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Transitional experiences of Australian health science researchers: where is academic teaching preparedness?

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Academic career development relies on a combination of teaching and research skills. In Australia, it is common for recent Doctor of Philosophy graduates to have a short-term post-doctoral research experience to build publication track-record and increase grant competitiveness, before securing a combined research and teaching or 'academic' role at a university. Other scientists work as full-time researchers for several years before transitioning to academic roles with expectations they can teach. The aim of this study was to explore the experiences of health and biomedical science researchers transitioning into academic roles using a mixed methods design. Sixty-six participants working in health and biomedical sciences at over 20 Australian Universities who had been in an academic role for 5 years or less completed an online survey. Of 66 participants, 18 (27%) had never been in a research-only role before, while 48 (63%) had held a research-only role for up to 11 years before starting their current academic role. Findings showed most academics were not trained nor equipped to successfully undertake scholarly teaching. They reported a lack of awareness of teaching expectations, practical resources, and direct support provision at the start of their appointment. For former researchers specifically, these experiences led to low confidence and poor enjoyment in their academic role, with the potential to decrease overall teaching quality, student learning and student satisfaction. We postulate that these issues may be mitigated by the implementation of teaching-specific training programs catering for the research-only background of staff entering health and biomedical academic roles in the higher education workforce.

KEYWORDS

faculty, staff development, teaching, teacher training, academic careers, research, transitions, mixed-methods

1 Introduction

A university's success and reputation are linked to the performance of its staff. University research achievements depend on researchers attracting external research funding to advance their research and innovation work via new and existing research programs, national and international collaborations, and funding. Similarly, a university's reputation for educational excellence is reliant on teachers delivering strong courses that attract domestic and international students, providing a funding stream for teaching and other core activities

including research. Academic career development therefore relies on a combination of teaching and research skills (Coates and Goedegebuure, 2012; Zacher et al., 2019). Recent Australian Doctor of Philosophy (PhD) graduates commonly undertake a brief (3–36 months) post-doctoral, pure research experience (Powell, 2015). This experience is often necessary to improve publication track-record and grant competitiveness before securing a combined teaching and research role; that is, an “academic role” at a university (Kaplan, 2010; Powell, 2015). Rarer, but not unusual, are early- and mid-career researchers who are supported by competitive salary funding or research fellowships for a number of years (3–15 years) before transitioning to a teaching and research role (Kaplan, 2010; Bexley et al., 2011). Such transitions are partly due to the pyramidal structure of the Australian research funding system, where the number of research fellowships available decreases with increasing levels of seniority (Australian Research Council, 2022; National Health and Medical Research Council, 2022). Thus, for most academics in the disciplines of health and biomedical sciences, combining teaching with research is the norm; yet we know little of these transition experiences.

Transitioning from a research-only to a combined teaching and research role requires a specific set of skills to enable high quality curriculum design and delivery via various modes. However, in Australia, those transitioning to their first under- and post-graduate academic role often do so with little or no prior teaching experience and/or no formal education qualification. The underlying assumption is that research skills are directly transferrable to education. Research skills are however distinct from teaching skills, and researchers are not equipped to seamlessly transition to under- and post-graduate scholarly teaching. Anecdotal experiences of one author and several peers in the health and biomedical sector revealed difficult transition experiences from holding a full-time research role to one that required additional responsibilities of delivering scholarly teaching in coursework programs. A subsequent literature search seeking evidence to guide and support these researchers’ transitions to academic roles yielded no meaningful results.

Significantly, without skills in evidence-informed teaching and learning, individuals may fail to thrive, let alone survive in academia after years of their own dedicated postdoctoral research. Moreover, substantially more students may not receive appropriately skilled learning guidance, feedback or a quality education from individuals unprepared for their teaching role; which, in turn may hinder students’ own study success and life goals. For the university and sector, student dissatisfaction with learning experiences becomes public through government survey data (Australian Government Department of Education, 2024), leading to reputational damage and potentially lower University rankings and/or dwindling enrolments. Given the increased global need for healthcare professionals and health and biomedical scientists, and their extensive educational preparation delivered by highly skilled academics, it is timely to address this specific research gap. Shortages of health science professionals in Australia (Jobs and Skills Australia, 2024) and globally (World Health Organisation, 2024) threatens the health and wellbeing of our communities. Thus, recruiting and retaining postdoctoral health academics who create the next generation of healthcare and health and biomedical science workforce is a global imperative.

Despite a call to conduct more studies to understand the transitions and trajectories of early-career academics (Castelló et al.,

2015), a comprehensive literature review revealed that the impact and mediators of the transitions from research-only to teaching and research specifically in health and biomedical sciences have not been previously investigated, in Australia and internationally. The overarching aim of this project was therefore to explore the preparedness and experiences of PhD qualified staff for their current academic role in the disciplines of health and biomedical sciences. An academic role describes academics who perform the crucial roles of creating healthcare professionals and health and biomedical scientists of the future and perform discovery and/or translational health science research. We hypothesized that a lack of guidance and support for staff during transitions from a research-only to teaching and research role may lead to dissatisfaction and lack of motivation. Gaining an understanding of this transition phenomena is critical before university leaders can assist with specific cohort of health academics to optimize their teaching quality and student learning, teacher training, and ultimately improve staff and student satisfaction.

