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Master Human Movement Sciences Maastricht University

Report of the limited programme assessment
January 21st 2019

Utrecht
March 2019
www.AeQui.nl
Assessment agency for higher education

Colophon

Maastricht University
Universiteitssingel 60
6229 ER Maastricht

Programme:	Master Human Movement Sciences
Specialisations:	Health and Rehabilitation
	Sports and Nutrition
	Physiotherapy
Location:	Maastricht
Mode of study:	Full-time and part-time
Croho-registration:	60462

Assessment committee
Raoul van Aalst, chair
Nicole Wenderoth, domain expert
Gertjan Ettema, domain expert
Anton Wagenmakers, domain expert
Bart Staal, domain expert
Vera Liselotte Broek, student member
Titia Buising, secretary
The committee was presented to the NVAO for approval.

The assessment was conducted under the responsibility of
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Content

Summary

On January 21st 2019, an AeQui committee performed an assessment of the master programme in Human Movement Sciences (HMS) of Maastricht University. The overall judgement of the committee is that the quality of the programme is **satisfactory**. The committee notes that since the programme was recently restructured, the current programme is quite new. The specialisations Health and Rehabilitation and Sports and Nutrition started in September 2017, the specialisation Physiotherapy in September 2018. The committee appreciates that in restructuring the programme, evaluation results and remarks of students and alumni were considered and taken very seriously.

Intended learning outcomes
The committee assesses the intended learning outcomes as **satisfactory**. The committee concludes that the intended learning outcomes have been given concrete form with regard to content, level and orientation and meet international requirements. The intended learning outcomes tie in with the domain-specific frame of reference, drawn up by all the Dutch programmes in human movement sciences. In addition, the committee notes that the Dublin descriptors are adequately represented in the intended learning outcomes. The committee values the Physiotherapy specialisation. The committee is enthusiastic about the vision on the role of graduates in the bigger context of the collaboration between the faculty and Maastricht UMC+ as presented during the site visit. Finally, the committee strongly supports the intention to appoint an alumni board, as an additional means to ensuring a close link to developments in the work field of human movement sciences.

Teaching-learning environment
The assessment committee assesses the teaching-learning environment of the programme as **satisfactory**.
The committee concludes that the programme enables students to realise the intended learning outcomes. The programme is coherent and contains both specialised and generic components. The specialisations allow for in depth study of the specific field. Academic skills are addressed in the specialised courses as well as in the generic Designing Intervention Research course. The committee notes that the courses in the Physiotherapy specialisation on pharmacy and ageing are unique and timely and tie in with future developments in the field. The Problem-Based Learning (PBL) concept is an explicit and established feature of the programme (and university). The committee notes that the PBL concept is consistently implemented in teaching methods and the assessments. The tutorials offer small scale and interactive teaching. Staff are highly competent and involved with students and the programme. The committee appreciates the refreshing vision on educational careers of lecturers. The committee supports the appointment of mentors who help students to reflect on the development of their academic skills and the optional brush-up course in statistics. The committee concludes that the digital learning environment is adequate. In addition, the courses and the programme are evaluated on a regular basis.

Assessment
The assessment committee concludes that the programme has an adequate system of assessment in place, and assesses this standard as **satisfactory**.
The committee concludes that an adequate system of assessment is in place. The intended learning outcomes are at the basis of this system. Effective measures are taken to guarantee the validity, reliability and transparency of the assessments, by using an assessment plan for each course, the more-eye-principle and support and review of the exam review committee. The assessments studied by the committee in general reflect the expected level and match the

learning goals of the courses involved. Students are content with the assessments and the feedback they receive. The board of examiners is adequately organised and safeguards the quality of the assessments.

Achieved learning outcomes
The committee assesses this standard as **satisfactory**.
Based on the studied documents and the interviews, the committee concludes that graduates of the master programme HMS achieve the required level and the intended learning outcomes. This was confirmed in the meeting with students and alumni; they are capable of creating their own career path within human movement sciences. The committee appreciates that students are actively encouraged to start thinking about their research topic in an early stage. The Designing Intervention Research course provides students with a solid start in their research proposal. The committee concludes that the overall quality of the studied theses is adequate and agreed with the grades given. The committee supports the programme's idea to organise a national career event, together with the other human movement sciences programmes.

Recommendations
The committee recommends making the intended learning outcomes more specific to the unique qualities of the programme. Three areas come to mind:

- the three specialisations;
- key elements of the problem-based learning concept, such as strong communication and collaborative skills;
- the strong vision on how graduates can play a role in the bigger context of the MUMC+.

The committee believes this will have benefits both in attracting students and in guiding the further development of the programme.

Secondly, the committee suggests retaining a keen eye on the depth of exam questions, as the committee found in a few instances questions that it deemed too easy.

Lastly, the committee notes with regard to the theses that in general the relation between the research question and the chosen research method can be improved. The committee also suggests the programme to invest in giving students more explicit feedback on the grading of their thesis.

All standards of the NVAO assessment framework are assessed positively; hence the committee awards a positive recommendation for the re-accreditation of the master programme Human Movement Sciences of Maastricht University. The committee concludes that the overall assessment of the programme is **satisfactory** for both fulltime and part-time mode.

On behalf of the entire assessment committee,
Utrecht, March 2019

Raoul van Aalst
Chair

Titia Buising
Secretary

Introduction

The master programme in Human Movement Sciences aims to deliver students that will be able to perform and understand research in an evidence-based way on the interaction between (i) physical activity, mobility and health as well as (ii) training programmes (exercise and nutrition) and physical performance in sports. The programme's mission is to prepare students for a research-oriented future in the field of human movement sciences in relation to health (care), rehabilitation/physiotherapy or sports performance and/or to educate students in such a manner that they are capable of (i) applying evidence-based practice within their professional setting and/or (ii) influencing (or improving) evidence-based practice in their discipline via scientific research and publications.

The institute

The programme is part of the Faculty of Health, Medicine and Life Sciences of Maastricht University. The mission of the programme as mentioned above ties in with the mission of the faculty, that aims to educate academics at a high level, to conduct high-quality, multidisciplinary scientific research and to valorise knowledge within the domains of health sciences, medicine and biomedical sciences.

