Transnational comparability of advanced pharmacy practice developmental frameworks: A country-level crossover mapping study.

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First published: 4 January 2018
DOI: 10.1111/ijpp.12427

Abstract

**Background:** Previous work by the International Pharmaceutical Federation Education Initiative (FIPEd) demonstrates that even though some country-specific variations occur in pharmacy practice, there exists a set of practice-related competencies that are globally applicable. This study aimed to evaluate the transnational comparability of the Royal Pharmaceutical Society Advanced Pharmacy Framework (RPS-APF, Great Britain), and the Advanced Pharmacy Practice Framework for Australia (APPF). The objective was to obtain preliminary data on the transnational applicability of the developmental competencies contained in the two frameworks.

**Method:** A crossover mapping study involving 42 advanced level pharmacists from four countries was conducted. Qualitative interview (n=17) was also carried out to explore practitioners' perception of the frameworks.

**Result:** The average post-registration experience of the practitioners in the crossover study was 19 years. Directly observed within-subject agreement per advanced practice competency ranged from 45% to 86%. This agreement was significant for 87% of the competencies evaluated ($k \geq 0.21$; $p \leq 0.05$). The lowest agreement was in the “governance” competency ($k=0.13$; $p=0.21$). Wilcoxon sum rank test showed a statistically significant within-subject difference in the “collaborative practice” cluster ($p=0.043$). This was not observed in the other five advanced practice clusters. From the qualitative interviews, practitioners generally perceived the two compared advanced level frameworks as similar in content and indicated they found the described competencies to be useful for clarifying expectations of practice and identifying skills development needs.

**Conclusion:** These findings provide preliminary evidence of the comparability and
transnational applicability of the advanced pharmacy practice competencies contained in the two national competency development frameworks evaluated.
Introduction

The International Pharmaceutical Federation Education Initiative (FIPEd) developed the FIP Global Competency Framework (GbCF v1) in 2012\(^1\). This framework was specifically designed to provide global guidance on the practice-based expectations of foundation level pharmacy practice. In this context, foundation level practice refers to pharmacists with generally less than three years post-registration experience, or those returning to practice. Ongoing validation of this developmental framework has demonstrated the relevance and validity of the GbCF v1 competencies in 64 countries around the world\(^2\). This suggests that even though some country-specific variations occur in pharmacy practice, there exists a set of practice-related competencies that are globally applicable for foundation practice development.

The finding is in line with existing evidence from the field of medicine that has shown transnational applicability of the Canadian CanMEDS Physician Competency Framework to medical practice in Netherlands\(^3\), Denmark\(^{4,5}\) and Australia\(^6\). It also corroborates evidence from previous research that demonstrate the applicability of the General Level Framework (developed in the United Kingdom, a precursor to the Foundation Pharmacy Framework\(^7\)) to pharmacy practice in Croatia\(^8\), Serbia\(^9\), Australia\(^10\) and Singapore\(^11\).

Since its development, the GbCF v1 has been successfully used to design pre-service education and training curriculum for undergraduate pharmacy students\(^12\). Also, Ireland\(^13\), the Pacific Island Countries\(^14\), Serbia and Singapore have developed national frameworks for foundation pharmacy level that are linked to the GbCF v1\(^12\). The transnational validation of the GbCF v1 alongside similar evidence from the field of medicine underscores the feasibility and relevance of a developmental framework that maps the expectations of professional practice for a global pharmacy workforce. Further work is necessary to identify the transnational validity of the core competencies required of an advanced (post foundation) pharmacy workforce.

Advanced pharmacy practice is generally held as that relating to practice that is implicitly different from that achieved at initial registration\(^15\). Advanced practice can be, or should be, demonstrably more complex with higher associated capabilities which can be professionally recognised. This is particularly important in view of the global changing healthcare environments where aging populations have resulted in increased prevalence of chronic and co-morbid diseases that demand complex care services. Therefore, the availability of a
pharmacy workforce that is capable of providing complex evidenced-based medicines expertise and pharmaceutical care services is essential.