2 Methods

2.1 Design

An exploratory descriptive mixed-methods design (Creswell and Plano, 2018) was used to investigate the experiences of Australian public university staff working in a health or biomedical related discipline and who had been appointed to their first academic role 5 years ago or less. Exploratory research is useful when little is known about the topic (LoBiondo-Wood and Haber, 2021), as was the case in this study of PhD qualified health science staff role transitions in Australian universities. Mixed methods was chosen to elicit data that would quantify participants’ responses, enable group comparisons and allow for descriptions of their experiences in their own words (Sandelowski, 2000).

2.2 Sample

Convenience sampling was used to recruit Australian academics. Staff with a PhD who had been appointed 5 years ago or less to their first academic role within health, science, biomedical and medical faculties of Australian universities were eligible to participate. An academic role was defined as one that had both teaching and research responsibilities. Eligibility criteria were chosen to allow describing and comparing transitional experiences of staff who had held a research-only role for up to 15 years before their academic role with those who had started their career in a combined teaching and research role or another role not involving research (e.g., clinical or industry). As such, the group of respondents that had held a research-only role prior to their current academic appointment including teaching and research responsibilities was labeled as “Research,” while the group of respondents that had not was labeled as “Non-Research.”

2.3 Recruitment and consent

Heads of the health, science, biomedical and medical faculties of the 36 public Australian Universities were approached by the

researchers using publicly available contact details, seeking permission to invite staff participation. Where permission was granted, institutional leaders forwarded electronic invitations to all staff. After reading the plain language statement, participants provided implicit consent to participate by completing the survey. This study was approved by the Deakin University Human Ethics Advisory Group (HEAG-H 2021–026).

2.4 Survey tool development

Since validated tools to measure specific areas of interest in this study could not be identified, survey questions were developed specifically for this study (Supplementary Data 1). Survey questions were designed to elicit participants' professional data; subjective transitioning experiences and their impact; and resources or support accessed along with their perceived value. Professional data included current level of appointment [Level A (associate lecturer) to E (professor)]; level of appointment when their academic role was taken up; years in a full-time research role; and funding sources for the latter were sought where relevant. Questions were informed by the anecdotal experiences given by colleagues, and evidence for reasons why people stay or leave roles in academia (Rosser, 2004; Zhou and Volkwein, 2004; Aarnikoivu et al., 2019). Subjective experiences regarding participants' level of enjoyment in their role were sought using a 10-point Likert Scale (0 = do not enjoy at all to 10 = enjoy thoroughly). Open-ended questions invited participants to describe personalized experiences and provide richer data, e.g., *'please list up to three things that you are not enjoying about being in a research and teaching position'*. Lists of resources were provided for participants to indicate what resources were available, used, and found valuable to support teaching practices and transitions. Participants' subjective experiences of research and teaching responsibilities, reasons for transitioning from a research-only role, and the transitional experiences of postdoctoral staff to their academic roles were collected using closed and open-ended questions. Free text descriptions of their experiences or other comments were also sought. The tool was piloted for face validity to ensure clarity and appropriateness to the research questions by two experienced health science researchers, with no changes suggested.

2.5 Data collection

Data were collected from April to June 2021 via the specifically designed survey tool using the online Qualtrics survey platform. Once institutional leaders forwarded the electronic invitations to all staff, prospective participants completed simple demographic characteristic questions that rendered them either eligible to participate in the study or acknowledged they did not meet criteria. Those who met eligibility criteria proceeded to the survey. On average, respondents completed the survey in 25 min.

2.6 Data analysis

Quantitative survey responses were analyzed using descriptive statistics, unpaired *t*-tests and linear regressions. Data are presented

as mean \pm SD unless stated otherwise. STATA version 16 was used to conduct all statistical tests. The value for significance was set at $p < 0.05$.

Open-ended survey responses were imported into NVivo (Version 12) for analysis using Braun and Clarke's reflexive thematic analysis method, given our emphasis on understanding the lived experiences of a social group, in this instance, health science academics (Braun and Clarke, 2006; Braun et al., 2019). Two researchers (OK and SL) analyzed the data independently following the phases of familiarization; coding; generating initial themes; reviewing and developing themes; refining; and defining and naming themes (Braun and Clarke, 2021). Themes were identified in an iterative process and organized hierarchically. On completion of independent analysis, both researchers discussed their themes and sub-themes, which were highly cohesive. Discussion with the third researcher resulted in minor refinement of thematic nomenclature to improve clarity. All themes represent meaning-based patterns and exist as outputs of the considerable analytical process (Braun et al., 2019). The sample was considered sufficient for the research aims, and the richness of information elicited from the data collected due to the information power gleaned during analysis (Malterud et al., 2016).

3 Results

The results of this study are presented in four main sections, with participant characteristics presented first. Second, new academics who previously held a research-only role ('Research') felt less enjoyment and less confident in their teaching and research role than those who had not been in such roles ('Non-research'). Third, new academics regardless of their previous role identified what aspects of their role they did and did not enjoy; provided a sense of reward; and/or led to a perception of burden and lack of support. Fourth, close to 40% of new academics were ill-prepared to teach due to a lack of university-based support in education. Such knowledge and skills were mostly gained on-the-job, with individuals seeking help from colleagues and mentors. The thematic analysis of participants' transitions experiences resulted in three main themes: Fear and Isolation in a Risky Career; Sense of Enjoyment and Self Confidence; and Ill-Prepared for a Teaching and Research Role. These themes are supported by, and assist in describing more fully, the empirical results, thereby providing for deeper understanding of the phenomena of interest in this study. Consistent with our mixed methods research design, quantitative and qualitative findings are presented and discussed together under the three main themes, and their associated sub-themes. Quotes from participants' responses are included to enhance transparency in data that generated each theme (Polit and Beck, 2021).

