

Competence to capability: An integrated career framework for sonographers

MITCHELL, P. <<http://orcid.org/0000-0002-1533-2118>>, NIGHTINGALE, J. <<http://orcid.org/0000-0001-7006-0242>> and REEVES, Pauline

Available from Sheffield Hallam University Research Archive (SHURA) at:

<http://shura.shu.ac.uk/24716/>

This document is the author deposited version. You are advised to consult the publisher's version if you wish to cite from it.

Published version

MITCHELL, P., NIGHTINGALE, J. and REEVES, Pauline (2019). Competence to capability: An integrated career framework for sonographers. Radiography.

Copyright and re-use policy

See <http://shura.shu.ac.uk/information.html>

Competence to Capability: An Integrated Career Framework for Sonographers

Introduction

For more than a decade the UK radiography profession has adopted a career structure aligned to the four-tier service delivery model ¹, with a career escalator from assistant practitioner, through practitioner and advanced practitioner, to consultant practitioner. However, this model clearly does not encapsulate the career structure that has traditionally existed in sonography for some time. The four-tier model was aligned to the Agenda for Change (AfC) framework ² for pay-banding; AfC mapped the national job specification for sonographers at band 7 (advanced practitioner), arguing that technical skill, interpretation and the production of written reports required higher levels of knowledge and skills than those required for a band 6, specialist practitioner ³. As most of the sonographer workforce is mapped to an AfC band 7, the underpinning levels of practitioner or assistant practitioner expected within the career framework are absent. Indeed, Parker and Wolstenhulme ³ in their 2012 workforce review indicated that, although there were a few band 6 and assistant practitioners employed, these were in limited scope roles.

A longstanding vacancy crisis in sonography has resulted in workforce transformation becoming a government priority. The Centre for Workforce Intelligence (CfWI) ⁴ were commissioned to investigate the sonographer workforce in isolation from radiography and their findings, although not surprising, provided the impetus for healthcare commissioners to explore the introduction of the graduate sonographer practitioner to the career framework. The Society and College of Radiographers (SCoR) ⁵ indicated that a more in depth understanding of the role and clinical competences was required to facilitate the inclusion of the new grade of practitioner into the sonographer career framework.

This research study explored the attitudes and opinions of practising sonographers concerning the proposed introduction of the graduate sonographer role with particular focus on how they would align with the existing sonographer clinical competence framework. A previous article explored the emerging concepts of power and protectionism that accompanies a profession experiencing significant change ⁶. This subsequent article explores a small sample of sonographers' opinions on

clinical competences associated with sonographer practitioner (band 5) to consultant sonographer (band 8), in order to inform the development of an inclusive sonographer clinical competence framework.

Literature Review

There is little consensus as to the definition of clinical competence^{7,8,9,10,11,12}; the synonymous use of terms such as competence, competency, competencies, performance and capability add to the confusion. Clinical competences outlined in a professional standards framework facilitate the articulation and communication of the scope of practice that specific professionals are expected to perform at different levels. This defining of practice creates a unique professional identity, not only for the practitioner but also for the public^{12,13,14,15}. The competences outlined within professional standards are fundamental to safe practice and have a role in professional regulation, informing clinical practice and education planning^{13,16,17,18,19,20}. The standardisation of clinical competences is therefore vital to ensure equitable quality of care and safeguarding for the public^{12,20,21}. However, Southgate²² argued that formal standards were not appropriate for more complex clinical practice; while minimum threshold competences are useful in defining graduate, entry level professional roles and scope of practice, they are less appropriate when defining advanced clinical practice^{7,21,23}. Applying prescriptive competences beyond entry level registrants may therefore be problematic, with the notion of capability potentially being more appropriately applied to advanced practice^{7,9,10}.

