School of
Health Professions
Education

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2020

SHE Mid-term evaluation report
Case studies
Part 2 (Optional)

Faculty of Health, Medicine and Life Sciences
Maastricht University Medical Centre (MUMC+)

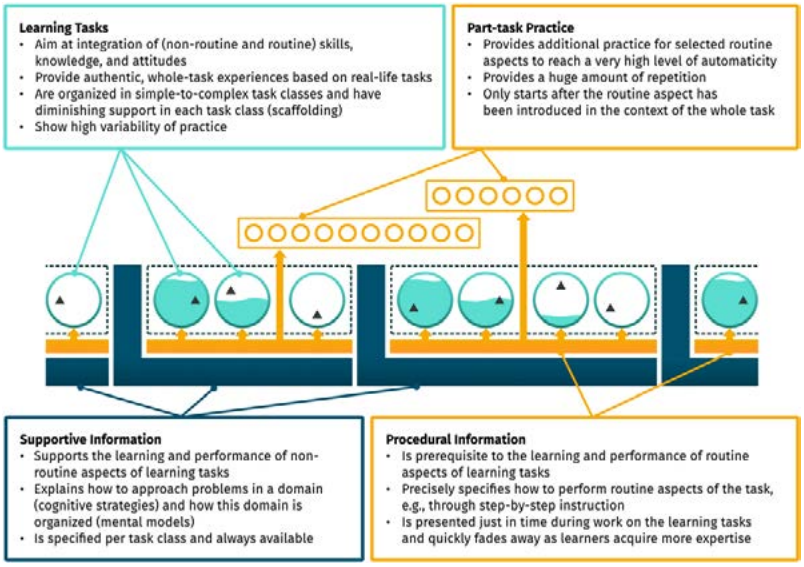
Maastricht University Maastricht UMC+

Part 2 - Case studies

Case study 1
Designing Education with 4C/ID

| What is 4C/ID?

Four-component instructional design (4C/ID) is a model for designing task-centered education, such as project-based, problem-based, and case-based learning. It helps teachers and instructional designers to develop education aimed at the training of complex skills and professional competencies, with a special emphasis on transfer of what is learned to professional practice or real life.



4C/ID provides guidelines for the analysis of real-life tasks and the transition into a training blueprint for an educational programme. It is typically used for designing and developing substantial learning and/or training programmes ranging in length from several weeks to several years and/or that entail a substantial part of a curriculum. Its basic claim is that blueprints for complex learning can always be described by four basic components, namely (a) learning tasks, (b) supportive information, (c) procedural information, and (d) part-task practice. Learning tasks provide the backbone of the training programme; they provide learning from varied experiences, are sequenced in simple-to-complex levels, and show a gradual decrease of learner support and guidance at each level of complexity. For more information, see www.4cid.org.

| Who is involved?

At the SHE, 4C/ID is used as a theoretical framework for conducting research projects, as an object of study in courses offered by the SHE (e.g., MHPE Unit 8 on Designing Learning Environments), and as a practical tool for running educational innovation projects. Lectures and workshops on the model are given by SHE researchers all over the world. People most heavily involved in developing and/or teaching and/or using 4C/ID are Prof. Diana Dolmans, Dr. Jimmy Frerejean, Drs. Wilma Huveneers, Dr. Karen Konings, Dr. Herma Roebertsen, Dr. Sanne Rovers, Prof. Jeroen van Merrienboer (founder of the 4C/ID model), Dr. Peter van Rosmalen, and Dr. Danielle Verstegen.

| Societal impact

As current research on 4C/ID is being conducted in the medical domain, the adoption of 4C/ID in medical education is growing quickly. For example, the SHE's own Master of Health Professions

Education (MHPE) underwent a major curriculum revision in 2020 and 2021, resulting in a more flexible programme designed according to 4C/ID design principles. The Amsterdam University of Applied Sciences offers a 4-year nursing programme that is based on 4C/ID and the Rijnland College for senior vocational education offers all its programmes based on 4C/ID, including its programmes in the Health and Care domain.

In Belgium, the Faculty of Medicine at the University of Leuven developed a series of courses under the name "Levensecht Leren" (lifelike learning; for an overview of these courses see: https://med.kuleuven.be/nl/levensechtleren). 4C/ID is also used to develop educational programmes in the health professions at, amongst others, the University of Pretoria, University of Surabaya, University of Recife, and New York University.

SHE uses 4C/ID as an approach to designing medical education in collaborative projects such as:

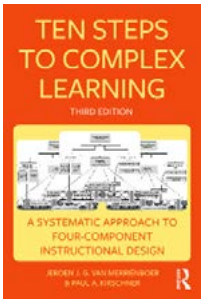
- A national continuous development programme for simulation facilitators, developed in collaboration with the MUMC+ Simulation Center, METS center Bilthoven, Med Tech Center Twente, and UMCG Simulation Center, and the Dutch Society for Simulation in Healthcare.
- *Pasemeco* where medical schools integrate education on palliative care in their curriculums. See http://www.pasemeco.nl/ (with medical schools in the Netherlands)
- *Safepat* where partners in the Euregion Maas-Rijn develop education on cross-border patient transfers. See https://www.safepat.eu/en/ (with OUNL, RWTH Aachen, Hospital Genk, University Hasselt and University Liege).
- *Indicators in Game-based learning*, where a medical simulation game for acute care is re-designed and evaluated. See https://virtualmedschool.com/abcdesim/ (with VirtualMedSchool, Erasmus MC, and IJsfontein).

Besides medical education, 4C/ID is also gaining popularity in the domain of teacher education. From 2017-2019, SHE collaborated with the University of Twente on the *Match project* where 4C/ID was used to conduct a task analysis and subsequently train primary school teachers to differentiate between pupils in their classrooms (https://www.matchproject.nl). A resulting publication describing the complexity of this skill is currently *School Effectiveness and School Improvement*'s most read article with nearly 20.000 views. The Match project continues to stimulate the use of 4C/ID in teacher training institutes in the Netherlands. Across the border, a German book about the use of 4C/ID in teacher education was published in 2019 (Kreutz, Leuders, & Hellmann, 2019).

In the Netherlands, 4C/ID is probably the most popular model for designing education in schools for senior vocational education, universities of applied sciences, and professions-oriented university programmes in all domains. In an investigation of Surf, 4C/ID was found to be one of the most popular instructional design models for the design of blended learning programme in higher education. It is also used by various educational publishers (Thieme Meulenhoff – Mixed; Tumult; Concreet Onderwijsmaterialen), many educational consultancy firms, as well as not-for profit organizations (e.g., Stichting Leerplanontwikkeling, Consortium Beroepsonderwijs, MBO council). Together with the Open University of the Netherlands, SHE organizes an annual *4C/ID User Day* where

users can participate in intervision sessions, follow crash courses in specific 4C/ID-related topics, and visit workshops in which practical 4C/ID applications are discussed. The user days typically attract between 100-150 participants.

The 4C/ID model has achieved considerable impact in society and has developed into one of the most popular models for designing education in the world. In fact, in a systemic review of instructional design models, Stefaniak (2020) shows that 4C/ID is the second most used model (after ADDIE). To sustain its impact, SHE actively disseminates the 4C/ID approach by offering workshops, courses, train-the-trainer programmes, consultancy, and freely available open-access guides (Van Merriënboer, 2019). Apart from the Netherlands, 4C/ID is taught and used around the world. The book *Ten Steps to Complex Learning* and several articles describing the model have been translated in Spanish, Portuguese, Korean and Chinese and there are plans for other translations (Iranian, Russian); this book is used as a study book in educational science programmes around the world.



Recent Interviews

- Na-apen moet. Interview met Jeroen van Merrienboer door Olmo Linthorst, ten behoeve van het blad *Profielen – onafhankelijk blad van de Hogeschool Rotterdam* (2016).
- Van Merrienboer, J. J. G. (2017). Breng het beroep de klas in. In *Onderzoeksconferentie Kennisnet/NRO 2017* (pp. 33-34). Den Haag: NWO/NRO.
- Three questions for giants in learning and development. Interview door Mirjam Neelen for the 2020 L&D Conference, see https://www.youtube.com/watch?v=czo7EBqSTtI

Entrees in Encyclopaedias

- Van Merrienboer, J. J. G. (2012). Four-component instructional design. In N. M. Seel (Ed.), *Encyclopedia of the Sciences of Learning* (pp. 1320-1322). New York: Springer.
- Van Merrienboer, J. J. G. (2015). Four-component instructional design (4C/ID). In J. M. Spector (Ed.), *The Sage encyclopedia of educational technology* (pp. 294-296). Thousand Oaks, CA: Sage Publications.

English Book

- Van Merrienboer, J. J. G., & Kirschner, P. A. (2018). *Ten steps to complex learning* (Third Revised Edition). New York: Routledge.

Dutch Book

- Hoogveld, B., Janssen-Noordman, A., & van Merrienboer, J. (2017). *Innovatief onderwijs ontwerpen – de ontwerpprincipes van het 4CID-model*. Groningen: Noordhoff**.**

Translated/non-English books

- Van Merrienboer, J. J. G. (2017). *Training complex cognitive skills: A four-component instructional design model for technical training* (Chinese Translation). Fuzhou, China: Fujian Education Press
- Van Merrienboer, J. J. G., Correia, S., & Paiva, J. (Eds.). (2012). *As novas tecnologias* (in Portugese). Lisboa, Portugal: Fundacao Francisco Manuel Dos Santos.

- Van Merrienboer, J. J. G., & Kirschner, P. A. (2012). *Ten steps to complex learning: A systematic approach to four-component instructional design* (Chinese translation). Fuzhou, China: Fujian Education Press.
- Van Merrienboer, J. J. G., & Kirschner, P. A. (2015). *Ten steps to complex learning: A systematic approach to four-component instructional design* (Chinese translation of the second revised edition). Fuzhou, China: Fujian Education Press.

