Developing an Assessment Instrument to Improve the Validity and Reliability in Assessing Clinical Competencies

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Abstract

Current chiropractic education, like most health professions education including complementary medicine, has shifted from a time based curriculum to a competency-based curriculum. In the past, curricular assessment methods consisted mainly of written and practical examinations of a student's comprehension of the material taught. Although these methods are still useful and applicable in assessing knowledge and skills, they are neither effective nor accurate when assessing student clinical competency in an academic clinical setting.

Clinical competence involves the critical thought process in which, knowledge and skills are applied to perform sound problem solving and decision making, perform critical analysis of the clinical data, call on creativity to recognize the complexity of human conditions, and the confidence to communicate decisions and recommendations to patients. Clinical competence is a dynamic process that continually changes over time with additional knowledge, skills, experience, and clinical settings.

Due to the multiplicity of clinical competence, especially with students in an academic clinical setting, it requires a valid, reliable, and consistent assessment instrument to limit the variables and challenges presented. These variables and challenges have been described in the literature consist of multiple clinical faculty members assessing the same student on the same requirements at different intervals in the program, clinical faculty members and students level of understanding of the assessment requirements, clinical faculty members provide an assessment on requirements that were not directly observed and grade inflation.

The goal of this study is to develop an assessment instrument that is not only valid and reliable for the assessment of chiropractic student interns in the academic clinical setting using the Council on Chiropractic Education's (CCE) Meta-Competencies, but will also serve as a template for assessment instruments in other healthcare clinical settings.

The CCE Meta-Competency 1 was chosen as the criteria used in developing the assessment instrument because competence in performing an appropriate history and physical examination are important procedures in the successful management of patients whether medical, chiropractic, clinical nutrition, or other complimentary medicine practices.

Key Indexing Terms: Clinical Competence; Competence Based Education; Dreyfus; Assessing Competence; Rubric; Likert; Chiropractic; Clinical Educational Standards

Introduction

The improvement of global health is currently a focus that can only be realized through the development of a workforce that has been educated to promote health and to care for those with disease. (20) As a result, time based education focusing on knowledge is being replaced with evidence based practice (EBP) which involves making clinical decisions informed by the most relevant and valid evidence available. (23) EBP has further been described as the integration of clinical expertise and patient values with the best available research evidence. Evidence based practice combined with competency based education has been developed as a means for optimizing the preparation of healthcare professionals. (7) (20) (21) (23) Like other healthcare professional educational programs including integrating complementary medicine practices in medical education (8), the Council on Chiropractic Education developed 7 Meta-Competencies that are assessable learning outcomes to be measured at the student and program levels. (22)

The CCE Meta-Competencies require the Doctor of Chiropractic programs to utilize a system of student assessment and evaluation that is based on goals, objectives, competencies and learning outcomes. (22) Competency based curriculum differs from past traditional curriculum in that the focus of traditional time based curricula is on content of knowledge, skills, attitudes and rotations. The goals of traditional time bases curricula is focused on knowledge acquisition from the instructor to the student and assessment consisted of a form that was referenced and summative. The program was based on a fixed time. (7) Traditional assessment methods have been perceived as distorting the learning process and favoring knowledge limited to recall, identification, or recognition. (13)

In contrast the Consortium of Academic Health Centers for Integrated Medicine (CAHCIM) developed competencies that delineate the values, knowledge, attitudes, and skills that are fundamental to the field of integrated medicine. (8) Integrated medicine can be defined as an approach to the practice of medicine that makes use of the best-available evidence, taking into account the whole person (body, mind, and spirit), including all aspects of lifestyle. (8) Integrated medicine approaches consisted of chiropractic, homeopathy, naturopath, Ayurveda and acupuncture. (8) However, there are questionnaires that address the perceptions whether positive or negative of medical students toward complementary therapies (8) however, there is very little if any documentation in the literature regarding an assessment instrument to assess a student's competence in applying their knowledge of integrated medicine approaches with medical approaches to better provide a more comprehensive approach to patient management and ultimately better outcomes. (8)