A global survey of pharmacy organisations and professional bodies conducted by FIPEd identified the existence of practitioner development frameworks for pharmacy practice in twenty-seven countries. United Kingdom and Australia were the two countries with published national developmental frameworks for advanced pharmacy practice. The frameworks: the Royal Pharmaceutical Society Advanced Pharmacy Framework (RPS-APF) and the Advanced Pharmacy Practice Framework for Australia (APPF), were developed and mapped to population needs in United Kingdom and Australia respectively. Further systematic literature searching, and a survey conducted in 2015 (updated in 2016), did not yield additional published national frameworks for advanced pharmacy practice, even though some countries indicated the existence and national recognition of pharmacy specialties.

Content mapping, via a thematic analysis technique identified six competency themes (these were the competency “clusters”) and 30 sub-themes (these were the developmental – or behavioural competencies) common to the RPS-APF and APPF frameworks. In total, 64 advanced pharmacy practice competencies were identified in the two frameworks with 34 contained in the RPS-APF and 30 in the APPF. These competencies were commonly described across three “levels” or “stages” of advanced pharmacy practice in both frameworks: ‘advanced stage I’, ‘advanced stage II’, and ‘mastery’ in the RPS-APF; and ‘transition’, ‘consolidation’, and ‘advanced level’ in the APPF (Appendix 1).

A matrix of the competencies and descriptors in the RPS-APF cross-matched semantically with corresponding competencies and descriptors in the APPF was created from the mapping process (Appendix 2). The output of the framework mapping was presented to a panel of international pharmacy experts (n=14) from nine countries for a review. Consensus from the expert group developed via a modified Delphi technique indicated broad similarity in advanced practice competencies and descriptors between the two frameworks, further corroborating existing evidence.

The goal of this study was to evaluate the transnational comparability of the two frameworks. The objective was to obtain preliminary data on transnational applicability of the developmental competencies contained in these advanced level frameworks.
Method

This study was conducted in two phases. Phase 1 was a crossover study while qualitative interviews were conducted in phase 2.

Sampling and data collection

A convenience sample of practitioners from New Zealand, United Kingdom, Australia and Ireland was used for this study. These were the countries identified to be actively involved in formal articulation of advanced level pharmacy practice\textsuperscript{16}. The pharmacy professional bodies in these countries assisted with the project by disseminating study invitations to their respective members via email. Participating organisations were the Pharmaceutical Society of Australia (PSA), Society of Hospital Pharmacists of Australia (SHPA), Royal Pharmaceutical Society of Great Britain, United Kingdom Clinical Pharmacy Association (UKCPA) and Pharmaceutical Society of New Zealand (PSNZ). A minimum practice experience threshold of 5 years was chosen for this study based on the consensus definition of advanced pharmacy practice\textsuperscript{18(p11)}. Interested practitioners were requested to contact the study authors AU or AB using the details included in the invitation. Practitioners who expressed interest to participate were assessed for eligibility. Consent and enrollment forms were then forwarded by AU to the eligible practitioners with enrollment completed on receipt of the signed forms. This study was conducted between February and August 2014 with none of the participants indicating they had undergone prior advanced practice credentialing in Australia or Great Britain. Figure 1 shows flow chart of the participant recruitment process.

Crossover study design

A simple random allocation software was used to randomise study participants to either of two groups: A or B. Participants self-assessed and mapped their practice on to one of the identified frameworks at a specified time (T\textsubscript{1}). After a three-month ‘wash out’ period, the same group of practitioners then carried out a second self-assessment using the alternative framework (T\textsubscript{2}). The three-month washout period between the first and second assessment was calculated respectively for each participant.

Each framework was fully reproduced and distributed via email as a questionnaire with the inclusion of checkboxes for use by participants to self-assess their level of practice for each competency (please see supplementary material Appendix 3 and 4). Participants used the checkboxes provided to indicate their self-assessed level of practice per competency including...
the type of ‘portfolio’ evidence they had available to support their assessment. A checklist of 12 sample portfolio evidences was provided for each of the competencies with participants required to check as many evidence categories as available to support their individual assessment. Completed documents were returned electronically.

**Interviews**

The participants who completed the two self-assessments required for the study were invited via email to participate in a semi-structured telephone interview. Interview time was agreed between AU and each participant who indicated willingness to be interviewed. An email reminder was forwarded to each participant prior to the interview date. The aim of the interview was to explore participant perception of the two frameworks used with respect to content and layout. It also aimed to obtain input on the self-assessment process (please see interview schedule in appendix 5). Participants were interviewed until redundancy. Verbal consent for audio recording was obtained from the participants at the start of the conversation. The telephone interviews each lasted for 15-20 minutes and the recordings were transcribed verbatim. A copy of the interview transcript was forwarded to the respective participants to confirm validity.