Other translations
In the period 2012-2017, about 12 journal articles and book chapters on 4C/ID have been translated to other languages, especially Chinese.

| Scientific Impact

The 4C/ID model provides the theoretical framework for many research projects, both inside and outside SHE. Within SHE, it is commonly used for master thesis projects in the MHPE programme as well as PhD projects. Some recent examples of PhD theses using 4C/ID are:

- Simulation design matters – Improving obstetrics training outcomes (Brena Carvalho Pinto de Melo, 12 December 2018). Maastricht University.
- With a little help from my e-portfolio. Supporting students' self-directed learning in senior vocational education (Jorrick Beckers, December 9, 2016). Maastricht University.
- All stakeholders matter in faculty development: Designing entrustable professional activities for small group facilitation (Muhammad Zafar Iqbal, December 15, 2020). Maastricht University.

Selection of scientific publications using 4C/ID
The 4C/ID model is widely cited in the scientific literature. The two books describing the model, *Training Complex Cognitive Skills* and *Ten Steps to Complex Learning* have, in order, about 1400 and 1300 citations in Google Scholar. A selection of recent publications is:

- Clarebout, G., Goanta, C., Hardt, S., Hazen, H., Hommels, A., Kicken, W., van Merrienboer, J., & Reithler, M. (2017). Integrating skills in curricula: An analysis based on the 4C/ID model. In *The UM Handbook for PBL & Research Skills* (pp. 32-43). Maastricht, the Netherlands: EdLab Maastricht University.
- Frerejean, J., van Merriënboer, J. J. G., Kirschner, P. A., Roex, A., Aertgeerts, B., & Marcellis, M. (2019). Designing instruction for complex learning: 4C/ID in higher education. *European Journal of Education*, *54*(4), 513–524. https://doi.org/10.1111/ejed.12363
- Frerejean, J., van Merriënboer, J. J. G., Kirschner, P. A., Roex, A., Aertgeerts, B., & Marcellis, M. (2020). Task-centred instructional design model for complex learning: 4C/ID in higher education (Q. Shen, Trans.). *Journal of Open Learning, 25(6),* 22-28. https://doi.org/10.19605/j.cnki.kfxxyj.2020.06.004 (Original work published 2019).
- Güney, Z. (2019). A sample design in programming with four-component instructional design (4C/ID) model. *Malaysian Online Journal of Educational Technology*, *7*(4), 1–14. https://doi.org/10.17220/mojet.2019.04.001
- Kolcu, M. İ. B., Öztürkçü, Ö. S. K., & Kaki, G. D. (2020). Evaluation of a Distance Education Course Using the 4C-ID Model for Continuing Endodontics Education. *Journal of Dental Education*, *84*(1), 62–71. https://doi.org/10.21815/JDE.019.138

- Martinez-Mediano, C., & Rioperez Losada, N. (2017). Internet-Based Performance Support Systems in Engineering Education. *IEEE Revista Iberoamericana de Tecnologias Del Aprendizaje*, *12*(2), 86–93. https://doi.org/10.1109/RITA.2017.2697778
- Peng, J., Wang, M., & Sampson, D. (2017). Visualizing the Complex Process for Deep Learning with an Authentic Programming Project. *Journal of Educational Technology & Society, 20*(4), 275-287. Retrieved January 25, 2021, from http://www.jstor.org/stable/26229223
- Pontes, T., Miranda, G., & Celani, G. (2018). Algorithm-Aided Design with Python: Analysis of Technological Competence of Subjects. *Education Sciences*, *8*(4), 200. https://doi.org/10.3390/educsci8040200
- Stefaniak, J., & Xu, M. (2020). An Examination of the Systemic Reach of Instructional Design Models: A Systematic Review. *TechTrends*, *64*(5), 710–719. https://doi.org/10.1007/s11528-020-00539-8
- Susilo, A. P., van Merrienboer, J. J. G., van Dalen, J., Claramita, M., & Scherpbier, A. (2013). From lecture to learning tasks: Use of the 4C/ID model in a communication skills course in a continuing professional education context. *The Journal of Continuing Education in Nursing, 44*(6), 278-284.
- Tjiam, I., Schout, B., Hendrikx, A., Scherpbier, A., Witjes, J., & van Merrienboer, J. J. G. (2012). Designing simulator-based training: An approach integrating cognitive task analysis and four-component instructional design. *Medical Teacher, 34*, e698-e707.
- Van Es, N., & Jeuring, J. (2017). Designing and comparing two scratch-based teaching approaches for students aged 10-12 years. *Proceedings of the 17th Koli Calling International Conference on Computing Education Research*, 178–182. https://doi.org/10.1145/3141880.3141883
- Van Merriënboer, J. J. G. (2019). *The Four-Component Instructional Design Model. An Overview of its Main Design Principles*. Maastricht University.
- Van Merrienboer, J. J. G., & Kester, L. (2014). The four-component instructional design model: Multimedia principles in environments for complex learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (2nd Ed.) (pp. 104-148). New York: Cambridge University Press.
- Vandewaetere, M., Manhaeve, D., Aertgeerts, B., Clarebout, G., van Merrienboer, J. J. G., & Roex, A. (2015). 4C/ID in medical education: How to design an educational program based on whole-task learning: AMEE Guide No. 93. *Medical Teacher, 37*(1), 4-20.
- Zhao, F., Wang, C., & Yin, R. (2017). The Application of 4C Training Model in the Operating Room Nurse Training. *BIO Web of Conferences*, *8*, 01032. https://doi.org/10.1051/bioconf/20170801032

Case study 2
Programmatic Assessment

| What is programmatic assessment?

Programmatic assessment is an assessment theory that optimizes an assessment programme as a whole. It is an integral answer to an assessment-for-learning strategy relevant to constructivist learning programmes. Programmatic assessment can be used for learning in school or in the workplace. In programmatic assessment both learning and promotion decision-making is optimized. There are five basic ground rules in this assessment approach.

1. **Single assessments are data points to inform learning, not to pass or fail a learner**

An individual assessment is considered to be a data point in programmatic assessment. A single data point should provide meaningful information to the learner either in quantitative or qualitative form. It is feedback oriented, not decision oriented. In essence there is too little information in a single data point to make a high-stake decision. For the evaluation of complex skills and behaviours narrative information is desired.

2. **The programme involves a deliberate mix of different methods**

Methods of assessment are deliberately chosen based on their alignment with the goal of education. Any method may be useful, modern or traditional, objective or subjective. The utility of a method comprising a single data point lies in the educational justification for using that method in that moment in time in the learning programme. Often there is a mix of modular and longitudinal assessment.

3. **Feedback use and self-directed learning is promoted through a continuous dialogue with the learner**

The use of feedback by learners is educationally scaffolded as a dialogue around feedback in a mentoring system. By creating a relationship with a trusted person, reflection and feedback use is promoted. The mentor has access to all assessment information (and other learning data) and periodically discusses this with the learner. The learner is stimulated to reflect on the assessment feedback and to plan study actions accordingly.

4. **The number of data-points needed is proportionally related to the stakes of the assessment decision**

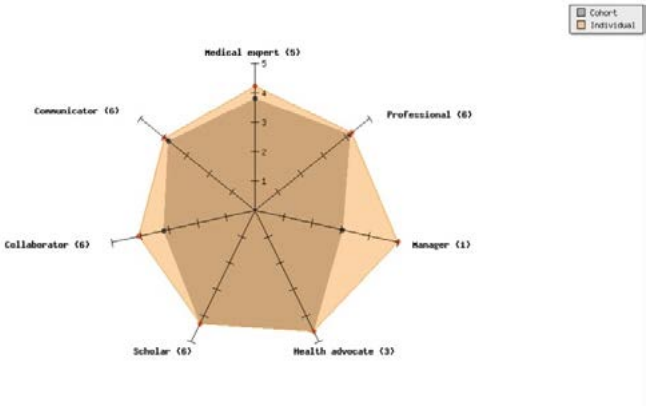
At some point in time pass/fail or promotion decisions need to be taken in a programme. In programmatic assessment the conventional summative and formative distinction is replaced by a continuum of stakes. A single data point is low stake since no pass/fail consequences are connected

to it. It is not of “no stake”, since the information from the assessment may feed into higher stake decisions at a later moment of time. In general, the higher the stake of the decision-making involved, the more data points are needed. Intermediate decisions are of higher stake and need less data points then very high-stake decisions.

5. High-stake decisions are professional judgments made in a committee of assessors
Given the quantitative and qualitative nature of the assessment information, high-stake decisions require a professional judgement. To harness that judgment, this high-stake decision is taken in a group of (independent) assessors. All assessment (and other learning) information, usually in the form of an electronic portfolio, is held against performance standards relevant to the phase of training and a decision is made.

Based on these ground rules teachers and curriculum developers create local implementations of programmatic assessment. Often very different approaches are taken. Implementation requires central governance on education and a different mindset to the role of assessment.

| Who is using programmatic assessment?



The first publication on programmatic assessment was in 2011. Since that time numerous schools and organizations have adopted it. Maastricht University, where this assessment model was conceptualized, has been among the first to implement it in several bachelor and master programmes.

A number Universities of Applied Sciences in The Netherlands are implementing the assessment concept.

Internationally, programmatic assessment is adopted in training programmes in the United States, Canada, Australia and New Zealand. A special interest group has been started under the umbrella of the European Board of Medical Assessors (EBMA) and regular meetings are being held. The Association of Medical Education in Europe (AMEE) publishes so-called “Consensus Papers”. A consensus group has been formed in 2019 to identify consensus on the theoretical principles of programmatic assessment. The group has reported a consensus statement at the Ottawa Conference in Kuala Lumpur, Malaysia, in February 2020. Two papers from this consensus group on programmatic assessment will appear in the journal Medical Teacher. The first will give an overview of the principles. In a second paper, 15 medical training programmes around the world were surveyed to identify implementation issues with these theoretical principles.

Programmatic assessment is also popular in postgraduate medical training programmes, both in The Netherlands and internationally. In The Netherlands, a number of professional universities have implemented programmatic assessment. A user group has been formed and a website has been set up: www.programmatischtoetsen.nl with all kinds of supporting information. The user group meets regularly and exchanges experiences and best practices.

A Dutch book has been published in 2020, in which nine different programmes are reported as case studies on programmatic assessment, followed by a conceptual evaluation. The conclusion from that book is that programmatic assessment is a very attractive conceptual view on assessment, that can

be implemented in many different ways. Therefore, programmatic assessment can have many different manifestations. Finally, programmatic assessment has fueled quite a lot of research over time since its inception. In 2020 the first literature review of this research has been published (Schut et al., 2020). The conclusion is that programmatic assessment can effectively work, but that certain conditions need to fulfilled. The review addresses those conditions.

| Selection of publications

Driessen, E. W., Van Tartwijk, J., Govaerts, M., Teunissen, P. & Van der Vleuten, C. P. (2012). The use of programmatic assessment in the clinical workplace: a Maastricht case report. *Medical Teacher*, *34*(3), 226-231.