Education at the faculty is based on the principles of Problem-Based Learning (PBL). These principles include small groups and a student-oriented approach, learning adapted to the individual experience and knowledge of the students, collaborative learning and contextual orientation by assessing an exemplary case from different angles. The faculty aims to create a sense of community and to stimulate and provide specific and real-life challenges to students. Within this educational concept, students are responsible for their own learning process and study progress.

The programme

The master programme in Human Movement Sciences (60 EC) has been restructured in the past few years. The new curriculum started September 2017, with two specialisations: Health and Rehabilitation (H&R) and Sports and Nutrition (S&N). In September 2018, the specialisation Physiotherapy (PHY) was added to the programme. With this specialisation, the university wants to contribute to the advancement of the physiotherapy profession and to embed graduated students from the SOMT undergraduate physiotherapy programme. For these students, the combination of the three-year bachelor programme and the one-year master programme leads to registration as a licensed physiotherapist in the Dutch BIG register.

In addition to the above-mentioned goals, the programme wants to teach students how physical activity and exercise can be used as a means to improve health, prevent illness and counterbalance the consequences of ageing. Moreover, students learn how physical activity and exercise can be used to improve human performance in conditions varying from limited performance in daily life to elite sports.

The intended learning outcomes of the programme are in line with the domain-specific frame of reference for the Human Movement Sciences cluster. Students follow courses within their own specialisation and more general courses with students from the other specialisations. The programme is, for all three specialisations, finalised with the placement and the master's thesis.

The programme (60 EC) is offered as a full-time mode (one year) and a part-time mode (two years). Part-time students follow courses with the full-time students. However, instead of two courses at the same time, part-time students attend one course per period. Because of the similarities between the two modes, in this re-

port all findings and judgements are presented for both fulltime and part-time integrated, except when different.

Cluster visitation

Since the committee visited all human movement sciences programmes, it was able to see similarities and differences between these programmes. All universities involved have their own specific focus. Learning at Maastricht University is characterized by the Problem-Based Learning concept. Human Movement Sciences at Maastricht University is offered at master's level, with specialisations in Health & Rehabilitation, Sports & Nutrition and Physiotherapy. Particularly, the strong expertise in nutrition, exercise physiology and the Physiotherapy specialisation are quite unique.

At VU Amsterdam, human movement sciences is offered at bachelor's and master's level. There is a strong focus and staff expertise on biomechanics, modelling, movement analysis and sports. The university also offers the only research master in human movement sciences in the Netherlands.

University of Groningen also offers human movement sciences at bachelor and master level. The bachelor's programme has a strong focus on neuroscience and statistics. The master programme Human Movement Sciences is a two-year programme. The programmes have close relations with the departments in rehabilitation and orthopaedics of UMCG.

Even though all three universities offer a programme or specialisation in sports, the focus is different. Maastricht University addresses sports and nutrition. The VU focuses on sport psychology, biophysics in sports and high-performance coaching. In relation to elite sport, the programme is connected to cyclic sports. The master programme in Sport Sciences in Groningen has a broad focus within this specific field, ranging from sport and cognition in children to performance analysis and optimisation in sport. Within elite sport, the programme is more connected to (Olympic) team sports.

In general, the committee recommends all programmes to stay in touch with new technologies and developments, such as big data, machine learning and cutting-edge molecular analyses of human blood and tissue samples.

The assessment

Maastricht University assigned AeQui VBI to perform a quality assessment. In close co-operation with AeQui, and the other programmes involved in this cluster, an independent and competent assessment committee was convened. A preparatory meeting with representatives from the programme has taken place.

The quality assessment involved all the universities (apart from Nijmegen) and programmes that are part of the Human Movement Sciences cluster in the Netherlands. The site visits were held between January 21st and 25th 2019. The site visit at Maastricht University took place at January 21st, in accordance with the programme in attachment 2. The committee explicitly oriented itself on the cluster of which the programme is part. This took place during the preparatory meetings for each site visit and the last committee meeting in which the final assessment took place. For the assessment of the master programme Human Movement Sciences of Maastricht University and more specific the Physiotherapy specialisation, dr. Bart Staal was part of the committee. The other committee members participated in all assessments part of this cluster.

The committee assessed all programmes in an independent manner. At the conclusion of the assessment, the results were presented to representatives of the programme. The draft version of this report was sent to the programme representatives; their reactions have led to this final version of the report.

Initiated by the programme, a developmental meeting will take place in the second quarter of 2019. The results of this meeting will not influence the assessment written down in this report.

1. Intended learning outcomes

The committee concludes that the intended learning outcomes have been concretised with regard to content, level and orientation and meet international requirements. The intended learning outcomes tie in with the domain-specific frame of reference, drawn up by all the Dutch programmes in human movement sciences. In addition, the committee notes that the Dublin descriptors are adequately represented in the intended learning outcomes. Even though the intended learning outcomes cover the three specialisations, the specialisations could be made more explicit in the intended learning outcomes. In addition, main aspects of the problem-based learning concept, such as strong communication and collaborative skills could be made more visible in the intended learning outcomes. The committee values the Physiotherapy specialisation. The committee is enthusiastic about the vision on the role of graduates in the bigger context of the collaboration between the faculty and Maastricht UMC+ as presented during the site visit. The committee encourages the programme to make this vision more visible in the positioning of the programme and strongly supports the intention to appoint an alumni board, as an additional means to ensuring a close link to developments in the work field of human movement sciences.

Findings
The programme ties in with the faculty's ambition to deliver graduates who can conduct high quality, multidisciplinary scientific research and can valorise knowledge within the domains of health sciences, medicine and biomedical sciences. The programme is research driven and the content of the programme is directly related to the research fields actively pursued by the lecturers.

As mentioned before, the programme offers three specialisations. The specialisation Health and Rehabilitation focuses on the role of physical (in)activity in health and disease (metabolic disease, cardiovascular disease, mental health, and also ageing) and on understanding and improving human movement in rehabilitation.

The specialisation Sports and Nutrition addresses nutrition in relation to exercise and sports performance. In this specialisation, themes such as exercise physiology, performance testing in athletes, dietary requirements based on type, intensity and volume of exercise, and efficacy of nutritional strategies to optimise sports performance and training adaptations are covered.