**Data analysis**

The matrix of competencies created from the initial semantic framework mapping \(^{19}\) (Appendix 2) was used for the analysis. The objective of the analysis was to assess individual ranking of matching competencies in the two frameworks. Within-subject agreement in ranking between matching competencies in the frameworks was assumed to be indicative of parity for that competency. Observed agreement was expressed using percentages. Kappa statistic (k) was used to evaluate chance-corrected within-subject agreement (statistical significance was set at \(P \leq 0.05\)). Values of \(0 < k < 0.20\) indicated *slight or poor* agreement; \(0.21 < k < 0.40\) *fair* agreement; \(0.41 < k < 0.60\) *moderate* agreement; \(0.61 < k < 0.80\) *substantial or good* agreement; \(k \geq 0.81\) *excellent* agreement; and \(k = 1\) indicated *perfect* statistical agreement \(^{21-23}\). Exploratory analysis using the Wilcoxon sum-ranked test was also conducted to evaluate difference in within-subject ranking of competencies.
The interview transcripts obtained in the second part of this study were coded and analysed using a thematic analysis technique as previously described by Braun and Clarke. The thematic coding was conducted independently by AU and AB with the results compared to ensure credibility and reliability.
Results

Crossover mapping study

Demography

After randomisation, twelve participants indicated they were unable to complete the first assessment within the time required and dropped out. Also, two other participants were unable to complete the second assessment due to role changes and these also dropped out of the study.

In total, 42 pharmacists from four countries completed the two self-assessments required for the crossover study (Table 1). This included 15 participants each from Australia and New Zealand, 11 from United Kingdom and one participant from Ireland. Majority (93%) of the study participants were in hospital practice. Community, academic and primary care pharmacy practice each had one participant represented. Mean length of practice was 19 years [SD: 11; Min-Max: 5-52 years]. More than half (57%) of the study participants indicated they were leading-edge practitioners (please see Appendix 1 for definition of level of practice).

Observed agreement ranged from 45% (N=19) in the 'national priorities' competency to 86% (N=36) in the 'reasoning & judgement' competency (Table 2). The k-values indicated fair (0.21<k<0.40) to moderate (0.41<k<0.60) agreement for a majority (n=26 (87%)) of the matching competencies evaluated. The k-values were also significant (p<0.05) for all of the competencies, except the 'governance' and 'national priorities' competencies (Table 2). Wilcoxon sum-rank test showed a statistically significant within-subject difference in the collaborative practice cluster (p=0.043). This was not observed in the other five clusters, although the median ranks were lower in the first assessment for the ‘leadership’, ‘management’ and ‘evaluation and research’ clusters (Table 3).

Disparity in the evidence used to support self-assessment was observed between the three cadres of advanced practice described in the two frameworks and across the identified clusters. Although the 95%CI overlapped, the trend did indicate that “leading edge” practitioners are more likely to be members of international, or regional committees, and are more likely to be involved in research. This is in contrast to the “experienced” practitioners who were mostly involved in staff management and in education and teaching roles. “Specialist-in-training” practitioners were generally least able to support their self-assessments (Figure 2 and 3).
Qualitative Interviews (phase 2 of the study)

This included seventeen participants in total with participants from the four countries in the study represented (7 from Australia, 4 from New Zealand, 5 from United Kingdom and 1 from Ireland).

Prior self-assessment experience

Most of the interviewees (53%) did not have formal self-assessment experience prior to the study.

No, this was the first time I have done a self-assessment. Ever since I completed my post-graduate diploma, which was basically mapped against the General Level Framework of the United Kingdom, I haven’t used anything else to sort of guide my development or see where I am. So this was the very first time that I had to use slightly different tools to look at my practice.

A48, experienced practitioner, UK

Some of those with no prior self-assessment experience were interested and motivated to do so in this study because they thought it would be a useful process.

'No, I have never done something (self-assessment) like this before. Though I have been in a management position for just over two years; I never thought of doing something like this ... when I saw the advertisement by our hospital pharmacy society, I thought it would be useful to give it a go, just to see where my practice was'.

A55, leading edge practitioner, Australia

Perceptions about the frameworks

The interviewees indicated they thought the two frameworks were similar in description of competencies.

