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Research article

Supporting early career anatomists: An international challenge

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ABSTRACT

Introduction: The formative years in academia are difficult for early career academics as they transition into their new roles in teaching and research. Ubiquitous changes in health sciences education have compounded this transition for early career anatomists (ECA), who must balance curriculum transformations, research imperatives and administrative responsibilities as they navigate their transition. Support for ECAs is thus important in order to provide a strong pipeline of anatomists for the future of the discipline and its foundational role in the health sciences. Thus, this study investigated the needs of international ECAs with respect to teaching, research and career/professional development in the anatomical sciences.
Method: The authors distributed an online survey in 2018 to ECAs of member associations of the International Federation of Association of Anatomists (IFAA). The survey contained both closed and open-ended response questions. Data gathered included ECAs level of academic appointment, training for teaching and nature of support that ECAs may find valuable for their development as anatomists. Frequencies and 95% confidence intervals were calculated and answers to open-response questions were analysed qualitatively.
Results: Over 590 respondents from across the globe answered the survey. Requests for training in the clinical relevance and application of anatomical sub-disciplines were frequent. Importantly, support to establish collaborations, mentorship relationships and professional networks were repeatedly requested.
Conclusion: In this first ever international survey of ECAs, the needs expressed by respondents indicate the importance of academic and professional development support at both local and global levels. Partnerships between the IFAA, institutions, anatomical and educational associations should create training and mentoring opportunities to smooth the transition into academia for these young academics, which would ensure the future of the discipline and its role in the health sciences.
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1. Introduction

The initial years in an academic's journey have a lasting influence on their educational philosophy, personal values and their professional persona (Remmik et al., 2011). Changing higher education landscapes have expanded the expectations of how an academic will engage in teaching, research and service as well as professional development in their discipline. For an early career academic, the essential process of gaining discipline-specific readiness is complicated by navigating their transition into academia. Learning new tasks, understanding novel responsibilities, meeting expectations and coping with an increasingly competitive institutional climate can all be highly challenging (Hardwick, 2005; Zukas, 2011), especially when combined with the need to maintain a balanced work and personal life (Hardwick, 2005). This can create a demanding and stressful environment for early career faculty as the adaptation period while embarking on an academic career can be relentless. Deficiencies in supportive interactions, transparent career pathways and access to opportunities would compound this transition period.

Educational innovations in the higher education landscape have led to the revision of health sciences curricula (Frank et al., 2010;

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Brauer and Ferguson, 2015; Pickering, 2017). As a result anatomists in collaboration with others have had to redesign their curricula according to these paradigms and include non-discipline activities, such as team-work and professionalism (Lachman and Pawlina, 2006; Böckers et al., 2010). The introduction of novel pedagogies within new curriculum frameworks has compounded the already high workload of anatomy teachers created by intense laboratory teaching, such as dissection, and a shortage of trained anatomists (McCuskey et al., 2005; Wilson et al., 2019). Teachers of anatomy are frequently entering the discipline with a diverse range of qualifications or academic backgrounds and are required to teach human and clinically applied anatomy which they may feel ill-equipped to deliver (McKuskey et al., 2005; Fraher and Evans, 2009; Giuriato et al., 2019; Schaefer et al., 2019). For early career anatomists (ECAs)[1], the navigation of this complex teaching role is compounded by resource constraints, such as a lack of cadavers and increased costs of dissection programs (Gangata et al., 2010; Kharb and Samanta, 2016; Chen et al., 2018), and the decrease in teaching hours now allocated to the discipline (Moxham et al., 2014; Moxham and Pais, 2017; McBride and Drake, 2018). In addition, increasing student numbers and greater diversity in student readiness for higher education and learning preferences (Freudenberg and Samarkovski, 2014; Stensaker, 2018; Ruyzicki et al., 2019) further increase the demands on ECAs. Furthermore, persistent pressure to undertake and publish research (Teodorescu, 2000; Rickard et al., 2009; Ness et al., 2014), establish collaborations and supervise postgraduate students places a sizeable amount of stress and workload on some academics. Thus, ECAs may find it difficult to become proficient in the teaching, research and service expectations of academia and balance their key performance areas.

