Assessment of Australian osteopathic learners' clinical competence during workplace learning

***Title Page (including all author details or any author identifiable references)**

Assessment of Australian osteopathic learners' clinical competence during workplace learning

Keri Moore [a,b].
Brett Vaughan [a,b,c]

[a] School of Health and Human Science, Southern Cross University, New South Wales, Australia
[b] Centre for Chronic Disease Prevention & Management, College of Health & Biomedicine, Victoria University, Melbourne, Australia
[c] Institute for Sport, Exercise & Active Living, Victoria University, Melbourne, Australia

Corresponding author:
Dr Keri Moore
School of Health and Human Sciences
Southern Cross University
PO Box 157
Lismore, NSW
Australia
p) (02) 6626 9300
e) keri.moore@scu.edu.au

***Implications for Practice**

IMPLICATIONS FOR PRACTICE

- The discussion in the paper asserts the need for discussion of workplace-based assessment procedures and processes at osteopathic teaching institutions re their responsibility to deliver programs that produce graduates who are fit to practice in the primary health care sector.
- Such discussion ought to be informed by a review of the programmatic approach to assessment of student's clinical competence, capabilities and capacity in the workplace as well as of the tools used to assess the learners developing clinical practices.

BACKGROUND

The faculty of an osteopathic teaching institution are expected to demonstrate to the various stakeholders that their systems and processes produce graduates with the desired competencies. On a global level the World Health Organisation *Benchmarks for training in osteopathy*[1] and the more recent, Osteopathic International Alliance *Osteopathy and Osteopathy Medicine: global view of practice, patients education and contribution to healthcare delivery*[2] are providing non-Australasian osteopathy programs with some guidance as to the recommended content of their teaching program. In Australia, osteopathy curricula are designed to meet the standards outlined in the Accreditation Policy of the Australasian Osteopathic Accreditation Council (AOAC).[3]

In addition to the above standards from the osteopathic community, the Australian Learning and Teaching Council Threshold Standards for Health, Medicine and Veterinary Science[4] clearly shows upon completion of their discipline-specific programs of study, healthcare graduates will be able to:

1. Demonstrate professional behaviours;
2. Assess individual and/or population health status and, where necessary, formulate, implement and monitor management plans in consultation with patients/clients/carers/animal owners/communities;
3. Promote and optimise the health and welfare of individuals and/or populations;
4. Retrieve, critically evaluate, and apply evidence in the performance of health-related activities;
5. Deliver safe and effective collaborative healthcare and;

6. Reflect on current skills, knowledge and attitudes, and plan ongoing personal and professional development.

Moreover, society and members of the health professions expect that health profession education programs prepare learners in accordance with the various accreditation and registration requirements for that profession.[4] In short, osteopathic graduates are expected to be able to demonstrate they have a particular set of clinical competencies – to prove they are fit for purpose - that they are *osteopaths* capable of working within their scope of practice. The teaching faculty cannot truly discharge this responsibility to demonstrate their graduates have achieved the required competencies without knowing they are using an appropriate assessment strategy incorporating valid and reliable assessment tools to measure learner achievement.[5-7] Apart from assessment being necessary to ascertain learners' progress and performance, workplace-based assessments, aka clinical assessments, are intended to provide ongoing feedback to improve learning and influence clinical behaviours.[8-10] Feedback is required to support and encourage learning focus.[11]

London[12] reported there is no consensus as to what might be regarded as best practice in osteopathic clinical assessment within the UK teaching institutions. This statement can reasonably be extrapolated to all but the US teaching institutions. Presently, there is a paucity of critical research related to workplace-based assessment in osteopathy curricula. However, there is an increasing volume of literature and research in the pipeline within the profession, which will be valuable in the development of a consensus about best practice in workplace-based

assessment in osteopathy. This research will provide examples of innovative workplace-based assessment practice and how to best provide students with constructive feedback on their ongoing skill development. The osteopathic profession needs to know how the teaching and assessment strategies they use impact on student learning, clinical practices, patient safety and clinical outcomes.

WHAT WE KNOW

There are currently three entry-level osteopathy programs in Australia that are accredited by the AOAC. Each program of study has a curriculum designed to allow learners to achieve the desired educational outcomes for that program, although there is guidance on expected content contained within the AOAC accreditation policy. Institutions are charged with explaining the assessment of these educational outcomes using a variety of tools to meet standard 3.7 '*The outcomes of teaching, especially clinical competence are rigorously assessed by a range of assessment methods*.'[3]

From our personal experience in osteopathic education we know that the current assessment tools used in workplace-based education settings have been influenced by tradition rather than by research and the dearth of literature provides support for this view. That is not to say they have not been critiqued often and updated as necessary – the outcomes of scholarly deliberations are not published in the peer-review literature. Work by Vaughan et al.[13] involving twenty-five participants across eleven institutions from the United Kingdom, Canada, Italy and Australia, explored how osteopathic teaching institutions assess their learners. The study reported

institutions utilised a variety of assessment types such as multiple choice questions and written papers in the early years of a program, and progressed towards more specific clinical assessments such as a) the Long Case Assessment (LCA) and b) the Objective Structured Clinical Examination (OSCE) in the later stages of a program. These authors concluded the latter are both valid measures of performance and each likely measures different constructs. There is little research within the non-US osteopathic profession to support these approaches to assessment beyond a paper by Vaughan & Florentine[14] describing the use of an OSCE.

