

## **Theo van Haeften: Programmatic assessment in undergraduate curricula: a powerful method to promote self-directed learning**

### *Problem analysis:*

Assessment has two major goals, i.e. it gives the student feedback on the learning process and it provides summative information on accomplishment of the student<sup>1</sup>. However, in many undergraduate curricula of Utrecht University, assessment is mainly used as a summative tool, whereas the steering power of formative assessment is almost neglected. As a result, students adopt a 'test-based' learning style which does not promote deep-learning. Student proficiency can be increased by making a longitudinally programmed series of formative and summative assessment tasks central in the learning process. This programmatic assessment will self-direct the learning process of the student and will ultimately result in better study outcomes. Since 2010, programmatic assessment is successfully used in the veterinary master to assess 'work-place' learning<sup>2, 3</sup>. However, experience with programmatic assessment in 'non-work-place' undergraduate education in our university is limited. In the process of educational innovation, it is imperative to implement a future-proof assessment procedure, which is in line with developments such as individualization and flexibilization of teaching, i.e. education outside the classroom. *Aim of this project is to create a university-wide impulse for implementation of programmatic assessment in undergraduate curricula, as a tool to stimulate self-directed learning and as a valid method for progress evaluation. Implementation of programmatic assessment in the veterinary bachelor, as proposed, can serve as example for other curricula.*

Fundamental principles of my approach are that:

- Academic and clinical skills, as well as personal and professional development, as learned in longitudinal learning lines and other courses, are formatively assessed and results are compiled in a digital portfolio (Learning Management System). At the end of the course-year, an assessment team decides whether the student has shown sufficient progress to pass.
- Knowledge and understanding will be assessed by adaptive progress testing<sup>3</sup>. At several time points during the course-year, students will be formatively assessed using a computerized adaptive testing algorithm (CAT)<sup>4</sup>. CAT is special in that it matches items' difficulty to students' abilities, i.e. the algorithm dynamically selects the difficulty of the next items based on students' performance in the previous answers. This software is already used in Maastricht Medical School and can easily be adapted to our specific needs (C. Collares, pers. com). So, test-takers will receive an individually customized test, tailored to their level of knowledge. Moreover, students are provided with feed-back on the results of their tests. To implement CAT, the existence of a large item-bank is essential. For that reason, I am currently collaborating with the veterinary faculties of Oslo, Copenhagen, Hannover, Uppsala and Helsinki to create a shared item-bank for the purpose of progress testing.
- Summative assessment will occur at three different moments during the year. Completely new is that students will be confronted with problem-based tests, which will enable the instructors to objectively determine the level of integration of multidisciplinary knowledge and insight.
- Annual 'final judgement' on the overall performance of the student, will be based on information collected in the portfolio and on results of the summative tests. In case of border-line decisions, the results of the formative tests can be included.

### *Expected outcomes:*

- Implementation of a 'holistic' longitudinal assessment program that supports the learning process of students, makes students owner of their learning process, as well as provides the instructors with objective indicators for decisions on failing or passing, as part of a university-wide initiative for programmatic assessment (USO and SIG UU) and as part of a European collaboration (Erasmus) on progress testing.
- Change in learning attitude, from test-based to 'needing to know', more intrinsic motivation.
- Reduction in time and money spent by instructors on assessment.
- Standardization of the assessment program in the bachelor.
- Reduced levels of experienced stress due to less frequent summative testing.
- University-wide (UU) acceptance of programmatic assessment in undergraduate studies.

### *Approach and planning:*

*Phase 1. Sept. 2020-Sept. 2021*

- Description of the philosophy of longitudinal (programmatic) assessment and construction of overall assessment plan for the veterinary bachelor.
- Alignment of assessment plan with the final attainments and with education guidelines and exam program (OER), and support of Board of Study and Board of Examiners.
- Introduction of teachers to the concept of programmatic assessment.
- Selection and implementation of a Learning Management System.
- Creation of an item-bank with teachers and foreign collaborators.
- Establishment of the necessary IT infrastructure (including CAT software).
- Training of teachers in CAT and in preparing high quality test questions.

*Phase 2. Sept. 2021-Sept. 2022*

- Start programmatic assessment in bachelor course-year one.
- Continuing expansion of item-bank.
- Working on a digital handbook on programmatic assessment and on e-modules to be used in other curricula as a guide for implementation, as member of Special Interest Group (USO and SIG, UU) 'Programmatic Assessment'.

*Phase 3. Sept. 2022- Sept. 2023*

- Analysis of first outcomes of the program in year-one through student and teacher evaluations and discussions. Adjustments to the program and sharing experiences.
- Implementation of programmatic assessment in bachelor course-year two.
- Continuing expansion of item-bank.

*Phase 4. Sept. 2023-*

- Fine tuning of program according to evaluation outcomes and analyses from course-years one and two. Validity analysis of assessment cf. Bok et al. (2018)<sup>2</sup> and Favier et al. (2017)<sup>3</sup>, together with Educational Consultancy UU.
- Expanding programmatic assessment to all bachelor course-years.
- First draft of a scientific paper on programmatic assessment and its validity in undergraduate curricula as a final report.
- Dissemination of the concept of programmatic assessment through SIG-related events, e.g. publication of digital handbook and E-learning .

*Risks:*

- Item bank creation may take a long time to become sufficiently large for CAT.
- Low ratings in first year, since students need to adjust to longitudinal assessment.
- Quality of summative problem-based tests may at first be poor, since teachers need to be trained and gain skills to prepare multidisciplinary tests.
- Teachers may initially feel that they lose autonomy in their assessment due to central programming and coordination of the assessment program.

*Dissemination:*

This project will be embedded in two larger initiatives: the Utrecht University Educational Innovation Grant application (USO UU) 'Programmatic Assessment' and the European Erasmus collaboration. Goals of the USO initiative are the sharing of experiences with programmatic assessment and providing teachers with tools and advice to implement programmatic assessment in other undergraduate curricula. This will be achieved by submitting a scientific manuscript and a joined 'position paper' on the theory, ambitions and aims of programmatic assessment and publication of an on-line guideline for implementation. Finally, a team of experts will be formed for providing support. The Erasmus collaboration aims more at the creation of a large shared item-bank, the establishment of a quality-control system for item-selection, standardization of Learning Management Systems and assessment algorithms.

<sup>1.</sup> Biggs, J., Tang, C. (2011) *Teaching for Quality Learning at University*. Maidenhead, McGraw-Hill

<sup>2.</sup> Bok, H.H.J., De Jong, L., O'Neill, T., Maxey, C., Hecker, K. (2018) Validity evidence for programmatic assessment in competency-based education. *Pers. Med. Educ.* 7: 362-372

<sup>3.</sup> Favier, R.P., Van der Vleuten, C.P.M., Ramaekers, S.P.J. (2017) Applicability of progress testing in veterinary medical Education. *J. Vet. Med. Educ.* 44: 351-357

<sup>4.</sup> Chalmers, R.P. (2016) Generating adaptive and non-adaptive test interfaces for multidimensional item response theory application. *J. Stat. Software.* 71: 1-38