Lobst, W. & Holmboe, E. (2020) *Programmatic Assessment: The Secret Sauce of Effective CBME Implementation.* Journal of Graduate Medical Education,12, 518–521.

Schut, S., Maggio, L. A., Heeneman, S., van Tartwijk, J., Van der Vleuten, C., & Driessen, E. (2020). Where the rubber meets the road—An integrative review of programmatic assessment in health care professions education. *Perspectives on Medical Education*, 1-8.

Schuwirth, L. W., & Van der Vleuten, C. P. (2011). Programmatic assessment: from assessment of learning to assessment for learning. *Medical Teacher*, *33*(6), 478-485.

Van der Vleuten, C. P., Schuwirth, L. W. T., Driessen, E. W., Dijkstra, J., Tigelaar, D., Baartman, L. K. J. & van Tartwijk, J. (2012). A model for programmatic assessment fit for purpose. *Medical Teacher*, *34*(3), 205-214.

Van der Vleuten, C. P., Schuwirth, L. W. T., Driessen, E. W., Govaerts, M. J. B. & Heeneman, S. (2015). Twelve tips for programmatic assessment. *Medical teacher*, *37*(7), 641-646.

Case study 3

Progress testing: Longitudinal knowledge assessment and feedback

| What is progress testing?

Often, students are only tested right after a course has ended on the topic of that course. In some cases, a national exam takes place at the end of the programme. But what is in between? How do we know that the student is at the required level in each subdomain at the moment of graduation?

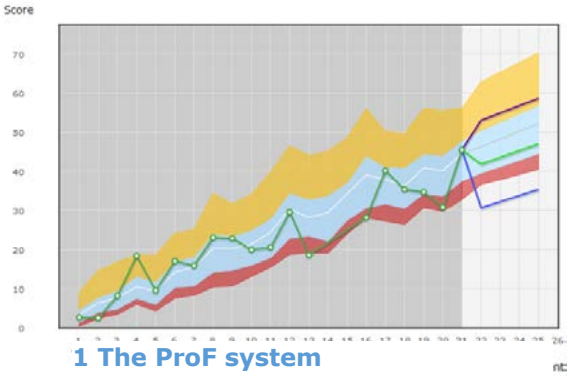
Here, progress testing comes in. In this form of testing, each student is tested at regular intervals on all relevant subdomains during the whole education programme. If all goes well, a student should show a steady development in all subdomains up to the graduation level. If not, the progress test results can tell what subdomains are underdeveloped and need extra attention. This information is available at the individual level, allowing a student to be helped with remediation but also at the cohort level so that teachers and programme developers can evaluate and improve the education. When a progress test is administered in multiple schools simultaneously, it can also form a perfect benchmark.

Since it prevents strategic study behavior and provides the students with rich longitudinal feedback, progress testing fits perfectly in the concept of assessment for learning.

The medical programme at Maastricht University has a longstanding tradition with progress testing. The particular form in which it takes place here is that 4 times each year all medical students take a written test of 200 multiple choice questions with a question mark option. The test is summative, and 4 subsequent tests are taken together to decide on sufficient progress. The standards are determined relative to each year group. It is developed and administered in six (out of eight) Dutch medical schools. To realize this joint progress test an elaborate item production and review process has been put in place, supported by an item bank system.

| Longitudinal feedback

To disclose the information that the progress tests produces on individual and group progress to students and staff, an online dashboard system has been developed (ProF: progress test feedback). The ProF system allows students to view their progress on all subdomains and to compare their development with that of their peers within the own school or nationally. It allows the students to zoom in on several details and by doing so discover their stronger and weaker areas. The result of this analysis is the start of a new action plan for individual improvement.



1 The ProF system

| The future: Computer adaptive progress testing

The current practice of paper-based progress test in six medical schools (involving almost 9,000 students sitting simultaneously per test) is a logistical challenge. Moreover, the psychometrical properties of the test are not optimal for first-year students since they only answer few questions. A computerized version of the test that allows students to do the test in batches and that is tailored to the level of each student would be an improvement of the progress test.

We therefore are investigating the use of computer adaptive testing for the progress test. In this type of testing, an algorithm selects the questions from a calibrated item bank based on the answers that the student gave on previous questions in the test. In doing so, the algorithm estimates the level of the student based on the difficulty of each question the student answered correctly or incorrectly. We applied the computer adaptive progress test in the international track of the medicine programme at Maastricht University and in the Al Rajhi University in Saudi Arabia, involving about 300 students per test. The questions used and their difficulty parameters were derived from the classical progress test. The implementation of the adaptive progress test in the international track of medicine has been quite successful and is a proof of concept. Online adaptive progress testing provides considerable advantages. First and foremost, it creates flexibility. There is no need to organize simultaneous session in large venues. The tests are individualized. One may spread test administration across a time window, all depending on the facilities and resources within a setting. A second big advantage is that fewer items are needed to reach the same reliability.

| Collaborations and uses

The progress test for the Dutch medical schools is organized in the iVTG (interuniversity progress test medicine, see: ivtg.nl) a consortium of Maastricht University, UMCG Groningen, LUMC Leiden, UMCN Nijmegen, VUmc and AMC Amsterdam. The test items are developed by all partners but Maastricht University takes care of central processing and analysis and provides all IT support.

iVTG
interuniversitaire
VoortgangsToets Geneeskunde

The iVTG collaboration has been a model and example for progress testing in many places, for instance the Dutch family medicine resident programme and the Dutch gynecology resident programme use a similar progress test. Many presentations, invited talks and workshops have been provided by SHE on progress testing worldwide. Within EBMA (see https://www.ebma.eu) the model inspired the start of a European progress test.

The ProF system has been developed to be used generically, i.e. independent from a specific type of progress test and is now supported by SHE in use for several other organizations. The adaptive online progress test for the Dutch collaboration will be implemented in 2022. To prepare for this we have created a calibrated item-bank of approximately 8000 items. The psychometric calibration of the items was done on historical data. Currently all calibrated items are undergoing another content review from experts to establish their contemporary relevance.
The last two medical schools in the country have committed themselves to join the collaboration. Once this happens, an old vision will be completed. We will then have a national exam testing medical knowledge in an educationally useful way in an organization that is fully owned by the schools themselves. This is a unique situation in the world.

| Who is involved?

Within SHE, Prof. Cees van der Vleuten, Dr. Jeroen Donkers, and Dr. Carlos Collares are involved in scientific research and development of progress testing as well as in the daily application of progress testing at a national and international level.

| Selection of publications

Heeneman S, Schut S, Donkers J, Van der Vleuten, CPM, Muijtjens AMM. 2017. Embedding of the progress test in an assessment program designed according to the principles of programmatic assessment. Med. Teacher 39(1):44-32.

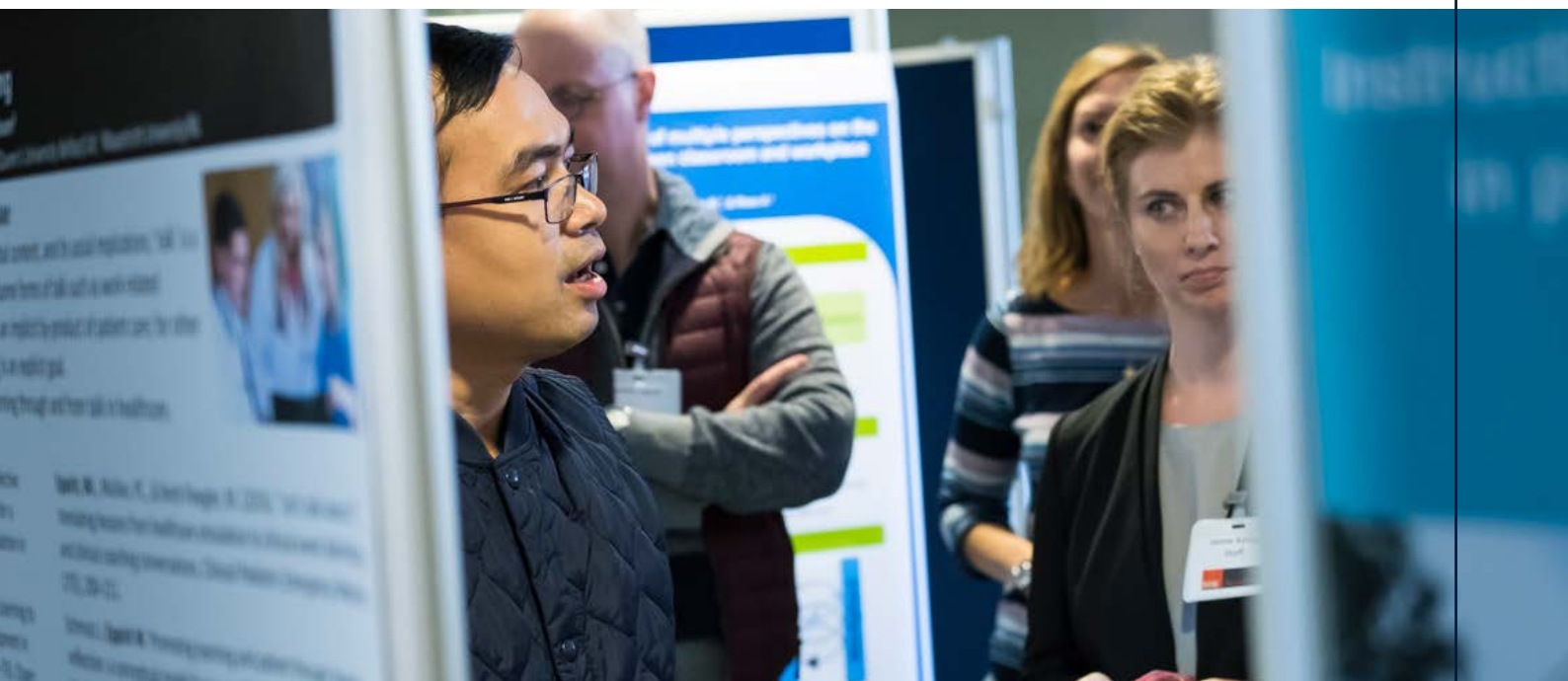
Muijtjens AMM, Timmermans I, Donkers J, Peperkamp R, Medema H, Cohen-Schotanus J, Thoben A, Wenink ACG, Van der Vleuten CPM. 2010. Flexible electronic feedback using the virtues of progress testing. Med Teach 32:491-495.