Frameworks provide an opportunity to achieve professional consensus on core competences and a shared understanding of the scope and requirements of a clinical role^{24,25,26}. The purpose of a clinical competence framework is to focus on what a person could do and how they perform, measured against a standard, with the primary focus being on the knowledge and skills required. However, Lester²⁷, after reviewing 40 UK professional standards, concluded that the extent to which competence frameworks were fit for purpose was variable. This casts doubt on the effectiveness of professional clinical competence frameworks in articulating the scope and standard of practice of health professionals. Frameworks need to be

evidence based and reflect the current or (in the case of sonography) the future workforce. The threshold standards outlined in National Occupational Standards²⁸ (Skills for Health), used to define ultrasound practice were questionable due to the complex clinical situations found in ultrasound that require higher levels of skill^{13,22}. Competence measures the ability to undertake a task (knowledge and skill), not how to adapt and apply knowledge and skills to different situations, as required at advanced and consultant practice levels^{10,27,29,30}. This would suggest that, over time, practitioners develop from threshold competence to a higher level of practice; for these higher levels of practice a capability framework rather than a competence framework would be more appropriate.

Benner²⁹ was one of the first to explore professional practice progression in nursing and is still cited today, even though there has been wide debate and critique of the narrow interpretative nature of the study⁹. Benner²⁹ adapted the Dreyfus Model of Skill Acquisition; the terms of novice, advanced beginner, competent, proficient and expert were used to delineate the different levels of practice. The five levels depict a transition from protocol guided practice (competent practitioner) to intuitive and autonomous practice (capable practitioner). Direct comparisons from the Dreyfus model²⁹ to that of the four-tier model¹ are problematic but some similarities to the banding structure in the AfC framework² can be drawn. A clinical competence framework for sonographers would need to be sensitive to these existing models and frameworks, whilst adding 'real world' meaning to the framework by listening to the voice of sonographers about their working world. This qualitative study aimed to explore the attitudes and opinions of sonographers towards clinical competence frameworks and in particular towards the introduction of a graduate sonographer role.

Method

The study explored a group of sonographers' attitudes and opinions towards the role and associated clinical competences of the graduate sonographer using qualitative semi-structured interviews. Interviews in person were offered but in order to include respondents from a wider geographical location four interviews were carried out via telephone. Through the interpretation of the participants' responses the study aimed to provide new insights into the clinical career framework development for

sonography that would be acceptable to the existing workforce and inclusive for the new workforce.

Ethical considerations

The project was undertaken within the university's ethical governance framework. Ethical approval was gained from [institution name withheld] Research Degrees Ethics Committee [No. 2013/HWB/HSC/DPS/10]; NHS Research Ethics Committee approval was not required.

Population and Sampling

The researcher used theoretical purposive sampling of a homogeneous group of participants possessing the following characteristics: qualified sonographers; currently practising in the UK. Table 1 illustrates the sample population demographics. The participants were recruited from the SCoR voluntary register of sonographers (individual invitation letters), the research network LinkedIn (via an advert requesting participants) and personal approaches from the researcher.

An initial target of fifteen participants was anticipated prior to data collection, however each interview was transcribed within two days of the event enabling on-going comparison of the data; this facilitated an inductive approach to determining the sample size. Analysis, after the tenth interview, indicated a *redundancy* of the data as no new concepts were identified suggesting saturation had been achieved^{31,32,33}. It is acknowledged that the sample size was small and could be deemed a limitation of the study, however, Guest et al³⁴ argued that when a population sample was homogeneous with a relevant expertise in the field of study a sample size between 6-12 was able to achieve saturation.

Data Capture and Analysis

The data was gathered over a period of 12 months (2015-16) using semi-structured interviews which enabled the researcher (an experienced sonographer) to vary the order and probing of participant answers as required. However, an interview guide (figure 1) was used to ensure consistency with all participants asked the same core questions. The interviews were audio-recorded, each lasting approximately 45

minutes, and transcribed for thematic analysis by the lead researcher. Themes were then debated within the research team to enable consensus and further refinement.

Findings

The participants' responses were, in the main, in agreement irrespective of role or professional background. The participants were asked to consider the potential role and competencies for AfC band 5/graduate sonographers educated at BSc (Hons) level as well as those that already existed at AfC band 6, 7 and 8. The responses provided by the participants highlighted the interchangeable use of clinical competence and career frameworks; this could be interpreted to suggest that the participants felt the two concepts, although defining different aspects of a sonographer, were intertwined. Even though the participants were asked to express their own feelings and opinions, the participants consistently responded to questions using collectives such as "they" and "we"; this could be interpreted as the participants were expressing a third party opinion or that they were displaying a subconscious distancing from the ownership of their own opinion.