A competency based curricula focuses on outcomes in which students demonstrate competence and relevant pass learning opportunities. The goals focus on knowledge application incorporating not only the instructor and student but also relevant role models. (7) The assessment of a competency based curricula consists of an evaluation portfolio with the assessments containing referenced criteria that is formative. The

competency based curricula program is based on variable time as opposed to fixed time of traditional programs (7)

It has been the experience and understanding of this author that accurate and consistent assessments of student intern's competence as they progress through the chiropractic academic clinical setting has been a challenge for all chiropractic institutions as well as most healthcare related academic institutions. (6) (12) (17) The main challenge is developing a valid and reliable assessment instrument that is inter and intra examiner consistent that is detailed enough that each clinical faculty member will understand, interpret, and apply consistently to each student resulting in an assessment that accurately demonstrates the student intern's competence progression. (12) (13) (17)

It is important to not only develop a reliable and valid assessment instrument but also implement an assessment process that contain the five generally accepted attributes. (19) These five accepted attributes are; reliability of the measure of the variation in scores due to differences in performance between subjects, validity as to the degree to which an assessment is a measure of what should be assessed, acceptability which is the degree to which the assessment process is accepted by all stakeholders, feasibility which is the degree to which the assessment can be delivered to all those who require it within real costs of staff and time constraints, and educational impact which is the degree to which the assessment can assist the doctor to improve his or her performance. (19) (Panzarella, 2007)

An assessment must take into account what is assessed, how it is assessed, and the assessments usefulness in fostering future learning. (17) The assessment of a student's clinical competence should occur at specific points throughout the clinical education process. (1) (12) (21) Because multiple assessments are performed on each student throughout their clinical education, multiple clinical faculty members may assess the same student. (1) In many cases clinician assessments are scored inconsistently resulting in confusion as to the level of competence of that student. (1)

The solution to accurately determining the level of clinical competence of a student is to develop an assessment instrument using standard acceptable models that would be considered both valid and reliable and would allow an accurate and consistent assessment from multiple clinical faculty for the same student using the same competence requirements. (1) (5) This instrument must be comprehensive enough to cover all criteria associated with the assessment requirements as well as very detailed regarding the requirements being assessed. (2) (8) Each level of student competence must be specifically determined and defined as well as when a student intern reaches that level and also when the minimum expected level that is needed to graduate the program is reached. (2) The more detailed the instrument and scoring the increased consistency in interpretation among clinical faculty and student interns. This type of instrument will also clearly define the clinical competence expectations and requirements for students resulting in less frustration and improved learning and clinical skills. (1) (3)

Based on the literature and clinical experience an instrument has been developed to assess the Council on Chiropractic Education's (CCE) Meta-Competencies specifically Meta-Competency 1.This competency will assess a student interns competence in performing an appropriate history and physical examination and applying this information in developing a diagnosis and patient management. The history and physical examination is the foundation for appropriate chiropractic and complementary including nutritional patient management (25) (26).

Methods

For the purpose of this study, an electronic review of the scientific literature 1995 to the present using Pubmed, Medline, and Google Scholar was performed searching Key Indexing Terms: Clinical Competence; Competence Based Education; Assessing Competence; Assessment Instruments; Chiropractic; Standards. The inclusion criteria consisted of the literature reviewed was published since 1995, the literature reviewed was relevant to the key indexing terms and the development of an appropriate assessment instrument for assessing clinical competence in the chiropractic academic clinical setting. The exclusion criteria consisted of literature published prior to 1995 and not relevant to the key indexing terms or the clinical competence assessment instrument A review of the 2012 CCE standards was also be reviewed as was the Department of Health and Human Services Centers for Medicare & Medicaid Services 1997 Evaluation and Management Services Guide.