While the anatomical and educational literature abounds with anatomical teaching innovations (Estai and Blunt, 2016; Trelease, 2016; Losco et al., 2017), what should be taught (Turney, 2007; Moxham et al., 2014; Moxham et al., 2015; Smith et al., 2016) and when, little is known about the developmental needs of the academics who teach and carry out research in the discipline. Considering the global shortage of suitably trained anatomists, the training of ECAs is of the utmost importance to ensure the future of the discipline (McCuskey et al., 2005; Wilson et al., 2018). The responsibility to adequately develop ECAs rests not only with higher education institutions, but also with the anatomical community.

The International Federation of Associations of Anatomists (IFAA)[2] is the umbrella organization to which most Associations of Anatomy are aligned. The Federation is therefore uniquely placed to contribute an international evidence-base regarding the needs of ECAs and the support they require for career development. Thus, this study explored the perceived needs of international ECAs of member associations of the IFAA with respect to teaching, research and career/professional development.

2. Materials and methods

Endorsement of the study was obtained from the IFAA Executive Board in 2018. Ethical approval for the study was obtained from the Human Research Ethics Committee (HREC) Medical (M180211) of the University of the Witwatersrand, South Africa.

2.1. Development of the survey instrument

An online survey (Supplemental data 1) was constructed using Qualtrics© (X3, 2016; United States). A series of closed and open response questions explored the needs of ECAs in the domains of teaching, research and establishing a professional collaborative community. In addition to questions on access to and need for support (Supplemental data 1, Q16-21) and the need for information on topics valuable for career development (Supplemental data 1, Q13), the survey included questions on demographic data, level of academic appointment (Supplemental data 1,Q9), training for teaching (Supplemental data 1, Q7-8) and areas of teaching and research (Supplemental data 1, Q6-7). The open response questions asked for additional topics about which respondents would like to receive information ((Supplemental data 1, Q15) and suggestions for communication/anatomical support (Supplemental data 1, Q22).

One researcher prepared draft questions based on anecdotal evidence within the discipline. These topics and questions were then refined by one of the first authors. The additional members of the research team then reviewed the questions. Comments and corrections were incorporated into the survey before it was reviewed by senior international anatomists. The member associations of the IFAA distributed an email containing a link to the online survey to their members. In addition, the survey was also distributed within the anatomical sciences community on social media and through the newsletter of the IFAA.

The survey instructions requested that only ECAs complete the survey. The definition of an ECA, used for the purposes of this study, was an individual who had held their academic position in the discipline of anatomy for less than 10 years. This definition accommodates individuals appointed to an academic position while registered for a PhD but is analogous to the 5-8 years discussed in definitions of early career academics in the literature (Bazeley, 2003; Bosanquet et al., 2017). The period of 10 years also accommodates individuals who may have a taken a short leave of absence for maternity and/or other personal or career responsibilities.

2.2. Data analysis

Statistica (v13.5.0.17, TIBCO Software Inc, Palo Alto, California, USA) and Microsoft Office (Microsoft Office Professional Plus 2016, Microsoft, Redmond, Washington, USA) were used to calculate the frequency of responses and 95% confidence intervals overall and according to the level of appointment or geographical region of respondents. In the latter, the frequency of responses within each category of the demographic variable is reported with the corresponding 95% confidence interval (e.g. the frequency of post-doctoral fellows who selected the option is expressed as a percentage of the total number of post-doctoral fellows answering the question).

