciplinary assessment (including sports psychology, physiotherapy and medicine). The group also carried out performance tests on the Chinese ice hockey team and participants of the talent meet in Tenero.

Research and development activities focused on the scientific publication of a self-developed method of recording high-intensity game stressors using positional data, its application in ice hockey and its integration into measuring systems in collaboration with an industrial partner. Investigations into the development of a football-specific repetitive sprint test were completed. Two applied research projects attracted third-party funding in the year under review.

Coaching sciences

The Coaching sciences department has two principal remits: to identify, scout and develop talent and to provide scientific support within the governing bodies.

A great deal of headway was made in 2018, including providing governing bodies and Swiss Olympic with scientifically validated practical tools for an improved, more reliable selection of emerging talents (PISTE 2.0). Five staff members are also working on applied research projects within the governing bodies to ensure scientific support for performance sports coaches. In addition, two innovative pioneer projects were initiated in collaboration with the Swiss Football Association and the Technique and tactics group. This year the department launched the "Bio-banding" project to investigate the effects of categorizing M13-M14 players according to biological rather than chronological age. Running parallel to this, the "Play more football" project is exploring the impact of a new game variant (4 against 4 in addition to the usual 7 against 7 format) in children's football (9-10 years). The objective is for children to engage in a significantly higher number of game actions and so gain more learning opportunities.

The empirical evidence and know-how acquired will subsequently be passed on to participants of the coaching courses under the Bachelor's and Master's programmes.

Performance sport section (from left to right): Philipp Röthlin, Severin Trösch, Erika Ruchti, Micah Gross, Marie Javet

Physiotherapy treatments 2748

Massages 2247

Sports physiotherapy

Sports physiotherapy further expanded its services for elite athletes. In addition to the athletes from the various national performance centres in Magglingen, the team increasingly also took care of injured sportspeople from the sports governing bodies and the Swiss Armed Forces (Elite Sport Training School for Recruits). Collaboration with the governing bodies in particular was stepped up. Athletes can benefit from a comprehensive physiotherapy and rehabilitation programme combined with the training structure that is in place. Interdisciplinary cooperation with specialists from the different departments during the rehabilitation process guarantees athletes extensive and optimal post-injury support. The return to competition test developed by Sports physiotherapy to determine the success of rehabilitation following knee injuries is being used Swiss-wide by numerous elite sportsmen and women from a range of different disciplines. A positive test result assures them a safe, injury-free return to sport.

Supplementing sports physiotherapy, the medical massage is an integral part of therapy and regeneration. Regeneration and prevention are becoming ever more significant in the elite sports community in terms of promoting the health and performance of athletes. Insights gained from real-life situations are incorporated by Sports physiotherapy staff into the various SFISM courses and coach training programmes. The principles of evidence-based, sport-specific, physiotherapeutic and rehabilitative interventions are developed in different interdisciplinary applied R&D projects.

Sports psychology

The Sports psychology group continued to expand its activities. In addition to around 450 individual or group counselling sessions (including sports psychological screenings), 92 support days were provided for governing bodies. Recovery-stress monitoring via smartphone was in heavy demand (over 7000 measurements). An increase in coach training course days was also recorded.

Publication activities included book chapters and articles in peer-reviewed professional journals, e.g. writing up scientific data for a broader mobile sports audience. An application to conduct research into self-compassion in coaches and athletes was approved by the Swiss National Science Foundation. The group also initiated a research project into career-impairing conflicts between different spheres of life for the Swiss Football Association. Likewise commissioned by the Swiss Football Association, the group drew up a compilation of the mental aspects to be included in the association's definition of the game philosophy.

In addition to a national professional conference on career transitions, the team also organized an international summit on mindfulness- and acceptance-based interventions in elite sports. 25 sports psychologists from 12 different nations were welcomed at the invitation-only event.

Publications

Do male athletes with already high initial haemoglobin mass benefit from 'live high-train low' altitude training?

Anna Hauser[1,2], Severin Troesch[1], Thomas Steiner[1], Franck Brocherie[2,3], Olivier Girard[2,4], Jonas J. Saugy[2], Laurent Schmitt[2,5], Grégoire P. Millet[2] and Jon P. Wehrlin[1].
[1]Swiss Federal Institute of Sport, Section for Elite Sport, Magglingen, Switzerland. [2]Institute of Sport Sciences, Faculty of Biology and Medicine, University of Lausanne, Switzerland. [3]Institut National du Sport de l'Expertise et de la Performance, Paris, France. [4]Aspetar, Orthopaedic and Sports Medicine Hospital, Athlete Health and Performance Research Centre, Doha, Qatar. [5]National School of Mountain Sports/National Ski-Nordic Centre, Prémanon, France.