Van der Vleuten CPM, Verwijnen GM, Wijnen WHFW. 1996. Fifteen years of experience with progress testing in a problem-based learning curriculum. Med Teach 18:103-109.

Van der Vleuten CPM, Schuwirth LWT, Muijtjens AMM, Thoben AJNM, Cohen-Schotanus J, van Boven CPA. 2004. Cross institutional collaboration in assessment: A case on progress testing. Med Teach 26:719-725.

Van der Vleuten, C., Freeman, A., & Collares, C. F. (2018). Progress test utopia. *Perspectives on Medical Education, 7*(2), 136-138.

Wrigley W, Van der Vleuten C, Freeman A, Muijtjens A. 2012. A systemic framework for the progress test: Strenghts, constraints and issues: AMEE Guide No. 71. Med Teach 34: 683-697



Case study 4

Problem-Based Learning: Alive and Kicking Worldwide

| What is problem-based learning?

Problem-based learning (PBL) is an instructional design approach that is implemented at many schools worldwide. Within PBL, students discuss professionally relevant problems in small groups. The problems are first discussed before any self-study has taken place to activate students' prior knowledge. Based on this discussion, questions are formulated for further individual self-study by the students. After this individual self-study, students meet again and discuss what they have learned. The small group discussion is facilitated by a teacher, a so-called tutor. PBL is well aligned with current instructional design approaches that emphasize the importance of learning by means of professionally relevant problems, in order to encourage integration of knowledge, skills, and attitudes and to better prepare learners for their future profession. The complexity of problems within our society requires educational practices in which learners are prepared to work in interdisciplinary teams and collaborate with professionals from different cultural, linguistic and educational backgrounds. PBL is continuously being innovated to prepare students to acquire domain specific knowledge, but also to develop a broad range of skills, including self-regulation, collaboration, and communication skills.

| Who is involved?

PBL is used in many curricula offered all over the world. Maastricht University is known for its PBL approach and its international orientation and multidisciplinary approach to research and education. Small-scale 'international classrooms' bring together students from all over the world who have different backgrounds and perspectives. PBL is also used in many research projects as an object of study. Workshops on PBL are given by many SHE researchers all over the world. In addition, PBL is continuously being innovated within the Maastricht curricula, which provide a rich and unique context to investigate PBL and its underlying theoretical principles. Researchers who are highly involved are Prof. Diana Dolmans, Dr. Janneke Frambach, Dr. Dominique Waterval, Prof. Hans Savelberg, Dr. Nynke de Jong, Emmaline Brouwer MSc, Dr. Herma Roebertsen, Dr. Sanne Rovers, Prof.. Jeroen van Merrienboer, Prof. Erik Driessen and Dr. Daniëlle Verstegen.

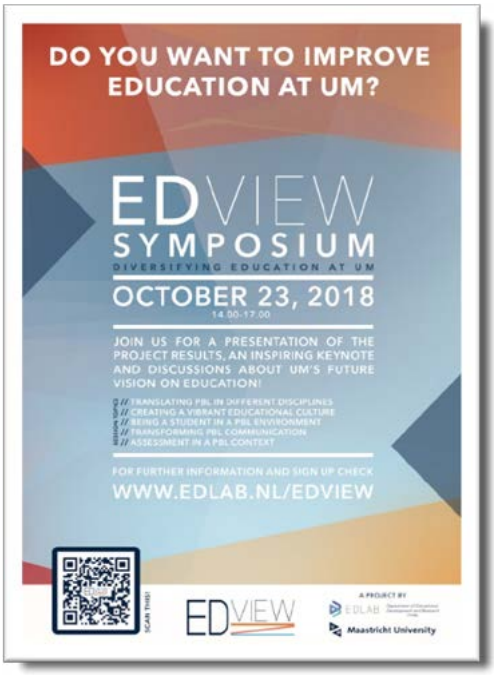
| Users and Collaborations

PBL plays a dominant role in many projects within SHE. A few examples are given below.

EDview is a research project that investigates the current state and the future of education at Maastricht University. Within this project, the merits and challenges of PBL were investigated, as well as the vision of education at UM for the future. EDview collected and synthesized the educational experiences of students, teachers, course coordinators, programme directors, educationalists, policy makers, and other stakeholders at UM, with the aim to establish a shared vision on education and suggestions for action.

EDview delivered a position paper that captures UM stakeholders' position on the current and future status of student-centered education at UM, focused on the do's, don't's, and don't know's of

teaching and learning at UM. An event (see www.youtube.com/watch?v=ZBqZCkKk5DE) was organized to present and discuss the paper, with workshops and interactive sessions planned for different stakeholders. Sophie Vanhoonacker, Dean of the Faculty of Arts and Social Sciences, presented a response to the EDview results on behalf of the UM Executive Board and the Deans of the six faculities, embracing EDview's conclusions. Furthermore, Rianne Letschert, Rector Magnifcus of UM expressed commitment to EDview's recommendations. Erik Driessen is currently leading a follow-up project to take EDview's findings another step further. HQ Chim and Anne van Dijk are involved as researchers. See: https://edlab.nl/edview/



Standing tutorials: Education that Moves You aims to turn the classroom into a more dynamic space to improve the learning experiences of students during tutorials. Innovative furniture and experimental whiteboards were introduced to improve the educational experience within UM. Although attention has been drawn to the health risks of prolonged sitting for years, the influence on learning was relatively unknown until recently, through the research studies conducted by SHE. Pilot studies were conducted at University College Maastricht and the Maastricht Science Programme. In the 2017-2018 academic year, Biomedical Sciences bachelor students attended standing tutorials throughout a 9-week course (see the published protocol[1] and results on physical activity behavior[2]).

A comprehensive measure of learning was carried out. We analysed the students' performance during various group discussions, multiple concept maps, and their final exam grades. Students who stood in their tutorial group meetings had a learning performance that was just as well as those who

[1]https://www.sciencedirect.com/science/article/pii/S0883035519306536?casa_token=yH0reTOcYGMAAAAA:rrcyfbKKs7kGW1s9tkcw23B4BuMgMFUlsNfsoaqCzNdCP00dw2MLa5FbkbI331gRgWQXtZnbaRo

[2] https://www.sciencedirect.com/science/article/pii/S0031938420306089?casa_token=TlC_-a5iNGAAAAAA:aby61_ThGNRLPYPmFYnago0ryvq90UiEJSnA1Q7o_VQ8NP6I_7U6t7iJe2M-894rgpW6h37Ply8

were sitting. Overall, when breaking up prolonged sitting with light activity is beneficial for health, then the students should be given the option to stand in class. Prof. Hans Savelberg and Dr. HQ Chim are involved in this project as SHE researchers. See: https://edlab.nl/the-dynamics-of-standing/

New Medical Education Initiative (NMEI) in Ethiopia. This initiative works on planning medical doctor training, supporting the medical schools in Ethiopia, focusing on the new medical schools, and developing standards for the medical doctors training. Ethiopia has intensified the pre-service education through increasing the number of medical schools from 14 to 27, expanding building capacity, and increasing the number of enrollees in the existing schools. The main purpose of this new approach to medical education is to reform traditional curricula, following principles such as early community and clinical contact and PBL. In the past 4 years, SHE has been offering support in innovating the curricula and training local teachers on PBL. Emmaline Brouwer MSc and Dr. Herma Roebertsen are highly involved in this project as SHE researchers. See: www.youtube.com/watch?v=-bKvnXUitQ&t=12s OR www.moh.gov.et/nmei

Enabling learning throughout Africa. Starting at the North Coast Medical Training College in Kenya, SHE has co-designed a highly practical and versatile blended course for health professions educators, which has now reached about 50 teachers across Africa through various project collaborations. The 'Enabling Learning' course heavily builds on PBL principles and SHE's research and experience around student centered education. In 3 modules, participants learn about the design and delivery of education sessions, modules, and courses respectively. For a short impression please visit www.youtube.com/watch?v=s71R_uGQemE

Curriculum collaboration in Saudi Arabia. This project is based on a long-term curriculum collaboration between the Medical programme of Sulaiman Al Rajhi University in Saudi Arabia and the Educational Institute of the Faculty of Health, Medicine and Life Sciences. Eleven years ago, the collaboration started with the franchise of the PBL curriculum. Ten years long, the school was given support to develop skills and competencies to independently run the curriculum. During that time, the school has expanded a lot. Now, the collaboration continues as the medical school will take the curriculum a step further and make it their own. This shifts the focus of the project to quality assurance of the curriculum and guidance in development of the curriculum. Dr. Jill Whittingham, Mohammed Meziani MSc, and Dr. Dominique Waterval are involved in this project.

PAN-PBL Association of Problem-Based Learning and Active Learning Methodologies. This association aims to promote educational forums for professionals, representing a wide variety of positions and knowledge on PBL and Active Learning Methodologies, as well as communication, cooperation, and scientific research for individuals and institutions (www.panbpl.org). PAN-PBL is a relatively small, but very international association that also strongly values the inclusion of educators and researchers from low and middle income countries. Maastricht University is represented in the board of PAN-PBL (Prof. Diana Dolmans). SHE researchers have presented their work at the PAN-PBL

conferences, e.g., in Santa Clara (USA) in 2018 and Sao Paolo in 2016. Up to now, PAN-PBL has a strong base in South and North America. To extend their reach, PAN-PBL will organize the next conference in Denmark, Europe. Maastricht University will be visible during the PAN-PBL conference in 2021, given their international reputation on PBL.

| Media exposure

Source	Title	Lead researcher (s)
Observant, October 24, 2018	PBL 2.0 is on its way: flexible, creative and tailor-made/ Form is no longer sacred, but the philosophy behind PBL is by Riki Janssen	Dr. Janneke Frambach
UM magazine, October 2018, pages 4-6	Interview on EDview: A Vision for the future of Problem-based learning. However many steps – to each problem its solution.	Dr. Janneke Frambach, Stella Wasenitz
Mayo Clinic USA. Mayo Clinic Educator's Central Podcast, June 5, 2020	Problem-based learning and Team-based learning: Your new educational super strategy. USA. https://mayocliniceducatorscentral.blubrry.net/2020/06/05/problem-based-learning-and-team-based-learning-your-new-educational-super-strategy-ep16/	Prof. Diana Dolmans

| Scientific quality (selection of publications)

Chim, H. Q., Van Gerven, P. W., de Groot, R. H., oude Egbrink, M. G., Erkens, R. H., & Savelberg, H. H. (2019). The effects of standing tutorials on learning in undergraduate students: Study protocol. *International Journal of Educational Research*, *98*, 123-133.