Associations between the level of appointment or geographic region and the responses to questions on access to support and the need for information on topics valuable for career development were analysed using STATA (v.14, Statacorp, College Station, Texas, USA) and Statistica. Significant differences (significance levels $p < 0.05$) were determined using Pearson Chi-squared and Fischer's Exact tests. Relationships between categories within geographic region were analysed by means of two by two tables using Pearson Chi-squared and Fischer's Exact tests with an adjusted level of significance set at $p < 0.002$, as established by a Bonferroni Correction, for multiple comparisons. Due to the limited number of respondents in the categories of post-doctoral fellow, associate professor and professor, these categories were added to other levels of appointment when analysing relationships between the categories of level of appointment as follows:

post-doctoral fellow to junior and associate lecturer/Research Assistant

[1] ECA: Early career anatomist.
[2] IFAA: International Federation of Associations of Anatomists.

associate professor and professor to senior lecturer.

Pearson Chi-squared and Fischer exact tests were used to determine significant relationships with the significance level set at $p < 0.0083$ as established by a Bonferroni Correction for multiple comparisons.

2.3. Coding of data

Responses to the question "In which country do you live/work?" were grouped according to geographical regions. Additional responses to the question on current employment status were equated with and allocated to the relevant categories as stated by Farrell (2009).

Two members of the research team coded the answers to open response questions independently using the phases described by Braun and Clarke (2012). Codes were discussed to achieve consensus and then grouped into categories according to the three main themes of the questionnaire: teaching, research and establishing a professional collaborative community.

3. Results

A total of 594 respondents from 47 countries completed the survey, with the majority of respondents emanating from Europe and Asia (Table 1). Respondents were of approximately equal gender distribution: males =296 (50%) and females = 276 (46.5%). Thirty-four percent of respondents (n = 203) held associate and junior lecturer/research assistant positions, while 28% (n = 166) held lecturer/assistant professor appointments (Table 1). These together with the 18% (n = 107) of respondents with teaching assistant/sessional appointments represent 80% of the anatomists who responded to the questionaire.

As the subject of anatomy is broad, teaching and research in the various sub-disciplines were explored. Morphological anatomy was the most common teaching (85% or respondents) and research (41.5% of respondents) area, followed by Neuroscience for teaching (56% of respondents) and Clinical, Applied, Radiological or Functional anatomy (36% of respondents) as the second most common research area (Table 2). Thirty-four percent of respondents (n = 173/506) teach in a single sub-discipline, with most respondents teaching in multiple areas (mean number of teaching areas = 2.34 ± 1.48). In contrast, 59% of respondents (n = 297/506) research in a single sub-discipline (mean number of research areas = 1.28 ± 0.89). This is evident in Fig. 1, where it can be seen that many sub-disciplines are being taught by academics whose research interests lie outside of their teaching responsibilities. Only 4% of respondents stated that they teach Clinical, Applied, Radiological or Functional anatomy compared to 36% of respondents who research in these areas. The opposite is seen in the categories of comparative/veterinary anatomy, neuroscience, histology/cell biology/molecular biology/genetics and embryology/developmental anatomy where a higher percentage of respondents teach, but do not undertake research in these disciplines.

With regards to the question on whether they had received training to teach, of the 498 respondents to the question, 80% (n = 400) indicated that they had received training, with 58% of this group of respondents (n = 232/400) indicating that this was formal training (Table 1). Respondents appointed at positions equivalent to junior lecturer, postdoctoral fellows and sessional staff were the least likely to have received formal training to teach (Supplemental data 2, Table 1).

Thirty-five percent of respondents (n = 205/594) indicated that they would like more information on all of the items suggested in Q13 in the survey. Additional respondents selected the items related to information on teaching anatomy (40%), the clinical relevance of morphological anatomy (33%), systems and structures (26%), and the embryological basis of regions, systems and structures (20%) (Table 3) resulting in 55% to 75% of respondents selecting these items. Similarly, the 122 answers to the open response question (Q15 in the survey) requested information on sub-disciplines of anatomy (n = 60), such as neuroanatomy, or information on teaching anatomy (n = 21), such as the application of technology in anatomical sciences education (Supplemental data, Table 2).