It has been proposed that athletes with high initial values of haemoglobin mass (Hb_{mass}) will have a smaller Hb_{mass} increase in response to 'live high–train low' (LHTL) altitude training. To verify this assumption, the relationship between initial absolute and relative Hb_{mass} values and their respective Hb_{mass} increase following LHTL inmale endurance and team-sport athletes was investigated. Overall, 58 male athletes (35 well-trained endurance athletes and 23 elite male field hockey players) undertook an LHTL training camp with similar hypoxic doses (200–230 h). The Hb_{mass} was measured in duplicate pre- and post-LHTL by the carbon monoxide rebreathing method. Although there was no relationship (r=0.02, P=0.91) between initial absolute Hb_{mass} (in grams) and the percentage increase in absolute Hb_{mass}, a moderate relationship (r=–0.31, P = 0.02) between initial relative Hb_{mass} (in grams per kilogram) and the percentage increase in relative Hb_{mass} was detected. Mean absolute and relative Hb_{mass} increased to a similar extent ($P \geq 0.81$) in endurance (from 916 ± 88 to 951 ± 96 g, +3.8 %, $P < 0.001$ and from 13.1 ± 1.2 to 13.6 ± 1.1 g kg–1, +4.1 %, $P < 0.001$, respectively) and team-sport athletes (from 920 ± 120 to 957 ± 127 g, +4.0 %, $P < 0.001$ and from 11.9 ± 0.9 to 12.3 ± 0.9 g kg–1, +4.0 %, $P < 0.001$, respectively) after LHTL. The direct comparison study using individual data of male endurance and team-sport athletes and strict methodological control (duplicate Hb_{mass} measures and matched hypoxic dose) indicated that even athletes with higher initial Hb_{mass} can reasonably expect Hb_{mass} gain post-LHTL.

Motivationstraining

Birrer, D. (2019). In A. Güllich & M. Krüger (Eds.), Sport in Kultur und Gesellschaft: Handbuch Sport und Sportwissenschaft (pp. 1-17). Berlin, Heidelberg: Springer Berlin Heidelberg.

Motivationstraining bezweckt die systematische Optimierung menschlichen Verhaltens via einer Erhöhung der Handlungsfrequenz, Verbesserung der -persistenz, Steigerung der -intensität sowie der Verbesserung der Handlungsqualität. Unter Berücksichtigung der Phasen des Rubikon-Modells geschieht dies durch den Einbezug motivationaler Schemata zur Befriedigung psychologischer Grundbedürfnisse, weiterhin durch Werteklärungen, mentalem Kontrastieren, affektivem Vorerleben, systematischer Zielsetzungsarbeit, Implementierungsintentionen, Veränderung des motivationalen Klimas, attributionalem Feedback/Retraining.

Sports teaching

The Sports teaching section's R&D activities are aimed at developing scientifically founded, empirically robust tools to promote the quality of physical education. The section also conducts research into fundamental principles and the contribution that promotional tools can make to improving the quality of physical education.

Research and development

In terms of the development of tools to promote the quality of physical education, the project "Choreographing learning and teaching – proposals for structuring physical education" can be singled out for the striking progress made. Under the project, a handbook is being developed to help teachers consciously integrate students' learning processes into their teaching structure. Five different learning and teaching models are presented and illustrated using examples from lessons: observational learning, experiential learning, problem-based learning, cooperative learning and tutorial learning. Work is currently underway on formulating the final learning and teaching model for tutorial learning. The handbook is scheduled for publication in 2019.

Research into improving the quality of physical education is directed primarily at the development and impact of sports teachers' professional skills. One project in this area was completed and a second successfully acquired: Jonas Steiger's dissertation project examined the beliefs held by sports teachers about their students and about sports as a school subject in the context of migration-related heterogeneity. To sound out their beliefs, he conducted extensive repertory grid interviews with teachers whose classes had a high proportion of students with a migration background. Jonas Steiger's findings showed that students with a migration background are on average perceived as less ideal by the teachers surveyed. On the other hand, it was demonstrated that sports teachers ascribe a great deal of potential to the subject of sport as a tool for integrating migrant students. In summer 2018, Jonas Steiger was awarded a doctorate by the Institute for Educational Sciences of the University of Basel on the basis of this dissertation.