From the review of the literature which included examples of professional educational institutions development of assessment instrument for clinical competence (1) (3) (8) an assessment instrument was developed for the CCE Meta-Competency 1 (appendix 1).

The CCE Meta-Competency 1 Assessment Instrument was developed using the components and outcomes contained in the Council on Chiropractic Education (CCE) Meta-Competency and applying the rubric model (1) (3), Likert scale (3), and Dreyfus model (4). The criteria that determined the level of competence of each component and outcome was based on the 1997 CMS Evaluation and Management guidelines. (26)

The four types of histories used to determine the level of competence are; (26)

> The problem focused history corresponds to level 1 or the novice. This student intern just entered the clinical setting and possesses minimal knowledge and history taking skills. Their history capabilities consist of obtaining a chief complaint, minimal history of present illness questioning one to three elements, no review of systems, no family history, no social history, and no past medical history. This student requires direct supervision throughout the process. (26) (27) (28)
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> The expanded problem focused history corresponds to level 2 or the advanced beginner. This intern recognizes the need for expanded information regarding a patient's history that is limited to the chief

complaint, brief history of present illness questioning one to three elements, limited review of those systems directly related to the area of chief complaint, no family history, no social history, and no past medical history. This student requires limited supervision throughout the process. (26) (27) (28)

The detailed history corresponds to level 3 or the competent student intern who recognizes on their own the need for a detailed patient history that includes the chief complaint, extended questioning on the history of present illness to include 4 or more elements, extended review of systems that not only includes systems directly related to the area of chief complaint but also an additional 2 to 9 systems not directly related, pertinent family history, social history, and past medical history. This student intern has the ability to intuitively gather information without supervision or input from the supervising clinical faculty member. (26) (27) (28)

The comprehensive history corresponds to level 4 or the proficient student intern who clearly exceeds the requirements and expectations in history taking. This history consists of comprehensive questioning on the history of present illness to include all elements of the history of present illness, complete review of all body systems that not only includes systems directly related to the area of chief complaint but also all remaining systems not directly related, pertinent family history, social history, and past medical history. (26) (27) (28)

According to the 1997 E/M guidelines the history of present illness is a chronological description of the development of the patient's present illness from the first sign and/or symptom or from the previous encounter to the present. It includes the following elements: location, quality, severity, duration, timing, context, modifying factors, and associated signs and symptoms. (26) (27) (28)

The criteria used to determine the level of competence in regards to external health records was based on the student intern recognizing the importance of external health records.

The novice did not question nor document that the patient was questioned and no rationale was provided why the patient was not questioned.

The advanced beginner documented in the record the rationale why they did not question the patient regarding external health records.

The competent student intern documented that the patient was questioned regarding external health records and whether or not they were available.

The proficient student intern document the relevance of external health records in their decision making process regarding diagnosis and management of the patient.

The criteria used to determine the level of competence in regards to case appropriate physical examination was based on the 1997 CMS Evaluation and Management guidelines. (26) Also the hierarchy of examinations will determine the competence level from a basic examination of palpatory findings to a comprehensive examination consisting of a full physical examination with orthopedic, neurological, and dermatomal. (26) (27) (28)

The problem focused examination corresponds to level 1 or the novice student intern. This examination is problem focused resulting a limited examination of the affected body area or organ systems consisting of vital signs and palpatory findings in the area of chief complaint. (26) (27) (28)

The expanded problem focused examination corresponds to level 2 or the advanced student intern. This examination is still problem based resulting in a limited examination of the affected body area or organ system and other symptomatic or related organ system(s) consisting of vital signs and palpatory findings in the area of chief complaint with orthopedic tests and range of motion as well as other associated areas. (26) (27) (28)

