



NVAO • THE NETHERLANDS

INITIAL ACCREDITATION

ACADEMIC MASTER

MSC HEALTH AND DIGITAL

TRANSFORMATION

Maastricht University

FULL REPORT

17 MARCH 2023

Content

1	Peer review	3
2	New programme	4
	2.1 General data	4
	2.2 Profile	4
	2.3 Panel	4
3	Outcome	5
4	Commendations	6
5	Recommendations	7
6	Assessment	8
	6.1 Standard 1: Intended learning outcomes	8
	6.2 Standard 2: Teaching-learning environment	9
	6.3 Standard 3: Student assessment	12
	6.4 Degree, field of study and assessment cluster	12

1 Peer review

The Accreditation Organisation of the Netherlands and Flanders (NVAO) determines the quality of a new programme on the basis of a peer review. This initial accreditation procedure is required when an institution wishes to award a recognised degree after the successful completion of a study programme.

The procedure for new programmes differs slightly from the approach to existing programmes that have already been accredited. Initial accreditation is in fact an ex ante assessment of a programme. Once accredited the new programme becomes subject to the regular review process.

The quality of a new programme is assessed by means of peer review. A panel of independent peers including a student reviews the plans during a site visit to the institution. A discussion amongst peer experts forms the basis for the panel's final judgement and the advisory report. The agenda for the panel visit and the documents reviewed are available from the NVAO office upon request.

The outcome of this peer review is based on the standards described and published in the limited NVAO Assessment framework for the higher education accreditation system of the Netherlands (Stcrt. 2019, nr. 3198). Each standard is judged on a three-point scale: meets, does not meet or partially meets the standard. The panel will reach a conclusion about the quality of the programme, also on a three-point scale: positive, conditionally positive or negative.

NVAO takes an accreditation decision on the basis of the full report. Following a positive NVAO decision with or without conditions the institution can proceed to offer the new programme.

This report contains the findings, analysis and judgements of the panel resulting from the peer review. It also details the commendations as well as recommendations for follow-up actions. A summary report with the main outcomes of the peer review is also available.

Both the full and summary reports of each peer review are published on NVAO's website www.nvao.net. There you can also find more information on NVAO and peer reviews of new programmes.

2 New programme

2.1 General data

Institution	Maastricht University
Programme	MSc Health and Digital Transformation (wo-master)
Variants	Full-time: yes. Part-time: yes. Dual: no.
Degree	Master of Science
Tracks	-
Locations	Maastricht
Study load	60 EC ¹
Field of study	Health Care (Gezondheidszorg)

2.2 Profile

Maastricht University is a publicly funded university consisting of six different faculties. Over 22,000 students are enrolled at Maastricht University. Annually, Maastricht confers over 300 PhD degrees.

The Faculty of Health, Medicine and Life Sciences (FHML) is part of the Maastricht University Medical Centre (MUMC+). The FHML is home to 5,500 students and 3,000 staff. The FHML currently offers 4 accredited bachelor's programmes and 12 master's programmes. About one fifth of all FHML students comes from abroad.

The master's programme Health and Digital Transformation (HDT) is a 60 EC one-year full-time programme, that can also be studied in a part-time format over a period of two years. The programme aims to educate "bridge builders who can facilitate the connection between healthcare and technology in an evidence-based way in order to achieve a sustainable transition within the healthcare domain".

2.3 Panel

Peer experts

- Prof. dr. Gerda Croiset (*chair*), Dean of Education and Training, University Medical Centre Groningen;
- Dr. Maryam Alimardani, Associate Professor in the domains of brain-computer interfaces (BCI) and human-robot interaction (HRI), School of Humanities and Digital Sciences and Department of Cognitive Science and Artificial Intelligence, Tilburg University;
- Prof. dr. Lisette van Gemert-Pijnen, Professor in Persuasive Health Technology and Head of the Centre for eHealth & Wellbeing Research, University of Twente, Enschede; Associate Professor, University of Waterloo, Canada;
- Koen Wijsman MSc (*student member*), student MSc Medicine, Leiden University; MSc Health Care Management, Erasmus University Rotterdam.