Dolmans, D. H. (2019). How theory and design-based research can mature PBL practice and research. *Advances in Health Sciences Education*, *24*(5), 879-891.

Kidane, H. H., Roebertsen, H., & Van der Vleuten, C. P. (2020). Students' perceptions towards self-directed learning in Ethiopian medical schools with new innovative curriculum: a mixed-method study. *BMC Medical Education*, *20*(1), 1-10.

Rovers, S. F., Clarebout, G., Savelberg, H. H., & van Merrienboer, J. J. (2018). Improving student expectations of learning in a problem-based environment. *Computers in Human Behavior*, *87*, 416-423.

Verstegen, D. M., Fonteijn, H. T., Dolmans, D. H., de Rijdt, C. C., de Grave, W. S., & van Merriënboer, J. J. (2019). An Exploration of Problem-Based Learning in a MOOC. *The Wiley Handbook of Problem-Based Learning*, 667-689.

Waterval, D. G., Driessen, E. W., Scherpbier, A. J., & Frambach, J. M. (2018). Twelve tips for cross border curriculum partnerships in medical education. *Medical Teacher*, *40*(5), 514-519.

Case study 5

Pasemeco: Improving palliative care education for our future doctors.

What is palliative care?
Palliative care is an approach that improves the quality of life of patients and their families facing a life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, of a physical, psychosocial and/or spiritual nature. (From: WHO definition of palliative care)

| What is Pasemeco?

Pasemeco was a national project aimed at improving palliative care education in the undergraduate curriculum in the Netherlands. The Pasemeco project ran from 2016 to 2020 and was funded by ZonMw, as part of the National Programme Palliative Care. All eight universities in the Netherlands that offer undergraduate medical curricula have committed to this project. For more information, see www.pasemeco.nl

| Attention for palliative care in the undergraduate curriculum

The need for palliative care is increasing due to the aging population and the growing number of people with chronic diseases such as cancer, heart failure, COPD, and dementia. Every doctor will be involved in palliative care. It is important that palliative care is included in medical education from the very start. Interviews with stakeholders and an analysis of Dutch undergraduate curricula showed that this is currently not the case: attention for palliative care is fragmented and suboptimal.
The goal of the Pasemeco project was to stimulate that junior doctors learn competencies required for palliative care by defining these competencies, developing a toolbox with educational materials and supporting teachers in implementing and evaluating palliative care education in the undergraduate curriculum. Key in the Pasemeco vision is to view palliative care as normal care and to integrate palliative care education systematically and longitudinally in the entire undergraduate medical curriculum. Learning about palliative care repeatedly and in all relevant contexts, will stimulate retention and transfer to practice.

| Who are involved?

The Pasemeco team consisted of a mix of educational scientists, physicians/teachers in medical education and experts in palliative care. Two medical students were involved as student-assistants. Students, patients and other stakeholders were represented in the Pasemeco advisory board. The Pasemeco team closely collaborated with teachers and curriculum leaders from the eight medical schools in the Netherlands, with a number of other projects in the National Programme Palliative Care (e.g. EDUPAL, O2PZ, PHAROS) and other stakeholders, such as the Expertise Centres for Palliative Care, situated in the Dutch academic hospitals. Over the years, the following people were part of the Pasemeco team: Dr. Franca Warmenhoven, Dr. Judith Westen, Jolien Pieters Msc, Dr. Annemie Courtens, Prof. Marieke van den Beuken, Prof. Diana Dolmans, Dr. Jimmy Frèrejean, Dr. Angel Schols, Hurriye Yaldiz, Delian Hofman, Barbara Dito, Dr. Evelien Neis, Dr. Juliette Parlevliet and Dr. Daniëlle Verstegen.

| Pasemeco activities in the spotlight

A questionnaire study amongst 222 students (5th/6th year) of four Dutch medical faculties showed that students feel that education about palliative care is important, especially concerning patient-oriented care, patient-doctor communication, and symptom control in palliative patients. They do not think that these are adequately covered in their curriculum, and they do not feel prepared for their role in providing palliative care. They also did not perform well on a knowledge test in this domain. Interviews with patients and caregivers resulted in many do's and don'ts for interactions between patients (and/or relatives) and medical professionals were distilled. Among these were: showing compassion and a healthy involvement with the patient in terms of attention and interest, listening carefully, taking time, not sticking to routines and following rules too strictly, avoiding administrative burden for patients, and refraining from using diminutive language.

A junior doctor is able to:
Discuss the incurable illness, prognosis, and death with the patient and loved ones.
Organize advance care planning in regular consultation with the patient, family, and the care providers involved.
Combat the suffering of patients requiring palliative care and their loved ones with consideration for all four dimensions of care.
Work in a multidisciplinary and interdisciplinary team of various care professionals, volunteers, and caregivers.
Carry out the care trajectory around the patient's death together with the multidisciplinary team
Ensure personal well-being and development.

These studies combined with an analysis of the literature led to a list of competences for palliative care for the undergraduate curriculum. This list was further refined in a Delphi-study involving five groups of stakeholders: palliative care experts, teachers/curriculum leaders in undergraduate medical education, recently graduated junior doctors, physicians and nurses working with junior doctors.

The Pasemeco project collected educational materials about palliative care in the Pasemeco toolbox, that contains small assets, such as video clips and patient cases, as well as elaborated lessons, learning tasks or modules with teacher and student instructions. The toolbox allows teachers to search for materials and use them or adapt them to their needs. The toolbox will remain freely accessibly also after the end of the Pasemeco project at: https://palliaweb.nl/onderwijsmaterialen

During the entire project, Pasemeco supported teachers of all eight medical schools in the Netherlands to implement new education about palliative care in their curriculum. Changes ranged from very small, e.g. replacing an example or a patient case in existing education, to substantial efforts to design and implement new workshops, learning tasks or courses.

The Pasemeco team also developed new materials for topics that were not sufficiently covered yet: a set of learning tasks on Communication and the spiritual dimension of care, a set of learning tasks on Advance care planning, a set of learning tasks on Care around the patient's death, and a short movie of five palliative patients sharing their views on the four dimensions of care. Two of these were evaluated in scientific studies.

| Visibility

The Pasemeco team conducted four studies resulting in publications (two published, one submitted and one in preparation). Study results have been presented at national and international conferences, including NVMO, AMEE, and Dutch-Flemish scientific meeting about palliative care . The Pasemeco project also organized presentations and workshops at Dutch medical faculties and for other stakeholders involved in palliative care. At the end of the project the team organized an online symposium for teachers in medical education on October 8 2020.

ZonMw

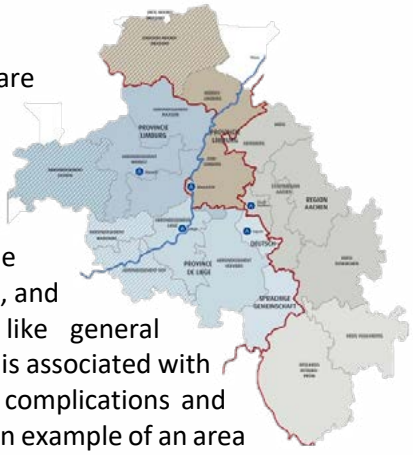
Case study 6

Excellence in patient safety in cross-border regions: SafePAT

| What is SafePAT?

The aim of SafePAT was to better understand and support international collaboration in the Euregion Meuse-Rhine (EMR). A total of six hospitals and educational institutions in the region formed the SafePAT consortium. The SafePAT project ran from 2014 to 2020, was supported by Interreg V-A, and co-financed by the regional provinces and all partner institutions. For more information, see the website: www.safepat.eu.

| Towards excellence in patient safety in the EMR



In border-region in the European Union, patients as well as healthcare providers cross borders more and more. This can be advantageous when care is more specialized, cheaper or more readily available in a neighboring country. However, fragmentation of care and disconnection between healthcare systems could amplify patient safety risks. Critical moments in the chain of patient safety are the patient's admission to hospital, transfer within or between hospitals, and discharge from the hospital to other healthcare providers like general practitioners, also known as handovers. Handover is a risky event. It is associated with medication errors, increased length of stay, increased in-hospital complications and decreased patient satisfaction. The Euregion Meuse-Rhine (EMR) is an example of an area where international healthcare is a topic of focus, is. In this region, Belgium, Germany and the Netherlands form a border triangle. Healthcare institutions in this area assumingly deal with additional challenges related to, for example, difference in system, culture and language. Obtaining a better understanding of the challenges related to international healthcare and patient safety enables supporting stakeholders involved in it to overcome these challenges. Two main research questions arose: (1) "What are requirements to improve cross-border care and international patient handover from the perspective of healthcare professionals *and* patients?", and (2) "How can these requirements be supported with training interventions?"

| Who are involved?