The specialisation Physiotherapy focuses on diagnosing, treating, and monitoring patients with conditions and co-morbidities that warrant physiotherapy treatment in a mono or multidisciplinary context. The latter specialisation enables students with a bachelor's degree in Physiotherapy, from SOMT University of Physiotherapy in Amersfoort, to obtain a registration as a licensed physiotherapist in the Dutch BIG register. With this specialization, the programme aims to educate and train scholarly physiotherapy students reaching an advanced level of clinical and academic competences. And, to further the undergraduate programme for students of SOMT to become competent health professionals capable of improving the physical well-being and quality of life of patients and generating scientific underpinning of the physiotherapy profession.

Intended learning outcomes
The intended learning outcomes tie in with the domain-specific frame of reference for Human Movement Sciences, which was drawn up by the universities offering programmes in HMS. All Dutch HMS programmes meet twice per year to discuss developments in the field of human movement sciences.

The intended learning outcomes are based on the Dublin descriptors and apply to all three specialisations. The intended learning outcomes related to knowledge and understanding, for example, focus on extending students basic knowledge of human movement sciences, research methodology and practical skills.
Secondly, applying knowledge and understanding is realised by designing, conducting and interpreting (intervention) studies in a variety of relevant work environments.
Next, making judgements is part of critically evaluating existing knowledge to allow the identification of opportunities to improve human performance and/or health by means of exercise, nutritional and/or physical activity interventions.
Fourthly, communication is practiced in for example written communication, oral presentations and interaction with experts, peers and the layman.
Learning skills comprise the skills to gradually learn how to independently identify problems and opportunities related to human movement; to objectively analyse all related relevant factors; and to develop appropriate, evidence-based solutions based on literature and/or own research, finally integrating these in the larger context of the professional setting: (sports) performance, rehabilitation, physiotherapy, or general physical activity and health.

The programme prepares students for a multidisciplinary work setting in which they have to collaborate with professionals from different sub disciplines. Therefore, the programme emphasizes the development of academic skills. This includes written and oral communication skills as a prerequisite to communicate thoughts and reasoning to peers, instructors and other stakeholders in the (work) field. In this context, students also need to be able to adequately design, conduct, analyse and present (orally and in writing) scientific research, and also need to develop their critical reading and academic thinking skills.

The programme is in close contact, and cooperates, with organisations such as the Sports Centre Papendal, the Adelante Rehabilitation Centre, HAN University of Applied Sciences and Zuyd University of Applied Sciences. In addition, the relations with the Care and Public Health Research Institute and the School of Nutrition and Translational Research in Metabolism ensure the embedding of both novel and relevant topics into the programme.

During the site visit, the committee learned that the programme considers installing an alumni board. This board will monitor whether the content of the programme matches the professional and academic practice of alumni.

The committee also learned during the site visit about the overall view on the positioning of the HMS programme in the future. This includes a regional focus, in close cooperation with general practitioners and Maastricht UMC+, on prevention, nutrition and improving mobility of patients within and outside the hospital. This can lead to valuable cooperation between researchers in HMS and clinical researchers dealing with deconditioned patients based in Maastricht UMC+.

Considerations
Based on interviews and the examination of underlying documentation, the committee concludes that the intended learning outcomes of the programme tie in with (inter)national requirements for (international) human movement sciences and the Dublin descriptors. Based on an overview of the relation between the courses and the intended learning outcomes and the course descriptions, the committee notes that all intended learning outcomes are covered in the programme.

The committee notes that the intended learning outcomes are quite general and that even though the intended learning outcomes cover the three specialisations, the differences between specialisations could be made more ex-

plicit in the intended learning outcomes. In addition, main aspects of the Problem-Based Learning concept, such as strong communication and collaborative skills could be made more visible in the intended learning outcomes.

The committee values that the programme offers the Physiotherapy specialisation. This gives students the opportunity to become an academically trained physiotherapist and to deliver independent research that contributes to physiotherapy treatments of which the efficiency has been proven with actual research. Regarding this specialisation, the committee concludes that it elaborates on the contents of the Amersfoort BSc physiotherapy programme and can be seen as the final closure of a four-year academic physiotherapy programme, in which the combination of the three-year bachelor's programme and the one-year master programme leads to a BIG registration.

The committee is also enthusiastic about the vision of human movement sciences elaborated on during the site visit. It encourages the programme to make this vision on improving mobility and rehabilitation of long-term hospitalised patients more visible in the positioning of the programme.

The committee notes that the education is connected to research. This ensures the topicality of the programme and it prepares students for an academic career or a career as an embedded scientist in professional practice. The committee supports the intention to appoint an alumni board. This will contribute to the connection of the programme and intended learning outcomes to developments in the field of human movement sciences in practice.

Based on the above, the committee assesses this standard as **satisfactory**.

2. Teaching-learning environment

The committee concludes that the programme enables students to realise the intended learning outcomes. The programme is coherent and contains both specialised and generic components. The specialisation allows for in depth study of the specific field. Academic skills are addressed in the specialised courses as well as in the generic Designing Intervention Research course. The committee notes that the courses in the Physiotherapy specialisation on pharmacy and ageing are unique and timely and tie in with future developments in the field. The PBL concept is an explicit and established feature of the programme (and university). The committee notes that the PBL concept is consistently implemented in teaching methods and the assessments. The tutorials offer small scale and interactive teaching. The staff is very competent and involved with students and the programme. The committee appreciates the refreshing vision on educational careers of lecturers. The committee supports the appointment of mentors who help students to reflect on the development of their academic skills and the optional brush-up course in statistics. The committee concludes that the digital learning environment is adequate. In addition, the courses and the programme are evaluated on a regular basis.

Findings

Programme
The programme (60 EC) is offered as a full-time programme (one year) and a part-time programme (two years). Part-time students follow courses with the full-time students. However, instead of two courses at the same time, part-time students attend one course per period. The programme is structured into periods.

The course descriptions inform students about the learning objectives, the content, the practical and academic skills that are addressed, the teaching methods and the assessment methods used.

Specialised courses
Within their chosen specialisation, students follow four courses in the first semester. The Health and Rehabilitation specialisation for example, addresses topics such as muscle health (muscle function, muscle mass, strength, endurance/fatigue) and how these parameters can be (non-invasively) assessed. Students also learn about the effects of physical (in)activity on metabolic, cardiovascular and cognitive health and especially how physical activity can be accurately measured in daily life using wearable sensors. In addition, the underlying principles of (restoring) human locomotion and the methodology to assess locomotor performance are discussed. Students apply the knowledge learned to clinically relevant cases in the Movement Disorders and Rehabilitation course. In this course students also learn how to communicate their findings to multidisciplinary expert teams.