Information on research- related skills, such as scientific and grant application writing, were both selected by an additional 19% of respondents (Table 3) and the need for funding for research (n = 23, Supplemental data 2, Table 2) emerged as a category from the 205 comments in both open response questions:

> "Access to external funding is very chall[e]nging to acquire, partly because teaching is more time consuming than in other disciplines (e.g. Biochemistry) and publication frequency is thus lower. . .."- respondent 84

> "limited funding for publications and conferences. specially publications. if a system could be developed for helping anatomists find funding for publication would be very useful"–respondent 282

Development of professional collaborative networks was a request highlighted by over a third of respondents (n = 220/594) who requested more information on opportunities to meet and collaborate with other anatomists (Table 3) as well as those who felt a mentor (74%, n = 330/466), a platform for anatomists to engage (81%, n = 360/444) and an event focused on emergent anatomists (90%, n = 372/414) would be valuable (Table 3). Fifty-four percent of respondents felt that they had sufficient support to develop as an anatomist (n = 246/457, Table 3) and 35% agreed that they had support to establish connections with the global anatomy community (n = 158/448). The themes of establishing professional collaborative communities and professional development opportunities (Supplemental data, Table 2) emerged from both open response questions through comments which highlighted the need for exchange programmes and opportunities to network (n = 37), further training for teaching and research roles (n = 12) and opportunities that will enable emergent anatomists to further their career development (n = 44).

> "I would find it helpful to have a local "hub" or community to engage with"–respondent 61

> "More communication with world wide young anatomists will [] be helpful sharing and improve our teaching and researching experience, also it provides more chances for everyone."–respondent 325

> "Mentoring and exchange programs organized by members associations should be placed for career development and advancement of young emergent anatomists."–respondent 221

> ". . .training in how to organize good teaching and good science would be of importance."- respondent 84

All of the needs described above were expressed by respondents from across all geographical regions (Supplemental data 2, Table 3&4). No associations were found between the geographical region and requests for information on teaching anatomy or explanations and examples of clinical relevance of morphological anatomy or systems and structures. However, respondents from Africa, Asia and South America expressed the need for access to greater support and more information on scientific grant and arti-

Table 1
Demographic characteristics of respondents according to the level of academic appointment[#].

