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Short Communication

Analysis of pre-clinical student narratives - progress in assessment of ACGME competencies

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ABSTRACT

Pre-clinical exposure to patients provides opportunities for medical students to display competencies which may be expressed in reflective narratives. Geriatric education experts used qualitative consensus methods to identify themes expressed in second year medical student narratives which were mapped to ACGME Core Competencies. Concept searches operationalizing these same competencies were created from USMLS medical subject headings and applied to the electronic medical student portfolios. Concept mapping compared poorly by face validity to qualitative consensus methodology in identifying competencies and issues of context displayed by student narratives. Assessment of electronic portfolios for ACGME Core Competencies may have to await more robust vocabulary to create concept identifiers capable of responding to issues of context for competencies such as ACGME Core Competencies reflecting sociologic and anthropologic content

Keywords: Preclinical narratives,
competencies, electronic searches

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INTRODUCTION

Early clinical exposure of medical students in a variety of settings is encouraged by the Licensing Council for Medical Education (LCME) to emphasize the relevance of educational pursuits to patient care and to foster the development of professionalism among students [1,2]. To monitor medical students' progress, many medical schools have adopted the Accreditation Council for Graduate Medical Education (ACGME) defined medical trainee core competencies including: 1) Medical Knowledge, 2) Patient Care, 3) Communication and Interpersonal Skills, 4) Professionalism, 5) Systems Based Practice, and 6) Practice Based Learning and Improvement, Available at: http://www.acgme.org/acWebsite/RRC_140/140_prI nd ex.asp [accessed March 15, 2012].

We have previously found that electronic searches (using computational linguistics) accurately detect disease concepts in curriculum documents and students' history and physical exam documents [3], and extend this work to detect ACGME core competency concepts in pre-clinical narratives.

Meharry Medical College (MMC) initiated a two-year course to acquaint pre-clinical students to professionalism and communication skills in Fall 2007 including site visits to child and senior community and day care centers. The electronic portfolios containing these narratives provide an opportunity to assess these clinical experiences for ACGME Core Competencies.

METHODS

Second year medical students visited community and day care centers to interview individuals about their experiences in these environments. At the conclusion of these site visits, students completed narratives about their encounters that were uploaded to a web portfolio. Course instructors reviewed the narratives for concepts that reflected coverage of ACGME competencies. This project was granted exemption as an educational evaluation by both the MMC and Vanderbilt Institutional Review Boards.

Qualitative Analysis and Development of Searches

Three expert geriatric educators (AS, JD, JP) independently reviewed the narratives and graded each core competency topic as present or absent. These ratings served as the reference to which subsequent computer searches were compared calculating sensitivity, specificity, and negative and positive predictive values.

We employed the KnowledgeMap/Learning Portfolio system (KM/LP) to electronically search the narratives for concepts of the ACGME Core Competencies. KM/LP is a web-based electronic search engine [3] that uses computational linguistics (prototypic biomedical concept identifier including both Unified Medical Language System (UMLS)-derived and locally-

developed resources) for word and term normalization, language processing, and concept identification[4], KM/LP successfully identifies disease concepts of interest in medical school document [5] and medical student personal electronic portfolios [6], but it has not been deployed to find concepts related to ACGME Core Competencies. For each ACGME Core Competency we derived a list of search terms (concept unique identifiers-CUI's) that mapped to the vocabulary of the Unified Medical Language System. To derive the list of search terms, we loaded the definitions of the ACGME Core Competencies obtained from the ACGME web site into KM/LP. Next, experts (AS, JD, JP) reviewed this list of search terms and added more terms via an iterative process arriving at 30-70 search terms for each ACGME competency. For example, search terms of the ACGME competency *Systems Based Practice* included such concepts as: ambulatory care services, health care system problem patient care planning (see Table 1) and for the competency *Practice Based Learning and Improvement* such concepts as: treatment goals, evidence-based practice, and self-assessment. We used KM/LP to search all students' narratives for the concepts of each ACGME Core Competency and compared these results with those of the expert panel's reference ratings of the narratives for each Core Competency.

Table 1. A Sample of the UMLS Concepts used for the ACGME Competency "Systems Based Practice".

Activities of Daily Living
Advocating (action)
Agencies - Case Management
Ambulatory care services
Arrange for appropriate home care services, as needed
Assist patient and/or family in making informed decisions regarding health care
Cares, Self (Rehabilitation)
Case Management Services
Collaborate with the physician, patient/family/significant others, and other health team members in planning for continuity of health care
Discharge planning
Financial cost
Health care system problem
Health Care Team
Identify the patient's care priorities
Medication List
Nursing, Community Health
Patient care planning
Patient discharge, to home
patient safety
person living alone;
person living alone
personal care
Physical therapy
problem; living alone
Skilled Nursing Facilities
Stay Length
Teach, encourage use of assistive devices.
Team
Telephone call by a physician to a patient or for consultation

Table 2. KM Competency Searches for MMC Students (n=100 documents, 2009) for Second Year Course Narratives.

ACGME Competency	# Docs Identified by Experts	#Docs Identified by KM/LP	Sens	Spec	PPV	NPV
SBP	27	0	0			
Patient Care	12	58	56	45	35	75
Professionalism	73	79	42	41	78	13
PBLI	29	45	77	0	94	0
Medical Knowledge	13	38	40	64	44	58
Communication	15	34	48	76	59	68

KM/LP: Knowledge Map Learning Portfolio, PPV: Positive Predictive Value, NPV: Negative Predictive Value

RESULTS

KM/LP searches scored many notes for containing concepts of ACCME Core Competencies. However, agreement with the expert panel ratings of ACGME content in the students' notes was poor. KM/LP sensitivity for finding a note rated by experts as having ACGME Competency content ranged from 40-77%, depending on the topic (Table 2). KM/LP labeled many narratives falsely positive for ACGME competencies, leading to low positive predictive performance for most topics (Table 2). A review of individual documents showed poor face validity, with search concepts unable to identify issues of context as written by the student and observed by the expert panel.

Take the example from a student reflecting on the challenges of encountering geriatric patients for the first time: *Perhaps the biggest challenge is lack of exposure to these populations. But by having us meet these patients and work with them, we may become more comfortable and competent in caring for them.* In the analysis, the experts rated this narrative strongly for practice based improvement and learning, given the student's reflection on personal growth. However, KM/LP did not rate this note for PBLI, rather the system mis-read the phrase *comfortable* and scored this note for communication.

DISCUSSION

Reflection provides critical analysis of personal experience that can enhance learning and improve future behavior and outcomes. Written reflection exercises have the potential to display valuable insights into the students' thinking and learning profiles [7-9], and possibly the development of selected competencies. Analysis of students' narratives by content experts revealed content that was relevant to the ACGME competencies. While KM/LP has

accurately found meaningful disease concepts in curriculum documents and students' history and physical exam documents, it did not perform well in this study in finding ACGME Core Competency concepts in student narratives. Certainly, early trainee's reflections of home visits to patients may not contain many rich concepts of the ACGME competencies so this puts a strain on the electronic tool to find relevant material. Additionally, we find that the UMLS lacks rich vocabulary that clearly describes ACGME competencies. Embellishment of better search terms will be important in operationalizing competencies as institutions seek authentic and efficient means, such as automated searches of electronic portfolios, to monitor trainees' progress in attaining ACGME competencies.

Declaration: The authors declare that they have no conflict of interest.

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