In the Sports and Nutrition specialisation the energy systems of the body, and the role of carbohydrates and fats as the main macronutrients needed to meet the energy demands of exercise are addressed. The Sport Supplements and Ergogenic Aids course focusses on how certain physiological adaptations can be facilitated and/or augmented by specific nutritional compounds, aiming for improved sports performance.
In the second period the general nutritional needs to facilitate muscle recovery and reconditioning, focusing on protein metabolism in all its facets, and in relation to skeletal muscle adaptation are addressed. Students apply the learned knowledge in the Sports and Nutrition, "Putting Science into Practice" course by translating the scientific knowledge to applications in athletes, with due attention to the multidisciplinary work field involving not only athletes, but also coach-

es, trainers, managers, dieticians, sports organisations, etc.

The Physiotherapy specialisation courses address the entrepreneurial and multidisciplinary perspective of this field. Students gain knowledge and skills to become an entrepreneurial healthcare professional and to create awareness about the possibilities and requirements of being an entrepreneurial healthcare professional as a career option. In addition, students gain knowledge and insight from a multidisciplinary perspective into complex problems in complex settings and patients.
Afterwards, students follow the before mentioned Movement Disorders and Rehabilitation course, together with H&R students. This course focuses on applying the learned knowledge to clinically relevant cases. The Pharmacology for Physiotherapists course addresses drug use and molecular drug (inter)actions that are necessary for optimal consultation and treatment of patients taking (self-) medication to cure, alleviate, or prevent complaints related to their medical problem.
The H&R and S&N specialisations include the online Reviews course. This course addresses the steps of a systematic review, and also conduct such a review on a theme related to their individual research placement.

For physiotherapy students, an eight-week clinical placement (12 EC) is part of the programme. Within the whole bachelor – master structure of becoming a registered physiotherapist, this is the third clinical placement (with the two previous being part of the bachelor's programme). Students can combine this placement with their master thesis placement (in a twenty-week placement). The placement coordinator ensures that the placement matches the student's learning goals and ensures that students cover all domains within their overall programme (three-year bachelor's and one-year master's programme). Even though all students find a placement, the number of placements available is limited. International placements are also common.

Within the specialised courses, practical skills are addressed. These include for example muscle characteristics, the use of electromyography and computer practicals on biomechanics in the H&R specialisation. In the S&N specialisation, practical skills include the measurement of body composition, isokinetic and isometric measurement of muscle strength and muscle imaging. The Physiotherapy specialisation practicals include topics such as pharmacokinetics, personalized medicine and DXA scan.

General components
In the Designing Intervention Research course, in the third period, students learn to develop a scientifically and societally sound and relevant research question and write, present and defend a well- argued research protocol, including ethical considerations, statistical approach and cost estimates.

The fifth and sixth period comprise, for all students the final research project that includes the the thesis and the placement (24 EC for H&R and S&N students and 18 EC for PHY students). This is further elaborated on in standard 4.

Academic skills
Academic skills are integrated in the different courses within the specialisation. Students develop their critical reading, data collection and writing skills in different assignments within these courses. With this integration, the programme wants to ensure that the academic skills students learn are closely related to their chosen field of study.
Students are expected to reflect on the development of their academic skills in a portfolio. The portfolio is also part of the generic Designing Intervention Research course, in which research skills are addressed. Student evaluations revealed that the relation between portfolio and the professional development of students is not always clear. Therefore, the programme intents

to appoint mentors to help students reflect on the development of their academic skills.

During the site visit, the committee learned that alumni value the placement and the practicals in the programme. Alumni now working as a PhD also appreciate the Designing Interventions Research course and the Reviews course (the latter for H&R and S&N students only). This prepared them for their current position as a PhD. Some alumni (of the 'old' programme) also expressed their need for more in-depth knowledge in the programme; looking back, some alumni found that the programme could have been a bit more challenging.

The students the committee spoke with are in general quite content with the programme. Due to different backgrounds of students, some students do experience some overlap at the start of the programme. Physiotherapy students especially value the Pharmacology for Physiotherapists course and The Entrepreneurial Healthcare Professional course.

The committee also learned during the site visit that on faculty level an honours programme is available for students. At programme level, students with the ambition to do more in research can join on-going research projects.

Educational concept
As mentioned before, Problem-Based Learning is the leading educational concept for the programme. This implies that learning is constructive, contextual, collaborative and self-directed. Teaching takes place in small tutorial groups. By focusing on real-life problems, students acquire relevant knowledge, insights and skills in a relatively independent manner. Students are regularly expected to reflect on each other's work. The PBL concept stimulates students learning from each other. This is important as students enter the programme with different backgrounds. Within the tutorial groups, students help each other and stimulate each other to keep up.
The theory learned is applied in skills training sessions, practical assignments and in the placement.

Teaching methods used are tutorial groups, self-study, lectures and work visits. Tutorial groups, usually consisting of a maximum of twelve students, meet with their tutor (a lecturer or a third- or fourth-year PhD student) on a weekly basis. During these meetings student's previously gained knowledge is activated and problems and learning goals are defined. In the next meeting, based on their self-study, students report on their results. For project work or assignments, tutorial groups are divided in groups of three to six students. Within these groups, students work together on practicals, written assignments, presentations and study proposals. The latter includes a short study plan based on the techniques used or data collected during a practical. During practicals students learn to use different measurement techniques in both research and practice.
In lectures, an overview on certain topics is provided and students gain a deeper understanding of the specific topics. Work visits are organised to for example Adelante Rehabilitation Centre, Sports Centre Papendal or the Royal Dutch Football Association. During these visits, students study real patients or athletes and can interact with health/sports professionals in practice.

During the site visit, the committee learned that students and alumni in general value the use of Problem-Based Learning in the programme. It enhances their collaboration skills and their self-learning abilities to come up to par with other students on specific subjects. Students remarked that the PBL concept makes very clear what they don't know yet and have to study.

Intake
The legal enrolment criteria are applicable to the programme. In addition, proficiency in English is a requirement. The different specialisations meet different backgrounds and interests of the students. On average, 20% of the students has an international background. The Admissions Board Health reviews all applications and decides on accepting candidates to the programme. Since the programme attracts students with a different background, students also have different experiences with methodology and statistics. To ensure that all students start from a common ground, the programme intends to organise an optional brush up course on statistics next academic year, at the start of the programme and to offer consultation hours and Q&A sessions with lecturers during the programme. In addition, candidates for the programme are required to have followed 15 EC in statistical / methodological courses in their previous education.
For the S&N specialisation, an overview of preparatory readings is made for students. In the first week of the programme this is discussed during one of the lectures.