Assisting staff

- Dr. Duco Duchatteau MBA, secretary;
- Michèle Wera MA, NVAO policy advisor and process coordinator.

Site visit

7 February 2023, Maastricht

¹ European Credits

3 Outcome

The NVAO approved panel reaches a positive conclusion regarding the quality of MSc Health and Digital Transformation offered by Maastricht University. The programme complies with all standards of the limited NVAO framework.

The master's programme Health and Digital Transformation programme is a 60 EC one-year full-time programme. Students can also opt for a part-time format over a period of two years. The programme aims to educate "bridge builders who can facilitate the connection between healthcare and technology in an evidence-based way in order to achieve a sustainable transition within the healthcare domain".

The programme's objectives were developed in close collaboration with the professional field. This ensures that Maastricht University will be educating academic professionals who are welcomed by the field. The panel believes that the programme – and its students – would benefit from increased efforts to establish an international benchmark and increased international collaboration. The panel is, however, sufficiently convinced that Maastricht University will be educating professionals at an academic master's level, in accordance with national and international requirements.

The aims of the programme are translated into a well-structured curriculum. Both the curriculum itself, with ample room for individual choices, as well as the chosen didactical approach of problem-based learning contribute to the student centredness of the programme. The programme aims to attract students with a diverse background. The programme modules are designed so that students can learn from one another, increasing the multidisciplinary nature of student learning.

The panel has formulated some recommendations to monitor the effectiveness of the curriculum: for part-time students as well as for students without a background in data science. The panel is confident nonetheless, that all students can attain the aims of the programme.

The programme will be taught by a multidisciplinary group of experts. They are experts in the fields they teach, and are well prepared for their role in the programme. Faculty members have sufficient time to fulfil their educational duties. The industry will play an important role, since they will be providing placements for the students' group projects and theses. Although the panel has recommended Maastricht University to diligently monitor the availability of high quality placements, the panel is confident that Maastricht University will make effective use of its large network. So far, the university has been successful in engaging relevant industry representatives.

The university's vision on student assessment has been consistently implemented in the programme. The programme uses a wide variety of different assessments. Procedures for a diligent assessment process are in place and the relevant committees are actively involved.

All in all, the NVAO expert panel is of the opinion that Maastricht University has developed a promising and novel academic master's programme educating future 'bridge builders' between healthcare and technology. The panel shares the industry's enthusiasm and is convinced that the programme's graduates will stimulate a data driven change in healthcare.

Standard	Judgement
1. Intended learning outcomes	meets the standard
2. Teaching-learning environment	meets the standard
3. Student assessment	meets the standard
<i>Conclusion</i>	<i>positive</i>

4 Commendations

The programme is commended for the following features of good practice.

1. Involvement of the professional field – Future employers were involved in the design of the programme. Maastricht University has clearly listened to the needs of the professional field. Employers remain committed to a continued contribution by means of involvement in students' projects and thesis placements.
2. Thorough programme design – When designing the programme, Maastricht University has followed a rigorous process that has led to a well structured and clear curriculum.
3. Student centredness – The programme has ample room for individual choices. Students have a great deal of liberty in designing their own goals and objectives. The combination of 'problem-based learning' and the room for individual choices in the programme makes this programme truly student centred.

5 Recommendations

For further improvement to the programme, the panel recommends a number of follow-up actions.

1. International benchmark and collaboration – Identify international institutions that offer similar programmes and form strategic partnerships. Universities can learn from one another and create synergy in opportunities for research and international student exchange.
2. Conceptual model – Keep the conceptual model that underlays the programme and the interdisciplinary project updated. The conceptual model would increase in strength and relevance when more up to date concepts are used.
3. Part-time students – Monitor the effectiveness of the curriculum for part-time students and the challenges part-time students face in order to ensure that all students experience the full richness of the programme, independent of the mode of study (full-time or part-time).
4. Diverse background of incoming students – Monitor the challenges students with different backgrounds face. For instance, the programme could be more challenging for students without a background in data sciences or not stimulating enough for those who have a strong background in computer (and technology) sciences.
5. Placements – Monitor the availability of high-quality placements for both the group project and the thesis placement. The programme is ambitious in its growth, which must be met by an increase in the number of available placements.
6. Grading Interdisciplinary Project – Reconsider the current pass/fail grading for the large project. The current grading system has limited opportunity to acknowledge excellence.

