Early career teachers' intentions to leave the profession: The complex relationships among preservice education, early career support, and job satisfaction

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Abstract. This paper investigates the complex factors that lead to early career teachers (ECTs) deciding to leave the profession. It extends prior studies to show the associations that different elements of preservice education (PSE), early career support, and on-the-job satisfaction have with the intention to leave the profession. The study uses data from 2,144 Australian ECTs to explore these relationships. Results highlight the importance of teachers' collegial relationships with their peers, and replicate prior findings showing the significance of mentoring and induction programs. Results show that elements of job satisfaction are strongly associated with intention to leave the profession, leading to a number of implications for achieving the twin goals of higher teacher retention and job satisfaction.

Keywords: early career teacher (ECT); retention; support; preservice education (PSE); initial teacher education (ITE); satisfaction; attrition; Australia

Introduction

Attrition by early career teachers (ECTs) is a long-running concern for teacher educators, researchers, policy makers, teachers, and other stakeholders in the education system, with high rates of teacher attrition in many parts of the world. The number is highly contested and has been placed at between 8% and 50% of teachers leaving the profession within the first five years (Buchanan et al., 2013; Changying, 2007; Cochran-Smith, 2004; Guarino, Santibanez, & Daley, 2006; Ingersoll & Smith, 2003; Queensland College of Teachers, 2013). The attrition of ECTs is also a long-running concern for those invested in teacher education and policy not solely because of the rate but also because of the reasons behind it. Often it is quality teachers who are leaving the profession (Smith & Ingersoll, 2004) where attrition is the result of dissatisfaction with alterable aspects of the profession (Borman & Dowling, 2008; Clandinin et al., 2015). Research into attrition is aimed beyond simply increasing retention at the broader goal of understanding how the profession can be changed to improve what Gu and Day (2007) referred to as *quality retention,* whereby teachers remain committed to and intrinsically motivated by their profession.

The reasons for teacher attrition have been studied at length using a variety of methods. Yet the persistence of the relatively high rates of such attrition cited above highlights the importance both of the attrition/retention question as it applies to teachers and of the considerable value of continuing to investigate it in multiple contexts and from diverse conceptual perspectives – in this case, with the added insights gleaned from a large-scale empirical evidentiary base.

In this paper we build upon the foundation afforded by previous scholarly literature by focusing upon three factors that play a significant role in ECT attrition: preservice education (PSE); early career support; and professional satisfaction with working conditions. There is evidence that the PSE provided to teachers impacts upon their intentions to leave the profession (Darling-Hammond, Chung, & Frelow, 2002; DeAngelis, Wall, & Che). There is also evidence that the support provided to ECTs, such as mentoring and induction, influences their intentions to leave the profession (DeAngelis et al., 2013; Ingersoll & Strong, 2011; Kelly, Sim, & Ireland, 2018). Finally, there is evidence that there is much in the "alterable characteristics of teachers' work environments" (Borman & Dowling, 2008, p. 401) that has an impact upon attrition. Professional satisfaction with on-the-job working conditions is at once a significant factor and a complex policy problem with regard to understanding teacher attrition and enhancing teacher retention (Ladd, 2011).

There are certainly other factors that are significant in explaining attrition, such as the values, personalities and contexts of individual teachers. The present study follows on from a series of qualitative studies into the attrition of Australian teachers, such as Ewing & Manuel (2005) who recognise the importance of having teachers' voices present in research. Similarly, Buchanan et al. (2013) present stories of how beginning teachers have survived, and suggest a need for research further that investigates the factors that enable teachers to "survive and thrive" in the profession (p. 126) rather than simply meeting standards. The need for this kind of qualitative research is shown also in the findings of Howes & Goodman-Delahunty (2015) who analyse the ways in which teachers' sense of personal fulfilment or lack of an alternative career impact upon their decisions to stay or leave. The present study attempts to make links between existing quantitative findings about teachers' attrition, and these qualitative findings that have highlighted the importance of contextual and cultural factors in explaining attrition.

The present study focuses upon the three factors identified above – PSE, early career support and professional job satisfaction – as being among those that can be influenced by policy. Thus the aim of this paper is to add a theoretically nuanced and empirically founded understanding of how these factors interact, so that they may potentially be addressed by policy-makers at multiple levels. Our thinking here is that an understanding of teachers as agential individuals striving to fulfil professional and personal aspirations in highly complex working conditions is crucial to generating new understandings of these factors and also of the policy strategies that might usefully be enacted to empower teachers individually and collectively.

