Medical student narrative reflection project reveals different CanMEDS competencies important to the practice of various internal medicine subspecialties

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Background: The CanMEDS competencies are an internationally-recognized framework of essential roles needed for optimal health care outcomes. Regardless of specialty, physicians use each of the competencies at various times in their practice.

Summary of Work: An educational activity has been developed and implemented to expand fourth year medical students’ awareness of the CanMEDS roles as they approach the end of their undergraduate medical education and prepare to begin residency in a large medical school in Canada. Students undertaking a three-week clinical rotation in an internal medicine subspecialty are asked to reflect on it through the lens of one of the CanMEDS roles of their choice. They are then asked to recount a case-based experience in a two-page narrative reflection and to share the account orally with a group of their peers and an instructor.

Summary of Results: In some subspecialties, students consistently choose the same one or two CanMEDS roles to reflect upon for this project regardless of the preceptor and hospital to which they are assigned. For example, Advocate is frequently chosen by students doing Infectious Diseases, while Collaborator is frequently chosen by students doing Cardiology.

Discussion and Conclusions: The students’ choice of CanMEDS competency for their narrative reflection could be highlighting a competency which is particularly vital to the practice of a particular internal medicine subspecialty or may be influenced by the “hidden curriculum”.

Take-home messages: Educators should be aware of the CanMEDS competencies most frequently used in individual subspecialties to ensure that the curriculum is balanced to give students exposure to all CanMEDS competencies.
A competency-based continuous assessment programme as part of a revised curriculum for postgraduate radiology training at the University of the Free State, South Africa

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Background: Comparing the postgraduate radiology-training programme of the University of the Free State (UFS), Bloemfontein, South Africa, with recently revised international postgraduate radiology-training programmes revealed several important shortcomings. Consequently, the aim of the research was the development of a competency-based, continuous assessment programme that could be integrated into a revised curriculum for postgraduate radiology training at the UFS, South Africa.

Summary of Work: A literature review allowed conceptualisation and contextualisation of postgraduate radiology education. Semi-structured interviews informed decisions about the proposed continuous assessment programme for radiology training at the UFS. A Delphi questionnaire survey researched the content of the revised curriculum.

Summary of Results: The research culminated in the development of a performance-based continuous assessment programme – consisting of regular formative workplace-based assessments conducted both informally and formally – meant to not only assess, but also contribute, to student learning. The assessment programme is furthermore blueprinted on a revised postgraduate radiology curriculum, which identifies and describes radiology-appropriate learning outcomes and competencies according to different levels of training.

Discussion and Conclusions: Structured assessment (predominantly formative) according to the revised curriculum aims to guide trainees, document their progress and ensure the acquisition of essential competencies.

Take-home messages: The definition of learning outcomes and the use of formative workplace-based assessment methods are essential components of a modern day postgraduate radiology-training programme.
**The best way to assess students in a competency-based Imagenology Course**

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**Background:** MCQ have been used for decades in our institution to assess students. Eight years ago we switched to a competency based curriculum. This change forced us to pinpoint the competencies in every course, among them the Imagenology Course. The competencies of the course focused on interpretation of images obtained by Rx, RMI, TAC, Ultrasound and other media used in medicine.

**Summary of Work:** Taking into account that the course competency focused on image interpretation, we concluded that the assessment could not remain with MCQ lacking images. We designed a completely new evaluation system, which consists in clinical cases with one or more images to be interpreted in a limited period of time. Each question, with their images, is projected to the entire group of examinees twice, in the first round they have 45 seconds to answer the question and in the second one they have 15 seconds.

**Summary of Results:** The new curriculum forced us to change not only the assessment method but also the teaching methodology, being both of them focused in image interpretation. This changes increased the interest of students in the course and with the new assessment we are really assessing the course competency.

**Discussion and Conclusions:** The success of a competency-based course depends in the congruence that exists between the competences raised in the program, the methodology used in class and the assessment tool.

**Take-home messages:** The course competency determines the assessment design.

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**What competencies do medical specialists need and what can medical schools learn about it?**

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**Background:** Graduate surveys provide valuable insights for curriculum planners, researchers and administrators. Information about discrepancies between occupational demands, and competencies acquired during medical training are relevant in order to improve curricula and prepare students for professional life.

**Summary of Work:** Graduates in different medical specialties were surveyed 1,5 years after graduation: general practice (n = 36), anaesthesiology (n = 100), surgery (n = 81), gynaecology (n = 55), internal medicine (n = 179), und pediatrics (n = 73). Data from the “Freiburg Questionnaire to Assess Competencies in Medicine” (FKM, Giesler et al., 2011), based on the CanMEDS Framework, were analyzed. T-test and ANOVAS were conducted and standardized response means (SRM) were calculated.