	All respondents	Post-doctoral fellow	Teaching assistant/ sessional teacher	Junior/Associate Lecturer/Research assistant	Lecturer/ Assistant Professor	Senior Lecturer	Associate Professor	Professor
	% [95%CI]	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]	% [95% CI]
All respondents (n = 594)	-	4.5 [2.5-6.5]	18 [15-21]	34 [30-38]	28 [24-32]	9 [7-11]	2 [1-3]	5 [3-7]
Geographical region in which you live/work (n = 594)								
Africa	12.5 [9.5-15.5]	4 [0-11]	13 [7-19]	17 [12-22]	8 [4-12]	19 [8-30]	0 [0-0]	7 [0-16.5]
Asia	22 [19-25]	7 [0-17]	18 [11-25]	14 [9-19]	31 [24-38]	35 [22-48]	54.5 [25.5-83.5]	14 [1-27]
Australia/New Zealand	6 [4-8]	4 [0-11]	11 [5-17]	7 [3.5-10.5]	2 [0-4]	4 [0-9]	0 [0-0]	7 [0-16.5]
Europe	29 [25-33]	78 [62-94]	12 [6-18]	33 [26.5-39.5]	29 [22-36]	27 [27-27]	18 [0-41]	29 [12-46]
North America	10 [8-12]	4 [0-11]	7.5 [2.5-12.5]	8 [4-12]	15 [10-20]	6 [0-12.5]	27 [1-53]	11 [0-23]
South America	11 [8.5-13.5]	0 [0-0]	15 [8-22]	11 [7-15]	10 [5-15]	6 [0-12.5]	0 [0-0]	32 [15-49]
United Kingdom	10 [8-12]	4 [0-11]	23 [15-31]	10 [6-14]	5 [2-8]	4 [0-9]	0 [0-0]	0 [0-0]
Which of the following best describes your gender? (n = 594)								
Male	50 [46-54]	44 [25-63]	38 [29-47]	48 [41-55]	54 [46-62]	67 [54-80]	36 [8-64]	61 [43-79]
Female	46.5 [42.5-50.5]	56 [37-75]	55 [46-64]	45 [38-52]	45 [37-53]	33 [20-46]	64 [36-92]	39 [21-57]
Other/Prefer not to answer	4 [2-6]	0 [0-0]	6.5 [1.5-11.5]	6 [3-9]	1 [0-2.5]	0 [0-0]	0 [0-0]	0 [0-0]
Have you had any training to teach anatomy? (n = 498)								
All respondents	-	4 [0-6]	12 [9-15]	33 [29-37]	33 [29-37]	10 [7-13]	2 [0-3]	6 [0-8]
None	20 [20-20]	53 [50-56]	35.5 [34-37]	29 [28-30]	9 [8.5-9.5]	0 [0-0]	20 [17-23]	11 [10-12]
Formal	47 [46-48]	0 [0-0]	0 [0-0]	26 [25-27]	74 [73-75]	81 [79-83]	40 [36-44]	75 [72-78]
Informal	34 [33.5-34.5]	47 [44-50]	64.5 [62.5-66.5]	45 [44-46]	17 [16-18]	19 [18-20]	40 [36-44]	14 [13-15]

[#] As defined by Farrell, 2009.

Table 2
Percentage of respondents teaching and researching in anatomical subdisciplines.

	Please indicate the areas in which you teach/lecture: (n = 506) % [95% CI]	Indicate in which of the following sub-disciplines of anatomy your research focus resides. (n = 506) % [95% CI]
Anthropology/Human biology/Forensic anatomy	5 [3-7]	15 [12-18]
Clinical/Applied/Radiological/Functional anatomy	4 [2-6]	36 [32-40]
Comparative/Veterinary anatomy	12 [9-15]	0.6 [0-1.3]
Education/History of anatomy/Ethics	0.4 [0-0.9]	10 [7-13]
Embryology/Developmental anatomy	34 [30-38]	11 [8-14]
Histology/Cell biology/Molecular biology/Genetics	39 [35-43]	24.5 [20.5-28.5]
Morphological anatomy	85 [82-88]	41.5 [37.5-45.5]
Neuroscience	56 [52-60]	12 [9-15]
Clinical research	0 [0-0]	3 [1.5-4.5]

[#]Respondents selected more than one option in response to this question. Therefore, the sum of the percentages is not 100%.

Table 3
Frequency of positive responses to questions regarding access to support and respondents' requests for information on the suggested topics.

Question	% [95% CI]
Do you feel that you have sufficient support to develop as an anatomist? (n = 457)[*]	54 [49-59]
Do you feel that you have sufficient support to establish connections with the wider global anatomical community? (n = 448)[*]	35 [31-39]
Would you find it helpful to have an assigned external mentor with whom you can communicate or ask questions on developing as an anatomist (via email etc)? (n = 446)[*]	74 [70-78]
Would you find it helpful to be part of a group or platform of anatomists to exchange ideas, ask questions and interact with other anatomists? (n = 443)[*]	
Response: Yes	81 [77-85]
Response: I am already part of such a group	12 [9-15]
Would you be more interested in attending a conference if there was an event focused on developing young anatomists and helping them network? (n = 414)[*]	90 [87-93]
Do you have access to funding to attend conferences? (n = 447)[*]	51 [46-56]
In communication with you, in which of the following areas would you like to be provided with more information: (n = 594)[#]	
All of the above	35 [31-39]
Information on teaching anatomy	40 [36-44]
Explanations and examples of clinical relevance of morphological anatomy	33 [29-37]
Explanations and examples of the clinical relevance of systems/structures	26 [22.5-29.5]
Explanations and examples of the embryological basis of regions/systems/structures	20 [17-23]
Opportunities to meet and collaborate with other international emergent/young anatomists	37 [33-41]
Information on scientific article writing	19 [16-22]
Information on scientific grant writing	19 [16-22]
Information on poster preparation for presentations	11 [8.5-13.5]
Information on developing your curriculum vitae	12 [9-15]