More broadly, the goal of research into attrition is not simply to reduce attrition (a deficit model of sorts) but rather to improve the satisfaction with working conditions of all teachers, whereby reduced attrition is a likely consequence (a positive perspective). However, in order for this positive notion of teacher education to become widespread and to gain traction to change policies, it requires a stronger evidence base.

In this paper we develop a theoretical model for how these factors are related that embodies two key hypotheses. Firstly, we hypothesise that all of these three factors are likely to be associated with a teachers' intention to leave the profession. Secondly, we hypothesise that PSE and early career support have some relationship to satisfaction with on-the-job conditions. The paper follows the work of DeAngelis et al. (2013), Ladd (2011) and Smith

and Ingersoll (2004) in using large data sets to uncover evidence for how these factors relate to one another.

Background
Attrition and Teacher PSE

The quality of teacher PSE, as self-reported by ECTs, impacts significantly upon rates of retention (Darling-Hammond et al., 2002; DeAngelis et al., 2013). The finding, replicated in both of these studies, is that there is "a direct association between new teachers' perceptions of PSE quality and their intentions to remain in their current school and in the profession" (DeAngelis et al., 2013, p. 350). In their study, DeAngelis et al. continued to track ECTs into their first two years of service, showing that "teachers who indicated being more satisfied with the quality of their preparation program were significantly less likely to leave teaching after their first year in the profession than those who were less satisfied" (p. 349), where those who were satisfied with their program were about half as likely to leave the profession as those who were not. Ingersoll et al. (2014) extended the theoretical understanding of this effect, providing evidence that teachers in programs with a focus upon applied teaching skills (practical experience, feedback and classroom observation) were less likely to leave the profession after their first year of teaching.

There is a methodological question as to whether teachers' self-reported quality of PSE programs is a valid indication of actual course quality. For example, in many studies comparing teacher outcomes across different programs types there can be more differentiation within program types than between program types (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2006; Kane, Rockoff, & Staiger, 2008). However, DeAngelis et al. (2013) gave some indication of the validity of the measure of perception of quality (taken at the time of graduation) through analysis over variance in responses from 12 institutions, when teachers were asked to rate program quality.

In their study of teachers within a state public school system, DeAngelis et al. (2013) showed that, of those teachers who intended to leave teaching, 18.1% had actually left the state system within the first two years. One implication of this is that a (surveyed) intention to leave teaching does not translate into action (within a two year time period) for the majority of teachers. However, given the large proportion of teachers who intend to leave the profession then the one fifth of these teachers actually leaving within two years remains a significant proportion. In Australia, the 2010 *Staff in Australia's schools* (SiAS) survey (McKenzie, Rowley, Weldon, & Murphy, 2011) showed that 25.8% of ECTs intend to leave the profession. Using these estimates, one fifth of this number would have approximately 5% of teachers leaving within the first two years; and this (very) rough approximation is consonant with the evidence that is available, that around 13.5% of teachers actually leave within the first four years of teaching (Queensland College of Teachers, 2013).

A recent Australian study used a large scale, mixed methods approach with over 5,000 ECTs to begin to address the question of which elements of PSE have the most impact (Mayer et al., 2017). It found links between the content of teacher education programs and the perceptions of ECTs about their PSE. The study showed that most participants believed that they were indeed effective as teachers, but that this was not due to their PSE. However, one key point that was identified by ECTs in this study was that learning how to work effectively with "socio-economically diverse learners" was a key need for the profession that was lacking in many PSE programs. This was the area in which "graduates felt least well prepared as well as least effective despite a majority of teacher education providers

nominating 'social justice' as a key feature of their programs when asked as part of the mapping of Australian teacher education programs" (p. 124).