'... Without being too detailed, I think they were both quite similar in a lot of ways. There was a lot of duplication between them ... generally I would say that the wordings of the framework were quite similar'.
B33, leading edge practitioner, Ireland

'I found the frameworks to be very similar and didn’t really see much difference. I know there was some gaps between doing the two assessments, but I do recall finding them to be similar in terms of wordings and description.'

B50, leading edge practitioner, New Zealand

They however reported some difficulties completing the framework in the first round but were more comfortable with the self-assessment process in the second round.

'A felt a bit lost the first time; I thought it was a bit difficult to comprehend. But by the second time I was quite familiar with the logic of the framework and knew what to do.'

A55, leading edge practitioner, Australia

'Even though I was quite familiar with the frameworks and evidence, I found it time consuming and difficult to do. I would say it was difficult to really get an accurate picture of it without spending a lot of time putting some sort of reflection into it, which is what I did in the first round. But by the second time I didn’t have to reflect so much on what the statements meant and what evidence to include since I had already gone through the process.'

B5, leading edge practitioner, UK

Some thought reflection and exposure to the framework in the first round might have made completing the second assessment easier.

'B When I first saw the framework, I thought wow … it felt a little bit overwhelming but when I read through the instructions and gave myself time to reflect, I felt more comfortable. The second round was a lot easier maybe because I sort of knew what the format was.'

B11, leading edge practitioner, New Zealand
Others specifically expressed difficulty with identifying appropriate evidence for use in supporting self-assessment.

What I did find slightly difficult was selecting the right categories that my evidence goes into. I had to refer back to information you sent about all the different meanings and I don’t think all my evidence kind of neatly fitted into all the categories that were given. So, that probably was more difficult'.

A35, experienced practitioner, Australia,

They also indicated that this initial difficulty might have resulted in them underestimating their perceived level of competence on some competencies.

'I had an incidence the other day involving a work colleague ... in the end I found myself thinking that maybe I had underestimated my competence. I found myself thinking that may be if I actually searched through my hard drive and found everything I have done, maybe I would have more evidence than I gave myself credit for'.

A35, experienced practitioner, Australia

Impact and relevance of the framework and self-assessment process

The interviewees generally had positive opinions about the self-assessment process. They found the assessments to be useful in identifying practice gaps while also providing a road map for practice development.

'I found the two self-assessments useful in identifying gaps in my practice that may limit my ability to become an advance practitioner. They also pointed out for me areas of advance practice that my current position does not offer, example master level competencies and making an impact at a national level'.

A21, leading edge practitioner, Australia
'It was a useful process because it helped me identify some areas where I haven’t done any particular work for one reason or the other; it gave me ideas about developing my practice in those areas'.

A48, experienced practitioner, UK

'It made me more conscious and a bit more aware of the things that I was doing. I suppose it gave me a little bit of perspective about where I was and so that was useful. It made me think about the scope or areas that I could be contributing to rather than just the clinical stuffs.'

A51, leading edge practitioner, Australia

'I found the framework to be a methodical way to look at a portfolio of professional activity. I don’t think I would intuitively look at all the different dimensions and areas that the framework prompted me to do. So I actually found that very constructive and really useful and made me realise the breath of activity and how they could contribute to making me a better practitioner'.

B33, leading edge practitioner, Ireland
Discussion

The results of the crossover study showed observed and chance corrected agreement for the majority (87%) of the developmental competencies in the national frameworks. Although the chance corrected agreement was relatively lower than the observed agreement (Table 2), this may be due to the known k-statistic property of generally underestimating observed agreement\textsuperscript{25,26}. While there were inconsistencies in the ranking of competencies in three of the clusters evaluated (Table 3), the results of the Wilcoxon signed-ranked test showed these were not statistically significant in all but one competency in the frameworks.

The convenience sampling technique and the use of self-selected participants in this study limits the generalisability of the findings, especially because studies show that self-selected participants are likely to be more intrinsically motivated than the general population\textsuperscript{34}. Given that majority (93%) of the study participants were in hospital practice, future research involving advanced pharmacy practitioners from practice areas like community, academic and industrial pharmacy, and from other countries not represented is needed to add to the evidence base. Similarities between the pharmacy practice model in United Kingdom, Australia and New Zealand may be another source of bias in this study. However, with emerging evidence showing broad similarities in pharmacy practice-related competencies globally\textsuperscript{2}, it can be argued that the results are likely to be applicable to practice in mid- and low income countries.