[*] Questions were Yes/No questions.
[#] Respondents could select more than one response. Therefore, the sum of the percentages does not equal 100%.

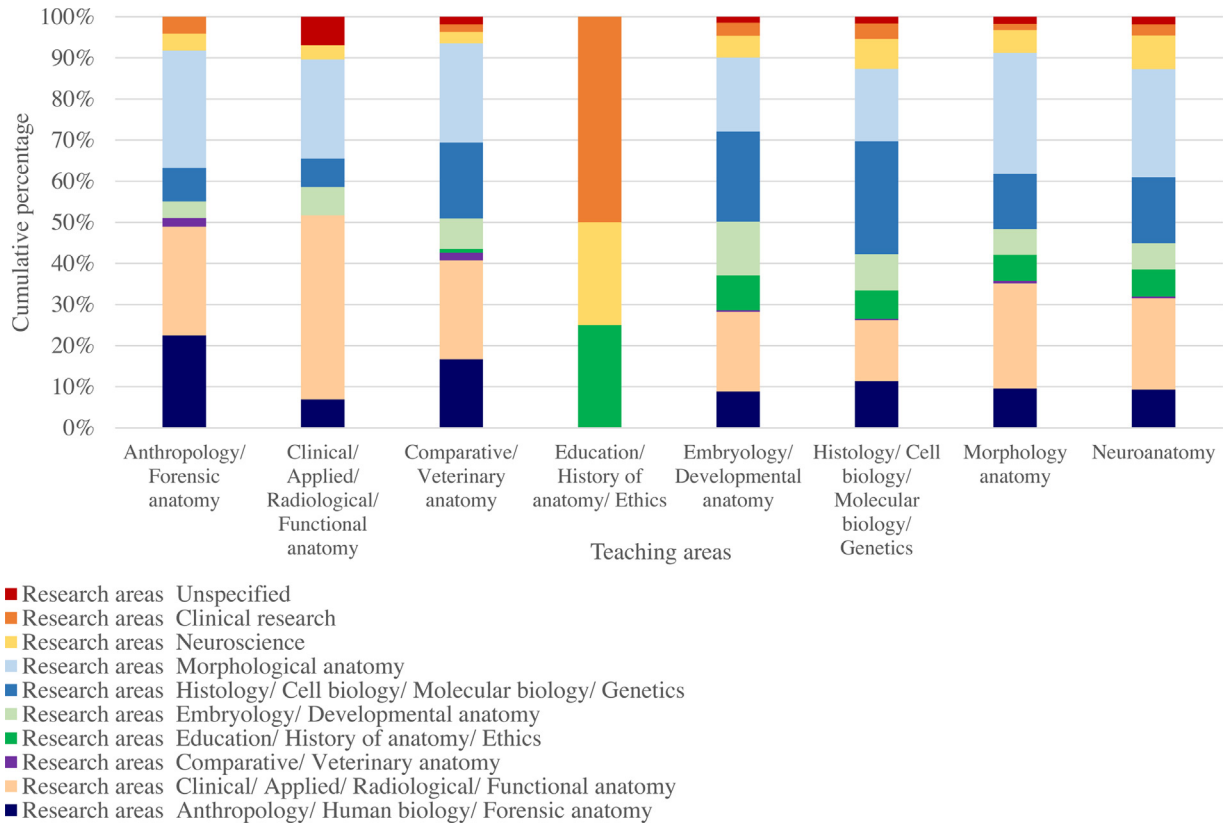


Fig. 1. Research areas of respondents according to the sub-disciplines of anatomy taught.

cle writing, preparation of posters and developing their curriculum vitae more frequently than respondents from other regions (Supplemental data, Table 3&4).