Major themes of power, protectionism and professional identity within the working world of sonography that emerged from this study have been presented in an earlier article ⁶. This article outlines the participants' perceptions of the challenges and opportunities concerned with the introduction of the graduate sonographer with its associated large-scale sonography workforce change. The themes included Implementing Change and Clinical Frameworks and, whilst discrete entities, they were linked to other themes (professional power and identity create an environment for protectionism to be fostered and change to be resisted; clinical frameworks provide articulation of professional identity). The notion of clinical competence was embedded across all of the themes, illustrating both linear and horizontal linkage (Figure 2: Coding diagram), and included a sub-theme of 'competence boundaries'.

Implementing Change

At the time of the data collection, the participants' perceptions of the stance of the sonographer community towards implementing any change to the clinical competence framework for sonographers were predominantly negative.

The quotations indicated below were prompted by the question “Is it possible to create a clinical competence framework that includes AfC Band 4-8 sonographer practice?”

“I think that will be the challenge in getting people to understand” (participant D)

“I think it would be extremely difficult to get everyone to agree” (participant B)

“Somebody who’s been in the profession for a long time and thinks it works just fine could be resistant to changing”. (participant A)

“I think they will find it difficult to understand” (participant E)

“...a lot of sonographers are resistant to change” (participant F)

However, two of the participants with responsibilities for workforce planning (departmental leads) shared the opinion that they thought change was overdue and inevitable.

“...I think there should be a career progression framework definitely for sonographers” (participant L)

“I know some of those areas are controversial, but I don’t think it should stop us looking at them” (participant A)

Clinical competence was discussed frequently by the participants, being coded on 109 occasions, yet there was an overall reluctance from all participants, irrespective of grade or role, to identify any role that a band 5/graduate sonographer could undertake:

“I don’t think there’s any role for a 5” (participant J)

“I think more work needs to be done on just what a band 5 would look like and what they can do” (participant A)

It was unclear as to whether this reluctance was a form of protectionism or if it indicated that the participants were struggling to articulate the competences as they had not previously had the opportunity to consider this role. However, the participants, rather than identifying competences for a graduate sonographer, focussed more on what a graduate could not do thereby creating competence boundaries.

“well I won’t want them left unsupervised for anything at all” (participant F)

“I can’t see this person working in isolation” (participant A)

“Certainly not writing their own reports” (participant F)

“certainly not thyroids with the new classification of thyroid masses” (participant F)

“Not gynae I wouldn’t have thought” (participant F)

The participant responses could be interpreted as reinforcing the value of their role as an advanced practice sonographer and protecting their position/status within the organisational hierarchy. Alternatively, as gatekeepers to their profession their caution and hesitancy may be seen as an important first step in the face of significant professional change.

In comparison to the caution expressed regarding the AfC Band 5 sonographer role, attitudes towards AfC Band 6 sonographer roles were more positive, demonstrating a willingness to consider clinical competences, even if within a narrow remit of practice. Once again, the majority of these positive responses were from clinical leads or managers who described competence and skills boundaries between AfC Bands 6 and 7. Arguably they may have had a different drive (fiscal and operational) for grading some sonographers at band 6 rather than all at band 7.

“6 has a narrow range of complex” (participant A)

“you could have them doing just something specific” (participant B)

“a 6 could have a range of examinations but not work independently” (participant L)

All the participants (irrespective of grade or role) expressed concerns that the recognition and value of their clinical practice and skills would be decreased if lower bandings were introduced to the sonographer career framework.