3.1 Participants

Of 111 responses, 45 (40%) were ineligible for participation due to: (1) not meeting the inclusion criteria; or (2) electing to quit the survey before reaching the last question. Only fully completed surveys by eligible staff were retained for further analysis, resulting in a final sample size of $N = 66$ academic staff members employed within health, science, biomedical or medical faculties of at least 20 Australian public universities. All participants held a PhD and had been appointed in

their combined teaching and research, i.e., academic role between 2016 and 2021. Current employment fractions ranged from 0.6 to 1.0 FTE. Forty-seven respondents (71%) had been in a research-only role (Research, R, black) prior to their current appointment, and 19 (29%) had not (Non-Research, NR, grey). Of the 19 participants who had not been in a research-only role, 10 had directly transitioned from their PhD into their current academic role, six had been employed in casual teaching positions or teaching-only positions (“teaching scholars”) before starting their current academic positions, one was a former government employee and two had been working in clinical settings. The characteristics of the two cohorts are displayed in Figure 1. There was no difference in the initial year of appointment of each cohort. Members of the Research cohort had been awarded their PhD significantly earlier than their Non-Research counterparts ($R=2009\pm 6$ yrs., $NR=2016\pm 3$ yrs., range 1998–2021, $p<0.001$) and had been employed in a research-only role for an average of 7.1 ± 3.4 years (range 1–11) before transitioning to an academic role. At the beginning of their academic role, members of the Research cohort had significantly higher research ($R=49\%$, $NR=31\%$, $p<0.001$) and lower teaching ($R=31\%$, $NR=59\%$, $p<0.001$) workload fractions than members of the Non-Research cohort. The only other difference between the two cohorts was their previous experience of university teaching during their PhD degree. The Research cohort reported teaching for an average of 4.1 ± 3.8 h per week, while the Non-Research cohort reported teaching almost twice as much, with an average of 8.1 ± 9.8 h per week ($p<0.05$).

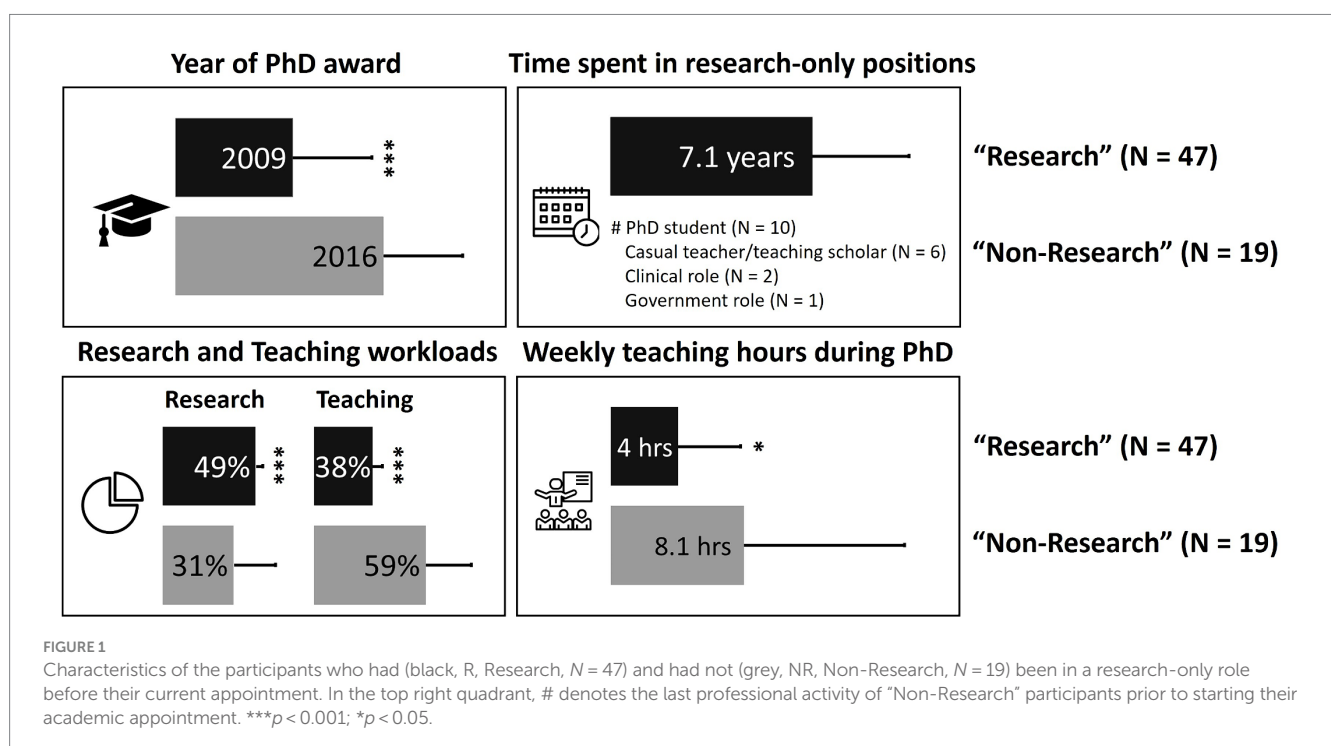
3.2 Theme 1: Fear and isolation in a risky career

The three main reasons to transition from a research-only to an academic role in health and biomedical sciences were linked to job

and financial security. The Research cohort mostly chose to transition because they wanted ‘a continuous position’ (80%) or ‘a safer position’ (57%). For a majority of those who had been in a research-only role initially (59%), a lack of certainty around research funding was given as the reason to transition to an academic role. Less than 20% of the Research cohort found research too competitive (15%) or did not see themselves in a research career in the long term (2%), while 54% of those who transitioned also did it because ‘they had an interest in teaching’.