6 Assessment

6.1 Standard 1: Intended learning outcomes

The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Judgement

Meets the standard.

Findings, analysis and considerations

The aim of the MSc Health and Digital Transformation programme (HDT) is to educate multidisciplinary “bridge builders who can facilitate the connection between healthcare and technology in an evidence-based way in order to achieve a sustainable transition within the healthcare domain”. In other words, graduates will be capable of bridging the gap between the healthcare domain on the one hand and IT and data science on the other. Graduates are expected to find employment in healthcare, consultancy, business, industry, research and government.

Based on the above-mentioned aim of the programme, Maastricht University (MU) has developed the so-called Digital Transformation Model as a conceptual model that underlies the programme. The Digital Transformation Model combines three existing models: the Data Science Life Cycle, the Integrated Technology Implementation Model and the Technology Acceptance Model.

The panel applauds the thoroughness of this first step in programme design. The model helps defining multi- and interdisciplinary learning objectives and shaping the curriculum (see standard 2). Not all elements used in the model are state of the art in data science and technology, e.g. the Technology Acceptance Model has been around for a long time and is not the most current model for interdisciplinary research in the domain of healthcare and technology.

MU has defined four competencies that all students must demonstrate upon graduation. These four competencies (expert, investigator, communicator and professional) are inspired by the CanMEDS framework, a framework commonly used in healthcare contexts. The four competencies are described well and are clearly linked to the master’s level of the new programme in the information file.

The panel discussed the choice for these four specific competencies or professional roles with the curriculum developers and the programme management. The original CanMEDS framework consists of seven distinct competencies. The panel therefore felt the need to discuss the rationale for the apparent selection of four out of the originally seven roles. During these discussions, it became apparent that, although four roles are used more prominently, this does not imply that the others are neglected. As an example, the panel has discussed to what extent the competency ‘collaborator’ has found its place in the programme. The panel learnt that this role is less explicitly incorporated in the HDT programme, but it is present nonetheless. For its Biomedical Sciences programme, MU has made a similar (apparent) selection.

The panel further discussed the ambition related to the role ‘expert’. The panel was particularly curious as to the extent to which MU intended to reach the competency level ‘expert’ at an academic master’s level. Can students without a background in data sciences attain this level in a one-year programme? The panel learnt that a graduate becomes an expert bridge builder, not an expert data scientist per se. Graduates must speak the language of a data scientist without becoming an expert data scientist themselves. The panel understands and appreciates the choices made by MU. The programme has an innovative academic profile. Its graduates are expected to become multidisciplinary bridge builders who make data driven change in healthcare happen.

The four generic main competencies have in turn been translated into fourteen more specific intended learning outcomes (ILOs). These fourteen ILOs, in conjunction with the Digital Transformation Model, serve as the fundament for curricular design.

During the site visit, the panel discussed both the process and the results of the programme development with the professional field. The professional field has been involved in the entire design process. The professional field supports the chosen ILOs and expresses the need for such graduates on the labour market.

The information file provides limited information regarding international requirements. The model underlying the programme is presented as international. Many of the identified trends and developments, justifying the need for the programme's graduates, are international. Moreover, the professional field includes internationally oriented organisations. The panel did, however, miss an international benchmark. In what aspects is the programme in line with comparable programmes abroad and in what aspects is it unique? Combining the written information with what the panel learnt during the site visit, led the panel to conclude that the programme meets international requirements. The panel feels, nonetheless, that the programme could benefit from further international collaboration. The programme management expressed the intention to share this new programme with international partners such as Leuven and Hasselt. These partners often exchange new developments. Opportunities also exist elsewhere, such as in Arhus and Bordeaux. The panel advises MU to strengthen ties with potential international partners, such as technical universities. Universities can learn from one another. Furthermore, this would help to keep the curriculum up-to-date and provides diverse opportunities for students.