**Summary of Results:** 1,5 years after graduation required professional competencies seem to differ: e.g. pediatricians need a greater amount of communicative competencies than surgeons (SRM=-1.20 vs. SRM=-.55) and general practitioners need more competencies to promote health and prevention (SRM=-.36) than gynecologists (SRM=-.13). In almost all specialties there was a need for more team competencies (SRM=-.86 to SRM=-1.62).

**Discussion and Conclusions:** We found different professional needs in the various medical specialties. In almost all medical specialties team competencies are needed to a great extent. In order to prepare all students for professional life in a better way, medical schools must know whether their curriculum lives up to this goal.
Background: Tuning Project is an initiative of the European Commission providing a set of competences for medical degrees in Europe. The aim of this study was to assess how do Portuguese medical graduates perceive their acquisition of competences according to this framework.

Summary of Work: Translation of the Tuning’s competences (Clinical Practice - CP), plus Knowledge domains and Clinical Settings was performed. A questionnaire was created and items were scored in a 6 point Likert-scale. 429 medical graduates participated. Cronbach’s alpha (α) and exploratory factor analysis (EFA) were conducted. Multiple comparisons were analyzed (Kruskall Wallis and Dunn tests).

Summary of Results: Significant differences among CP factors (α=0.971) were found: Ethical principles (4.0) obtained the highest CP score while Legal aspects (1.3) yielded the lowest. Consultation with a patient, Psychological and Social aspects of illness, Evidence-based Medicine/Information technologies/Scientific principles and Promotion of health were scored above the median CP score; Medical emergencies, Drug prescription, Practical procedures and Legal principles were below median score. Knowledge areas and Clinical Settings also showed significant differences among factors. Significant differences among schools were found (p<0.05).

Discussion and Conclusions: Tuning generated a questionnaire for the self-assessment of Portuguese medical graduates. Self-perceived deficits were detected in some core competences. This may indicate lower self-confidence and/or lower effective competence in medical practice, knowledge areas and patient contact. Preparedness to practice might not be assured regarding those specific competences, which should encourage medical schools’ analysis of curricula.

Take-home messages: Valid and reliable medical graduate’s self-assessment may assist quality assurance processes and prove valuable for medical schools to assess the effectiveness of their curricula delivering core competences.
Developing a Structured Oral Examination to assess clinical reasoning in pre-clinical medical students

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Background: We designed summative assessment to determine 2nd-grade students' readiness for clinical practice. The key outcome of preclinical phase was clinical reasoning, that was competency to apply their organized knowledge based on pathophysiology to real case. To evaluate this outcome we have developed Structured Oral Examination (SOE).

Summary of Work: The exam consisted of 6 stations with cases containing history and physical findings. In each station, students read the case for 1 minute, and wrote organized knowledge as schema to solve the patient's problem for 2 minutes, then they presented interpretation and application of the case to the schema for 8 minutes. Assessor interacted with students, asking two key question during students' presentation. The areas of evaluation were clinical reasoning(case application), organized knowledge, and communication. Assessor trained before the exam.

Summary of Results: The reliability(cronbach α) across 6 cases was 0.708 in day 1, 0.696 in day 2. Case reliability(cronbach α across items with one case) was 0.796–0.892. The mean score was 53.4±1.8(36.6–66.6) in day 1, 53.0±1.8(43.5–63.8) in day 2. The correlation with GPA was moderate(R=0.583, p<0.001). Both assessors and students answered that the exam was adequate to assess preclinical students' competency.

Discussion and Conclusions: The SOE was reliable and valid to assess clinical reasoning in pre-clinical medical students. SOE is potentially a valuable method to determine preclinical students' readiness for clinical practice.

Take-home messages: The SOE is a new method to assess clinical reasoning.

A simple and integral pathway to teach medical students the basis of Clinical Reasoning

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Background: Clinical reasoning is complex and remains as one of our biggest challenges as medical educators. Most physicians have achieved good clinical reasoning but they usually do not know how. Our students are not aware of how relevant it is to develop clinical reasoning skills from the beginning of the career. Since there are no internationally established and accepted criteria, we as professors do our best to teach clinical reasoning through different manners with unpredictable outcomes.

Summary of Work: Objective: To propose a simple but integral pathway for teaching medical students the general basis of clinical reasoning. I settled a mentoring workshop with 25 medical students (2nd to 7th-year). We reviewed the general basis of health–illness process, natural history of disease and scientific approach applied to clinical method to develop basic mental abilities and automatic processes in clinical reasoning, supported by constructivist tools.