“I think there will be resistance because I think at the moment it’ll be seen as a dumbing down”. (participant A)

“they sometimes still feel that you are trying to undermine their errm their position and their achievement” (participant B)

“there are a lot of people feeling threatened that it’s a way of undermining them and devaluing them” (participant C)

“people will feel that you are valuing ultrasound less because you are giving it a lesser grade” (participant K)

Clinical Frameworks

There was some uncertainty amongst the participants as to what frameworks were in place (at the time of the interviews) and how they were implemented. There was also an agreement that the multiplicity of frameworks applicable to their work also increased confusion and lack of clarity.

“the professional body will write one document and the AfC Framework will say one thing and something else and the KSF says something else – it starts to get a bit confusing as to which one is right and which one you should use” (participant B)

“ we are trying to fit into something that isn't there ... Don't work for ultrasound” (participant D)

All participants were critical of the historical development and implementation of clinical frameworks within the health service and their application to the occupation of sonography:

“I mean the things we still use is the agenda for change which is a completely out of date and never was set up properly for sonographers in my view” (participant A).

“I think sometimes they, they can create problems and create a bit of confusion almost because you're trying to make a round peg go into a square hole” (participant B).

“...we're trying to get ultrasound to fit into a structure that works within radiography and physio and other professions, but they are professions, so we are trying to fit into something that's not there” (participant D)

The participants identified that the majority of the frameworks were framed around clinical competence. It was suggested by one participant that the challenge of applying these frameworks was that competency was perhaps not appropriate to define sonography advanced practice.

“I think there is a difference between assessing competency and assessing excellent practice... if I was assessing someone who is ... an advanced practitioner I would be looking for them to be an expert in their field” (Participant C).

Discussion

This qualitative study explores the potential introduction of an integrated sonographer career framework using clinical competence and capability that would facilitate effective workforce transformation. While this study yielded rich data related to the issues of implementing change there are nevertheless limitations that must be

acknowledged. Whilst attempting to capture a range of perspectives from within the professional community of sonography (academics, practitioners, managers etc), the numbers from each sub-group were small. Participants were drawn from several different regions of the UK, and many of their quotations were very similar to each other, suggesting that their views may have been representative, however as with most qualitative studies the findings cannot be generalised to the wider population. A further limitation of this study is that the participant interviews took place in 2015-16, at the start of a period of intense sonographer workforce development activity. While some negative attitudes towards the introduction of a graduate sonographer role were identified, further work undertaken by various professional organisations to shape and define the AfC Band 5 / 6 sonographer role may have helped to harness more optimistic and progressive attitudes within the sonographer community.

Whilst Cowan et al⁹ and O'Connell et al¹⁰ agreed that clinical competences provided the cornerstone for defining clinical roles, the appropriateness of the use of core clinical competences for defining the scope of practice of health professionals above entry level to the profession is questioned. At the time of writing, sonographers normally entered the profession at AfC Band 7; being aligned to the Four Tier Model at advanced practitioner. Whilst the concept of advanced practitioner and entrant to the profession are at odds with each other it is argued that the use of competence measures to define the role was at this time appropriate. However, with the introduction of the graduate sonographers to the workforce creating a new entry point to the profession it could be argued that the evolving clinical skills of the AfC Band 7 sonographers would need to be aligned to capabilities, rather than competences, that better reflected the more complex clinical skills required at this level of practice. This was also the viewpoint of one of the participants.

Suggestions that capability was more appropriate for defining advanced practice were fully endorsed by Benner²⁹, who explored the continuum of novice to expert practitioner. Career frameworks consistently used competences as a measure of clinical practice, however, if a complete integrated framework for sonography was to be developed then the debate for using competence and capability to illustrate a hierarchy of clinical skills would be justified. The increasing value and status created by the hierarchy of clinical skills could potentially reduce the fear of professional loss

that reinforced the protectionism associated with the demarcation of clinical competences ⁶.

The concept of the continuum of progression from competent to capable practitioner, introduced by Benner²⁹, suggested that there were important differences between a novice practitioner who was newly registered (graduate) and an advanced practitioner especially when defining competence. The hierarchy of clinical competence was supported by O'Connell ¹⁰ who suggested that competences by their very nature were prescriptive and not relevant to advanced practice where complexities of clinical practice were not addressed. The complexity found within sonographer advanced practice roles could explain why the participant sonographers found it difficult (rather than being resistant) to breakdown clinical competences that a lower grade could undertake and was therefore not, necessarily, a mechanism of protectionism.