All levels of appointment expressed the need for support with no significant differences found between different categories of appointment (Supplemental data 2, Table 5).

4. Discussion

The transition into academia for early career academics is pressurized (Remmick et al., 2011) and includes acquisition of a myriad of duties/skills such as gaining discipline-specific readiness and confidence, initiation of research, and professional development. In this context, support for early career academics is important. The results of this exploratory survey, which to our knowledge is the first undertaken on international ECAs, have highlighted areas of support needed by ECAs. The most frequently requested information related to teaching the discipline, grant application writing and collaboration with other international ECAs. Similarly, ECAs indicated that access to the capacity building resources that facilitated collaboration (mentoring, platforms, events at conferences and conference funding) were needed. Early exposure to role models and mentoring as well as career support for junior faculty members were some of the themes also identified by medical students, residents and faculty members in relation to their career development as doctors (O'Sullivan et al., 2009).

While distribution of the survey to all international ECAs was difficult, the number of responses obtained from junior academics of both sexes and a wide geographical distribution provide valuable insight into the needs of early career anatomists across the globe. Of the respondents 20% were at senior levels of academic appointment which may suggest early career progression for some ECAs.

When assessing the totality of the needs requested by respondents to the survey, a "Communities of Practice" (CoP) model (Wenger et al., 2002), may be one of the ways in which support and assistance can be provided to ECAs. While McDonald and Star (2008) argue that the competitive nature of HEIs challenges the formation of communities of practice, the ideals of a discipline such as anatomy and the foundational role the discipline plays in the health sciences, may overcome competition. Thus, professional networks, mentorship (Hardwick, 2005; Geber, 2009) and collaborative platforms, which were the needs frequently expressed in the responses to this survey, should be made available to support ECAs as they navigate the transition into the research and teaching roles of academia.

4.1. Training for the role of teacher in anatomy

The request for training for the teaching role, highlighted in the current study, is echoed in the call in the literature for anatomists to be trained within the discipline as well as to hold education qualifications (Rizzolo and Drake, 2008; HAPS, 2013; Doss and Brooks, 2016). Such training would be especially important for sessional and junior academics who were least likely to have received formal training to teach.

The need for ECAs to teach in a variety of anatomical sub-disciplines, in which they may not have received formal training (Giuriato et al., 2019; Schaefer et al., 2019) and which are not part of their research focus, may leave them feeling ill-equipped to teach sub-disciplines such as neuroanatomy or embryology. In addition, there is a growing emphasis on teaching applied anatomy (Moxham et al., 2011; Brauer and Ferguson, 2015). This may explain why information on teaching anatomy and the clinical relevance of the sub-disciplines was requested so frequently by respondents. Continuing education courses that integrate clinical practice with

anatomy (Wilson et al., 2018) could sustain the ongoing needs of anatomists and provide valuable teaching credentials for graduates and their employers (Richardson-Hatcher et al., 2018). These strategies could assist ECAs in growing their confidence in teaching and determining whether they are achieving the relevant levels of education to be accredited (Rizzolo and Drake, 2008; HAPS, 2013) and prepare themselves for a long-term career in anatomy.