The detailed examination corresponds to level 3 or the competent student intern. This examination is detailed and an extended examination of the affected body area(s) and other symptomatic or related organ system(s) including vital signs and palpatory findings in the area of chief complaint with orthopedic tests and range of motion with muscle, neurological, dermatomal tests and physical examination of the area corresponding to the area of chief complaint and other associated areas. The student intern will perform these examinations with confidence and in an organized skillful manner without any guidance from the supervising faculty clinician. (26) (27) (28)

The comprehensive examination corresponds to level 4 or the proficient student. This examination is comprehensive including a general multi-system examination or complete examination of a single organ system along with vital signs and palpatory findings in the area of chief complaint with orthopedic tests and range of motion with muscle, neurological, dermatomal tests and comprehensive physical examination of all body systems. The student intern will perform these examinations with confidence and in an organized skillful manner without any guidance form the supervising faculty clinician. (26) (27) (28)

The criteria used to determine the level of competence in regards to diagnostic testing was based on the hierarchy of testing.

The student intern novice will consider advanced testing but does not order any testing.

The advanced beginner will order minimal radiologic studies of the area of chief complaint.

The competent intern will order base line clinical testing such as blood studies and urinalysis.

The proficient intern will order advanced radiologic studies such as MRI, CT, ECG and spirometry to rule out serious and comorbid factors.

The criteria used to determine formulating and documenting appropriate diagnosis was based on the 1997 CMS Evaluation and Management guideline hierarchy of diagnostic codes. (26) (27)

The student novice will only diagnose soft tissue findings resulting in 1 to 2 diagnosis relating to 1 to 2 body systems. (26) (27)

The student advanced beginner will diagnose soft tissue findings along with functional findings still limiting the diagnosis to less than 4 diagnosis but greater than 2 relating to 3 to 4 body systems. (26) (27)

The competent student intern will diagnose soft tissue, functional, structural, and neurological findings providing multiple diagnosis greater than 4 related to up to 5 body systems. (26) (27)

The proficient student intern will diagnose soft tissue, functional, structural, and neurological findings along with comorbid and aggravating factors providing greater than 6 diagnosis related to greater than 5 body systems. (26) (27)

The criteria used to determine the generation of problem list with diagnosis corresponds to the student intern's ability to formulate a diagnosis and the complexity of the diagnosis.

The student novice will only diagnose soft tissue findings and therefore, will develop a very limited problem list to 1 to 2 problems. (26) (27)

The student advanced beginner will diagnose soft tissue findings along with functional findings further expanding the problem list but is still limited to 2 to 3 problems. (26) (27)

The competent student intern will diagnose soft tissue, functional, structural, and neurological findings listing 4 to 5 problems. (26) (27)

The proficient student intern will diagnose soft tissue, functional, structural, and neurological findings along with comorbid and aggravating factors listing greater than 5 problems. (26) (27)

A score is given to the assessment for each component documenting the level of clinical knowledge, skills, attitudes and critical thinking ability. This score will be used to track the progression of the student intern and whether remediation will be necessary if the student intern does not progress as expected.

For the purpose of the Meta-Competency 1 assessment instrument, the Dreyfus Model of Learning has been used to describe a student intern's level of skills acquisition. These descriptions are as follows:

