8G1 (21814) Development of a formative competency-based progress test with MC-items constructed by students – pilot test and further development

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Background: Progress tests give feedback to students about their longitudinal increase in knowledge with respect to the graduate level of their studies. Due to the increasing international importance of competency-based medical education, a competency-based progress test was developed. For this, “subject groups” and “competencies” were combined to a two-dimensional blueprint in order to construct items.

Summary of Work: Students from seven German medical faculties were actively involved in the development of the competency-based progress test. The students were given an intensive and comprehensive training program and then constructed and reviewed the items for the test using the ItemManagementSystem. For the first pilot test in 2013 students developed more than 200 MC-items.

Summary of Results: 469 students from eight German medical faculties took part in the pilot for the progress test in November 2013. The item scores of the test were analyzed in total and differentiated analyses were calculated for the “subject groups” and the “competencies”. The results showed that the quality of the items created by the students was on a high level. Cross-section analyses showed an increase in knowledge in each academic year in total as well as in the “subject groups” and the “competencies”.

Discussion and Conclusions: For the further development of the competency-based progress test in cooperation with students issues like question formats and assessment formats (e.g. Key Feature and OSCE), feedback formats and the possibility of web-based formative assessment are in ongoing discussion.

Take-home messages: The quality of MC-items created by students is on a high level.

8G2 (22031) Simultaneous progress testing in five German-speaking vet schools

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Background: The German-speaking veterinary faculties of Europe have developed and implemented a progress test designed for veterinary medicine (PTT: Progresstest Tiermedizin). This new test is part of the KELDAT project, a common initiative of all German-speaking institutions for veterinary education funded by the Volkswagen and Mercator Trusts. The test is purely formative (i.e. no grading and no sanctions).

Summary of Work: The PTT consists of 136 MC-Questions. Test content is referring to day one competencies as defined by the European Association of Establishments for Veterinary Education (EAEEV). The test questions are contributed by teaching staff of all participating institutions and subject to a multistage review process. The same set of questions is being presented to all students. Besides a choice of 4 answers there is an option “I do not know” to encourage students to honestly appreciate their knowledge.

Summary of Results: Out of five establishments a total of 1800 students have participated in the first run in December 2013. Results show i) the level of spontaneously retrievable knowledge, ii) the amount of knowledge relative to different areas of competence, iii) the participants’ level of knowledge as compared to all cohorts of one’s own institution and, as the test will be implemented in the coming years iv) the learning progress in the course of a student’s undergraduate training.

Discussion and Conclusions: PTT is a feedback tool to enhance autonomy and self-monitored student learning and to improve quality of veterinary education.
Take-home messages: The simultaneous implementation of the PTT in seven institutions is a first in collaboration in veterinary education in Europe.

8G3 (20048)
Learning and collaborative action: Progress testing construction process across an Interinstitutional Consortium in Northeast of Brazil

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Background: A national assessment project was conducted by Brazilian Medical Education Association. An interinstitutional consortium of seven Northeast medical schools was assembled for implementation of progress test (PT).

Summary of Work: A faculty committee representing each school conducted the test desing. Learning objectives from Medicine, Pediatrics, Obstetrics/Gynecology, Surgery/Emergency, Public Health and Basic Sciences were enrolled, based on Brazilian Foreing Medical Degree Revalidation blueprint and National Curriculum Guidelines. After, these contents were rated in relevance degree (1to5) by an each school expert panel and contents with mean ranking 4/5 were included in PT blueprint (20 per area). A faculty development in multiple choice question (MCQ) construction was conducted and an order for MCQ, contained the learning objective and clinical setting was send to schools. Three MCQ were produced for each content by different schools. First quality control reviewed was done. Of a 350 MCQ pool, a consortium meeting defined the 120 MCQ PT, after a second review and adjustment. All questions were classified at level3 or more at Bloom’cognitive taxonomy.

Summary of Results: At the same time, schools administered PT to 2656 students (66.1% of all students from 7 schools). The mean scores were 38.75% at year 1 and 65.17% at year 6. By Classic Test Theory, 49% of questions were middle and 24% difficult, 77% had good/optimal discrimination, with reliability 0.91.

Discussion and Conclusions: The consortium provided collaborative and cost-effective work, benchmarking and assessment quality improvement, resulting in more reliability and curriculum alignment.

Take-home messages: Different strategies to encourage student participation must be used. An integrated process of TP construction increases the assessment effectiveness.