Sonographers (at the time of writing) did not enter the profession at graduate level where threshold competences were argued to more accurately define the clinical role ^{12,22}. Evidence from literature and the research findings suggested that sonographers traditionally entered sonography at AfC band 7 with some graded at band 6 when scope of practice was limited to one area of ultrasound speciality ^{3,35}. The grading, at point of qualification as a sonographer, could be argued (using the Dreyfus model) to be inappropriate; newly qualified sonographers were novice practitioners by definition. Commencing their sonographer career at a banding that aligns to the Four Tier Model advanced practitioner is unlikely to reflect the expected level of skill across all four domains of advanced clinical practice³⁶ or meet the SCoR requirements for advanced practice accreditation³⁷. This argument supports the participants' perspective that the frameworks used to define sonographer practice were indeed not fit for purpose.

Clinical competences, as previously alluded to, were commonly used to map clinical roles and scope of practice within frameworks across a range of levels of performance within health care ²⁶. The research findings suggested that, although there were many frameworks cited by the participants and used within health care,

the participants all agreed there was not (at the time of data collection) a clinical competence framework dedicated to defining and mapping the sonographer roles.

The Dreyfus model (used by Benner ²⁹) created an inclusive framework that acknowledged the range of scope of practice within an occupation, which arguably creates a sense of increasing value and status to each level of practitioner. The participant feedback, set alongside the Dreyfus model, suggests that a career framework for sonography using competence to determine the scope of practice for the graduate sonographer (point of entry to sonography) and capability for the scope of practice of existing advanced practice sonographers (thus recognising the increasing complexity and value of the clinical skills), has the potential to reduce the resistance exhibited toward the role of the graduate sonographer.

The participants were most familiar with the AfC framework² and the four-tier model¹. Both frameworks aimed to create a more standardized approach to grading of practice, the definition of clinical roles and scope of practice. Whilst the four-tier model¹ and AfC framework² were adopted by service providers, the participants argued that they were irrelevant to sonography. Most sonographers were graded band 7 (advanced practitioner) with a few sonographers employed at band 6 due to a limited scope of practice. Anecdotally a recent trend to bolster recruitment and retention had emerged in some regions of England, awarding band 8 to sonographers who were not in a consultant sonographer or management role. The lower band 4 (assistant practitioner) and band 5 (practitioner roles) in the frameworks were redundant within the provision of symptomatic ultrasound services.

The Dreyfus Skills Acquisition model was argued to support the continuum of practice from competent to capable practitioner more effectively than a competence only framework^{10,29}. An advanced practice sonographer (band 7), using capability as a measure, would be at the proficient level of practice and a consultant sonographer (band 8) would be at expert level. Furthermore, if using the suggested framework outlined in Table 2, it would be possible to map the graduate sonographer role (after preceptorship sign off) to a band 6 rather than a band 5. The requirements of the preceptorship would require further debate.

The explicit articulation and obvious delineation between the different levels of expected sonographer practice within such a framework could foster a more positive attitude toward the implementation of the graduate sonographer role. Terminology used to identify a professional group is fiercely protected; it is argued that the articulation of competence, for graduate practitioners, and capability, for advanced practitioners would provide a progressive hierarchy of clinical value that would be more acceptable to the existing workforce and reduce resistance to the implementation of graduate practitioner sonographers.

At the time that this study was completed, Health Education England, British Medical Ultrasound Society and the Society and College of Radiographers had joined to propose a new inclusive career structure for sonography from graduate to consultant practitioner with associated academic requirements for each level³⁸; the career structure has yet to be fully endorsed but will, instead of referring to banding, use career level 5, 6, 7 & 8 as descriptors moving to a more integrated framework.