Summary of Results: Some students' absenteeism, rejection to think critically and do homework were the biggest challenges we faced. Students who attended responsibly with the workshop developed thinking and clinical skills to analyze information, diagnose illnesses and propose treatment strategies.

Discussion and Conclusions: Most of students improved their clinical performance, demonstrable when structuring good clinical notes. My proposal considers critical thinking and integral approach on the basis and pathophysiology as the bridge that connects basic to clinical sciences-therapeutics.

Take-home messages: Self-learning and autonomy in clinical reasoning can be learnable through a simple but integral pathway.
“Seeing the forest for the trees” – examining the metaphors that physicians use when talking about clinical thinking

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Background: Physicians commonly use metaphor to translate their thinking processes for students and residents. From a constructivist perspective, metaphors both capture thinking processes and actively construct those processes.

Summary of Work: In this qualitative study, we completed two in-depth interviews each with four physician educators, inviting participants to describe critical thinking in clinical contexts. An interpretive approach was used to analyze transcripts. Coding identified the range of metaphors used as well as common themes.

Summary of Results: Clinical thinking metaphors were often constructed around dichotomies related to space and size (eg. “big picture” vs. little details, forest vs. trees) or speed (quick vs. slow). Metaphors were also used to describe the processes of thought themselves (eg. mind as machine). However, metaphors were also a site of struggle: as clinicians described how a metaphor related to practice, discrete dichotomies often disintegrated. Participants also expressed frustration with learners who are challenged by the complexities and ambiguities of practice.

Discussion and Conclusions: Metaphor can help learners develop clinical thinking, but can also be harmful as they fail to capture the complexity of practice. The unraveling of dichotomies might be viewed as a failure of metaphor, it can also be viewed as a significant component of communication through metaphor. The unraveling of metaphor becomes an important part of communicating the ambiguity of clinical thinking.

Take-home messages: • Metaphor is an important component of communicating abstract and complex processes such as clinical thinking. • Educators should be aware that no single metaphor can capture the necessary complexity and ambiguity of clinical thought.

Family Medicine: are senior residents different from junior residents in clinical reasoning assessed by the Script Concordance Test?

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Background: Research has shown that residents’ reasoning is different from experts’ and that this difference is due to the fact that experts usually use scripts in clinical reasoning. The Script Concordance Test (SCT) assesses this type of reasoning, and has been validated in various medical fields but not in Family Medicine (FM). The objective of this study was to evaluate differences in clinical reasoning in FM residents with SCT.

Summary of Work: A SCT was designed and included 23 clinical cases with 5 items each. Ten experts in FM validated the scoring table. The study compared SCT scores of senior residents (7 PGY-4) to those of junior residents (20 PGY-1, 17 PGY-2, 13 PGY-3). Eleven similar four-year residency programmes participated.

Summary of Results: Alpha coefficient was 0.614. A significant difference between junior residents (PGY 1, 2, 3) and senior residents (PGY 4) was found (p=0.03).

Discussion and Conclusions: In FM, clinical reasoning of senior residents shows a more prominent use of scripts than junior residents'.
A competition-based method to quantify the efficiency of clinical reasoning in psychiatry

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Background: Diagnosis in psychiatry relies on descriptive classification of symptoms, laid down in the DSM-criteria. Their sheer number, and substantial overlap between disorders, easily overwhelms the novice in the field. Hardly anything is known about the relative importance of both pattern recognition and explicit clinical reasoning in the diagnostic process. It is therefore unclear to what extent training in clinical reasoning could benefit medical students.

Summary of Work: We developed a competition-based way to quantify clinical reasoning. Medical students, residents and staff members in psychiatry, working in small competitive groups, are presented with a clinical case containing little information. They can then “buy” additional information for virtual coins. Both relevant and irrelevant items from history, observation and additional investigations can be selected from a comprehensive set. The participants are instructed to find the most likely diagnosis while spending as few coins as possible. We then compare the number of diagnostic steps between groups, the presence of obligatory and excluding DSM-criteria, and the ratio between relevant and irrelevant questions.

Summary of Results: Paper-based pilots used with medical students, psychiatrists and residents received very positive evaluations. The need to prioritize history questions appears to trigger deep clinical reasoning in psychiatry. A new web-based instrument allows evaluating the efficiency of clinical reasoning and the effect of targeted training (in clinical reasoning) within groups.

Discussion and Conclusions: This approach and the web-based tool measuring diagnostic reasoning have great potential to provide insight into the process of clinical reasoning, and to better train diagnostic skills in psychiatry.