Qualitative analysis of the open-ended survey questions provided meaningful insights into the unenjoyable aspects that featured in the transition from a research-only to an academic role in the Research cohort. ‘Fear’ and ‘Isolation’ were the two main sub-themes evident from participants’ responses. Fear was related to a high level of job insecurity and uncertainty for their future career, as well as to the highly competitive nature of research and pressure to obtain funding, also defined by one participant as the ‘competitive cut-throat nature of research’ (Research participant 23, R23). Participants were pushed to consider transitioning into a research and teaching role by the ‘job insecurity with contract renewal depending on success in grant applications’ (R29), where many reported being ‘highly uncertain as to where my next year worth of salary was coming from’ (R24). The high level of expectation to publish and obtain funding in the discipline of health and biomedical sciences, with statistically known very low success rates (Australian Research Council, 2022), contributed to feelings of futility, rejection and lack of stability.

Isolation reflected a feeling that participants experienced as a full-time researcher. Isolation played out as a sense of disconnection and distance from both the main function of universities (i.e., education) and their academic colleagues whose roles included teaching and research. Isolation stemmed from ‘not being treated as a full and equal member of faculty’ (R29) and also having ‘limited contact with students interested in research’ (R52). Essentially, Fear and Isolation appeared



key drivers in the decisions of researchers to become teaching and research academics.

3.3 Theme 2: Sense of enjoyment and self-confidence

There was no significant difference between how much the Research and Non-Research cohorts enjoyed (Figure 2A) or felt confident (Figure 2B) at the start of their academic role in health and biomedical sciences. However, when asked about how much they enjoyed their academic role now, the Research cohort reported significantly lower enjoyment than the Non-Research cohort (Figures 2C; $p < 0.05$), with no difference in self-confidence between groups (Figure 2D). Enjoyment and self-confidence closely correlated for both groups at both time points (all $p < 0.0001$).

We then investigated how role enjoyment and self-confidence evolved over time. There was no change in enjoyment between the start of their academic role and now in either cohort (Figure 3A). However, self-confidence was higher in the Non-Research than in the Research cohort overall (main effect of group, $p < 0.05$; Figure 3B).

Self-confidence also increased with time across both groups (main effect of time, $p < 0.01$; Figure 3B).

Linear regressions showed that job enjoyment at the start of the participants' academic role tended to negatively correlate with the number of years they had spent in a research-only role ($p = 0.055$; Figure 4A). This relationship became significant at the later time point, where job enjoyment now was negatively associated to the number of years participants had held a research-only role before ($p < 0.05$; Figure 4B). This negative association was however attenuated if there was a feeling that research was highly valued at the participant's current university ($p < 0.05$).

Enjoyment at the start of the academic role was positively correlated to the teaching experience both participant cohorts had gained during their PhD, more specifically to the average weekly number of hours spent teaching during that period ($p < 0.05$; Figure 5A). Overall, a positive correlation was also found between prior teaching experience and self-confidence, both at the start of the academic role and now ($p < 0.001$ and $p < 0.01$, respectively; Figures 5B,C).

We then explored the specific components of teaching that may be predictive of job enjoyment and self-confidence at the start of a new

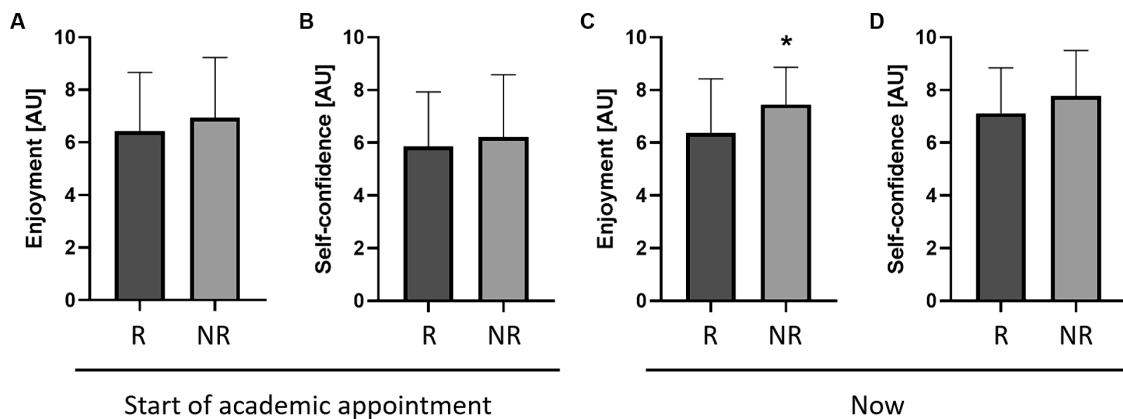


FIGURE 2

Enjoyment and self-confidence at the start of the participants' academic appointment (A,B) and now (C,D) were subjectively appraised on a Likert scale from 1 to 10 (10 being the highest; R, Research, $N = 47$; NR, Non-Research, $N = 19$). * $p < 0.05$.