The findings from the study by Vaughan et al.[13] were largely corroborated in the investigation of summative assessments of osteopathic clinical reasoning in the final two years of the curricula in the work by Moore et al.[15] These authors found that 5 assessment types were used. These and examples of other types of assessment of clinical competence *per se*, not just in the workplace and are described below. They are:

1) Assessment of Actual Workplace-based Performance – the LCA;
2) Assessment of Simulated Clinical Performance – the OSCE;
3) Clinical Supervisors Reports;
4) Oral (viva) Assessments
5) Written assessments and
6) Portfolio Assessments.

<u>1. Assessment of Actual workplace-based Performance</u>

The assessment of student's actual clinical performance in osteopathy is typically via the long case examination. This takes place at the end of a semester of learning and involves one or two examiners sitting in on a student's consultation in which a student consults a new patient. One criticism of this type of assessment is that is only requires the student to describe a hypothetical management plan beyond the initial consultation – it does not explore the student's full management of a patient's health concern. Furthermore, the long case exam is typically used as a summative exam and as such does not provide an opportunity for students to receive formal critique and feedback so they can improve.

Vaughan et al.'s[13] study in osteopathy concluded the long-case assessment still predominates in the final assessments undertaken by learners. These authors reported osteopathic educators are keen to continue using the long-case assessment due to its perceived validity, however there is no empirical literature in osteopathy supporting this view, and there are questions about its reliability.[16] That said it is difficult to support or refute its continued use in osteopathy or elsewhere with further research required.

2. Assessment of Simulated Clinical Performance

In an OSCE students present at several 'stations' at which they are required to perform a particular task, skill or talk conceptually about an issue or, deliver a combination of all three activities. At each 'station' the students' work will be graded by one or two examiners. The assessment is time limited and once they have

completed the work at one station they move to the next. One criticism is that it does not allow the student to demonstrate the performance of whole tasks in an authentic clinical context with all its inherent variables. That said, it is a valuable method of assessing specific aspects of the curriculum in a safe environment.

The OSCE is traditionally used in medicine, and more recently in health profession education programs, is designed to promote and assess integration and consolidation of clinical skills.[17-22] The OSCE was developed as an alternative to the traditional viva as it is lends itself to greater reliability within a range of caveats.[23] Reports on the use of OSCE in osteopathy identified the assessment of reasoning related to specific skills on standardized patients which is understood to facilitate examinee's knowledge organisation and information integration across 'standard' cases and context.[14, 24]

3. The Clinical Supervisor Report

A Clinical Supervisor's Report (CSR) is something that is typically administered during placement and records the supervisor's impressions of the student's overall professional habits and clinical behaviours and methods over the length of time in any clinic. Sometimes this may be administered mid-placement promoting a conversation between student and supervisor in which the student receives feedback about their performance. A second administration is typically held at the end of the placement when the tool is used as a summative assessment of the student. Known by different names, this form of assessment focuses on various aspects of learner

knowledge, skills and abilities. The CSR and its variants are still in use in pre-professional osteopathic education.[13]

An example in Australian osteopathic education

To illustrate the use of a CSR as part of the assessment of clinical competence, the authors obtained ethics approval to retrospectively analyse de-identified CSRs from an osteopathic teaching institution using a mixed methods approach.

The stated goals of the CSR were to: 1) ensure that the learners are performing their prescribed duties in clinic to the accepted standard; 2) give formative feedback to learners throughout the year; and 3) ensure that the clinical supervisor spends time with each learner in a mentoring capacity. Learners were graded *satisfactory* or *unsatisfactory* against the statements itemised in Table 1. Space for qualitative comments was also available.

INSERT Table 1 here

Thematic analysis of written comments on the CSRs completed between 2012-2013 was undertaken. In addition, interviews and focus groups with 2014 learners and clinical supervisors were used to explore views about the use of the CSR as an assessment. The interview questions were open-ended and sequenced.

The results revealed all 241 assessments in the 2012-2013 student cohort were graded as 'satisfactory' against each of the five statements presented in Table 1. The

qualitative comments focused on encouragement and positive affirmation and directives for improvement were not prevalent. In only two cases, feedback offered in earlier reviews of the students was followed-up. No learners' reactions or self-assessments were noted, and interview data from students and staff revealed there was no apparent monitoring of feedback given from one administration of the CSR to another during the students time in clinic. In terms of acceptability, the qualitative data from learner and supervisor interviews suggests there is the potential to provide greater feedback and this could be driven by changes to the structure of the CSR. Further, it is likely the supervisors would require training to provide appropriate, structured feedback so as to benefit the student. The lack of qualitative feedback from the review of the CSR in this small study is a concern given feedback adds significant educational value to any assessment.[23] That said, we did not explore the feedback given via other forms of formal or summative assessment or the quality of verbal feedback offered daily.