The section is a key participant in the Swiss National Science Foundation project *The professional skills required of physical education teachers and their impact on teaching and student performance*, which was approved in the year under review. The project is a joint venture between the teacher training institutions of the University of Applied Sciences and Arts Northwestern Switzerland and FHS St. Gallen as well as SFISM. The allocated resources covered funding for a scientific assistant and two PhD students. As of April 2019, Anna Siffert from the Sports teaching section will be supporting the project in her capacity as PhD student.

The following section staff members received special recognition: Patricia Steinmann was invited by the Hessian Gymnastics Association to present her work on teaching disruptions at the 5th Hessian Gymnastics & Sports Congress; André Gogoll, jointly with Prof. Erin Gerlach (University of Potsdam), presented a keynote address on the topic "Physical activity, sport and learning – between pedagogical desire and empirical reality" at the 26th Congress of the German Society for Educational Science (DGfE) at the University of Duisburg-Essen.

Sports teaching section (from left to right): Anna Siffert, Nina Zahnd, Eric Jeisy, Dominique Fankhauser, Patricia Steinmann, André Gogoll

Teaching

In terms of teaching, the section provided much fresh momentum in the transfer of sports teaching knowledge to enhance the pedagogical quality of sports courses:

For the first time, the section included required elective specialization courses in sports teaching in the Bachelor's degree programme launched in 2016. They serve the twofold objective of providing a practice-based consolidation of previously acquired theoretical application know-how and expanding the scope of application to non-school contexts.

The integration of the new learning and teaching units on "prevention and rehabilitation in gymnastics" and "biomechanical aspects of gymnastic sports" into apparatus gymnastics courses 1 + 2 has reinforced the sports science perspective on gymnastics. This underpins the Institute's aspirations to provide teaching which is solidly founded in sports science and satisfies the criteria of university-level didactics in all areas of training (including "practical" sports courses).

Changes were made to the sports teaching course "Applications of sport science theories and models" offered in the Master's course in sports science conducted jointly with the University of Fribourg. Increasingly discredited by the scientific community, the learning and teaching module "Differential Learning" was replaced by two newly developed, as yet unpublished learning and teaching models on "Cooperative Learning" and "Tutorial Learning". On an encouraging note, students also succeeded in using these models to design sports lessons which meet the deep-structure learning demands in sport.

The degree course leading to a "Master of Arts in Educational Sciences with Specialization in Sports Teaching Methodology" was launched at the Institute for Educational Sciences of the University of Basel; a course offered by the Sports Teaching Methodology competence centre in which SFISM is participating and which is funded by project-linked grants from the Swiss federal government under the P-9 programme "Development of subject-specific didactics". The Sports teaching section is running three courses.

Publication

Sportdidaktik als wissenschaftliche Disziplin

Gogoll, A. (2018). In H. Aschebrock & G. Stibbe (Hrsg.), Schulsportforschung. Wissenschaftstheoretische und methodologische Reflexionen (S. 43–54). Münster: Waxmann.

Im Vordergrund bisheriger Selbstbeobachtungen und Selbstreflexionen der Sportpädagogik bzw. der Sportdidaktik stehen vorrangig die Bezüge, die diese Disziplinen zu ihren sportwissenschaftlichen Schwesterdisziplinen oder zu Disziplinen ausserhalb der Sportwissenschaft unterhalten. Nur wenig thematisiert werden dagegen Fragen der disziplinären Identität selbst oder Versuche, diese herzuleiten oder zu bestimmen. Ziel des Beitrags ist es, zu einem tieferen Verständnis der Sportdidaktik als wissenschaftliche Disziplin im modernen Wissenschaftssystem der Disziplinarität und Interdisziplinarität zu kommen: Worin liegt die Spezifität der Sportdidaktik? Welches ist ihre Eigenheit, die sie als eigenständige wissenschaftliche Disziplin auch identifizierbar macht? Welchen Status nimmt sie in dieser Form im modernen System der wissenschaftlichen Disziplinen ein? Welche Probleme stellen sich ihr als wissenschaftliche Disziplin? Beantwortet werden diese Leitfragen zur disziplinären Bestimmung der Sportdidaktik aus zwei Perspektiven: erstens aus einer transdisziplinären Perspektive und im Anschluss an eine systemtheoretische Bestimmung des Subsystems «wissenschaftliche Disziplin» im modernen Wissenschaftssystem. Zum Zweiten und konkretisierend im Anschluss an Auslegungen zum disziplinären Status der Fachdidaktiken, wie sie aus der Erziehungswissenschaft oder aus einzelnen selbst stammen. Als Ergebnis der Analyse wird deutlich, dass die Sportdidaktik insbesondere ihre Probleme mit der einheitsbildenden Schliessung ihrer kommunikativen Akte angehen muss, wenn sie sich dauerhaft als wissenschaftliche Disziplin etablieren möchte.