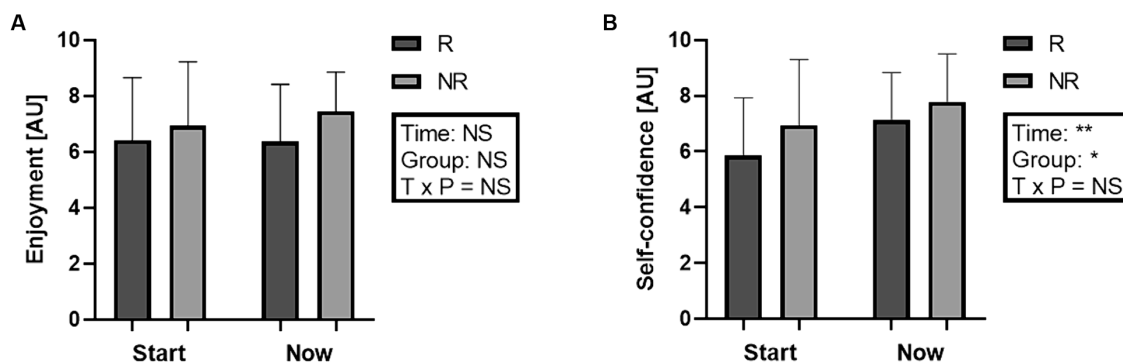


FIGURE 3

Evolution of enjoyment (A) and self-confidence (B) in both participant groups. Enjoyment and self-confidence were subjectively appraised on a Likert scale from 1 to 10 (10 being the highest; R, Research, $N = 47$; NR, Non-Research, $N = 19$). ** $p < 0.01$; * $p < 0.05$.

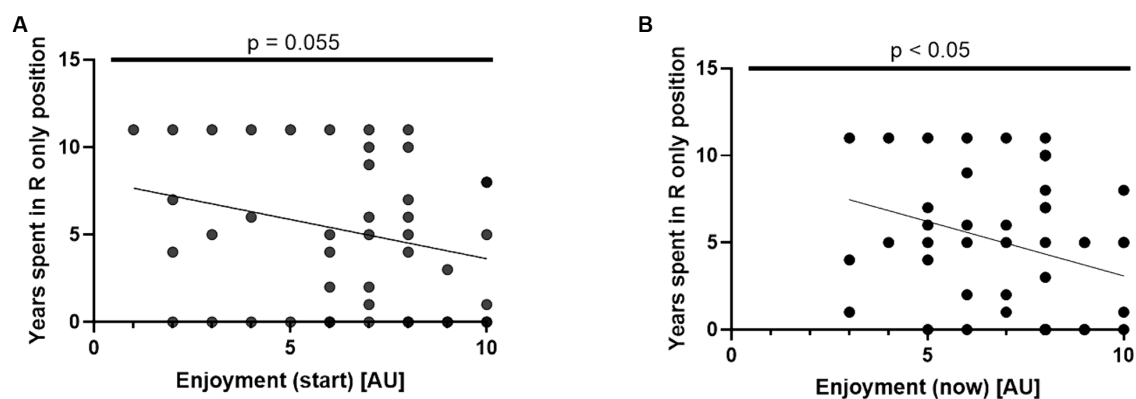


FIGURE 4

Correlation between job enjoyment and years spent in a research-only role at the start of the participants' academic appointment (A) and now (B). Enjoyment was subjectively appraised on a Likert scale from 1 to 10 (10 being the highest).

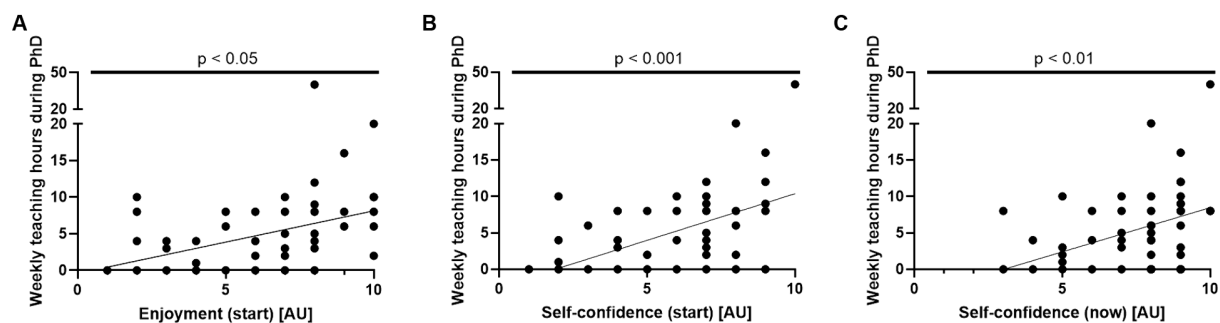


FIGURE 5

Correlation between job enjoyment at the start (A), self-confidence at the start (B) and self-confidence now (C) and average weekly number of hours spent teaching during the PhD period. Enjoyment and self-confidence were subjectively appraised on a Likert scale from 1 to 10 (10 being the highest). There was no difference between the Research and Non-Research cohort, therefore the data were pooled.

academic role. We found that some, but not all, aspects of prior teaching experience positively correlated with enjoyment and self-confidence. Developing teaching content, acting as a unit (or subject/course) chair or managing online student interaction all positively associated with enjoyment and self-confidence in the Research and Non-Research cohorts (all $p < 0.05$). On the contrary, no matter how great the extent of prior experience in marking, demonstrating practical classes, tutoring or lecturing, such teaching practices did not predict how happy or confident new Research and Non-Research academics felt at the start or once settled in their academic role.

Qualitative analysis of participant's comments regarding enjoyment and self-confidence showed two favorable and one less than favorable thematic findings. 'Reward' and 'Connection' were evident components to staff sense of enjoyment and self-confidence. Conversely, staff satisfaction was hindered by 'Unrealistic Expectations' regarding academic workloads and key performance indicators.