Like many of the clinical competency assessment tools in use in osteopathic education, there are very few where the psychometric properties have been reported. The example of the CSR provided here highlights the importance of developing assessment tools that consider the users of the information provided by the tool, as well as the users completing the tool. If such a tool was to be used in the future, the psychometric properties would warrant investigation, as the context of the assessment is likely to vary between teaching institutions.[25] We did not explore the cost effectiveness of the CSR however, given its brevity, it is likely to be efficient to administer. The CSR is but one tool used within the osteopathic profession that would require further investigation.

Learners change over time and, at best, tools such as the CSR offer a snapshot of a learner's work – and most likely records what has been observed immediately preceding the act of 'putting pen to paper'. Hence, used as an *assessment of learning* and a summative form of assessment, the CSR is of minimal educational value. Its value is in its use as *assessment for learning*, as an opportunity to provide the student with feedback – formative assessment. Furthermore, caution must be applied if performance assessments are used to measure a learner's customary characteristics, rather than the learner's ability to interact within a given situation.[26]

4. Oral (viva) Assessments

Although not undertaken in the workplace, summative oral assessments of students' knowledge are known by many names including the *viva*. This is an oral exam employed to evaluate learners' problem solving abilities. One criticism is again, that students discuss and defend their actions in a hypothetical not an actual case they have managed.

An example in the allied health literature is the use of the Structured Oral Self-directed Learning Evaluation (SOSLE) in occupational therapy and physiotherapy.[27] The study identified that excellent inter-rater reliability could be achieved using the SOSLE, however its relationship with written tests and tutorial marks suggests the SOSLE measures a different aspect of clinical competence. Chapman et al.[27] concluded that the SOSLE is a useful approach for assessing 'process-oriented' skills such as problem-solving and self-assessment abilities.

The authors of the current commentary are aware of a SOSLE-like assessment that is being developed in Australasia. In an osteopathic context, Orrock et al.[28] have recently published the findings of the initial stage of a viva exam assessing clinical reasoning. This exam appears to be promising however it will require further psychometric investigation prior to its use in high stakes assessment scenarios.

5. Written Assessments

Written assessments are typically held during a formal examination period and are often designed to assess a student's clinical reasoning and management of clinical scenarios. Recently Esteves et al.[29] have explored the implementation of a script concordance test (SCT) in a small cohort of osteopathic students. The SCT has been employed primarily in medicine to assess students' reasoning and management strategies through a stepped process,[30-32] and are typically written or computer-based. Various reports have suggested this format is reliable and valid, however it can be time-consuming to construct the examination and mark it, particularly for written, rather than computer-based, exams. Other formats such as the multiple choice question and essay-type questions have long been employed in written assessments, however the extended matching question,[33-38] and key feature question formats[39-41] are now finding favour. Written examinations are generally easy to administer and grade than workplace-based assessments, however the results of both types can provide a picture of the students' patient management approaches.

7. Portfolio Assessments

In this type of assessment students collect evidence of their learning and present them to the assessor as a *Portfolio* supporting their claim of achievement of learning goals. Vaughan et al.[42] identified that osteopathic teaching institutions are developing a greater awareness of the portfolio as an assessment tool.

In a Masters level health promotion program in medicine, McKenna et al.[43] found a competency-based reflective portfolio is useful for drawing together theoretical and experiential learning. In this example, using a portfolio promoted reflection across the *entire* course rather than within the practice module only. Other authors agree that portfolios are thought to provide learners with an opportunity to bring together the course as a whole and to integrate material across modules and tasks.[43-45] Portfolio assessment however, can be labour intensive for both academics and students.[46] Portfolios require structured preparation and ongoing support of learners, assessors and lecturers if the pedagogic aims for their use are to become an integral part of providing evidence of meeting professional competence requirements.

Vaughan et al.[42] offered a view of the use of portfolio assessments in the pre-professional osteopathy curricula. They reported that this type of assessment helped them with decisions about a learner's competency, and that the educational value is strengthened by the ongoing mentoring of learners, examiner training and by using holistic rating scales. Subsequent evaluations of the implementation of the portfolio will be forthcoming.

WHAT CONSTITUTES A *GOOD* ASSESSMENT TOOL?

Be they formative or summative, effective assessments have five identifiable features:[9]

1. **Validity** - whether the assessment measures what it claims to measure;
2. **Reliability** - the degree to which the measurement is accurate and reproducible;
3. **Acceptability** – the tools and processes are acceptable to learners, faculty and other stakeholders;
4. **Educational impact** – the assessment influences learners learning in several ways; and
5. **Efficient and affordable** – that the assessment strategy and tools are cost effective/labour saving to the individual trainee, the institution, and society at large.