Staff
In total thirty-two lecturers are involved in the programme. 88% of the academic staff involved obtained a PhD and 84% obtained the universities teaching certificate. All academic staff involved in the programme must follow a number of introductory courses on programme-based learning, the leading educational concept. In previous years, lecturers have been tested on their English language skills and if needed followed remedial courses. Besides, other training and workshops on educational aspects are available within the faculty and the university. Lecturers are involved in research and in education. Part of standard evaluation processes, lecturers receive feedback on their performance.

Lecturers are expected to be equally active in research and education. The university offers lecturers the possibility of aspiring a career in education. Research is then focused on educational aspects.

During the site visit, lecturers confirmed the close relation between education and research. The topics addressed in the courses are fostered by the research of the lecturers. Students value the small scale and informal character of the programme and the approachability and helpfulness of their lecturers.

Facilities
Students' progress is monitored throughout the programme and during the courses. During the courses, weekly discussions with the course coordinator and the involved staff members are held. Student's progress is also discussed in regular meetings between the programme coordinator and the course coordinators. These meetings allow for early detection of students with problems, and also for close monitoring of these students throughout the year. Tutors have an important role in the guidance of students, since they meet their students on weekly basis in the tutorial groups. After finishing the four specific courses of their chosen specialisation, students hand in a self-reflection. This academic year, mentors have been appointed to discuss (after four months into the programme) the individual development with students. The site visit revealed that lecturers involved value their role as a mentor and that the individual meetings with students help students in finding their focal point.

The programme organises an annual career event, during which alumni inform students about their possibilities on the labour market and the different work fields of human movement sciences.

During the site visit, the committee met with representatives from the education programme committee Health. It became clear that the education programme committee was involved in the development and the evaluation of the current new programme. It concludes that the eval-

uation of the current new programme is more positive than the evaluation of the previous programme. Students are involved in quality assurance by evaluations and focus groups. The education programme committee does not have insight into the evaluations filled out by the lecturers.
The committee also learned during the site visit that in addition to the course evaluation, the complete programme is evaluated each year.

Considerations
The committee concludes that the programme, the teaching-learning environment and the staff involved enable students to achieve the intended learning outcomes. The programme is coherent and contains both specialised and generic components. Students start the programme in their chosen specialisation, allowing for in depth study of the specific field. Academic skills are addressed in the specialised courses as well as in the generic Designing Intervention Research course. The latter course prepares students for their thesis. The placement and thesis are also generic parts of the programme. The committee notes that the courses in the Physiotherapy specialisation on pharmacy and ageing tie in with future developments in the field.

Regarding the clinical placement in the Physiotherapy specialisation, the committee wants to stress the importance of rotating placements (within the whole four-year programme) so that students are able to cover all the relevant domains in their placements. Even though this is not a formal requirement for BIG registration, the committee recommends the programme to keep safeguarding this.

The committee believes that the need for more in-depth knowledge expressed by the alumni is now covered in the specialised courses. It is however of the opinion that the programme can be more active in offering extra opportunities for ambitious students other than participating in research projects.

Even though, the programme attracts international students, the committee is of the opinion that this number can be increased.

The PBL concept is an explicit feature of the programme (and university) and also an important reason for students in choosing the programme. The concept is proven and consistently implemented in teaching methods and assessment. The tutorials offer small scale and interactive teaching. Within the PBL concept, students have to find relevant literature themselves. Based on the studied essays and reports made by students, the committee concludes that the literature used is up to date and relevant.

During the site visit, the committee met with very competent and involved staff members. As mentors and tutors, the staff is very engaged with students and the programme. The committee appreciates the refreshing vision on educational careers of lecturers.

The committee values the appointment of mentors who help students to reflect on the development of their academic skills. The committee also supports the optional brush-up course in statistics for students with less experience in this. The committee is of the opinion that this will ensure a more equal level of students in this subject. The committee concludes that the digital learning environment is adequate. In addition, the courses and the programme are evaluated on a regular basis.

Based on the above, the committee assesses this standard as **satisfactory**.

3. Assessment

The committee concludes that an adequate system of assessment is in place. The intended learning outcomes are at the basis of this system. Effective measures are taken to guarantee the validity, reliability and transparency of the assessments, by using an assessment plan for each course, the more-eye-principle and support and review of the exam review committee. The assessments studied by the committee in general reflect the expected level and match the learning goals of the courses involved. Exam questions of two studied exams could be more in depth. Students are content with the assessments and the feedback they receive. The board of examiners is adequately organised and safeguards the quality of the assessments.

Findings

The programme ties in with the faculty's assessment policy, which is based on the assessment policy of the university. The assessment forms used match the teaching methods used. For each course, an assessment plan provides insight in the conditions for passing the course and the calculation of the final grade, the relation between the assessment and the course objectives, the specific examinations and resits and rules and regulations.

To ensure the validity and reliability of the assessments, the course planning group draws up exam questions. This means that usually three to six lecturers are involved in this process. The exam questions, together with the content, structure and composition of the exam are also discussed in the planning group. In addition, the course planning group also reviews and grades the exams by using a preformulated answer key. Papers are graded by individual staff members, by using an assessment form with criteria. Before students are informed about their grades, the lecturers involved discuss the individual or group grading in a formal meeting.

In all but one course, two or more methods of assessments are used. This includes individual and group assessments. The individual assessment encompasses a written exam or an essay. The group assignment consists of project report, practical report, presentation and essay or a combination of some of these. In most courses, the individual assessment outweighs the group assessment in determining the final grade. In addition to the assessments, students have to participate in all educational activities to pass the courses. Students' participation is monitored by means of the before mentioned weekly reflections on the group work and the supervision of their tutor. This is assessed with a pass or fail. Students also have to deliver a self-reflection after completion of the four specific courses of their chosen specialisation and the mentor meeting in which their progress is discussed. This is also assessed with a pass or fail.

Students are informed about the assessment in the course descriptions, the assessment plan of each course and during the courses. Students can inspect their reviewed assessments during a meeting (within 10 days after the grading of the assessment took place).