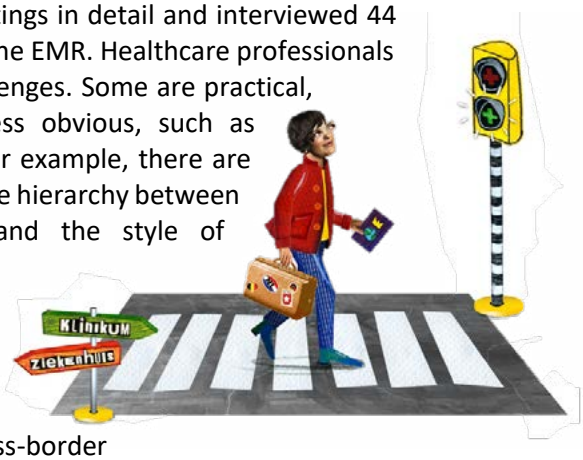
The SafePAT consortium consisted of six partner institutions based in the Euregion Meuse-Rhine: Uniklinik RWTH Aachen, Ziekenhuis Oost-Limburg Genk, CHR de la Citadelle Liège, Universiteit Hasselt, Open Universiteit Heerlen, and Maastricht University (UM).
At UM, Dr. Mara Bouwmans , Juliët Beuken Msc, Dr. Daniëlle Verstegen, Michael Hoven and Prof. Diana Dolmans have been involved in the project. Mara

Bouwmans was UM project leader for SafePAT and Michael Hoven took over that role in the last year. Juliët Beuken conducted her PhD research within the SafePAT project. Daniëlle Verstegen supervised the team and Diana Dolmans was involved as promotor of Juliët Beuken.

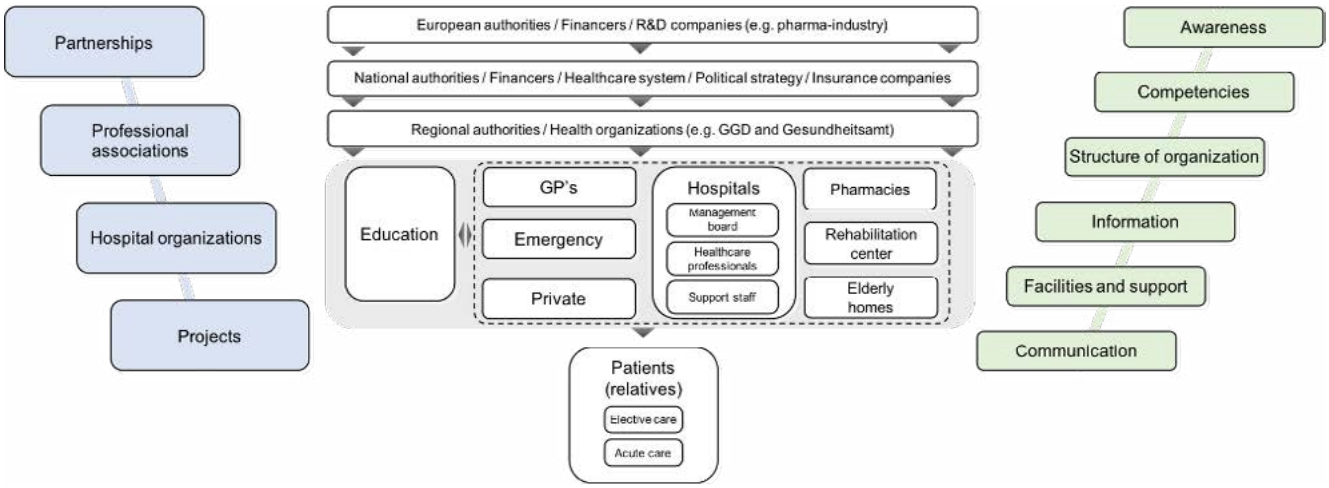
| SafePAT activities in the spotlight

UM led the work aimed at analyzing the state-of-the-art of cross-border healthcare in the EMR. Listening to healthcare professionals, we learned that cross-border patient handover happens regularly in the EMR. A questionnaire study showed that a third of the 846 responding healthcare professionals was involved in cross-border patient handover regularly. In some settings, cross-border patient handovers happen often, because there are special arrangements. In acute care, for example, ambulances sometimes drive to the closest hospital even if that is in another country. Patients also cross borders for highly specialized care, such as liver transplantation or hip replacement. They sometimes cross borders on the advice of their doctor, and sometimes of their own accord.

In an interview study, we investigated three of those settings in detail and interviewed 44 healthcare professionals involved in cross-border care in the EMR. Healthcare professionals see advantages of cross-border healthcare, but also challenges. Some are practical, like language and sharing patient files. Others are less obvious, such as differences between healthcare systems and cultures. For example, there are substantial differences between countries in the EMR in the hierarchy between healthcare professionals, the role of the patient, and the style of communication. Healthcare professionals felt that they did not know enough about the colleagues that they worked with. They would like to know more about how healthcare is arranged in other EMR countries.



We looked at the patient perspective and interviewed nine patients and/or caregivers who had experienced cross-border care. Patients told us that they did not have enough information about international healthcare and the consequences of it. Sometimes they were not involved in important decisions (e.g. which hospital to go to). At other times, they were given too much responsibility, e.g. transferring their own files or arranging post-operative care at home.



The analysis of the state-of-the-art led to a visual overview of stakeholders involved in cross-border care and, on the right hand side, six types of challenges:

1. Communication, for example differences in language, can make communication between healthcare professionals more difficult during handover. They can also hinder communication with patients.
2. Facilities and support, for example the use of different handover procedures or checklists.
3. Information, for example the lack of shared systems to transfer patient files and patient information (risk of information loss).
4. Structure of the organization, e.g. the way that the hospital is organized and the task and role divisions between healthcare professionals.
5. Competencies of healthcare professionals, which can differ because of differences in educational systems.
6. Awareness: the lack of awareness of differences can cause miscommunication and lead to patient safety risks.

The SafePat project worked on overcoming these challenges with specific interventions, e.g. training and community building. UM developed, piloted and evaluated an interprofessional workshop to bring healthcare professionals from different countries together, exchange experiences and discuss how to collaborate better in future. To start awareness of the advantages and challenges of cross-border care early on, we also developed, implemented and evaluated a workshop for specialists in training in the EMR. Other SafePAT-members worked on other ways to improve cross-border patient safety, identifying opportunities to improve patient safety education in medical and nursing education in the EMR, interprofessional training in patient handover, targeted team training, patient empowerment, and using virtual reality and a CPR tutor teaching students cardiopulmonary resuscitation using instant feedback.

| Visibility

The UM SafePAT team conducted five studies resulting in five publications (one published, two under review, two in preparation). Study results have been presented at national and international conferences, including NVMO, AMEE, and ICCH. The consortium also organized two symposia: “Joining forces across borders” (2018) and “Power-Ups for Patient Safety (2020).

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Case study 7

Educational Taskforces FHML: Promoting Innovations in Education

| What are the Taskforces?

The Department of Educational Development and Research supports the development and innovation of training programmes within the Faculty of Health, Medicine and Life Sciences (FHML), Maastricht University and the MUMC+. The department offers educational support to teachers, educational coordinators and leaders through four expertise groups called 'taskforces' in the following domains: Faculty Development, Instructional Design and e-Learning, Programme Evaluation and Assessment. Members of the taskforces are strongly involved in research activities in these domains and have strong connections with SHE. Within the taskforces, the redesign of theory-based education and teaching practices is combined with studying these practices in close collaboration with students, teachers, educators, leaders, scholars and health care professionals. The taskforces build bridges between theory and practice, which we consider our strength. The department collaborates closely with SHE but also with the FHML Institute for Education, the MUMC+ and Edlab. All taskforces support the innovation of education, provide advice and disseminate knowledge by combining recent scientific insights with educational theory and stakeholders' perspectives. Examples of projects are given below.

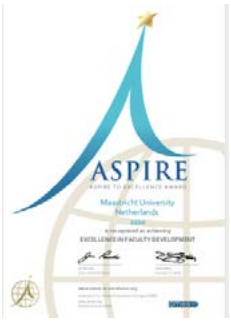
| Who are involved?

The taskforces are led by Dr. Herma Roebertsen, Dr. Peter van Rosmalen, Dr. Renée Stalmeijer and Dr. Marjan Govaerts, and many other SHE staff are involved, namely, Dr. Karen Könings, Lianne Loosveld MSc, Dr. Pascal van Gerven, Maarten van Kooij MSc, Wilma Huveneers MSc, Dr. Tiuri van Rossum, Prof. Erik Driessen, Dr. Jimmy Frerejean, Dr. Jeroen Donkers, Dr. Maryam Asoodar, Dr. Nynke de Jong, Dr. Joyce Moonen, Prof. Jeroen van Merriënboer, Suzanne Schut MSc., Dr. Sanne Rovers, Dr. Jill Whittingham, Dr. Carolin Sehlbach,D. Ineke Wolfhagen, Prof. Cees van der Vleuten and Prof. Diana Dolmans.

| Project examples per taskforce

The taskforces play an important role in in many innovation and research projects. Below several examples of projects are presented per taskforce.

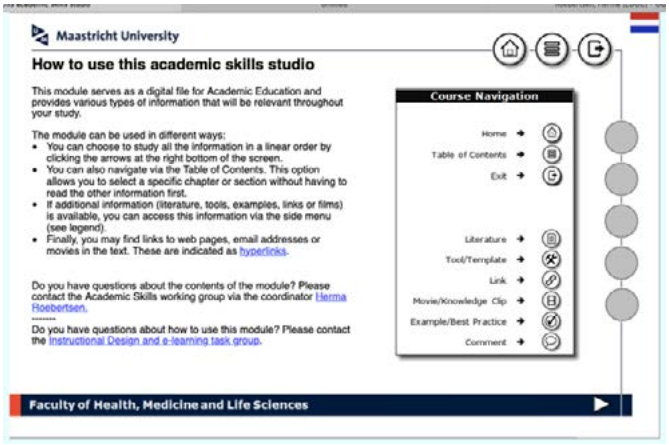
| Taskforce Faculty Development



This group offers a variety of professional development activities for all teachers and course coordinators within FHML. Activities are all designed according to the latest insights in faculty development. Creating professional learning communities around workplace learning is the cornerstone of the current programme. The excellence of taskforce faculty development was recognized in 2020 when they were the recipients of the 2020 ASPIRE to Excellence Award in

the theme of Faculty Development. This is an internationally well-recognised award. Examples of current projects are given below.

Academic Skills Studio on intranet. In the bachelor programmes of FHML students receive training in academic skills. As instructors noted that students often lost track of relevant materials and would benefit from a central information hub on all information relevant to academic skills, the Knowledge Studio was constructed. In a collaboration between taskforce e-learning, faculty development and coordinators of courses in academic Skills Philosofy, Statistics and Methodolgy the Knowledge studio was designed and embedded within the FHML intranet.