In workplace-based health professional education the inherent variability and unpredictability of workplace affects standardisation of learners' assessments. For that reason, methods of assessment cannot be declared as either unreliable or reliable *per se* but they can be reliable with multiple sampling. This multiple sampling is the pivotal factor in achieving reliable scores when using any assessment instrument.[10, 23]

Assessment validity stems from the application of the most appropriate tools to sample and aspect(s) the curriculum; reliability is strengthened by aggregating

observations from variety of situations, by a variety of assessors and; positive educational impact is found by confirmation that the tools are assessing attributes that are of value to the discipline.[47]

ASSESSMENT OF CLINICAL COMPETENCE IN THE WORKPLACE

Knowledge, skills, problem-solving skills, and attitudes or professionalism are the key competencies required to be demonstrated by a graduate from a health discipline.[48] To develop these competencies to be an effective health professional, programs of study incorporate a clinical education component. This education is designed to develop a students' clinical reasoning, problem-solving and critical appraisal skills, in addition to their communication and professionalism.[49-51] As a learner progresses through their clinical education, assessment of competence means assessing a learners' management of integrated *whole tasks* of increasing complexity.[48, 52]

Dijksterhuis et al.[53] contend that 'Competence achieved in a certain clinical procedure does not automatically translate into more independent practice'. Thus, the assessment strategy in any curriculum needs to accommodate and capture the ongoing development of competence in the professional workplace. If competence is thought of as a 'constantly evolving set of multiple interconnected behaviours enacted in time and space'[26] then this has consequences for the program of assessment. Competence ought not be seen as an 'achievement' *per se*, instead, it is developed over time. The pursuit of competence is best thought of as an agenda,

a habit expressed in the desire for life-long learning - competence is contextual, reflecting the learner's relationship and abilities with the task at hand.[54]

The major distinguishing features of workplace learning events are that they are inherently variable, unpredictable and often brief events of high educational value that are typically not replicable.[55] With that in mind, assessment strategies and the tools employed in workplace-based education must be flexible enough to capture realistic work practices relevant to the discipline. The assessment strategy and tools used need to be responsive to the circumstance of the event(s) observed[9, 56] and not encumber the workplace activities.

Finally, the challenge for those designing a workplace-based assessment programme is to structure assessments in such a way that, despite differences between learning environments, all learners are inspired to work towards the required competency levels and have sufficient opportunities to prove that they have achieved them.[23, 57] In any curricula, the assessment strategy needs to be equitable and mindful of diversity and ought to include a variety of tools that capture different aspects of student's performance in the professional workplace of the discipline.

There are some advantages to basing judgements on a single assessment event in that it proves the rater has actually observed the learner's performance and also, reached a decision.[51] On the other hand, it is understood that a single performance does not necessarily predict the performance of the learner during another encounter.[51] Assessing the study across multiple patient encounters is valuable for a variety of reasons. For example a learner may 'fake' their performance in a patient

encounter.[26] Unless re-tested in another context or situation, their feigning may not be exposed – the instability of his/her competence could potentially remain undetected,[26] and impact on patient safety.

Formative assessment is preferred over summative assessment because formative creates an opportunity for educators to give students feedback how to improve.[58] Furthermore qualitative feedback is preferred over quantitative feedback even though this relies on the raters' professional judgement which can be considered subjective.[23] That said, there is still a need for summative assessment and professional judgement of a learner. Information from formative and qualitative judgements can be collated to provide a well-informed view of the learner and subsequently a defensible summative assessment.

There are numerous examples of workplace-based assessment tools in the literature that can be used to provide these formative and summative assessments of competence. They are typically divided into global assessments of student's clinical methods and assessments at the point of patient care.

<u>Global assessments of student's clinical methods</u>

In Australia some allied health disciplines have developed national, standardised workplace assessment tools to capture student performance during, and at the end of, their clinical placement. These tools include the Assessment of Physiotherapy Practice,[59-61] occupational therapy's Student Practice Evaluation Form – Revised,[62] speech therapy's COMPASS,[63, 64] the Radiation Therapy Student Clinical Assessment,[65, 66] and a tool to assess nursing competencies.[67] They all

demonstrate face and content validity, and varying levels of construct validity and reliability. However, each of these tools demonstrates varying levels of evidence for their psychometric properties. Of these tools, the Assessment of Physiotherapy Practice tool appears to be the most psychometrically sound, however further work on the evaluation of the criterion, concurrent and predictive validity of these tools is required. That being said, they provide a valuable resource for the osteopathy profession to draw on when developing clinical competency workplace-based assessment strategies. It is important to note that these tools do not assess a learners' work during single, learner-patient encounters at the point of patient care – there are other tools available for this purpose.

Assessment at the point of patient care

In workplace learning activities in medicine, there is an increasing emphasis on the assessment of learners' performance during multiple, single-patient encounters and this is evidenced by the volume of literature in this area. There are a variety of tools that exist however the mini-CEX is one of the most widely studied and used workplace-based assessment tools because it has been found to be a valuable tool to assess actual clinical performance with real patients in the workplace.[68-73]

The mini-CEX evaluates the learner's history taking and examination skills, clinical judgment, professionalism, and organization related to the clinical consultation. When used to assess learner's progress during multiple clinical encounters with different examiners and different patients reliable ratings can be achieved. [58, 72]

A far as usability is concerned, although the work is ongoing, it has been identified that the mini-CEX is easy to use in day-to-day practice and has broad applicability in a variety of settings and provides learners with instant feedback.[74, 75] Stone et al.[76] have advocated its use in osteopathic post-professional fitness-to-practice assessments, such as those undertaken with practitioners wishing to migrate to Australia, and Vaughan et al.[77] reported it is used in the osteopathy program at Victoria University (Australia). At present there is no research into the use of the mini-CEX in either the pre- or post-professional context in osteopathy, albeit, this tool could be relatively easily implemented in on-campus, student-led osteopathic clinics or in private clinics off-campus.

