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**Competency-oriented concepts in a formative progress test with questions constructed by students**

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**Background:** In 2013 and 2014 a formative competency-oriented progress test with questions constructed by students was developed and implemented. The progress test contained MC-items and Situational-Judgement-Test (SJT) items. Clusters of “competency domains” and “subject groups” were combined to a two-dimensional competency-oriented blueprint for the MC-items. The “competency domains” include theoretical clinical, practical clinical, communicative, scientific competencies and professional behavior. To provide meaningful competency-oriented feedback for students and faculties regarding test results on “competency domains”, sufficient reliability and discriminant validity of these domains are required.

**Summary of Work:** After a comprehensive training program students from eight medical faculties constructed MC-items and SJT-items. A competency-oriented feedback concept was developed. To establish the discriminant validity of the “competency domains”, a discriminant analysis of principal components of the data was conducted.

**Summary of Results:** About 800 students from nine medical faculties in Germany and Austria took part in the progress test since 2013. They received feedback about the “competency domains” and “subject groups” and the SJT-items. All “competency domains” showed a high reliability. The analysis of discriminant validity showed that items of the clinical competency domains, communication/professional competence, as well as scientific competence could be verified as three reliable and distinct clusters of items.

**Discussion and Conclusions:** With improved classification of the items, it can be proved, that “competency domains” contain different constructs. Competency-oriented feedback can be given to students.

**Take-home messages:** The competency-oriented concept in a formative progress test shows a good discriminant validity.

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**I’ve seen the future: Using progress test predictions to facilitate early interventions**

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**Background:** The progress test (PT) facilitates frequent assessment reviews and rapid remediation. The system of grading means students may already be struggling before being identified for remediation. Identifying those whose trajectory across tests gives concern that they will struggle later would allow early intervention and targeted support.

**Summary of Work:** Bespoke software has been developed that accumulates scores for all students, calculates the percentile rank and z-score, and then based on the most recent tests highlights students who are not on a trajectory to meet minimum satisfactory performance.

**Summary of Results:** Optimal data for prediction is found using the three most recent tests. Z-scores provided a slightly more sensitive measure than percentile rank and is our preferred method. Students are flagged if their final test score is below -1sd, or their trajectory is negative. This method has helped to identify students who may struggle before they receive low grades.

**Discussion and Conclusions:** Knowing students may not achieve the level of knowledge required at various stages of the course can facilitate support, but also make students aware of any concerns before they receive low grades. While support structures are available to all, these predictions can help target those who may need support the most.

The PT provides useful information that accumulates over time, so basing predictions on its performance is intuitive and useful for staff and students. Predictions may be refined further with the use of Bayesian score adjustments to improve knowledge estimates.

**Take-home messages:** Longitudinal PT data can predict students who may struggle over coming tests and provide targeted support.
Metacognitive cues, confidence, and performance in progress testing: are they related?

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**Background:** In a variety of medical curricula, students perform a multiple-choice paper-and-pencil progress test multiple times each year in their curriculum. There is an unsolved controversy about the utility of a question mark option and penalty for incorrect answers in this test. Although this approach may enhance reliability estimates of scores through an increased metacognitive reflection and reduced guessing, it may also threaten validity through construct-irrelevant variance (e.g., different attitudes towards risk). This study addresses the relationship between confidence, metacognitive cues, performance, and question mark use.

**Summary of Work:** In an 180-item paper-and-pencil progress test, five-point confidence rating items were presented along with the first 10 items (one topic). Students in each cohort (year 1-5) were allocated randomly over four conditions: the metacognitive cue “It is long ago that I studied the content of this question” (n=29), “I had to think hard about this question” (n=32), both cues (n=33) or none of these cues (n=29) were presented along with confidence ratings.

**Summary of Results:** Multilevel analysis revealed that confidence was on average lowest for question mark responses but not on average highest for correct responses across cohorts. Further, confidence was virtually unrelated to cue presentation, and confidence increased while question mark use decreased in subsequent cohorts.

**Discussion and Conclusions:** Although cohort differences in confidence and question mark use are in the expected direction, differences in confidence between correct and incorrect responses and the potential of metacognitive cues need further study.

**Take-home messages:** While low confidence and question mark use appear to go together, the meaning of high confidence ratings deserves further study.
Progress Testing – A Novel Use for Practice Objective Structured Clinical Exams Representing a Clinical Office Encounter (Simulated Office Oral) in Family Medicine

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Background: Simulated Office Orals (SOOs) are used by the College of Family Physicians of Canada as a method to evaluate family medicine resident readiness for clinical practice and are an integral component of the College’s certification exam. The utilization of practice exams to prepare residents is common place.

Summary of Work: During a prospective cohort study conducted at the University of Ottawa, exploring the predictability of practice exam sessions on final certification exam performance, we also explored the prospects of using practice SOO sessions, a structured clinical exam, as a progress test.

Summary of Results: Repeated measures analysis of the data using ANOVA resulted in $F(3, 66) = 27.52, p<0.001, \eta^2 = 0.55$.

Discussion and Conclusions: Our results demonstrate the feasibility of utilizing a Simulated Office Oral exam, a clinical exam, as a progress test. Combined with other measures acquired during in-training evaluation, the utilization of practice SOOs as a progress test will provide program directors with valuable information on resident progression.

Take-home messages: The simulated office oral, an OSCE-like exam can be feasibly used as a progress test in medical education.