3.3.1 Reward

The enjoyable aspects of being in an academic role in the disciplines of health and biomedical sciences significantly overlapped between the two cohorts. The main difference was that the Research cohort tended to appraise their current professional experience

through the lens of their previous, research-only role. For those in academic roles, 'Reward' captured the satisfying interactions and sharing of topic expertise and research knowledge with students. Participants saw the opportunity to 'contribute to the development of a new generation of thinkers' (R28) and 'seeing students learn – the lightbulb moment when a student understands something' (R60) providing a great sense of gratification and reward. Many participants shared a sense of fulfillment in being able to innovate in teaching, contribute to diverse teaching units or projects and have a tangible influence on others' lives. This feeling was especially strong among those who had been in a research-only role before, who favorably compared the opportunity of 'doing a task and being rewarded for it' (R49) and 'realising that you can achieve something' (R49) in an academic role compared to continuous 'grant failures' in research-only roles. Thus, Reward was immediate, ongoing and strongly driven by student interactions during teaching. Reward was thus closely linked, but still distinct from the second sub-theme, 'Connection'.

3.3.2 Connection

Connection describes how participants enjoyed being able to work closely with others, whether students or staff. Again, this was specifically emphasized by those who had been in a research-only role before, who had reported 'feeling isolated from colleagues and

main function of School' (R50) previously, while now *'feeling part of the School team'* (R50) and having *'fun engaging with students'* (R54). The importance of Connection was apparent each in mentee, peer and mentor relationships. Independent of their previous experience, participants enjoyed being able to learn from colleagues who were experienced educators and found a strong sense of collegiality in being able to *'meet new people and attempting to develop new collaborations'* (R28) as well as engage with other teaching academics with different research interests. Support from colleagues and peers was therefore a clear enabler for success in participants' first year of teaching. Being able to ask questions and problem solve with other academics was essential, as were *'helpful colleagues willing to spend their time guiding me to become familiar with systems, procedures, university layout'* (R42). This collegial support gave participants a sense of confidence and reassurance in their work. However, support from peers to assist with teaching was rarely a formal process and having the ability to build relationships and having the confidence to request help from others was a condition for success.

3.3.3 Unrealistic expectations

In contrast, 'Unrealistic Expectations' captured a strong united voice from both cohorts regarding the unrealistic workload allocation, specifically for teaching and learning activities. High teaching workloads created equal feelings of distress and frustration in both cohorts, and participants identified a lack of support and transparency regarding the high teaching and administration load and the impact this has on their research outputs. Participants felt a heightened sense of pressure to produce excellent research in a smaller amount of time, while delivering high teaching demands. Notably, they mentioned a *'mismatch between time required to deliver teaching compared to importance of publication and grant targets'* (R52) and an *'unreal expectation relating to time to deliver quality teaching and to do quality research'* (R68). In addition, they identified that their teaching itself suffered from *'a lack of time to develop or update teaching materials'* (R39). Ultimately Unrealistic Expectations was a perceived barrier to

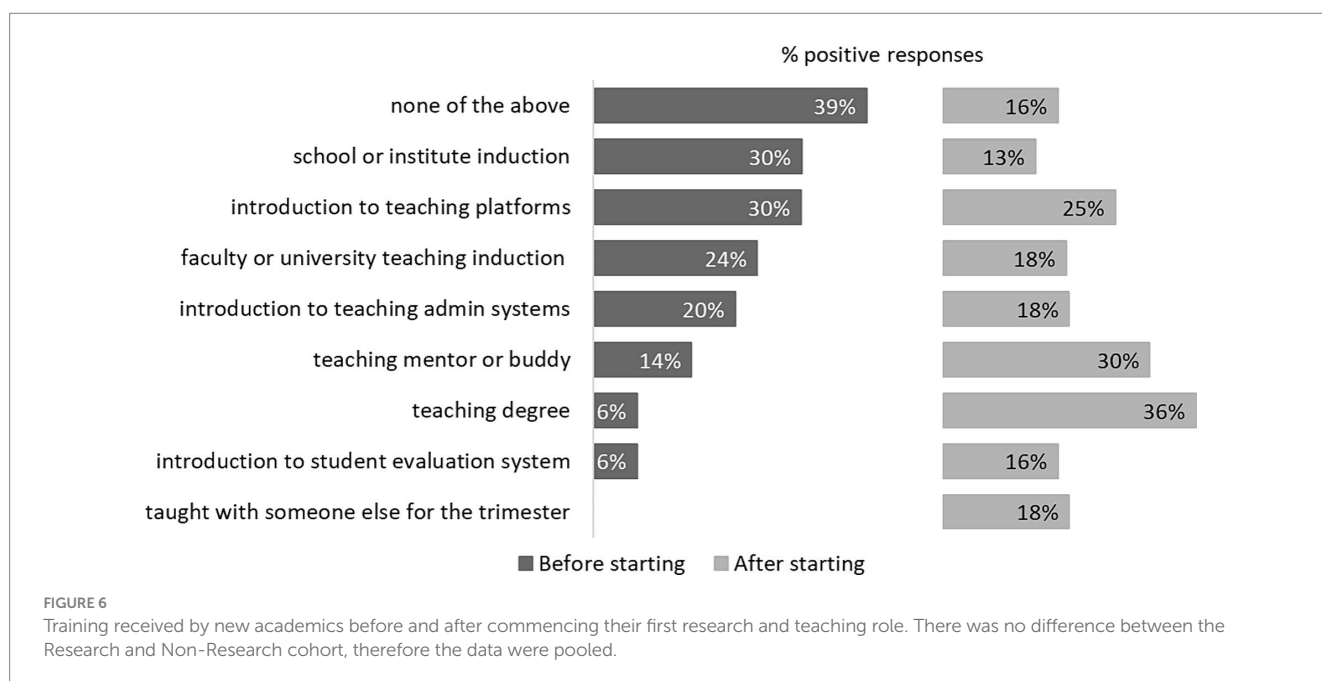
their teaching success, sense of enjoyment and self-confidence; and to the success of research component of their combined role.