OTHER CONSIDERATIONS

The literature around assessment in the health professions is suggesting a move away from making high stakes decisions based on individual assessment tools, to decisions based on programmatic approaches.[10, 48, 57] Focusing on the assessment of a set of small tasks or 'ticking the box' leads to trivialisation and threatens validity - global and holistic judgements help avoid this,[23] particularly when the samples are taken from different assessment tools completed by a variety of examiners in a multitude of settings. Moreover in workplace-based assessment, highly structured assessment ('tick the box') tools do not work well.[78]

In order to track a learner's growth through the curriculum it is necessary to identify a range of assessment tools that achieve *assessment for learning* at the same time as ensuring the student is assessed on progressively more complex tasks, or whole

task integration. Miller's triangle[79] for example, provides a guide as to the type of assessments that can be used during various stages of a program. In essence this represents a building-block approach to understanding a learners developing competence.[78] Further, the work of Boud and associates[80] can provide a framework on which to ensure that the assessment tools used meet this *assessment for learning* ideal. Vaughan et al.[42] used this framework to demonstrate the ability of a portfolio to demonstrate 'assessment for learning' in osteopathic education.

The typical health profession assessment strategy needs a range of tools which explore discipline-specific clinical reasoning, critical analysis of self and others, clinical and professional judgement, and tacit knowledge. A well-designed assessment programme will explore how well learners integrate their knowledge, skills and attributes to solving all-encompassing clinical problems – this is the essence of competency-based education. The sum of the information gathered by the tools, be they used formatively or summatively, provides a legal record of the learner's progress and achievement of the desired competencies.[81] Wilkinson[47] provides a neat summary:

> *'A variety of assessments over a variety of times, matched against the areas of interest and value, enhances both reliability and validity. Workplace-based assessment tools can complement centralized assessment tools. Multiple snapshots, even if some are not totally in focus, give a better picture than one poorly aimed photograph'*

CONCLUSION

Given the holistic philosophy that underpins osteopathic clinical practice, assessment of clinical competency should ensure that decisions about competence, capability and capacity can be made, so that ability, responsibility, accountability, authority and autonomy can be realised.[82]

We have demonstrated that a gap in knowledge exists in that, currently, there are no published studies which have explored the validity and reliability of the approaches to assessing clinical competence within the profession albeit that it has been shown the professions' educators perceive the current tools to be valid.[13] There is a paucity of literature on assessment of students in day-to-day osteopathic workplace settings and the feedback offered to them during single, learner-patient encounters - at the point of patient care. We maintain that observation of student's clinical performance and feedback given at this time is beneficial to learning and safeguards patient care.

We can identify no studies in osteopathy that determine how well a learner's clinical skills are developed and assessed across the curriculum or in different workplace settings. It remains uncertain the degree to which, during day-to-day professional workplace activities learners are able to elicit the patients full set of symptoms, determine what intervention they may need to implement, as well as develop and evaluate appropriate management plans on a consistent basis with multiple patient complaints and complexity of complaints. Yet, the skills described here are core competencies of a health professional. Without valid and reliable assessment tools

being used to assess learners work over time, or during moments of direct observation of learners clinical work, improvement in student performance is unlikely,[81] and the defensibility of assessment decisions is questionable.

In the osteopathic curriculum the ideal assessment strategy would contain several tools, each having a different focus and each providing feedback. Where possible, assessments should be performed by a variety of examiners and include a variety of patients and clinical scenarios to ensure the resultant feedback is authentic, variable and broad – reflecting the scope of osteopaths as primary health care practitioners.

Be they formative or summative, effective clinical competency assessments are known to have five identifiable features:[9] validity, reliability, acceptability, educational impact, efficiency and affordability. Studies that explore these features in any assessment tool are essential to ensure the quality of delivery of the pre-professional osteopathic curricula.

There is an emerging group of osteopathic education researchers who, over the coming years, will be developing the literature around competency assessment in osteopathic clinical education. They have a body of work ahead of them to identify the best strategy, and tools, to assess learners' performance and the application of osteopathic clinical knowledge, skills and attributes in order to prepare graduates for practice. These authors hope that the preceding discussion provides researchers with some direction, and we eagerly await further contributions to how these skills are defined and assessed in the pre-professional curriculum.

REFERENCES

1. World Health Organisation. Benchmarks for training in osteopathy. 2010; http://www.who.int/medicines/areas/traditional/BenchmarksforTraininginOsteopathy.pdf. Accessed July 20, 2013.

2. Osteopathic International Alliance. Osteopathy and Osteopathic Medicine: A Global View of Practice, Patients, Education and the Contribution to Healthcare Delivery. Chicago, USA. 2013.

3. Australasian Osteopathic Accreditation Council. Accreditation Policy: Standards and procedures for the accreditation of osteopathic courses in Australia. 2012; http://www.osteopathiccouncil.org.au/accreditation.html.

4. Australian Learning & Teaching Council. Health, Medicine and Veterinary Science Learning and Teaching Academic Standards Statement. 2011; http://www.olt.gov.au/system/files/resources/altc_standards_HMVS_210611.pdf. Accessed June 3, 2012.