In order to facilitate the implementation of the new sonographer framework, the Consortium for the Accreditation of Sonographic Education (CASE) made a constitutional change from only accrediting level 7 education programmes to developing new standards of education for academic level 6³⁹. Furthermore, CASE have defined the Proficiency Standards for the Sonographer Practitioner³⁹, aligned to the National Occupational Standards (2019)⁴⁰; this provided the much-needed clarity concerning the expected clinical skills for each career level. The adoption of the model of competence and capability, as defined in Table 2, into the career level structure and the education standards would provide the relevance to practice that has long been missing for sonography.

Conclusion

Two themes of Implementing Change and Clinical Frameworks have emerged to describe sonographer participants' attitudes and concerns towards the introduction of a graduate sonographer role. While those with a 'manager' role identified the need for a new sonographer framework, all participants struggled to clearly articulate a graduate, AfC band 5, role, instead preferring to focus on threshold limitations of the activities they could not perform. AfC Band 6 competences were more clearly

articulated as a progression of clinical skills towards the AfC Band 7 which has alignment with advanced practice.

With the advent of the introduction of the graduate sonographer practitioner there is an opportunity for sonography to develop an integrated framework that is more reflective of the workforce with explicit aligning to competence and capability standards. The competence to capability model, if incorporated into the sonographer framework currently in development by Health Education England, British Medical Ultrasound Society and the Society and College of Radiographers, would maintain the professional identity differentiation between graduate sonographer clinical skills (assessed by competence) and advanced practice sonographer complex clinical skills (defined by capability) and facilitate effective mapping to the new ACP Framework³⁶.

References

1. Department of Health. *Radiography Skills mix. A Report on the four-tier service delivery model*. London: Department of Health. 2003.
2. Department of Health. *Agenda for Change*. 2004.
http://webarchive.nationalarchives.gov.uk/20080805202245/dh.gov.uk/n/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidancDH_4095943
3. Parker, P. & Wolstenhulme, S. A Workforce review in diagnostic ultrasound. *Ultrasound*. 2012; 20: 165-170.
4. Centre for Workforce Intelligence. *Securing the future workforce supply: Sonography workforce review*. (2017). <http://www.cfw.org.uk>
5. Society of Radiographers. *Education and Career Framework for the Radiography Workforce*. 2013.
http://www.sor.org/learning/document_library/education-and-career-framework-radiography-workforce
6. Mitchell, P.A. & Nightingale, J. Sonography Culture: Power and Protectionism. *Radiography*. 2019
<https://doi.org/10.1016/j.radi.2019.02.004>
7. Banning, M. Educating for capability in NMP education and training. *Nurse Prescribing*. 2012;10 (3): 148 - 153
8. Cassidy, S. Interpretation of competence in student assessment. *Nursing Standard*. 2009; 23 (18): 39 - 46
9. Cowan, D.T., Norman, I. & Coopamah, V.P. Competence in nursing practice: A controversial concept – A focused review of literature. *Accident and Emergency Nursing*. 2007; 15: 20-26.
10. O'Connell, J., Gardner, G. & Coyer, F. Beyond competencies: using a capability framework in developing practice standards for advanced practice nursing. *Journal of Advanced Nursing*. 2014; 1: 2728-2735.