3.4 Theme 3: Ill-prepared for a teaching and research role

Both empirical survey results and thematic analysis showed participants were not appropriately prepared for their teaching and research academic role. When it came to receiving qualifications or training prior to, or after starting their academic role, there was no significant difference between the Research and the Non-Research cohorts. Therefore, the cohorts were pooled for further analyses. Only 6% of all participants had gained a teaching degree before their first academic role and, strikingly, 39% of participants had received no education training or teaching induction at all before starting to teach. About one third of academics (30%) were introduced to online teaching platforms, and 20% had received an introduction to teaching administration systems prior to commencing in their academic role. Thirty percent had received a School or Institute based induction and 24% had received a University or Faculty based induction before starting their academic role (Figure 6).

While about half of participants ended up being introduced to online teaching platforms (55%), teaching administration systems (38%), or attending a School/Institute (43%) or University/Faculty (42%) based induction, only 36% of new academics had been given the opportunity to start or complete a teaching degree at the time they responded to this survey. When asked about which of these training opportunities were the most helpful for the reality of teaching practice, 42% of academics mentioned a teaching mentor or 'buddy' as their most useful experience, followed by obtaining a teaching degree (24%). Inductions by Schools, Faculties or Universities, independent on their duration, were only considered useful by less than 10% of the participants.

Thematic analysis affirmed these findings by showing participants felt 'Ill-Prepared' for their combined research and teaching roles due



to a lack of training or guidance in understanding the University teaching systems and processes. Being Ill-Prepared left participants feeling helpless and lost when attempting to navigate administration systems and learning platforms. *'I needed to work everything out for myself'* (R33) and the fact that *'I did not know what I did not know - Information and support regarding teaching was not often offered, instead I had to seek it out'* (R21) exacerbated the feeling that new academics were *'really thrown in the deep end'* (R23, R65), which they found *'extremely stressful'* (R65). Ultimately, the lack of information, communication and guidance resulted in participants lacking confidence in their teaching and administrative capabilities.

On the other hand, we have already highlighted that prior teaching experience was a positive moderator of preparedness and transition to an academic role by increasing enjoyment and self-confidence independent of whether participants had spent some time in a research-only role after their PhD or not (Figure 5). Experiential learning and time on task however remained the most reliable, positive drivers of teaching preparedness when participants were asked how long it took them to become comfortable in their everyday academic role. The majority of respondents (31%) reported that it had taken them one to 3 years to reach that point. Others reported that it had taken them less than 3 months (16%), between 3 and 12 months (20%) and more than 3 years (2%), while 31% could not respond as they had not reached a point where they actually felt comfortable. There was no difference between cohorts.

4 Discussion

This is the first study to report the experiences of Australian academics in health and biomedical sciences having transitioned from a research-only to an academic role, which combined research and teaching responsibilities. Our primary finding was that, in line with our hypothesis, staff in new academic roles who had been in a research-only role previously felt less sense of enjoyment in their current job and less confident at performing it overall when compared to those who had not held a research-only role beforehand. A secondary finding was that close to 40% of all new academics in health and biomedical sciences were ill-prepared and received no formal or informal education nor induction to teaching and learning theories or practices before starting to teach. Instead, they strongly relied on colleagues and mentors to gain knowledge, confidence and reassurance in their work. Aspects of the academic job participants enjoyed or did not enjoy were the same regardless of the participants' teaching background. Both cohorts expressed the rewarding aspects of an academic role, specifically the connection with students and colleagues and the sense of achievement linked to their work. On the other hand, the perception of burden, lack of support and unrealistic expectations associated with a research and teaching role was also the same in both cohorts. Our results confirm and expand on previous findings from Australia and the United Kingdom that identified priority areas in the development of early career academics in the field of arts, education and science are to 'help manage the tensions inherent in the time devoted to teaching and research' (Hemmings, 2013; pp 43), but also 'stress the positive nexus between teaching and research' (Hemmings, 2013; pp 43).

Because both cohorts identified the same hurdles, it can be assumed that, for former full-time researchers, it is rather the loss

of positive aspects intrinsic to their identity as a researcher that contributed their discontentment. Establishing one's identity as an early-career researcher is a challenging process that is increasingly complex due to global changes in the higher education and research sectors (Castelló et al., 2015)—a perspective shared by researchers from five European countries on the basis of interviews of early-career researchers from various disciplines based in Finland, the UK and Canada. Rather than an established status that is automatically attained at a given stage of career development, establishing one's identity is a long and dynamic process (McAlpine et al., 2014). There was a perception of having to compromise one's identity by leaving a 'risky-career' (Castelló et al., 2015), whether for financial, personal or other reasons, to transition to a more predictable academic role. Undertaking that transition at a time when still building a researcher identity may come with a burden that prevents former full-time researchers to fully enjoy the positive aspects of their new academic role. In contrast, those becoming research and teaching academics directly after their PhD may not experience this feeling of loss. Instead, they may be primarily focused on becoming competent teachers and may not engage in research to the same extent as their peers, at least for the first few years (Hemmings, 2013).