5. Walton M, Woodward H, Van Staalduinen S, Lemer C, Greaves F, Noble D, et al. The WHO patient safety curriculum guide for medical schools. *Qual Saf Health Care* 2010;**19**:542-6.

6. Murray E, Gruppen L, Catton P, Hays R, Woolliscroft JO. The accountability of clinical education: its definition and assessment. *Med Educ* 2000;**34**:871-9.

7. Moonen-van Loon J, Overeem K, Donkers H, van der Vleuten C, Driessen E. Composite reliability of a workplace-based assessment toolbox for postgraduate medical education. *Adv Health Sci Educ Theory Pract* 2013;**18**:1087-102.

8. Norcini JJ. ABC of learning and teaching in medicine: Work based assessment. *Br Med J* 2003;**326**:753.

9. Schuwirth LW, van der Vleuten CP. How to design a useful test: the principles of assessment. In: Swanick T, ed. *Understanding medical education: Evidence, theory and practice*. London, United Kingdom: John Wiley & Sons; 2011:241-54.

10. Van der Vleuten C, Schuwirth L, Driessen E, Dijkstra J, Tigelaar D, Baartman L, et al. A model for programmatic assessment fit for purpose. *Med Teach* 2012;**34**:205-14.

11. Pelgrim EA, Kramer AW, Mokkink HG, van der Vleuten CP. The process of feedback in workplace-based assessment: organisation, delivery, continuity. *Med Educ* 2012;**46**:604-12.

12. London S. The assessment of clinical practice in osteopathic education: Is there a need to define a gold standard? *Int J Osteopath Med* 2008;**11**:132-6.

13. Vaughan B, Sullivan V, Gosling C, McLaughlin P, Fryer G, Wolff M, et al. Methods of assessment used by osteopathic educational institutions. *Int J Osteopath Med* 2012;**15**:134-51.

14. Vaughan B, Florentine P. The OSCE in a pre-registration osteopathy program: Introduction and psychometric properties. *Int J Osteopath Med* 2013;**16**:198-206.

15. Moore K, Grace S, Orrock P, Coutts R, Blaich R, Vaughan B. Benchmarking the strategies for assessing clinical reasoning in osteopathic curricula. *Int J Osteopath Med* 2014. doi:10.1016/j.ijosm.2014.03.001

16. Wilkinson TJ, Campbell PJ, Judd SJ. Reliability of the long case. *Med Educ* 2008;**42**:887-93.

17. Ladyshewsky R, Baker R, Jones M, Nelson L. Reliability and validity of an extended simulated patient case: A tool for evaluation and research in physiotherapy. *Physiother Theory Pract* 2000;**16**:15-25.

18. Marshall G, Harris P. A study of the role of an objective structured clinical examination (OSCE) in assessing clinical competence in third year student radiographers. *Radiography* 2000;**6**:117-22.

19. Khattab AD, Rawlings B. Assessing nurse practitioner students using a modified objective structured clinical examination (OSCE). *Nurse Educ Today* 2001;**21**:541-50.

20. Khattab AD, Rawlings B. Use of a modified OSCE to assess nurse practitioner students. *Br J Nurs* 2008;**17**:754-9.

21. Barry M, Noonan M, Bradshaw C, Murphy-Tighe S. An exploration of student midwives' experiences of the Objective Structured Clinical Examination assessment process. *Nurse Educ Today* 2012;**32**:690-4.

22. Naumann F, Moore K, Mildon S, Jones P. Developing an objective structured clinical examination to assess work-integrated learning in exercise physiology. *Asia-Pacific Journal of Cooperative Education* 2014;**In-press**.

23. van der Vleuten CPM, Schuwirth LWT. Assessing professional competence: From methods to programmes. *Med Educ* 2005;**39**:309-17.

24. Portanova R, Adelman M, Jollick J, Schuler S, Modrzakowski M, Soper E, et al. Student assessment in the Ohio University College of Osteopathic Medicine CORE system: progress testing and objective structured clinical examinations. *J Am Osteopath Assoc* 2000;**100**:707-12.

25. McGill D, Van Der Vleuten C, Clarke M. Supervisor assessment of clinical and professional competence of medical trainees: a reliability study using workplace data and a focused analytical literature review. *Adv Health Sci Educ Theory Pract* 2011;**16**:405-25.

26. Anderson MB, Hodges BD, Lingard L. *The question of competence: reconsidering medical education in the twenty-first century*: Cornell University Press; 2012.

27. Chapman JA, Westmorland MG, Norman GR, Durrell K, Hall A. The structured oral self-directed learning evaluation: one method of evaluating the clinical reasoning skills of occupational therapy and physiotherapy students. *Med Teach* 1993;**15**:223-36.

28. Orrock P, Grace S, Vaughan B, Coutts R. Developing a viva exam to assess clinical reasoning in pre-registration osteopathy students. *BMC Med Educ* 2014;**14**:193.

29. Esteves JE, Bennison M, Thomson OP. Script concordance test: Insights from the literature and early stages of its implementation in osteopathy. *Int J Osteopath Med* 2013;**16**:231-9.