In assessing the Designing Intervention Research course, the thesis and the placement, two or more examiners are involved. In academic year 2018 - 2019, the programme started with the discussion sessions on thesis grading. In from now on yearly calibration sessions, experienced lecturers re-assess the same two theses and the similarities and differences in grading are discussed. An independent third examiner studied a selection of theses from 2017 – 2018, to gain insight in the variability of assessment between different lecturers. In addition, a rubric for assessing and grading the theses is in development.

Students and alumni noted during the site visit that in general they are content with the level and amount of assessment. In addition, the forms of assessment tie in with the PBL concept. Students value the feedback from their lecturers. However, they also note a difference in feedback and assessment between their tutors.

Board of examiners
The faculty's board of examiners is responsible for safeguarding the quality of examinations. The board consists of a daily executive board, three members from the educational programmes and an external member. The executive board, consisting of the chair, vice-chair and secretary meets on a weekly basis. The full board meets every six weeks. The board appoints and trains examiners and writes an annual report.

The task of controlling the quality of assessments and exams has been delegated to the faculty wide exam review committee. This committee assists and advices the before mentioned planning groups in the composition of exam questions. Starting 2018 – 2019, the committee also reviews all exam questions prior to the examination. The before mentioned course assessment plans have to be approved by the board of examiners before the start of the course / period.

The meeting with the board of examiners during the site visit learned that a programme assessment plan is in development. In addition, Bloom's taxonomy will be used in the construction of assessments / exams. The board of examiners randomly assesses the quality of the theses.

Considerations
The committee concludes that an adequate system of assessment is in place. The quality assurance of the assessment system is solid and effective measures are taken to guarantee the validity, reliability and transparency of the assessments. The assessment plans, four-eye principle, the support of and check by the exam review committee and the yearly calibration sessions are important in this matter. In addition, multiple assessment methods (both individual and group) are used in the courses. In general, the different assessments studied by the committee during the site visit reflect the expected master's level and tie in with the learning goals of the specific courses. Students also value the feedback from their lecturers. The committee noted however that the exam questions for the Sport Supplement and Ergogenic Aids course (S&N specialisation) and the Physical Activity and Health course (H&R specialisation) did not meet the expectations for the claim that these were open examination questions testing insight rather than facts.

The committee suggests to clarify the relation between the intended learning outcomes and the assessments in the assessment matrices.

The board of examiners and exam review committee are adequately organised and safeguard the quality of the assessments.

Based on the above, the committee assesses this standard as **satisfactory**.

4. Achieved learning outcomes

Based on the studied documents and the interviews, the committee concludes that graduates of the master programme HMS achieve the required level and the intended learning outcomes. This was confirmed in the meeting with students and alumni; they are capable of creating their own career path within human movement sciences. The committee appreciates that students are actively encouraged to start thinking about their research topic in an early stage. The Designing Intervention Research course provides students with a solid start in their research proposal. The committee concludes that the overall quality of the studied theses is adequate and agreed with the grades given. The committee however also notes that in general the relation between the research question and the chosen research method can be improved. The committee suggests the programme to invest in giving students more explicit feedback on the grading of their thesis. The committee supports the programme's idea to organise a national career event, together with the other human movement sciences programmes.

Findings

The programme is finalised with the placement and the thesis (24 EC for students of the H&R and S&N specialisation and 18 EC for students of the PHY specialisation). For the latter students an eight-week clinical rotation period is mandatory. During this period, students are placed in a more complex environment, for example a rehabilitation centre, stroke centre or complex hospital setting. These students can also opt to combine this clinical rotation with their research placement, which allows for a twenty-week internship.

Students are encouraged to start thinking about a thesis topic from the start of the programme. This is enhanced by a preparatory lecture in September, during which the aims and time schedule of the research project and the search for a topic is discussed with students. A list of topics is available and students can propose their own topic. In December, the first meeting with their supervisor is planned.

Students write their research proposal as part of the Designing Intervention Research course. As part of this course, in a symposium, students present and defend their research proposal for a committee of staff members. After this course, students work on their individual research and thesis, under supervision of a staff member, at their placement. Students can execute their research at departments in the university or the university hospital or external. Students can also opt for other (inter)national universities and research institutes. During the research period individual meetings are organised to guide students during their research, the writing of their article and to monitor their progress.

The thesis is written in the form of a research paper. Lecturers remarked during the site visit that to limit the variation in formats, in the near future students have to select a journal from a list of five, for which they aim to write the article. The guidelines of the journal can then be used in the assessment of the thesis. The committee also learned that due to the short span of the placement, students usually join an on-going research project. Students are required to be involved in data collection. For the research thesis, they usually work on their own research question for which the dataset had already been collected. i.e., in those cases that data collection and analyses for the ongoing projects is insufficient for their thesis

As mentioned before, the thesis and the placement are assessed by two or more examiners (the supervisor and a second examiner not related to the research project). In determining the final grade, the practical work performed weighs in for 25% and the quality of the thesis for 75%.

More informal individual closing events are organised by research groups or placement organisations, for example a (scientific) presentation

with an informal drink. The programme considers organising an end of the year event for all students where students can present their work to their fellow students and staff members.

The programme keeps in touch with the alumni through LinkedIn. In addition, alumni are involved in the before mentioned career event. Alumni work in positions such as PhD candidates, post-docs, clinical research specialists, scientific project manager, physician, physical therapist, clinical chemist, dietitian, consultant or embedded scientists. Alumni work in hospitals, consultancy, governmental bodies, industry, research institutes, universities, sports organisations and rehabilitation centres et cetera. On faculty level, a taskforce on Employability and Post-graduate Education has been installed recently. This taskforce is focused on reinforcement of involvement of the labour market and of alumni.

Even though the alumni the committee met felt prepared for their career, they noted that the programme can put more emphasis on the specific knowledge and skillset students acquire and in what kind of positions this can be of use.

Considerations

The committee concludes that the programme has an effective placement and thesis procedure in place. The committee appreciates that students are actively encouraged to start thinking about their research topic in an early stage of the programme. The Designing Intervention Research course provides students a solid start with their research proposal.

The committee reviewed fifteen theses of the programme. The committee concludes that the overall quality of the studied theses is adequate and graduates of the HMS programme achieve the required level. In general, the committee agreed with the grades given and noted the variation between adequate theses and theses that were published. The committee however also notes that in the adequate theses the relation between the research question and the chosen research method can be improved.