The best leads-in to assess clinical reasoning in an anatomy course

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Background: We have a curriculum which considers diagnosis as the cornerstone of Clinical Reasoning; to reach this, it is essential to identify the pathogeny and physiopathology in a clinical case. To clarify the processes that students should pay more attention in an Anatomy Course, we selected the best questions that must be considered when structuring a written test.

Summary of Work: Some of the leads-in we consider basic to assess Clinical Reasoning in an Anatomy Course are:

- The most likely is that this patient is unable to perform…
- The sign that confirms the diagnosis of this patient is…
- The maneuver which confirms the diagnosis of this patient is…
- The most likely is that this patient wound is at the level of…
- The nerve injury in this patient is at the level of…
- The muscle injured in this patient is…
- The organ injured in this patient is…
- The bone injured in this patient is…
- The altered joint in this patient is…

Summary of Results: By using these leads in in our tests it has been possible to evaluate the examinee’s ability to integrate information from the clinical history, lab exams, treatment, etc, and therefore their ability to solve an Anatomy clinical problem applying their knowledge. Its acceptance has been so much that it is used as a model for other courses.

Discussion and Conclusions: The use of specific leads-in for each Medical Course assures the assessment of Clinical Reasoning.

Take-home messages: Assessment must be always oriented to evaluate higher cognitive skills implied in Clinical Reasoning according to each course.
The use of standardised client simulation to improve clinical reasoning in veterinary undergraduates

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Background: Standardised patients are widely used in undergraduate medical education for a multitude of purposes, including clinical reasoning skill development. In veterinary education, standardised clients (SCs) are used extensively in communication skill training, but are not commonly used to achieve other learning outcomes.

Summary of Work: A simulated client program focussing on clinical reasoning skill development has been designed and implemented into The University of Nottingham School of Veterinary Medicine and Science (UNSWMS) curriculum. During a clinical placement in a first opinion small animal practice, all final year students undertake three consecutive consultations with an SC. They are required to diagnose and treat the accompanying canine patient, and are debriefed on their decision making strategies afterwards. Each consultation is filmed for later analysis. The session is designed to mirror typical consultations faced by new graduates in a fully immersive setting.

Summary of Results: The effect of SC simulation on clinical reasoning development is being evaluated in four ways:
1) Comparison of skill levels demonstrated in each consultation (using the Lasater Clinical Judgement Rubric (LCJR))
2) Student self-assessment of clinical reasoning (using the LCJR pre- and post-simulation)
3) Quantitative student survey feedback
4) Qualitative student focus group discussions

Discussion and Conclusions: The study is ongoing but preliminary self-assessment, survey and focus group data suggest students’ clinical reasoning skills improve as a result of the sessions. Skill level comparison has not begun at present.

Take-home messages: Standardised client simulation can be utilised to improve clinical reasoning skill level and confidence in veterinary undergraduates.
System 1 and system 2 clinical reasoning performance in a structured clinical oral Internal Medicine Clerkship examination

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Background: An Internal Medicine clerkship structured clinical oral examination (SCO) consisted of eight stations. In three stations, students interacted with examiners in structured case discussions which tested clinical reasoning (CR) skills in diagnosis/management. Several structured questions in each station could be categorized as System 1 (intuitive pattern recognition) or System 2 (analytical) tasks. One of 4 global assessments in each station assessed integration and problem solving.

Summary of Work: Student performance (n=85) in the CR components of the SCO and other assessment modalities during 2 separate 8-week Internal Medicine clerkship rotations were computed. Correlations (Spearman’s rho) between students’ performance in these CR components and traditional clerkship assessment domains were determined.

Summary of Results: The overall %mean +/- standard deviation mark on the rotation was 78.9% +/- 4.0. Mean marks for the 4 measures of CR were: the three CR stations 78.6% +/- 5.7; for System 1 tasks 85.8% +/- 9.9; for System 2 tasks 84.5% +/- 10.2, and for the CR global 75.4% +/- 12.2. Overall CR station marks correlated best with the students’ final marks (r=.545) and written examination marks (r=.491). The CR global assessments had the strongest correlation of all CR measures with ward assessments (r=.263). System 1 performance paralleled overall CR station performance. System 2 performance correlated poorly with most other assessments.

Discussion and Conclusions: Clerkship ability in CR in Internal Medicine correlates best with written examination performance. Student marks between System 1 and System 2 CR tasks did not correlate significantly.

Take-home messages: Assessment of different types of CR skills may be important in clinical clerkships.