30. Brailovsky CA, Charlin B, Beausoleil S, Cote S, van der Vleuten CPM. Measurement of clinical reflective capacity early in training as a predictor of clinical reasoning performance at the end of residency: An experimental study on the script concordance test. *Med Educ* 2001;**35**:430-6.

31. Charlin B, Brailovsky CA, Brazeau-Lamontagne L, Samson L, Leduc C, van der Vleuten CPM. Script questionnaires: Their use for assessment of diagnostic knowledge in radiology. *Med Teach* 1998;**20**:567-71.

32. Charlin B, Roy L, Brailovsky C, Goulet F, van der Vleuten C. The Script Concordance test: a tool to assess the reflective clinician. *Teach Learn Med* 2000;**12**:189-95.

33. Beullens J, Struyf E, Van Damme B. Do extended matching multiple-choice questions measure clinical reasoning? *Med Educ* Apr 2005;**39**:410-7.

34. Case S, Swanson DB. Extended-matching items: A practical alternative to free-response questions. *Teach Learn Med* 1993;**5**:107-15.

35. Lukic IK, Gluncic V, Katavic V, Petanjek Z, Jalsovec D, Marusic A. Weekly quizzes in extended-matching format as a means of monitoring students' progress in gross anatomy. *Ann Anat* 2001;**183**:575-9.

36. Samuels A. Extended Matching Questions and the Royal Australian and New Zealand College of Psychiatrists written examination: an overview. *Australas Psychiatry* Mar 2006;**14**:63-6.

37. Wilson RB, Case SM. Extended matching questions: An alternative to multiple-choice or free-response questions. *J Vet Med Educ* 1993;**20**.

38. Wood EJ. What are extended matching sets questions? *Biosci Educ* 2003;**1**.

39. Farmer EA, Page G. A practical guide to assessing clinical decision-making skills using the key features approach. *Med Educ* 2005;**39**:1188-94.

40. Hatala R, Norman G. Adapting the Key Feature Examination for a clinical clerkship. *Med Educ* 2002;**36**:160-5.

41. Page G, Bordage G. The Medical Council of Canada's Key Features Project: a more valid written examination of clinical decision making skills. *Acad Med* 1995;**70**:104-10.

42. Vaughan B, Florentine P, Carter A. Introducing a portfolio assessment in a pre-professional osteopathy program. *Int J Osteopath Med* 2014;**17**:129-34.

43. McKenna V, Connolly C, Hodgins M. Usefulness of a competency-based reflective portfolio for student learning on a Masters Health Promotion programme. *Health Educ J* 2011;**70**:170-5.

44. Timmins F, Dunne PJ. An exploration of the current use and benefit of nursing student portfolios. *Nurse Educ Today* 2009;**29**:330-41.

45. Haffling A-C, Beckman A, Pahlmblad A, Edgren G. Students' reflections in a portfolio pilot: Highlighting professional issues. *Med Teach* 2010;**32**:e532-e40.

46. Clarke D, Cortis J, Sowter J. Pilot testing of guidelines to support good practice in the development of professional portfolios. *Nurse Educ Today* 2011;**31**:e70-e8.

47. Wilkinson T. Assessment of clinical performance: gathering evidence. *Intern Med J* 2007;**37**:631-6.

48. Schuwirth LW, Van der Vleuten CP. Programmatic assessment: From assessment of learning to assessment for learning. *Med Teach* 2011;**33**:478-85.

49. Higgs J, Glendinning M, Dunsford F, Panter J. Goals and components of clinical education in the allied health professions. *Proceedings of the 11th International Congress of the World Confederation for Physical Therapy, London*1991:305-7.

50. Higgs J, Edwards H. *Educating beginning practitioners: challenges for health professional education*: Elsevier Health Sciences; 1999.

51. Norcini JJ. *Workplace-based assessment in clinical training*: Association for the Study of Medical Education; 2007.

52. Dijkstra J, Van der Vleuten C, Schuwirth L. A new framework for designing programmes of assessment. *Adv Health Sci Educ Theory Pract* 2010;**15**:379-93.

53. Dijksterhuis MG, Voorhuis M, Teunissen PW, Schuwirth LW, Ten Cate OT, Braat DD, et al. Assessment of competence and progressive independence in postgraduate clinical training. *Med Educ* 2009;**43**:1156-65.

54. Epstein RM. Assessment in medical education. *N Engl J Med* 2007;**356**:387-96.

55. Cooper L, Orrell J, Bowden M. Workplace-learning management manual: A guide for establishing and managing university work-integrated learning courses, practical, field education and clinical education. Adelaide, Australia. Flinders University. 2003.

56. Yorke M. Work-engaged learning: towards a paradigm shift in assessment. *Qual Higher Educ* 2011;**17**:117-30.

57. Driessen EW, van Tartwijk J, Govaerts M, Teunissen P, van der Vleuten CP. The use of programmatic assessment in the clinical workplace: a Maastricht case report. *Med Teach* 2012;**34**:226-31.

58. Norcini J, Burch V. Workplace-based assessment as an educational tool: AMEE Guide No. 31. *Med Teach* 2007;**29**:855-71.