Even though the overall study results showed inconsistencies in ranking that were not statistically significant; the output in the analysis does indicate that the participants were likely to underestimate their ‘level’ competence in the first assessment. It suggests an initial lack of self-awareness of the breadth and depth of practice prior to exposure to the framework. This corroborates the results from the qualitative interviews which indicated that the opportunity for reflection and exposure to the competencies in the first ‘exposed’ framework likely aided accurate assessment of competence with the second exposure to a framework. Evidence from published literature\textsuperscript{27} suggest this may be due to task familiarity in the second assessment. This finding is in contrast to existing evidence\textsuperscript{28} indicating that “learners” tend to overestimate their abilities, although, the authors of the study also reported that overestimation was generally attenuated by further training and increased self-awareness of gaps in practice (which may be more particularly important with foundation – or less experienced – ‘learners’ and not generalizable to advanced, experienced practitioners).
Furthermore, since the results in this study showed that some of the study participants ranked their practice higher in the second self-assessment (Table 3), it is possible that the opportunity for reflection provided by the first assessment may have heightened self-awareness of depth and limitation of practice. Evidence from the qualitative interviews corroborates this finding; further emphasising the need to promote reflective practice and routine self-assessment for continually developing pharmacy practitioners. Reflective practice can promote self-awareness of gaps in practice and facilitate self-directed learning for continuous professional development. Potentially, it could ensure that pharmacists are continuously self-aware of their capabilities and possibly provide the motivation and confidence needed to take on more responsibilities. Ultimately, this would aid the efficient use of available pharmaceutical skills and expertise, and is the prima facie reason for the use of developmental frameworks as a continuous career skill escalator tool.

On the other hand, the observed change in ranking may have been potentiated by the carryover effect inherent in crossover studies. This is in line with evidence that demonstrate improvement in understanding and greater confidence in perceived level of competence after a four-day competency-based training workshop involving a group of health professionals.

Evaluation of the evidence used to support self-assessment demonstrates the two frameworks are capable of differentiating between the three distinct cadres of advanced pharmacy practice identified in the two frameworks. This corroborates evidence from previous research and is in line with the practice profile expected of the different cadres of advanced practitioners. Overall, the study results indicate a minimal disparity between the competencies in the two national frameworks and demonstrates a commonality of advanced developmental competencies that are applicable for advanced pharmacy practice in different countries as suggested by previous research. From a policy perspective, the initial difficulties with using and understanding the terms in the frameworks suggests that training on the self-assessment process and the use of frameworks is essential and this will assist in ensuring that these tools are used effectively by practitioners.

Conclusion

This study provides preliminary evidence of transnational applicability of the competencies in two nationally developed advanced practice frameworks (the RPS-APF and the Australian...
APPF). In light of similar evidence from other studies looking at specific and specialized competencies, our results also suggest that the two advanced pharmacy frameworks evaluated here can be used as core mapping tools for the development of other country-specific frameworks.
REFERENCES


Figure 1: Flow chart showing participant recruitment

Pharmacy organisations approached (N=4)

Pharmacists assessed for eligibility (N=59)

Declined (N=4)

Enrolled, consented and randomised (N=56)

Dropout (N=12)

Completed first self-assessment (N=44)

Dropout (N=2)

Completed second self-assessment (N=42)

Programme: (Word/Mac)
Figure 2: Evidence used to support self-assessment in the Expertise and Expert skills cluster

Programme: (SPSS/Mac)
Figure 3: Evidence used to support self-assessment in the Evaluation and Research cluster

Programme: (SPSS/Mac)
<table>
<thead>
<tr>
<th>Level of practice</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialist-in-training</td>
<td>8 (19)</td>
</tr>
<tr>
<td>Experienced practitioner</td>
<td>10 (24)</td>
</tr>
<tr>
<td>Leading-edge practitioner</td>
<td>24 (57)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>42 (100)</td>
</tr>
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</table>
Table 2: Within-subject Agreement per Competency