The meetings with students and alumni during the site visit confirmed the adequate level of the thesis / the programme. The students and alumni the panel met are capable of creating their own career path within human movement sciences.

The committee noted that the feedback provided on the thesis assessment form is quite limited. In addition, it is not always clear how the grade was determined. It suggests providing students with more explicit feedback on the grading of the thesis. In the meeting with the board of examiners, it became clear that currently a rubric is being developed for the assessment of the thesis. The results of the before mentioned thesis calibration sessions will be used for the development of this rubric.

The committee supports the programme's idea to organise a national career event, together with the other human movement sciences programmes.

Based on the above, the committee assesses this standard as **satisfactory**.

Appendices

Appendix 1 Assessment committee

Naam panellid (incl. titulatuur)	Korte functiebeschrijving van de panelleden (1-3 zinnen)
prof. dr. Gertjan Ettema	Gertjan Ettema is sinds 1998 professor aan de NTNU, Department of Neuromedicine and Movement Science, Faculty of Medicine and Health Sciences, NTNU, Trondheim. Zijn onderzoeksgebieden zijn biomechanics en (neuro)fysiologie in motor behaviour (in het bijzonder sport) en computer modelling van biomechanica en spierfunctie in coördinatie. Hij doceert en is curriclumontwikkelaar op het gebied van biomechanica, motor control en coordinatie op alle niveaus. Hij is sinds 2014 wetenschappelijk manager van Centre for Elite Sports Reseach en sinds 2013 section editor van Human Movement Sience (sinds 2010 editorial board member). Daarnaast is hij lid van de International Society of Biomechanics (ISB) en de European College of Sport Science (ECSS). In de jaren 2000 was hij professor II aan Norges Idretts Høgskole Oslo; in de jaren '90 docent aan de University of Queensland, Australië en de VU Amsterdam. In Australië heeft hij een cursus voor Problem-based-learning facilitator in the Medical Curriculum gevolgd.
prof. dr. Anton Wagenmakers	Anton Wagenmakers is sinds 2012 professor of Exercise Metabolism and Lead of Exercise Metabolism & Adaptation Research Group aan Liverpool John Moores University. Anton is voorzitter van de werkgroep curriculumontwikkeling BSc Sport and Exercise Science en moduleleider en examinator in de MSc Sport and Exercise Physiology. Daarvoor was hij 10 jaar lang als Professor of Exercise Biochemistry verbonden aan University of Birmingham, sinds 2008 als & Head of School of Sport & Exercise Sciences. In Nederland had hij van 2003-2007 een parttime leerstoel in Metabolic Control Systems, Faculty of Biomedical Engineering aan de TU/e en was hij tot 2003 verbonden aan de UM. Bij UM was hij tutor en examinator van bachelortheses en lid van voortgangstoets Beoordelingscommissie. Van 1999-2003 was hij lid van de Examencommissie BMT aan de TU/e.
prof. dr. Nicole C. Wenderoth	Nicole Wenderoth is sinds 2012 full professor Neural Control of Movement en directeur van het Institute for Human Movement Science and Sport, Department of Health Sciences and Technology, ETH Zürich, Zwitserland. Hier geeft zij leiding aan een multidisciplinaire onderzoeksgroep. Zij is lid van de ETH Onderzoekscommissie, lid van de Stuurgroep Neuroscience Centre Zürich, wetenschappelijk bestuurslid van zowel de Hochschulmedizin Zürich als van de European College of Sport Sciences. Zij treedt regelmatig

	op als reviewer van internationale fondsen en van journals op het gbeied van Neuroscience, Neuroimaging en Motor Control. Tot 2012 was zij verbonden aan KU Leuven als assistant professor. Zij is promotor van tot nu toe 20 afgeronde promotietrajecten en heeft meerdere wetenschappelijke prijzen in ontvangst mogen nemen, zoals in 2013 de Golden Owl for excellent teaching; in 2006 een professorship with specific research assingment (competitive position awarded for 10 years).
dr. Bart Staal	Bart Staal is sinds 2015 senior onderzoeker IQ Healthcare aan de Radboud UMC en lector musculoskeletale revalidatie, Hogeschool van Arnhem en Nijmegen. Hij is fysiotherapeut en heeft postgraduate opleidingen epidemiologie gevolgd aan de VU en aan het New England Epidemiology Institute, Boston USA. Hij is peer reviewer van meerdere journals en is regelmatig co-promotor. Hij is reviewer van onderzoeksbeursaanvragen en heeft zelf ook meerdere beurzen gewonnen. Op dit moment is hij lid van de Nederlandse Vereniging voor Neurologie (guideline panel Lumbosacral radicular syndrome), van deZonMw commissie Sportblessurepreventie en van de wetenschappelijke commissie van de Nederlandse Vereniging voor Manuele Therapie. Hij geeft les (BSc en MSc) aan de Radboudumc, HAN en UMC Utrecht. Sinds 2017 is Bart lid van de Examencommissie van de HAN.
Vera L. Broek, student-lid	Vera Broek studeert Biomedische Wetenschappen aan LUMC en Klassieke Muziek aan Codarts University of the Arts. Zij is student-assistent bij microscooppractica in het LUMC en studentvertegenwoordiger in de minor Cellular Therapies in Biomedical Sciences. Zij treedt op als student-lid van visitatiepanels voor TNO's en was in 2016-2017 panellid ZonMw (Lyme Disease).
drs. Raoul R. van Aalst	Raoul van Aalst is bedrijfskundige van achtergrond. Na afronding daarvan is hij werkzaam geweest in zowel controllersfuncties als adviesfuncties. Sinds 2005 vervult hij de functie van controller bij Tennet. Sinds 2016 is hij programmamanager Always Energy, een gezondheids- en vitaliteitsprogramma dat erop gericht is om een gezonde levensstijl bij medewerkers te bevorderen. Hij is sinds 2004 frequent betrokken bij uitvoeren van visitaties in het hoger onderwijs, zowel in de rol van extern deskundige als in de rol van voorzitter. In oktober 2018 verwacht hij de module "Assessment in Higher Education" bij de Erasmus Universiteit Rotterdam (Risbo) af te ronden.

The panel was supported by Titia Buising, secretary. All panel-members signed a declaration of independence and confidentiality, which were submitted to NVAO.