The panel discussed the name Health and Digital Transformation with programme management. The panel learned that CDHO² advised making use of a programme name already in use by another institution in order to increase transparency of the different offerings in higher education. The panel has discussed several alternatives with the programme management. The panel became convinced of the unique and multidisciplinary nature of the programme which justifies the use of a new name. After deliberation, the panel agreed with the name as chosen by the university.

All in all, the panel concludes, that Maastricht University has followed a robust process in defining the new programme's ILOs. The ILOs are well defined and demonstrably in line with the expected level and orientation for an academic master in Health and Digital Transformation. The programme presents an innovative and multidisciplinary set of learning outcomes aiming at bridging the gap between healthcare and technology. The panel especially appreciates the manner in which the professional field has been involved as a partner in defining the graduates' required expertise. The programme could however benefit from increased efforts to establish an international benchmark and increased international collaboration. Management, faculty and future employers expect graduates to be able to make data driven changes in healthcare happen. The panel agrees with this expectation. The panel concludes that the requirements of this standard are met.

6.2 Standard 2: Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Judgement

Meets the standard.

Findings, analysis and considerations

The master's programme HDT is a 60 EC one-year full-time programme, that can also be studied in a part-time format over a period of two years. The curriculum is well-structured and coherent. It is divided into six periods and consists of two learning lines: 'Data science in Healthcare' and 'Adoption of Digital Technology in Healthcare'. Both learning lines, that are taught in parallel in the full-time format, consist of three separate modules (each 3 ECs) and a shared (6 EC) research methods module. During period 1, 2, and 3, students work on a large (18 EC) interdisciplinary project. This project forms "the centrepiece" of the programme. The programme concludes with a two period, 18 EC placement, during which students write their master's theses.

The programme is competency based. The four main competencies, that were translated into 14 generic intended learning outcomes, have demonstrably been translated into a well-structured programme. The information file contained appendices that describe the separate modules. Furthermore, the panel had access to an online

² Commissie Doelmatigheid Hoger Onderwijs

environment where more detailed information regarding the modules was provided. The panel was able to study the programme in sufficient detail. The panel concludes that Maastricht University has followed a rigorous process, successfully translating the learning objectives into modules and learning activities within the curriculum and the programme as a whole. The content of the different modules is of a good quality and the literature is generally relevant. The panel noted that the literature lists contained several textbooks for the same topic, e.g. multiple frequently used textbooks for statistics. The panel learnt that this has been done deliberately. Instead of prescribing one dominant textbook, MU chooses to identify several high quality resources. The student selects the most relevant source, depending on his or her individual learning needs.

The programme follows a Problem-based Learning (PBL) didactic model. MU has followed the so-called 'CCCS-principles' that the information file describes as "a constructive, collaborative, contextual and self-directed learning approach to enhance deep-learning, motivation for learning, and skills for life-long learning". Maastricht University has ample experience with the didactic models applied. The experience was clearly visible in the meetings throughout the site visit. Students receive ample support to guide them through their individual and collaborative learning. The student's individual portfolio plays an important role in the learning process.

The programme is open to students with a relevant bachelor's degree (or equivalent). This ranges from students with a biomedical background who want to learn about data sciences and digital technology to students with a technological, data science or social sciences background who want to develop themselves further in the context of healthcare. After studying the written materials, the panel had some concerns regarding the broadness of the students' backgrounds. The panel raised the question to what extent students without a data science background can gain sufficient depth. For students without a background in data science, courses must be introductory. At the same time, these modules must be sufficiently attractive for students who are already quite knowledgeable about the subject.

During the site visit, the panel learned that the programme does not aim to achieve an expert level in data science as such. Students must learn to speak the languages of the different worlds of data science, technology and healthcare. Student must learn to feel comfortable and effective on the crossroads of the different disciplines. Furthermore, MU successfully convinced the panel that the broad intake was not a complication, but actually a prerequisite for a truly multidisciplinary peer-to-peer learning experience. The university has ample experience in dealing with a diverse student body and the chosen didactical model guarantees that students make use of one another's expertise and experience. Students who lack specific skills that are required for successful completion of the programme can take bridging courses, especially in data science, statistics and methodology. This is, however, voluntary and extracurricular.