Level	Description
1 Novice	Describes the novice student that just entered the clinical setting and possess a minimal level of knowledge of the requirement but cannot put this information together to formulate an appropriate plan of action. This student documents minimal information and performs a limited history, examinations, and diagnosis and needs direct supervision throughout this process. If this student is still at this level after the next assessment, remediation should be considered.
2 Advanced Beginner	Describes the advanced beginner student who recognizes the need for expanded information regarding the history, physical examination and diagnosis with limited direct supervision or input from the clinical faculty. The student will gather at least 50% of the needed information including advanced studies on their own. If the student remains at this level after the next assessment, remediation should be considered.
3 Competent	Describes the competent student who recognizes on their own the need for a detailed patient history, detailed physical examination, order additional diagnostic testing if needed, synthesize all of this information to formulate final diagnoses and comprehensive patient treatment plan based upon this information without supervision or input from the clinical faculty. This detailed history and physical can result from the intern intuitively gathering this information based on what they felt was insufficient information previously and without clinical faculty supervision. The clinical faculty member offers very little if any additional input to formulate all appropriate diagnosis. This student has met all the qualities and requirements needed to at least meet this Meta-Competency if not exceed its expectations. This student will require no remediation.
4 Proficient	Describes the proficient student that clearly exceeds the requirements and expectations detailed in the highest level of the Meta-Competency. This student takes a comprehensive approach to the patient workup including history and physical examination and either orders diagnostic testing or strongly considers the rational as to why or why not. From all information gathered, the student formulates all appropriate diagnosis and develops a comprehensive treatment plan. This student will take into consideration the smallest of details and continue to question the patient during subsequent office visits to gain as

	much information as possible and alter the treatment plan as needed.

Discussion

Clinical internships in the health care curriculum is a phase in the educational process where one of the main goals is to provide students with multiple opportunities to integrate theoretical knowledge with practical skills while receiving ongoing guidance and feedback. (22) The clinical internship is were academic knowledge, clinical skills, and patient communication come together for experience and patient management training. (13) Internships increase clinical competence and enables the collaboration of educators and mentors in facilitating the transition of the student to professional practitioner. (22) Assessment of clinical competencies in the educational clinical setting has always been a challenge due to the multitude of variables such as clinical faculty practice philosophy, understanding expectation interpretation, clinical setting, and level of academic and clinical knowledge (advanced clinical degree). (6) (12) (17) To eliminate these variables and bring consistency to the clinical evaluation process a standardized instrument must be developed that will clearly define the clinical competencies and their assessed components, establish a minimum level of attitude, knowledge, and skills needed to graduate and practice successfully, provide periodic indicators on intern clinical learning, and provide clear assessment criteria to be used by clinical faculty. (1) (2)

The assessment of students in the clinical phase should be meaningful, applied consistently to all students, and linked to the internal learning outcomes. (13) It must take into account what is assessed, how it is assessed and the assessment's usefulness in fostering future learning. (17) Assessment drives teaching methods and learning and has powerful effects on student performance. (13) McKinley et.al 2001 referenced five required attributes of an assessment process consisting of; Reliability is a measure of the variation of scores due to differences in performance between subjects and also the correlation of assessors rating the same performance. Validity is the degree to which an assessment is a measure of what should be measured and concerns both the instrument and the assessment process. Acceptability is the degree in which the assessment process is acceptable to all of the stakeholders including the doctor (student) being assessed, the assessors, patients or simulators, the profession, future patients of that doctor, and society. Feasibility is the degree to which the assessment can be delivered to all those who require it within real cost of staff and time constraints. Educational impact is the degree to which the assessment can assist the doctor to improve his or her performance, usually through the provision of feedback on specific strengths and weaknesses together with prioritized and specific strategies for improvement. (19)

To better understand what is to be assessed it is important to understand the difference of performance, competence, and competency as well as their interrelationships. (13) Clinical performance does not always predict clinical competence. (13). Clinical skills can be based on the student's performance, competence, and competency, which are all interrelated. (10) Clinical performance is a composite of clinical cognitive, psychomotor, and affective abilities of the individual along with their non-clinical skills like team

working and situational awareness. Clinical competence has several definitions with most meaning approximately the same. Competence involves sound problem solving and decision-making, critical analysis, creativity, and autonomy to make satisfactory and effective decisions or to perform a skill in a specific setting or situation. (7)(10) Competence is "multi-dimensional and dynamic", as is changes over time, experience, and setting. (7) It is assumed that the student must reflect upon their knowledge, skills, and functions to make their decision. (10) (17) A competent clinician possesses the integrative ability to think, feel, and act like a physician. (17) Professional competence is defined by the ability to manage ambiguous problems, tolerate uncertainty, and make decisions with limited information. (17) Competency should strictly be used for the "skill" itself while competence is the ability to perform that skill and the attribute of the performer. (10) All competency-based assessments should be called competency based assessments of performance. (10) These assessments can be used for both observed and un-observed assessments. (10)