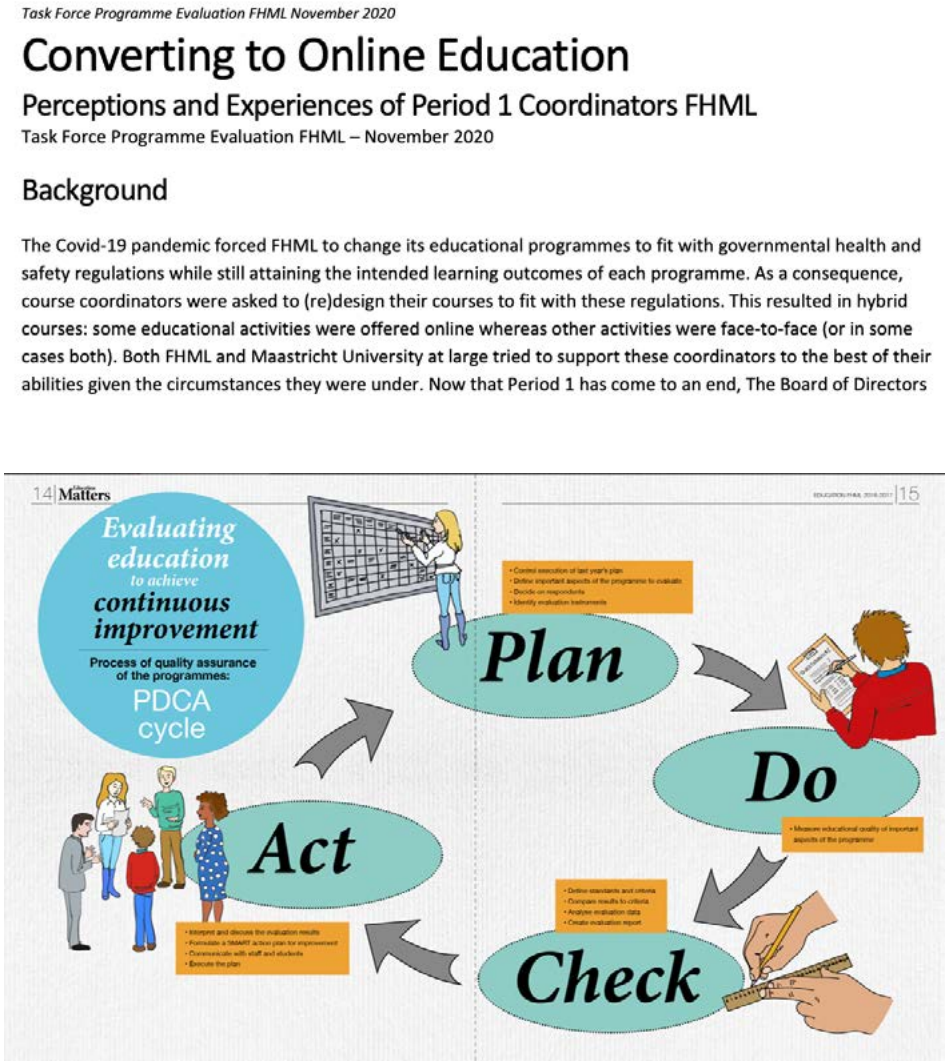


Improving academic writing skills. Feedback is helpful to develop students' academic writing competency. However, despite provision of written feedback by teachers, students often experience difficulties in interpreting this feedback. To address this issue, the taskforce faculty development was involved in a project in which face-to-face peer dialogue on academic writing skills addressing written peer feedback was introduced to improve students' feedback understanding. The taskforce studied the intervention and results demonstrate that face-to-face dialogue stimulates peers to elaborate on their written feedback, helps them deliver (more) constructive comments and feel responsible for the feedback process. The findings resulted in changes to the longitudinal academic tracks of several Bachelor programmes at FHML and have been published internationally (Schillings et al., 2020).

| Taskforce Programme Evaluation

This taskforce supports the process of educational quality enhancement at FHML by systematically collecting and reporting relevant information and having a dialogue with different stakeholders. Several projects of this taskforce focus on creating and stimulating a quality culture within FHML (Bendermacher et al., 2020). A quality culture is a type of organizational culture requiring attention to structural/managerial processes and fostering shared values, beliefs, expectations and commitment towards educational quality. One project is concerned with the translation of the PBL core principles (CCC-S) and principles of workplace learning into evaluation instruments aimed at monitoring and enhancing quality of courses and individual teachers. Another project consists of the (re-)design of yearly workshops for internal and external stakeholders on quality assurance processes. For example, the taskforce offers yearly workshops for educational programme committee members and student evaluation committee members of FHML to aid them in their role in educational quality enhancement. These workshops have also been organized for national and international audiences at conferences. A third project example relates to strengthening the involvement of affiliated hospitals in educational quality assurance and enhancement. Given the importance of practice-based learning for many of the FHML curricula, the taskforce has invested in

providing tools and workshops for affiliated hospitals to be more in control of the educational quality within their own institutes. A fourth example is that the taskforce evaluated the experiences of coordinators, teachers and students regarding the redesign of the FHML courses to online or blended formats due to the COVID-19 crisis.



Task Force Programme Evaluation FHML November 2020

Converting to Online Education

Perceptions and Experiences of Period 1 Coordinators FHML

Task Force Programme Evaluation FHML – November 2020

Background

The Covid-19 pandemic forced FHML to change its educational programmes to fit with governmental health and safety regulations while still attaining the intended learning outcomes of each programme. As a consequence, course coordinators were asked to (re)design their courses to fit with these regulations. This resulted in hybrid courses: some educational activities were offered online whereas other activities were face-to-face (or in some cases both). Both FHML and Maastricht University at large tried to support these coordinators to the best of their abilities given the circumstances they were under. Now that Period 1 has come to an end, The Board of Directors

| Taskforce Instructional Design and E-learning

This taskforce offers support to the design and innovation of the educational programmes at FHML and has a lot of expertise on E-learning. Three examples of projects are given.

VR Glasses in the PBL classroom. In cooperation with the Living Lab in Ageing and Long-term Care (Academische Werkplaats Ouderenzorg[3]), the students "join" a homecare visit with real employees of the MeanderGroep Zuid-Limburg, by watching a 360° video (a video in which all directions are recorded simultaneously) through virtual reality glasses, thereby getting the feeling of what such a visit consists of in reality. This in turn is used as a basis for discussions in the problem-based

[3] https://www.academischewerkplaatsouderenzorg.nl/living-lab-ageing-long-term-care

classroom. Dr. Nynke de Jong is involved as one of the SHE researchers. See https://edlab.nl/bringing-reality-into-the-classroom/. Currently Taskforce Instructional Design and E-learning is collaborating with Taskforce Faculty Development and Edlab to use the same design principles and technology to train tutors within the PBL system.

Videos on Core principles of PBL: constructive, collaborative, contextual, and self-directed. These video series have been designed to explain how the educational principles of Maastricht University (CCC-S) are and can be applied. The intention is to guide teachers on how they can implement these principles in their everyday teaching methodologies. The videos look at the definition of PBL and CCC-S, at how they can promote better learning skills and competencies. In addition, they provide guidelines on applying these principles in course development, (group) assignments and assessment, the organization and delivery of lectures, and the organization and facilitation of tutorial sessions. Video explanations of these four PBL learning principles can be viewed here: https://edlab.nl/pbl-learning-principles/

A series of videos on Creative PBL practices at Maastricht University. Resulting from a brainstorm sessions with a large group of UM teaching staff, these video series display how have designed and implemented creative approaches to PBL. The videos can be found here: https://edlab.nl/innovation-2/media/

| Taskforce Assessment

One of the key focal points of the taskforce Student Assessment is the support, design and implementation of assessment innovations (both at the level of assessment instruments and assessment programmes). Over the past few years, research findings on use of comprehensive portfolios, workplace-based assessment and programmatic assessment in particular have been translated into new and innovative assessment approaches within FHML. One of the current projects is a large scale revision of the competency-based assessment system within the Master in Medicine, based on programmatic assessment approaches. The focus of the assessment re-design project is on enhancement of the feedback culture, use of narratives and student ownership in assessment for learning, as well as on improvement of high-stakes portfolio-based competence assessment. Another current project is the implementation and consolidation of the competency-based assessment system within the Bachelor of Biomedical Sciences, largely based on programmatic assessment principles. Third, the (re-)design of workshops for clinical faculty (e.g. use of narratives in work-based assessments, multiple role mentoring is a current project. Members of the taskforce furthermore serve as consultants for a broad range of assessment projects, both nationally and internationally.

| Media exposure

Source	Title	Lead researcher (s)
Education Matters, 2020, pages 30-31	Problem-based learning in times of corona	Dr. Marjan Govaerts, Dr. Herma Roebertsen, Dr. Peter van Rosmalen, Dr. Renée Stalmeijer
AMEE website, September 2020	The AMEE 2020 Aspire Award in the Theme of Faculty Development was awarded to the Taskforce Faculty Development; https://amee.org/awards-prizes/aspire-award/2020-winners	Dr. Herma Roebertsen
European Commission Erasmus+, October 4, 2019	Education Talks: Learning spaces designed together, interview, www.schooleducationgateway.eu/en/pub/viewpoints/interviews/education-talks-karen-koenings.htm	Dr. Karen Könings
AMEE, Invited lecture / webinar. November 2020	Interactive AMEE webinar on “The how, what and why of mentoring”	Lianne Loosveld Msc, Dr. Pascal van Gerven

| Scientific quality (selection of publications)

Bendermacher, G. W., De Grave, W. S., Wolfhagen, I. H., Dolmans, D. H., & oude Egbrink, M. G. (2020). Shaping a culture for continuous quality improvement in undergraduate medical education. *Academic Medicine*, *95*(12).

De Jong, N., Verstegen, D. M., & Könings, K. D. (2018). The role of the e-tutor in synchronous online problem-based learning: A study in a Master Public Health Programme. *British Journal of Educational Technology*, *49*(3), 385-397.

Loosveld, L. M., Van Gerven, P. W., Vanassche, E., & Driessen, E. W. (2020). Mentors' beliefs about their roles in health care education: a qualitative study of mentors' personal interpretative framework. *Academic Medicine*, *95*(10), 1600-1606.