The panel has become sufficiently convinced, that the intended learning outcomes can be achieved by all incoming students. The panel does, however, advise monitoring the profile of the incoming students and challenges the different types of students face in achieving the learning objectives. Regarding the curriculum, the panel has one specific (minor) recommendation. Considering the multidisciplinary nature of the programme, module 5 (research methods) would benefit from an increased attention for multidisciplinary research and alternatives to quantitative "trial like" studies. Given the didactical model, students already have the possibilities to make choices outside the beaten path, but students need to be aware of the broadness of scientific methodology to make a well justified choice.

Full-time students benefit from the two learning lines being offered in parallel. In addition, full-time students frequently interact with one another, which facilitates interdisciplinary learning. For part-time students this is less obvious. Part-time students would generally follow the two learning lines consecutively instead of in parallel. They therefore do not have the benefit of the two lines "crossing-over" or enriching one another. Further, although they still work in small groups, there would be less interaction with fellow students compared to part-time students. In addition, the interdisciplinary group project requires competencies that are acquired in both learning lines. On the other hand, part-time students are experienced professionals, which clearly has its advantages. MU has ample experience in offering programmes in two modes of study. The panel nonetheless advises Maastricht to monitor the challenges that part-time students face along with the effectiveness of the curriculum for this group to ensure that all students experience the full richness of the programme, regardless of the mode of study.

The programme is truly student-centred. Two elements contribute to the student-centredness of the curriculum. The most visible elements are the large (18 EC) interdisciplinary project students work on in a group and the 18 EC individual placement and thesis. Students can really choose to aim for a specific profile that suits their personal interests and help them increase their attractiveness for a specific labour market (industry, consultancy, government, healthcare or science). The second element that contributes to student centredness of the programme is the didactical model. To a large extent, students define their personal learning needs in order to achieve the learning objectives. A portfolio that is discussed frequently with a mentor helps a student develop a truly unique profile. The panel advises MU to consider manners to express students' individually achieved competencies, context and profile on the transcript that students receive with their diploma. This should help students showcase their attractiveness for a specific labour market niche. Students that want to pursue a career in consultancy might want to highlight different achievements than students who want to continue their studies in the form of a PhD or otherwise prepare for a career in academic research.

The university has succeeded in attracting high quality faculty members for this programme. The programme is offered by the Faculty of Health, Medicine and Life Sciences, in cooperation with the Institute of Data Science of the Faculty of Science and Engineering. This cross-faculty collaboration integrates disciplines from two separate faculties and ensures the availability of the required diverse expertise. Members of the teaching faculty are experts in the fields they teach. The panel learnt that faculty members are to spend approximately half their time on teaching and half on research. This ensures sufficient availability of faculty members, while at the same time ensuring that teaching is provided by those who contribute to the development of the field. In the project as well as during the placement, students are exposed to professionals who are experts on implementation or end-users. The student is thus exposed to all stages of innovation and transformation.

The programme involves a wide variety of internal and external experts, which increases the need for proper training of faculty members, especially considering the unique didactical model that is used. During the site visit, the panel learnt that all faculty members are not only didactically qualified but explicitly trained in their roles. External experts are also offered training to help them understand their role and to effectively fulfil this role. Faculty training is robust.

MU has a broad network in the industry, which ensures the availability of placements, also for this new MSc programme. All representatives of the professional field with whom the panel has met expressed that they plan to offer placements. While developing the programme, MU has demonstrated to be successful in engaging the industry (see standard 1). At the same time, the programme intends to start with 25 students, rapidly growing to 60 new students per year. This steep increase in student numbers could become a threat for the availability of placements for all students. The panel therefore advises MU to carefully monitor the availability of sufficient high quality internship opportunities.

The programme will be offered in English. The panel has studied the motivation to choose English as the language of instruction. The arguments can be summarised as a combination of international faculty, an international student body, placements where English will be the prime language, and requirements of the professional field. Further, the choice fits within MU's language policy. The panel therefore agrees with the programme's motivation and supports the choice for English as the language of instruction.