Sports economics section

Particular highlights for the Sports economics section in 2018 included the development of research on sports clusters and the publication of two scientific articles on elite sports in professional journals.

Research

In order to support elite athletes in achieving sporting successes at national and international level, the section put together observations on the opportunities and challenges presented by the creation and management of sports clusters designed for one or more disciplines (e.g. performance or training centres). Drawing on its network of national and international partners, it organized several thematic workshops with key representatives of the Swiss sports community and authored three analysis reports directed at decision-makers in the sporting world. Research activities led to the publication of a number of scientific articles in professional journals in the area of elite sports (see example) and to staff participating in several science conventions, including the congress of the European Association for Sport Management (EASM), the conference of the Swiss Society for Sports Science (SGS) as well as the 50th Journées de Statistique and the World Congress of Sociology of Sport (WCSS).

Education

As part of the successful collaboration with the Bern University of Applied Sciences, since September 2018 the department has been offering students a 12 ECTS credits module in sports management and sports events. The new study programme comprises four different courses (e.g. sports management or sports marketing) taught by several members of staff and has been enthusiastically received by the almost 40 students enrolled. Activities included a tour of the Hallenstadion stadium in Zurich, where students heard a talk by the Swiss Cup official responsible on the organization of the event and the challenges posed. In the various modules that fall under its area of competence, the department is also actively involved in courses on the Bachelor's programme in sport and the Master's programme in elite sports.

Services

Our department performs diverse services for its partners in the fields of sports economics and sports management. In 2018, staff played a key role in organizing the SwissTopSport event forum in Magglingen (17 and 18 October), which was attended by numerous experts in the digitization of sport. They analysed the pros and cons of this trend with regard to the future development of sport. In addition to providing organizational support for the event, the department also planned and participated in several thematic blocks addressing in particular the role of e-sports (Michaël Mrkonjic and Andreas C. Weber) and new funding instruments (Ariane Weber and Florence Pillet) in Swiss sport.

Sports economics section (from left to right): Andreas C. Weber, Florence Pillet, Ivo Gête, Hippolyt Kempf

Publication

Is prioritisation of funding in elite sport effective?

De Bosscher, V., Shibli, S. & Weber, A. Ch. (2018). An analysis of the investment strategies in 16 countries. European Sport Management Quarterly. DOI: 10.1080/16184742.2018.1505926

Research question: This paper explores the extent to which nations prioritise elite sport funding; whether such nations are more successful than those whose funding is more diversified; and, if the sports that receive the most funding are also the most successful.

Research methods: Data on public expenditure for elite sport programmes (2011/2012) were collected on a sport-specific basis in 16 nations (n=445 funded sports). The Herfindahl index and concentration ratios of the four/eight most funded sports (CR4/CR8) are used as proxies for prioritisation. Success was measured using top three and top eight places during the Olympic Games and World Championships. Descriptive analysis and linear regression are applied to identify the relationship between the distribution of funding and success.

Results and findings: Generally, all sample nations are prioritises. Nations with smaller total elite sport budgets tended to prioritise more. There is a slight negative association between the distribution of funding within a country and subsequent success, indicating that the sample countries that prioritise more tended to be less successful. Sample nations that diversify their funding more, are found to be successful in a wider range of sports. In addition, the data illustrated only low allocative efficiency for some nations.

Implications: The study produced ambiguous conclusions that prioritisation as a deliberate strategic choice is an efficient way to invest funding. The findings have important implications for high-performance managers and suggest that a more diverse resource allocation policy may help to avoid unintended negative consequences.

All SFISM's publications are listed on www.ehsm.admin.ch

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