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Competencies</th>
<th>N Agreement (%)</th>
<th>K statistic (P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expertise and Expert skills</td>
<td>Expert skills</td>
<td>28 (67)</td>
<td>0.424 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Delivery of expertise</td>
<td>23 (55)</td>
<td>0.253 (0.024)</td>
</tr>
<tr>
<td></td>
<td>Professional autonomy</td>
<td>32 (76)</td>
<td>0.516 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Reasoning &amp; Judgement</td>
<td>36 (86)</td>
<td>0.725 (&lt;0.001)</td>
</tr>
<tr>
<td>Collaborative practice</td>
<td>Communication</td>
<td>27 (64)</td>
<td>0.376 (0.002)</td>
</tr>
<tr>
<td></td>
<td>Team work</td>
<td>27 (64)</td>
<td>0.352 (0.004)</td>
</tr>
<tr>
<td>Leadership</td>
<td>Strategic context &amp; planning</td>
<td>28 (67)</td>
<td>0.426 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Governance</td>
<td>18 (43)</td>
<td>0.130 (0.214)</td>
</tr>
<tr>
<td></td>
<td>Vision</td>
<td>29 (69)</td>
<td>0.558 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Innovation &amp; service development</td>
<td>27 (64)</td>
<td>0.455 (0.001)</td>
</tr>
<tr>
<td></td>
<td>Motivation</td>
<td>23 (55)</td>
<td>0.227 (0.044)</td>
</tr>
<tr>
<td>Management</td>
<td>National priorities</td>
<td>19 (45)</td>
<td>0.161 (0.098)</td>
</tr>
<tr>
<td></td>
<td>Resource utilisation</td>
<td>28 (67)</td>
<td>0.479 (&lt;0.001)</td>
</tr>
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<td></td>
<td>Standards of practice</td>
<td>24 (57)</td>
<td>0.34 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Managing risk</td>
<td>23 (55)</td>
<td>0.328 (0.001)</td>
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<tr>
<td></td>
<td>Managing performance</td>
<td>20 (48)</td>
<td>0.215 (0.016)</td>
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<tr>
<td></td>
<td>Project management</td>
<td>24 (57)</td>
<td>0.357 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Managing change</td>
<td>28 (67)</td>
<td>0.474 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Working across boundaries</td>
<td>17 (41)</td>
<td>0.170 (0.049)</td>
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<tr>
<td>Education, Training &amp; Professional Development</td>
<td>Role model &amp; mentorship</td>
<td>26 (62)</td>
<td>0.394 (0.001)</td>
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<td></td>
<td>Education &amp; training</td>
<td>25 (60)</td>
<td>0.285 (0.007)</td>
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<td></td>
<td>Professional development</td>
<td>24 (57)</td>
<td>0.299 (0.006)</td>
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<td></td>
<td>Link practice to education</td>
<td>26 (62)</td>
<td>0.420 (0.001)</td>
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<td>Educational policy</td>
<td>30 (71)</td>
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<tr>
<td>Evaluation &amp; research</td>
<td>Critical evaluation</td>
<td>22 (52)</td>
<td>0.289 (0.005)</td>
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<tr>
<td></td>
<td>Identifies gaps in evidence base</td>
<td>24 (57)</td>
<td>0.382 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Develops &amp; evaluates research protocols</td>
<td>25 (60)</td>
<td>0.466 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Apply research evidence</td>
<td>21 (50)</td>
<td>0.351 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Supervises others undertaking research</td>
<td>25 (60)</td>
<td>0.551 (&lt;0.001)</td>
</tr>
<tr>
<td></td>
<td>Establishes research partnerships</td>
<td>24 (57)</td>
<td>0.539 (&lt;0.001)</td>
</tr>
<tr>
<td>Cluster</td>
<td>Median rank</td>
<td>Wilcoxon sum rank Z (p)</td>
<td></td>
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<tr>
<td>-------------------------------</td>
<td>-------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1st Assessment</td>
<td>2nd Assessment</td>
<td></td>
</tr>
<tr>
<td>Expertise and Expert Skills</td>
<td>10</td>
<td>10</td>
<td>-0.838 (0.402)</td>
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<tr>
<td>Collaborative Practice</td>
<td>5</td>
<td>5</td>
<td>-2.027 (0.043)</td>
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<td>Leadership</td>
<td>13</td>
<td>14</td>
<td>-0.897 (0.37)</td>
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<tr>
<td>Management</td>
<td>18.5</td>
<td>19.5</td>
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<td>12</td>
<td>-0.543 (0.587)</td>
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<td>Evaluation &amp; Research</td>
<td>13</td>
<td>13.5</td>
<td>-1.465 (0.143)</td>
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