Summarising, the panel is of the opinion that Maastricht University has successfully developed a coherent and effective MSc programme that enables students with a diverse background to achieve the intended learning objectives. The diversity in backgrounds is used as a resource. The programme is truly student-centred, enabling students to maximise their learning objectives, based on their individual needs and preference. In order to achieve these goals, Maastricht University has involved a diverse group of internal and external experts who are highly qualified and well trained for their role. For further improvement of the new programme, the panel lists a few recommendations regarding the part-time mode, the diverse background of the student population and the availability of placements. The panel concludes that the requirements for this standard are met.

6.3 Standard 3: Student assessment

The programme has an adequate system of student assessment in place.

Judgement

Meets the standard.

Findings, analysis and considerations

For the assessment of the HDT programme, Maastricht University has developed a clear and consistent approach. The approach is based on the MU wide vision of assessment. One of the core elements of this vision of assessment is that the assessment supports the CCCS³ principles, and that it is constructively aligned with the intended learning outcomes. In the programme, a distinction is made between assessment *for* learning, assessment *of* learning and assessment *as* learning.

The panel studied a wide variety of documents describing assessment in the programme. The information file provided a matrix that clearly linked the intended learning outcomes with the assessment in the different modules, demonstrating that all ILOs are in fact covered. In addition, the panel studied the module descriptions that included the assessment of the module as well as the assessment of the portfolio and the thesis. Furthermore, the panel was provided with a wide variety of assessment examples, descriptions and assessment rubrics. Finally, the panel examined the relevant procedures such as the Education and Examination Regulations.

The panel was impressed with the consistency in which the programme has implemented its vision of assessment. The programme makes use of a wide variety of both formative and summative assessments. The form of assessment appears to tie in with the learning outcomes of a specific educational segment. In other words, the form of the assessment fits the aim of the assessment. The panel trusts the assessment to be valid, reliable and objective. Where relevant, the four eyes principle is in place.

Both the Board of Examiners and the Taskforce Assessment were involved in developing the assessment plan for the programme. During the meeting with representatives of the Board of Examiners and representatives of the Taskforce Assessment, several dilemmas and choices were discussed. It became apparent that all choices were well thought through and that experts were and remain to be involved.

There is one element where the panel believes that an improvement can be made. The assessment of the 18 EC Interdisciplinary Project is currently pass/fail. The panel agrees with the programme management and the Board of Examiners, that assessment of the portfolio includes elements that are difficult to quantify. The panel acknowledges the rationale for not grading the project with a numerical grade. At the same time, the current system cannot acknowledge student excellence. Even when a student exceeds all expectations, the transcript will list the same "pass" as for a student that barely made the grade. The Board of Examiners is aware of this and expressed that the assessment rubric in its current form is being discussed. Considering the involvement of the Board of Examiners and the Taskforce Assessment as well as the ample expertise at the table, the panel is confident that the programme will bring this discussion to a satisfactory conclusion.

The suggestion made by the panel is merely finetuning. The suggestion is meant to make a robust and solid system even better. The panel believes that a rigorous system of assessment is in place, a system that is based on a clear vision that is implemented consistently. The panel therefore concludes that this standard is met.

6.4 Degree, field of study and assessment cluster

The panel advises awarding the following degree to the new programme: Master of Science.

The panel supports the programme's preference for the following field of study: Gezondheidszorg (Health Care).

The panel supports the programme's preference for the assessment cluster: Gezondheidswetenschappen (Health Sciences).

³ constructive, collaborative, contextual and self-directed learning

Abbreviations

CanMEDS	Canadian Medical Education Directions for Specialists
CCCS	constructive, collaborative, contextual and self-directed learning
CROHO	Centraal Register Opleidingen Hoger Onderwijs
EC	European Credit
FHML	Faculty of Health, Medicine and Life Sciences
HDT	Health and Digital Transformation
IDS	Institute of Data Science
ILO	Intended Learning Outcome
MSc	Master of Science
MU	Maastricht University
MUMC+	Maastricht University Medical Centre
NVAO	The Accreditation Organisation of the Netherlands and Flanders
PBL	Problem-based Learning