Martens, S. E., Wolfhagen, I. H., Whittingham, J. R., & Dolmans, D. H. M. (2020). Mind the gap: Teachers' conceptions of student-staff partnership and its potential to enhance educational quality. *Medical Teacher*, *42*(5), 529-535.

Meeuwissen, S. N., Stalmeijer, R. E., & Govaerts, M. (2019). Multiple-role mentoring: mentors' conceptualisations, enactments and role conflicts. Medical education, 53(6), 605-615.

Van Rossum, T. R., Scheele, F., Sluiter, H. E., Bosman, P. J., Rijksen, L., & Heyligers, I. C. (2018). Flexible competency based medical education: more time efficient, higher costs. *Medical Teacher*, *40*(3), 315-317.

Schillings, M., Roebertsen, H., Savelberg, H., van Dijk, A., & Dolmans, D. (2020). Improving the understanding of written peer feedback through face-to-face peer dialogue: students' perspective. *Higher Education Research & Development*, 1-17.

Schut, S., Maggio, L. A., Heeneman, S., van Tartwijk, J., van der Vleuten, C., & Driessen, E. (2020). Where the rubber meets the road—An integrative review of programmatic assessment in health care professions education. Perspectives on Medical Education, 1-8.

Case Study 8

Project Mozambique

‘Capacity building for innovative interventions and services on sexual and reproductive health and rights’

From 2017 onwards, SHE Collaborates cooperates with Universidade Católica de Moçambique (UCM) and the Instituto Superior de Ciências de Saúde (ISCISA) in Mozambique in the area of sexual and reproductive health and rights. This 4 year project is funded (1,5 million Euros) by the Ministry of Foreign Affaires through the Netherlands Initiative for Capacity building in Higher Education (NICHE). This is a Dutch global development programme, available in 54 developing countries and managed by Nuffic, a Dutch non-profit organisation for internationalisation in education. The programme is funded by the Dutch Ministry of Foreign Affairs and it aims to change their future through education and training.

University students are at increased risk of contracting a sexually transmitted disease (incl. HIV) because of risk-taking sexual behaviour in a new and liberal living environment. Within this project there is a focus on improving SRHR services and campaigns for students and staff of Universidade Católica de Moçambique (UCM) and Instituto Superior de Ciências de Saúde (ISCISA). Via outreach activities the scope of the project will be extended to other education institutions, policy makers and communities.

The project trains staff members in topics such as health promotion, gender, how to handle sexual harassment, and many more. Additionally, a post-graduate course in ‘health promotion’ is under development and we are assisting in the development of a ‘life skills’ course. This course is for 50,000 UCM students and 2,300 ISCISA students and helps them develop the skills that are needed for the demands, challenges, and stress of everyday life, with a focus on sexual and reproductive health issues. The project also supports two PhD candidates in Health promotion and sexual and reproductive health, and one Master of Sciences candidate in Public Health.

| Who is involved?

A consortium of three organisations: Maastricht University (UM), Royal Tropical Institute (KIT) and Aidsfonds. All three organisations have (inter)nationally recognized expertise and experience in the relevant fields. The consortium offers a complementary and comprehensive set of knowledge and skills in order to reach the main objectives of the project:

Maastricht University (UM): expertise in the field of international project management, health promotion and education, expertise on research in SRHR, and educational development.

Royal Tropical Institute (KIT): expertise and work – including in Mozambique - at the crossroads of sexual health, reproductive health and HIV, as well as promoting adolescent (sexual) health, reducing teenage pregnancy, improving maternal health and strengthening HIV prevention and care especially for key populations through a mixture of research and capacity development. KIT offers an MPH with a specific track on SRHR/HIV, that covers comprehensively the broad spectrum of SRHR.

Aidsfonds: linking & learning (Academic researchers, civil society and government,) and SRHR knowledge transfer from science to professionals and vice versa (via blended learning strategies, social media and Online learning platforms), both in Dutch context, as in various Sub-Saharan countries. The main expert SRHR topics for STOP AIDS NOW! include HIV and SRHR integration, SRHR education, youth work (including meaningful youth participation, youth leadership and advocacy), entrepreneurship and working with key populations.

| Societal impact

Awareness campaigns on sexual harassment were conducted at all UCM faculties simultaneously. ISCISA organized smaller scale activities on sexual harassment in the secondary school and community. The campaign lasted for two weeks and addressed issues like: what is sexual harassment? Myths and facts about sexual harassment, legal framework in Mozambique, types of harassment and official policies at the university. A variety of activities was organized to engage students, staff and the community: a march, posters, theatre, a movie, a forum for discussion, etc.

It is estimated that with the campaign 80% of UCM students were reached, this comes down to approximately 23,000 young people (12,000 females and 11,000 males). The campaign was designed by the department of HGHIV with distance-based support from the Dutch partners. In year 2 they already received a training on influencing health behavior with campaigns.

The biggest external factor influencing the project was Cyclone Idai, which hit Beira on March 14th 2019. Followed by Cyclone Kenneth in Northern Mozambique. This event severely impacted Mozambique and especially the Sofala region. The destruction in Beira and at UCM was enormous and the project activities were paused for about 4,5 months. This time was needed for UCM to recover the physical and digital infrastructure, before the activities could restart. Damages included the destruction of the office of the department of Health, Gender and HIV (HGHIV), including the computer and other materials inside. The department has since been moved to a different location. The faculties in Beira (economics and health sciences) were also severely damaged.

Moments of the campaign "**Together Against Sexual Harassment**". Above: opening of campaign at Faculty of Education and Communication (Nampula). Below: Marching through the streets of Tete.

The recovery of UCM and the challenges to the project lasted much longer than these 4 months. Especially the diminished internet capacity influenced the project for many more months.
Maastricht University organised a campaign 'Care for Beira', which collected €39.515,48 for the recovery of the roofs of UCM buildings.

| Selection of media exposure

www.limburger.nl/cnt/dmf20190328_00098739
Care for Beira - all under one roof! (umcrowd.nl)
Keihard Abbey Road van The Beatles tegen de angst > Observant Online
UM-start-inzamelingsactie-voor-Mozambikaanse-universiteit

Case study 9

Meta-research: the science of healthcare education science

| What is meta-research?

Health care education research is a burgeoning field, with growing numbers of researchers and publications. Only in 2020, over 7500 papers about medical education were published. Meta-research in health care education researcher studies how health care education researchers perform, communicate, and verify the field's research or how the field rewards research. In other words, meta-research studies research itself. Meta-research is essential for a field's research effectiveness, responsible research conduct and a healthy research culture.

| Who is involved?

Meta-research has a place within SHE through research, faculty development and education. SHE members most involved in meta-research activities are Dr. Karen Königs and Prof. Jascha de Nooijer (research and faculty development), Prof. Lorelei Lingard (faculty development and education), Prof. Diana Dolmans (education), Prof. Cees van der Vleuten (research) and Prof. Erik Driessen (research and education).

| Meta-research activities and its impact

SHE staff is part of an international meta-research network. The heart of this network exists of Lauren Maggio (Uniformed Service University, USA), Tony Artino (Washington University, USA) and Erik Driessen. The network is extended for different activities with specialists from the meta-research field. For example, for bibliometric studies on knowledge syntheses two bibliometrists joined the research team. For research on the mechanisms of nonresponsible author behavior, the team collaborated with specialists in qualitative research. A last example is a study on the peer review process. This study is performed by a team of journal editors.

Both in the SHE master and graduate programme, meta-research gets attention. In both programmes the students participate in a workshop on responsible research conduct. In these workshops, students discuss and reflect on cases, exchange experiences and discuss strategies for maintaining responsible research conduct. How to communicate your research is part of the graduate programme. Meta-research papers are discussed in the journal clubs of SHE and the SHE SIGs

The faculty development programme pays attention to meta-research through critical incident discussions during supervisor meeting. Moreover, meta-research scholars are invited to share their research in the supervisor meeting and during lunch lectures.

The meta-research has a wide impact and media pay attention to SHE's meta-research activities. For example, the Maastricht University newspaper Observant regularly interviews SHE researchers about meta-research activities:

www.observantonline.nl/Home/Artikelen/articleType/ArticleView/articleId/18527/Een-Weinstein-affaire-als-wake-up-call?fbclid=IwAR0JEfMyVSkwOknGBDYkDgmgcIFnm8YuAEoE27CmKWoHkXGzdaO9WcX1pwc

www.observantonline.nl/English/Home/Articles/articleType/ArticleView/articleId/13607/Majority-researchers-are-guilty-of-sloppy-science

Retraction watch published an interview about one of the sloppy science studies: https://retractionwatch.com/2018/03/02/ethical-shades-of-gray-90-of-researchers-in-new-health-field-admit-to-questionable-practices

And the Dutch general medical journal (Nederlands Tijdschrift voor Geneeskunde) wrote about the same sloppy science study: www.ntvg.nl/artikelen/nieuws/dubieuze-onderzoekspraktijken-zorgopleidingen

SHE researchers provide workshops and lectures on meta-research for research groups within Maastricht University, e.g. Surgery, Regenerative Medicine, Labour Market research, etc. Moreover, SHE researchers provide workshops on National and International conferences.

| Selection of publications

Lauren A Maggio, Ting Dong, Erik W Driessen, Anthony Artino (2019) Factors Associated with Scientific Misconduct and Questionable Research Practices in Health Professions Education. Perspectives on Medical Education doi.org/10.1007/s40037-019-0501-x

Lauren A Maggio, Erik W Driessen, Anthony (2018) Preprints: Facilitating early discovery, access, and feedback Perspectives on Medical Education, 7: 287-289 https://doi.org/10.1007/s40037-018-0451-8

Artino, A.R, Driessen, E.W. & Maggio L.M. (2019) Ethical Shades of Gray: Questionable Research Practices in Health Professions Education Academic Medicine 94: 76-84 doi: 10.1097/ACM.0000000000002412

Maggio, L.A., Artino, A.R., Picho, K. & Driessen, E.W. (2017) Are you sure you want to do that? Fostering the responsible conduct of medical education research *Academic Medicine* Early online doi: 10.1097/ACM.0000000000001805


Overview of tools
Mail http://Webmail.maastrichtuniversity.nl
EleUM: www.maastrichtuniversity.nl/eleum
Student Desktop Anywhere
www.maastrichtuniversity.nl/anywhere
Log in with username (student number)
and pass word

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