8G4 (20264)
Use of Progress Test for Monitoring the Effectiveness of the Medical Curriculum in Qassim College of Medicine

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Background: Qassim College of Medicine adopts a student centered integrated problem based curriculum with spiral approach. Continuous monitoring and re-adjustment of the medical curriculum is of prime interest. Recently, progress testing was introduced to serve for both assessment of learning and assessment for learning.

Summary of Work: The results of four rounds of progress test conducted during 2012 & 2013 were analyzed. Evaluation of knowledge growth and performance of the students at graduation were specially stressed. The potential of progress testing in prediction of overall students’ performance shown by the cumulative Grade Point Average (GPA) was also tested.

Summary of Results: Final year students of the college consistently performed higher than the average for other participants. Growth of knowledge was steady in all components of the curriculum. Basic biomedical knowledge continued growth in clerkship phase and diagnostic and case management skills were shown to develop from the early years of the program. Areas related to professionalism were also shown to build up from the start. The correlation of progress test results with the cumulative GPA was moderate.

Discussion and Conclusions: The results of study confirmed the effectiveness of the student centered integrated curriculum and the spiral approach in building up competencies needed for medical graduates as well as continuing knowledge gain. Since progress testing primarily targets knowledge and cognitive skills, it may not be useful for prediction of students’ performance in other assessment modalities.

Take-home messages: Progress testing should be an integral part of the assessment system to monitor the efficacy of the curriculum. Detailed analysis of results based upon the multifaceted blueprint can add more insight in this regard.
**8G5 (22599)**

**Are scenario-based items associated with more omitted answers in progress testing?**

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**Background:** Progress tests have undoubtedly benefited from the usage of omitted answers and penalties for wrong answers in the prevention of undeserved scores due to guessing, in the maintenance of adequate generalizability in early years and in the promotion of metacognitive skills. The International Progress Test (IPT) Committee recommended to increase the usage of scenario-based items in order to increase early exposure of students to more authentic and relevant items. Nevertheless, such measure apparently caused an increase of omitted answers in the test.

**Summary of Work:** An edition of IPT was analyzed with bootstrapped multiple linear regression models. Considering the percentage of omitted answers of each item as the dependent variable, the models included four independent variables related to item format and position (usage of a clinical scenario, stem word count, item number and number of alternatives) and sixteen dummy variables related to the content domains.

**Summary of Results:** R-square for the most complete model was 0.333. The only independent variable unrelated to content domains that was meaningfully and significantly associated to the percentage of omitted answers in all models was presence of a clinical scenario. The observed increase of omitted answers in scenario-based items gradually decreased until it disappeared in the fourth academic year.

**Discussion and Conclusions:** Scenario-based items were associated with increased omitted answers when penalties for wrong answers are used in progress testing, independently from content, number of alternatives, item length and item position, particularly in early years.

**Take-home messages:** The current progress testing framework might be associated to a delay in the engagement of students into solving scenario-based items.

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**8G6 (22220)**

**Computerized adaptive progress testing in the medical domain: A study of students’ experiences**

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**Background:** Five medical schools in the Netherlands jointly construct an interuniversity progress test. All students perform a 200-item multiple-choice paper-and-pencil test four times per year during the six-year curriculum. Tailoring items to the respondent’s level, computerized adaptive testing (CAT) can yield a more efficient knowledge measurement than the traditional test. This study focused on students’ experiences with CAT for progress testing in the Dutch medical curriculum.

**Summary of Work:** Master’s students in medicine (N = 192) performed a CAT consisting of 100 multiple choice items calibrated from the traditional test. Prior to the CAT, they completed an 18-item questionnaire on their experiences with the traditional test. Eight items were adapted from a recently developed cognitive load instrument, and the other items asked about representativeness of the test for the medical domain, the extent to which performance was in line with expected performance, comprehensibility of the score, and some specific aspects of the test. Immediately after the CAT, which took on average about one hour, they completed the same 18-item questionnaire but this time tailored to the CAT.

**Summary of Results:** On average, CAT imposed a lower cognitive load on students. Moreover, CAT was perceived to be more representative for the medical domain, and to yield a more informative score more in line with their expected performance than the traditional test.

**Discussion and Conclusions:** The findings appear to provide evidence for some benefits of CAT compared to traditional paper and pencil testing, including a more efficient knowledge measurement.
**Take-home messages:** CAT for progress testing may offer more advantages than just efficient measurement.