Apart from a handful of formal qualifications offered by institutions in anatomical sciences education (Brokaw and O'Loughlin, 2015; Jergenson et al., 2017; Kolomitro et al., 2018), certain of the large anatomical professional associations have established programmes which train anatomists to teach anatomy and the clinical relevance of the discipline (Fraher and Evans, 2009). Ideally, the number of these programmes provided around the globe should be expanded to ensure in-depth training of future anatomists on all continents. Partnerships between the IFAA, institutions, anatomical associations and medical education associations could facilitate ECAs' participation in such programmes. Furthermore, such opportunities may enable ECAs' entrance into communities of practice and mentoring relationships that facilitate their professional development. These strategies may be a crucial step in preparing ECAs for a long-term career in teaching anatomy and provide valuable teaching credentials for graduates and their employers (Richardson-Hatcher et al., 2018).

4.2. Training for the role of researcher

The diversity of research areas expressed by respondents, particularly in cell biology and morphological and applied anatomy, augurs well for the future of research in the anatomical sciences. However, it is imperative that ECA's research skills are developed to provide the future generation of supervisors and researchers to move the discipline forward.

A perceived need among respondents was access to research funding and training in grant application writing skills. This may reflect the frustration of ECAs of having to chase elusive research funding while also managing teaching responsibilities and establishing a publication record. Grant application writing is an essential skill if anatomists are to continue to be successful in attracting funding for research. Supporting the development of research skills, such as scientific and grant application writing, in ECAs is an urgent need if the discipline of anatomy is to continue to contribute to biomedical research that addresses global health issues. An enabling environment, such as workshops, writing groups or supervisor/mentor networks, have been shown to facilitate not only the development of writing skills, but also the dissemination of the generated scientific knowledge (Kramer and Libhaber, 2016). Introduction of such activities by member associations of the IFAA, in partnership with institutions, may assist early career anatomists in realizing research skills that improve their ability to conduct and publish research. In addition, there is an imperative for international communities of established anatomists to actively work to create and communicate funding opportunities for young and emergent anatomists.

5. Limitations

As this is an international study, differences in terminology of academic appointment levels may have caused difficulty for respondents in interpreting certain questions in the survey.

6. Conclusions

Supporting ECAs in their transition from dependence to independence is of importance to the discipline of anatomy as well as health sciences education and research. The results of this exploratory study emphasize the ECAs need to establish professional networks and mentoring relationships as well as highlight requests for support in some aspects of teaching and research. While training for the roles of teacher and researcher are of the utmost importance, the real value of such opportunities may lie in the communities of practice that are established as ECAs engage in training. We recommend that ECAs are included in communities of practice as well as mentorship relationships to enable them to create professional networks and facilitate collaborations, an important need identified in this study. This will support them as they navigate their entrance into academia. Mentoring of ECAs by more senior anatomists in career development and professionalism could assist in the expansion of the ECA's horizons. Partnerships between the IFAA, anatomical and educational associations and institutions should create opportunities for support that positively influence the initial years of an ECAs academic journey.

Declarations of interest

The authors declare no conflicts of interest. BK is currently President of the International Federation of Associations of Anatomists (IFAA). NP is currently Chair of the Federative International Programme on Anatomical Education (FIPAE) of the IFAA.

Ethics statement

Endorsement of the study was obtained from the IFAA Executive Board in 2018. Ethical approval for the study was obtained from the Human Research Ethics Committee (HREC) Medical (M180211) of the University of the Witwatersrand, South Africa.

Table indicating Authors contributions to the research and article.

	Beverley Kramer	Carol Hartmann	Francesca du Toit	Erin Hutchinson	Nalini Pather
Conceptualization	Yes	No	Yes	No	No
Data Curation	No	Yes	No	No	Yes
Formal analysis	No	Yes	No	No	Yes
Methodology	Yes	Yes	Yes	Yes	Yes
Project administration	Yes	Yes	Yes	Yes	Yes
Software	No	Yes	No	No	Yes
Validation	Yes	Yes	Yes	Yes	Yes
Writing–original draft	Yes	Yes	No	No	No
Writing- review & editing	Yes	Yes	Yes	Yes	Yes

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.aanat.2020.151520.

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