Appendix 2 Programme site visit

Monday 21 January 2019		
8.45		Welcome
8.50	09.15	Break
9.15	10.00	Meeting with management HMS 1
10.00	10.30	Showcase: Example practical "Biodex"
10.30	11.00	Break
11.00	12.00	Meeting with staff HMS
12.00	12.45	Meeting with students HMS
12.45	13.45	Lunch and walk-in hour
13.45	14.30	Meeting with alumni HMS
14.30	15.00	Meeting with members of the Education Programme Committee Health
15.00	15.45	Meeting with members of the Board of Examiners Health
15.45	16.30	Break
16.30	17.00	Meeting with management HMS 2
17.30	17.45	Reporting provisional findings committee on HMS

Appendix 3 Intended learning outcomes

A. Knowledge and understanding

1. Relationship between health and physical activity in different stages of life
2. The effect of interventions (training/rehabilitation/nutrition) on (sports) performance
3. How to correctly select and apply techniques of human movement analysis and/or dietary assessment
4. Methodological and statistical methods commonly used in HMS

B. Applying knowledge and understanding

1. Design and conduct studies on human movement performance
2. Design and conduct studies to evaluate effect of interventions (training/rehabilitation/nutrition) on health and human (sports) performance.
3. Apply their knowledge in a variety of work environments (e.g. research institute, rehab centre/hospital, sports, life style centre, etc.).
4. Apply academic skills like: argumentation, formulating a hypothesis, reviewing and writing, proper data handling.

C. Making judgements

1. Critically evaluate intervention programmes (training/rehabilitation/nutrition) and judge the quality of measurements and instruments to assess outcomes.
2. Summarize and critically review scientific literature.
3. Identify opportunities to improve health and/or (sports) performance via physical exercise and nutrition, within a variety of working environments (academic, care, business, societal, policy or educational context).

D. Communication

1. Write literature reviews, scientific papers, grant proposals and give oral presentations (in various formats).
2. Effectively and professionally communicate in multi-disciplinary teams.

E. Learning skills

1. Independently study international literature on topics related to human movement performance, rehabilitation, physical activity and health, and nutrition.
2. Engage in self-directed learning processes and to develop a positive and professional attitude towards lifelong learning.

Appendix 4 Overview of the programme

<table>
<tr><td>Per</td><td colspan="2">Specialisation
Health and Rehabilitation</td><td colspan="2">Specialisation
Sports and Nutrition</td><td colspan="2">Specialisation
Physiotherapy</td><td>Wks</td></tr>
<tr><td>1</td><td>Imaging Muscle Health
(HMS4501)
6 ECTS</td><td>Physical Activity and Health
(HMS4502)
6 ECTS</td><td>Nutrition to Fuel Sports Performance
(HMS4601)
6 ECTS</td><td>Sports Supplements and Ergogenic Aids
(HMS4602)
6 ECTS</td><td>Growth and Ageing from a Systems Biology Perspective
(HMS4801)
6 ECTS</td><td>The Entrepreneurial Healthcare Professional
(HMS4802)
6 ECTS</td><td>8</td></tr>
<tr><td>2</td><td>Analysis and Restoration of Human Locomotion
(HMS4503)
6 ECTS</td><td>Movement Disorders and Rehabilitation
(HMS4504)
6 ECTS</td><td>Nutrition to Support Training Adaptations
(HMS4603)
6 ECTS</td><td>Sports and Nutrition: Putting Science into Practice
(HMS4604)
6 ECTS</td><td>Pharmacology for Physiotherapists
(HMS4803)
6 ECTS</td><td>Movement Disorders and Rehabilitation
(HMS4504)
6 ECTS</td><td>8</td></tr>
<tr><td>3</td><td colspan="6">Designing Intervention Research
(HMS4001)
6 ECTS</td><td>4</td></tr>
<tr><td>4</td><td colspan="2"></td><td colspan="2">Reviews
(HMS4707)
6 ECTS</td><td colspan="2"></td><td>8</td></tr>
<tr><td>5</td><td colspan="3">Placement and Thesis
(HMS4003)
24 ECTS</td><td colspan="2">(Clinical) Placement and Thesis
(HMS4804 & HMS4805)
30 ECTS</td><td>8</td></tr>
<tr><td>6</td><td colspan="6"></td><td>4</td></tr>
</table>

Per: Period
Wks: Weeks
Note: Academic Skills for all students run through the specialisation modules in period 1, 2 and 3 to prepare students for their Placement and Thesis.

Appendix 5 Studied documents

Self-evaluation report and appendices
Graduate theses

Specialisation Health and Rehabilitation
Course Physical Activity and Health (HMS4502)
- Course book 2018-2019
- Tutor instructions
- Example lectures
- Literature

Assessment:
- Assessment plan 2018-2019
- Project report guidelines
- Test of October 24, 2018
- Score sheet project report

Quality Assurance:
- Course evaluation report 2018-2019

Specialisation Sports and Nutrition
Course Sports Supplements and Ergogenic Aids (HMS4602)
- Course book 2018-2019
- Tutor instructions
- Examples lectures

Assessment:
- Assessment plan 2018-2019
- Test of 23 October 2018 plus answer key
- Factsheet assessment form
- Score sheet assessment of the presentation
- Score sheet assessment of the report

Quality Assurance:
- Evaluation report 2017
- Course evaluation report 2017-2018

Specialisation Physiotherapy
Course the Entrepreneurial Healthcare Professional (HMS4802)
- Course book 2018-2019
- Example lectures

Assessment:
- Assessment plan 2018-2019
- Score sheet assessment group paper
- Score sheet assessment form individual paper

Quality Assurance:
- Evaluation report 2018
- Course evaluation report 2018-2019

Master Human Movement Sciences
Course Designing Intervention Research (HMS4001)
- Course book 2018-2109
- Tutor instructions

Assessment:
- Assessment plan

Quality Assurance:
- Evaluation report 2018
- Course evaluation report 2017-2018

Education Programme Committee Health
- Agenda en notulen 2018
- Year Report EPC for Health 2017-2018

Board of Examiners Health
- Assessment policy Faculty of Health, Medicine and Life Sciences – Education domain Health 2017 (OI17.5271)
- Jaarverslag Examencommissie Health 2017-2018
- Thesis review HMS 2018

Platform Employability and Postgraduate Education
- Employability – More than a Job (November 2018)