Assessment of the clinical competence has relied on several testing formats. The most popular assessment for both the student and faculty are multiple-choice questions that are frequently poorly written, favoring knowledge limited to recall. Essay style examinations have been used successfully for assessing clinical judgment although they are lengthy to review and grade for the faculty and are not reliable. Practical examinations are a good tool used to assess competence in clinical skills although one examiner using an arbitrary standard, which could affect the validity and reliability of the examination, usually scores the encounter. (13) Since the 1980's, the Objective Structured Clinical Examination (OSCE) is a time sensitive multi station process using standardized patients and has been widely accepted in medical schools, post graduate residencies and other health care professional schools as a method of assessing student's clinical skills. (13) (16) (18) Using standardized patients provides the greatest authenticity to the OSCE test. (13)(16) Defining pass/fail criteria for OSCE's has been complex and there is debate as to who should rate the student such as the standardized patient, the physician or a standardized patient observer. (17) Each of these assessment formats has their limitations and flaws especially in assessing clinical competence.

Direct observation of trainees with actual patients by clinical supervision is critical for teaching and assessing clinical and communication skills. By direct observation by the clinical faculty and assessing students during patients encounters and providing feedback, faculty help students to acquire and improve skills and help patients through better supervision of clinical care. (15) Reliability and validity evidence for clinical competence is enhanced when more direct observation is included as a basis for rating. (16) (17)

According to the Council on Chiropractic Education (CCE) desired student learning outcomes are assessed and evaluated by the programs goals, objectives and competencies as well as Meta-Competencies defined by the Council on Chiropractic Education (CCE) and appropriate to entry-level chiropractic practice guides the Doctor of Chiropractic program. (CCE Accreditation Standards Jan 2013) The assessment of attainment of these Meta-Competencies should be measured directly through student reports, exams, demonstrations, performances, and completed work and indirectly through student

perceptions of learning. Such perceptions can come from students, faculty, patients, internships, alumni and transfer institutions. (CCE Accreditation Standards Jan 2013)

The challenges clinical faculty is presented with that question the validity and reliability in current assessment instruments and processes must be taken into consideration when developing an appropriate assessment instrument. These challenges include; variance in faculty ratings of a resident's performance (i.e., individual faculty rate the same resident differently on the same rotation), and evaluation based on arbitrarily defined interpretation of model clinical performance, inflated grades, and offers information that lacks value. (1) (6) (12) (13)(17) Other concerns are regarding educators themselves possessing strong clinical skills and also having the necessary skill to effectively observe, evaluate, and provide feedback to trainees' regarding clinical skills. (13) Clinicians and faculty have always expressed concern and skepticism that many of the skills included on evaluation forms are not really observed but the assessment of a student's clinical knowledge, skills, and attitudes are based on. (11) (13)

In developing a reliable and valid assessment instrument that will accurately assess student competence in an educational clinical setting a combination consisting of the rubric format, Likert scale of scoring and Dreyfus Model of Learning can be used. (3) (10) Likert-type rating-scale assessments that consist of numeric ratings, even when accompanied by quantitative labels often yield scores that are subjectively derived with limited value in formative evaluation because they lack detailed requirements of performance expectations and behavioral descriptions for each domain. (3)