59. Dalton M, Davidson M, Keating JL. The assessment of physiotherapy practice (APP) is a reliable measure of professional competence of physiotherapy students: a reliability study. *J Physiother* 2012;**58**:49-56.

60. Dalton M, Davidson M, Keating J. The Assessment of Physiotherapy Practice (APP) is a valid measure of professional competence of physiotherapy students: a cross-sectional study with Rasch analysis. *J Physiother* 2011;**57**:239-46.

61. Dalton M, Keating J, Davidson M. Development of the Assessment of Physiotherapy Practice (APP): A standardised and valid approach to assessment of clinical competence in physiotherapy. Australian Learning and Teaching Council (ALTC). 2009.

62. Allison H, Turpin MJ. Development of the student placement evaluation form: A tool for assessing student fieldwork performance. *Aust Occup Ther J* 2004;**51**:125-32.

63. McAllister S, Lincoln M, Ferguson A, McAllister L. Issues in developing valid assessments of speech pathology students' performance in the workplace. *Int J Lang Commun Disord* 2010;**45**:1-14.

64. McAllister S, Lincoln M, Ferguson A, McAllister L. A systematic program of research regarding the assessment of speech-language pathology competencies. *Int J Speech Lang Pathol* 2011;**13**:469-79.

65. Dempsey S, Giles E, Chiswell M, Wright C, Charlton N, Rowntree P, et al. Development and implementation of the Australian universities radiation therapy student clinical assessment form. *J Med Radiat Sci* 2012;**59**:13-25.

66. Giles E, Dempsey S, Chiswell M, Wright C, Bridge P, Charlton N. A survey to evaluate the implementation of a national clinical assessment form. *J Med Radiat Sci* 2012;**59**:77-84.

67. Crookes P, Brown R, Della P, Dignam D, Edwards H, McCutcheon H. The development of a pre-registration nursing competencies assessment tool for use across Australian universities. Office for Learning & Teaching, Australian Government. 2010.

68. Norcini JJ, Blank LL, Arnold GK, Kimball HR. The mini-CEX (clinical evaluation exercise): a preliminary investigation. *Ann Intern Med* 1995;**123**:795-9.

69. Holmboe ES, Huot S, Chung J, Norcini J, Hawkins RE. Construct validity of the miniclinical evaluation exercise (miniCEX). *Acad Med* 2003;**78**:826-30.

70. Kogan JR, Holmboe ES, Hauer KE. Tools for direct observation and assessment of clinical skills of medical trainees: a systematic review. *J Am Med Assoc* 2009;**302**:1316-26.

71. Norcini JJ. The Mini Clinical Evaluation Exercise (mini-CEX). *Clin Teach* 2005;**2**:25-30.

72. Norcini J, Blank L, Duffy D, Fortna G. The mini-CEX: A method for assessing clinical skills. *Ann Intern Med* 2003;**138**:476-81.

73. Hatala R, Ainslie M, Kassen BO, Mackie I, Roberts JM. Assessing the mini-Clinical Evaluation Exercise in comparison to a national specialty examination. *Med Educ* 2006;**40**:950-6.

74. Holmboe ES, Yepes M, Williams F, Huot SJ. Feedback and the mini clinical evaluation exercise. *J Gen Intern Med* 2004;**19**:558-61.

75. Pelgrim E, Kramer A, Mokkink H, Van den Elsen L, Grol R, Van der Vleuten C. In-training assessment using direct observation of single-patient encounters: a literature review. *Adv Health Sci Educ Theory Pract* 2011;**16**:131-42.

76. Stone C, Boud D, Hager P. Assessment of osteopaths: developing a capability-based approach to reviewing readiness to practice. *Int J Osteopath Med* 2011;**14**:129-40.

77. Vaughan B, MacFarlane C, Florentine P. Clinical education in the osteopathy program at Victoria University. *Int J Osteopath Med* 2014;**17**:199-205.

78. Schuwirth LW, van der Vleuten CP. Programmatic assessment and Kane's validity perspective. *Med Educ* 2012;**46**:38-48.

79. Miller GE. The assessment of clinical skills/competence/performance. *Acad Med* 1990;**65**:910-7.

80. Boud D, and Associates. Assessment 2020: Seven propositions for assessment reform in higher education. Sydney. Australian Learning and Teaching Council. 2010.

81. Holmboe ES, Hawkins RE. *Practical guide to the evaluation of clinical competence*. Philadelphia, USA: Elsevier 2008.

82. Graham I. Personal communication2014.

ACKNOWLEDGEMENTS

We are grateful to Professor Iain Graham, School of Health and Human Science, SCU, Dr Peter Harris, Senior Lecturer, Office of Medical Education, UNSW, as well as Osteopathic Educators BJ Field and Sue Jenssen-Clare for their critique and advice on the manuscript.

Table 1. Items on the Record of Progress (ROP) form.

1. Learner has attended all shifts unless on approved leave
2. Learner's participation has been professional: punctuality, dress, interpersonal skills,
3. Learner demonstrated effective and comprehensive written communication skills
4. Learner has shown initiation and willingness to participate in clinical activities
5. Learner demonstrated teamwork: peer support, observation and rostered duties.