11. Windsor, C., Douglas, C. & Harvey, T. Nursing and competencies – a natural fit: the politics of skill/competency formation in nursing. *Nursing Inquiry*. 2011; 19 (3): 213-222.
12. Epstein, R.M. & Hundert, E.M. Defining and Assessing Professional Competence. *The Journal of the American Medical Association*. 2002; 287 (2): 226 -235.
13. Chiarella, M., Thoms, D., Lau, C. & McInnes. E. An overview of the competency movement in nursing and midwifery. *Collegian*. 2008; 15: 45-53.
14. Homer, C.S.E., Passant, L., Kildea, S., Pincombe, J., Thorogood, C., Leap, N. & Brodie, P.M. The development of national competency standards for the midwife in Australia. *Midwifery*. 2007; 23: 350-360.
15. Singh, G., Lucas, M., Dolan, L., Knight, S., Ramage, C. & Toozs H.P. Minimum Standards for Urodynamic Practice in the UK. *Neurology and Urodynamics*. 2010; 29:1365-1372.
16. Bulley, C. & Donaghy, M. Sports physiotherapy standards: A minimum threshold of performance. *Physical Therapy in Sport*. 2005; 6: 201-207.
17. Gardner, G., Carryer, J., Gardner, A. & Dunn, S. Nurse Practitioner competency standards: Findings from collaborative Australian and New Zealand research. *International Journal of Nursing Studies*. 2005; 43: 601- 610.
18. Health & Care Professions Council. Standards of Proficiency: Radiographers. 2013.
http://www.hpcuk.org/assets/documents/10000DBDStandards_of_ProficiencyRadiographers.pdf
19. Victorian Government. *Allied Health: credentialing, competency and capability framework. Driving effective workforce practice in a changing health environment*. Australia. 2014.
20. Baker, R. Professional regulation: Developing standards, criteria and thresholds to assess fitness to practise. *British Medical Journal*. 2006; 332: 230-232.
21. Turrill, S. The education of UK specialized neonatal nurses: Reviewing the rationale for creating a standard competency framework. *Nurse Education in Practice*. 2014; 14: 504-511.
22. Southgate, L., Hays, R.B., Norcini, J., Mulholland, H., Ayers, B., Woolliscroft, J., Cusimano, M., Mcavoy, P., Ainsworth, M., Haist, S. & Campbell, M. Setting performance standards for medical practice: a theoretical framework. *Medical Education*. 2001; 35: 474 – 481.
23. Butler, M., Fraser, M. & Murphy, R.J.L. What are the essential competencies required of a midwife at the point of registration? *Midwifery*. 2008; 24: 260-269.
24. Department of Health. Report to the National Allied Health Professional Advisory Board on the outcomes of the Modernizing Allied Health Professional Careers Programme. 2011.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/215721/dh_124803.pdf
25. Green, T., Dickerson, C. & Blass, E. Using competences and competence tools in workforce development. *British journal of Nursing*. 2010; 19 (20): 1293 – 1299.

26. Verma, S., Paterson, M. & Medves, J. Core competencies for Health Care Professionals. *Journal of Allied Health*. 2005; 35 (2): 109 -115.
27. Lester, S. (Professional competence standards and frameworks in the United Kingdom. *Assessment & Evaluation in Higher Education*. 2014; 39 (1): 38–52.
28. Skills for Health. 2019. <http://www.skillsforhealth.org.uk/standards/item/215-national-occupational-standards>
29. Benner, P. From Novice to Expert. *American Journal of Nursing*. March: 1984. 402-407.
30. Zasadny, M.F. & Bull, R.M. Assessing competence in undergraduate nursing students: The Amalgamated Students Assessment in Practice model. *Nurse Education in Practice*. 2015; 15: 126 – 133
31. Charmaz K. Grounded Theory: Objectivist and Constructivist Methods. In Denzin NK, Lincoln YS (eds) *Strategies for Qualitative Inquiry* (2nd Edition). Thousand Oaks, CA: Sage Publications 2003
32. Gray DE. *Doing Research in the Real World* (3rd ed.). London, Sage 2014
33. DePoy E, Gitlin LN. *Introduction to Research. Understanding and Applying Multiple Strategies*. (5th ed.). Missouri, USA. Elsevier 2016
34. Guest, G., Bunce, A. & Johnson, L. How Many Interviews Are Enough? An Experiment with Data Saturation and Variability? *Field Methods*. 2006;18 (1): 59 -81.
35. Parker, P. & Harrison, G. Educating the Future Sonographic Workforce: Membership Survey Report from the British Medical Ultrasound Society. *Ultrasound*. 2015; 1: 11.
36. Health Education England. Multi-professional framework for advanced clinical practice in England. 2017. <https://www.hee.nhs.uk>
37. Society & College of Radiographers. *Education and Professional Development Strategy: New Directions*. March; 2010.
38. Health Education England. <https://www.hee.nhs.uk/our-work/sonography> Accessed 17.04.19
39. Consortium for the Accreditation of Sonographic Education. Standards for Sonographic Education. CASE June 2018
40. Skills for Health. “National Occupational Standards for Sonography” www.skillsforhealth.org.uk May 2019.