The rubric has been used as a "scoring tool that lays out the expectations of an assignment". (1) (12) The scoring rubric is a method of assessment that has been extensively studied and is gaining recognition in professional education. (3) A type of matrix that provides scaled levels of achievement or understanding for a set of criteria or dimensions of quality for a given type of performance. (2) They promote consistency in scoring, encourage self – improvement and self - assessment, and motivate the learner to achieve the next levels, provide timely feedback, and improve instruction. (1) The four general components of a rubric consist of: (1) description of the task, (2) the scale to be used, (3) the dimensions of the task, and (4) the description of each dimension on the scale. (1) (12) The rubric can be designed to formulate standards for levels of accomplishment to guide and improve performance along with making standards clear and explicit to students. (2) The rubric provides outcomes based assessment tool for objectively assessing resident (student) learning and encouraging lifelong learning skills while focusing on achieving early defined outcomes. (1)

Rubrics are used within the medical education to specify performance indicators and outcomes, ensure that assessment is coherent and consistent for all residents, measuring resident outcomes based on real-life criteria, provides opportunities for residents to demonstrate proficiency in a specific competency and outcome level, and improves the quality of assessment. (1) The rubric type assessment has been shown to increase the ability to deliver more consistent reliable feedback that fellows are willing to hear and

incorporate into constructive changes as well as has resulted in a decrease in unhappy, dissatisfied, or disagree with their faculty assessment. (3)

There are challenges to the use of a rubric such as finding a rubric to use that provides a close enough match to a particular assignment with a specific set of content and process objectives. (2) In designing a rubric the designer must approach the rubric development with a clear idea of the desired student learning outcomes along with a clear picture of what meeting each outcome looks like. (2) Although rubrics can take considerable time to develop and implement, once implemented they can streamline the grading process, make the instructor's standards and resulting grading explicit, as well as provide students a clear sense as to what the expectations are for a high level of performance on a given assignment, and how it can be met. (2)

The Dreyfus Model of Learning for skill acquisition has also been recommended as a tool to demonstrate progression in skill acquisition over time. (1) (10) (12) The Dreyfus model describes how and why our abilities, attitudes, capabilities, and perspectives change according to skill levels. (4) The Dreyfus model takes into consideration that no one is an "expert" or "novice" at all things or skills. (4) (10) This is a concept that fits well when assessing a student's clinical competence. This model not only takes into consideration cognitive aspect of learning but also how this information is perceived and applied with other information and situations. (4) The Dreyfus model outlines five discrete stages through which an individual must pass from novice to expert. (4) (10) This progression mimics the progression that a student will pass from entering the clinical education to finishing their clinical education.

The five model stages consist of; the novice practitioner possesses little to no previous experience in a skill area. The advanced beginner practitioner has enough experience to try tasks on his or her own but have difficulty troubleshooting. The competent are practitioners that can develop conceptual models of a problem and work with these models effectively. They can troubleshoot on their own and figure out how to solve new problems. The proficient practitioner will seek out and want to understand the larger picture and will become frustrated with over simplification. This stage they will be able to use their experience and that of others and self-improve so that they do the task better the next time. The final stage is the expert practitioner who functions as the primary source of knowledge and information in any field. They continually look for better methods to accomplish tasks. (4)

When using this type of assessment tool it is important to understand and take into consideration that many students if not all especially at the onset of clinical training will fall in more than one skills acquisition levels for different competency requirements. (4) This assessment instrument will serve to document a student intern's strengths and weaknesses regarding competency requirements and expectations allowing for early remediation and continued progress toward minimum level competence. (4) (10) This instrument will serve as an indicator as to when a student is competent in all requirements

and expectations of the CCE Meta-Competency 1 and is competent to graduate and practice safely within the public.