The lack of formal training, induction and support at the start of participants' academic appointment was a striking finding. Over a decade ago, Hemmings et al. proposed that early staff inductions should emphasize teaching, learning, assessments and mentoring (Hemmings, 2013). They also suggested that such inductions should take into account the various background of new academics (Hemmings, 2013). In particular, training in tertiary teaching should cater for those coming from research-only roles, as 'simply providing general training in tertiary teaching, and associated assessment and administration may fail to meet the diverse learning needs of those new to academe' (Hemmings, 2013; pp 45). Two other Australian studies have suggested that teaching training should be embedded in all PhD courses (Coates and Goedegebuure, 2012) based on individual needs and interests (Edwards et al., 2011). Australian universities focus on developing translational, graduate employability skills in PhD students from all disciplines (McGagh et al., 2016), but these training opportunities do not usually involve teaching. Since most health and biomedical PhD graduates will not exclusively focus on research in their career, some, mostly within the nursing discipline, have questioned why the doctoral degree does not address the needs of those willing to research and teach (Edwards et al., 2011; The New Work Reality Foundation for Young Australians, 2018) by providing formal training and experience in each of the two key functions of academia (McNelis et al., 2019; Dunbar-Jacob and Hravnak, 2021). This should include teaching, as is already the case in some courses and countries, such as a number of nursing doctoral programs in the United States (King et al., 2020). Optional preparatory learning for teaching in higher education may be ideal for those who intend to work in academia.

Perversely, the number of Australian PhD graduates across all disciplines increases every year (McCarthy and Wienk, 2019) along with a decrease in the number of research-only positions available (McCarthy and Wienk, 2019); a fact that holds true for other countries (Castelló et al., 2015). In addition, the current post-pandemic context has seen numerous governments reducing their funding to universities and research institutes, with the additional loss of international student course-based funding due to closed borders. These events

might accelerate a trend initiated more than a decade ago in Australia (Edwards et al., 2011), where an increasing proportion of new PhD graduates will choose to become part of the teaching workforce (sitting at about 41% of all PhD graduates in Australia between 3 and 9 months post-graduation; Guthrie, 2015) rather than pursuing a research-only career in future years.

Finally, we found that previous *and* recent teaching experience were strong predictors of future job enjoyment and self-confidence. The less time between the conferral of their PhD and the start of their academic role, the more self-confident participants felt in their job, even though they had significantly higher teaching workloads. Two main factors may explain this. Firstly, recent Australian health and biomedical science PhD graduates may benefit from fresh teaching experience during their PhD (Bexley et al., 2011), in contrast to those having spent up to a decade or more in research-only roles. For example, an existing knowledge of state-of-the-art teaching platforms acquired while teaching casually during the PhD might constitute an undeniable advantage, especially in the context of the COVID-19 pandemic, during which some of this study was completed. Secondly, one of the significant differences between the two cohorts was the number of hours spent teaching during their PhD candidature. Those who had not been in a research-only role had taught twice as much, which might reflect an inherent and early interest for teaching or academia. Teaching experience was however not a guarantee of success and self-confidence, and only cognitively demanding teaching responsibilities (involving curricula conceptualization, online learning design and assessment formation, managing team dynamics, navigating administrative processes inherent in chairing a unit, or developing a unit) provided participants from the either cohort with a significant advantage.

4.1 Limitations

Beyond the provision of formal training, it is necessary to interpret the generally perceived lack of support reported by both cohorts in the context of the timing of data collection. We conducted this survey in the second quarter of 2021, as the COVID-19 pandemic was entering its second year. Close to half of our participants would therefore have started their academic role in the year preceding, or during the pandemic. This timing might partly explain the difficulties identified when commencing a new role, in addition to having to transition from face-to-face systems to online platforms without any prior education for using these systems, or easy access to mentors and colleagues. Several participants remarked that they were unsure if their experience, especially their feelings of isolation in navigating new systems, was a product of the COVID-19 pandemic. However, those whose first year of teaching was not during the pandemic made similar comments, suggesting that the pandemic probably acted as a magnifying glass by amplifying pre-existing issues.

Our limited sample size did not allow us to conduct further analysis to account, for example, for those who had worked in a different industry prior to or after completing their PhD in health and biomedical science, before transitioning to academia. This included one participant having worked for the government, and two participants having worked in clinical settings. This sub-cohort may have their specific, formal or informal previous

teaching experiences that may have mediated their transition in a research and teaching role and should constitute the topic of future studies. Finally, while all participants were in the first 5 years of their first research and teaching appointment, our sample size was not large enough to account for time as more than a discrete variable ('at the start' versus 'now') for our outcomes of interest.

5 Conclusion

Our study surveying 66 academics working in the disciplines of health and biomedical sciences at over 20 Australian universities outlined a gap between those who did and did not work in research-only roles before their first research and teaching appointment. While both cohorts often undergo this transition with little prior teaching experience and no formal education training, it remained less satisfying and enjoyable for those who used to be full-time researchers. The reported lack of guidance and support during the first few years of a research and teaching role may therefore lead to staff dissatisfaction, lack of motivation, disengagement and ultimately to poor quality teaching and student learning. It is postulated these issues may be mitigated by the implementation of teaching-specific training programs catering for the pure research background of new health science academic staff members.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by Deakin University Human Ethics Advisory Group (HEAG-H 2021-026). The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin because implicit consent was provided at the moment the participant read the PDF and clicked on the button to start the study.

Author contributions

SL and JC: conception and design. SL, OK, and JC: acquisition, analysis, and interpretation of data. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2024.1233358/full#supplementary-material>

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