Conclusion

It is clear that there is a need to development of a valid and reliable assessment instrument and its proper implementation in all healthcare professional academic clinical setting whether it be chiropractic, medicine, or nutritional programs with internships. It is essential to determine the clinical competence of students as well as their progression so that institutions graduate competent practitioners. (9) This instrument must clearly define the intended expectations at the same time provide clinical faculty detailed descriptions as to the requirements that are being assessed. (2)The use of a rubric style assessment instrument along with the Likert scale scoring combined with the Dreyfus Model of Learning model appears to provide an appropriate format to insert detailed information. This assessment instrument will eliminate many of the challenges in regards to the clinical faculty to further ensure the validity and reliability of the assessment process. Other considerations that must take place to further the provide validity and reliability along with accuracy and consistence to the assessment process is that clinical faculty and students must be educated on the instrument, its requirements and expectations and the scoring process. (1) (18) Both the clinical faculty and student must be clear in all aspects of this process. Clinical faculty must be given more time to directly observe all aspects of the required assessment components. (11) (16) (17) The assessment instrument must be reviewed on a predetermined periodic basis and changes must be made as needed.

By taking this multifaceted approach starting with the assessment instrument, developing an instructional process for the clinical faculty and students, and a consistent assessment process to be used by all clinical faculty, chiropractic and other healthcare institutions including clinical nutrition programs will be able to accurately determine a student intern's clinical progress allowing this progress to be accurately monitored to ensure these institutions graduate clinically competent students. This process will not only gain cultural authority within higher education but also cultural authority with other healthcare professions and within society. To ensure students are successful in practice in this ever-changing healthcare environment the graduated students must hold a high degree of clinical knowledge, ethical standards, and patient management skills.

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Meta-Competency 1 assessment instrument – assessment and diagnosis

Component	Score			
	1 Novice	2 Advanced Beginner	3 Competent	4 proficient
Compiling a case appropriate history Assessment Score:	Student performs a limited patient history to the area of chief complaint questioning OPPQRST	Student performs an expanded patient history that included the limited history and past and current medical history, family history, psychosocial history, and social history	Student performs a detailed patient history that includes the expanded history and a review of systems related to the area of chief complaint	Student performs a comprehensive patient history that includes the detailed patient history and a review of all body systems
External health records Assessment Score:	Student did not document that the patient was questioned regarding external health records	Student provides a clinical rational as to why external health records were not requested	Student documents the request for external health records	Student provides documentation to support the clinical relevance of the records in patient diagnosis and management
Case appropriate physical examination Assessment Score:	Student performs a limited exam consisting of vital signs and palpation limited to the area of chief complaint	Student performs an expanded exam that includes the limited exam plus all associated orthopedic tests and range of motion	Student performs a detailed exam that includes the expanded exam and muscle, neurological, dermatome testing, and a physical exam corresponding to the of the area of chief complaint	Student performs a comprehensive exam that includes the detailed exam and a complete physical exam of all of the body's systems.

Diagnostic Testing Assessment Score:	Student documented that diagnostic testing such as radiological and clinical laboratory studies were considered in the clinical decision process	Student ordered appropriate radiological studies based on the information gathered in the history and physical exam	Students ordered appropriate clinical laboratory studies based on information gathered in the history and physical examination.	Student ordered appropriate advanced diagnostic studies such as MRI, CT, ECG, spirometry based based on information gathered in the history and physical examination
Formulating and documenting appropriate diagnosis based on the history, physical examination, diagnostic studies, and external health records Assessment Score:	Student formulates a limited diagnosis based on patient's complaints and palpatory findings such as cervicalgia, thoracalgia, lumbalgia, segmental dysfunction and muscle spasms	Student formulates an expanded diagnosis taking into consideration the limited diagnosis and the tissue of injury such as facet, sprain/strain, myofascitis	Student formulates a detailed diagnosis taking into consideration the expanded diagnosis, external health records, and complicating factors such as time before treatment, skeletal pathologies, severity of pain	Student formulates a comprehensive diagnosis taking into consideration the detailed diagnosis and all aggravating factors such as ADL's, hobbies, work activities, social activities
Generation of problem list with diagnosis Assessment Score:	Student developed a problem list based on limited diagnosis	Student developed a problem list based on expanded diagnosis	Student developed a problem list based on detailed diagnosis	Student developed a problem list based on comprehensive diagnosis