Attrition and Working Conditions

Working conditions have been consistently found to be good predictors of teachers' attrition: studies have reported strong correlation between intentions to leave and general satisfaction with working conditions (Ladd, 2011; Skaalvik & Skaalvik, 2011; Wang, Hall, & Rahimi, 2015). At the same time, research has also been interested in understanding the role that different specific working conditions play in attrition. One of these conditions is workload, which may include, among others, the number of worked hours, the quantity of work not related to teaching (e.g., bureaucratic work) and in general the feeling of being overwhelmed by the amount of work. Several quantitative studies have found a direct significant positive relationship between workload and teacher attrition (e.g., Borman & Dowling, 2008; Cui & Richardson, 2016). Moreover, indirect evidence for this relationship has been reported by several authors, suggesting that the effect of workload on attrition may be mediated by burnout variables (emotional exhaustion, depersonalisation, personal accomplishment). Thus, some studies (Alarcon, 2011; Rabasa, Figueiredo-Ferraz, Gil-Monte, & Llorca-Pellicer, 2016; Skaalvik & Skaalvik, 2011) found a significant relationship between workload and burnout on the one hand, and between burnout and attrition on the other hand.

This indirect relationship is consistent with studies and meta-analyses that have found a significant positive relationship between burnout and attrition (e.g., Swider & Zimmerman, 2010; Wang et al., 2015), and also with other studies that found a significant positive relationship between workload and burnout (Košir, Tement, Licardo, & Habe, 2015; Näring, Briët, & Brouwers, 2006; Van Droogenbroeck, Spruyt, & Vanroelen, 2014). Some qualitative studies provide some additional nuances to this relationship between working conditions and intention to leave the profession. For example, Buchanan et al. (2013) reported that increased workload for beginning teachers is often due to the necessity of teaching subjects or completing tasks that fall outside their expertise, which implies a considerable increase in the required time for preparation. Clandinin et al. (2015) analysed the subjective tensions that beginning teachers face as a consequence of this increased workload (e.g., tensions between work and friends, work and family, work and health, etc.) and they showed how these tensions have led some beginning teachers to think about leaving the profession.

Another working condition that seems to be an important predictor of teachers' attrition is their relationships with stakeholders, especially with students. Thus, several studies have found a significant relationship between students' conflictive behaviour or students' lack of engagement and teachers' attrition (Cui & Richardson, 2016; Ingersoll, 2001; Wang et al., 2015), and it has also been reported how conflictive relations with parents may cause attrition decisions by teachers (Lindqvist & Nordänger, 2016; Struyven & Vanthournout, 2014). Borman and Dowling (2008), in a meta-analysis, also found a significant relationship between students' performance and teachers' attrition. Moreover, several studies (see the meta-analysis by Aloe, Shisler, Norris, Nickerson, & Rinker, 2014) have also found a significant relationship between students' conflictive behaviour and burnout variables that, as we have already mentioned, have been consistently related to teachers' attrition.

This could suggest that schools with more socially disadvantaged students are associated with more attrition or turnover, but this is not so clear. Dupriez, Delvaux, and Lothaire (2015), for example, did not find a significant relationship between these two variables, and, although Borman and Dowling (2008) found a significant relationship in their

meta-analysis, the effect size was quite small (only a 5% greater possibility of attrition when the majority of students were from a low socioeconomic background). On the other hand, Allen, Burgess, and Mayo (2012) reported a significant relationship between neighbourhood deprivation and teachers' turnover. This echoes several studies that have found that there is more attrition in schools located in urban areas than in those located in rural areas (Borman & Dowling, 2008; Ingersoll, 2001). However, Dupriez et al. (2015) found that there was more turnover in rural areas, a result that they explained in terms of the idiosyncrasies of the Belgian context: a decentralised educational environment and low pressure on the students and schools performances, combined with the advantages of living in more populated cities, encouraged teachers to escape from rural areas and to go to the cities. This explanation (i.e., different social and educational contexts) may indeed be the key to understanding the contradictory results found by researchers about the influence that social deprivation and urban–rural areas have on attrition. By the same token, for example, studies conducted in Australia, Canada and Sweden (Buchanan et al., 2013; Burke, Aubusson, Schuck, Buchanan, & Prescott, 2015; Clandinin et al., 2015; Lindqvist & Nordänger, 2016) have reported how isolation (including geographical isolation) may drive teachers to leave the profession, and other studies (Borman & Dowling, 2008; Ingersoll, 2001) have found that there is significantly more attrition in smaller schools (although with small effect sizes).

The decentralisation of the educational system and the accountability pressures, which Dupriez et al. (2015) used to explain some results in their study in Belgium, are aspects that have also been commonly related to attrition and turnover. Thus, it has been found consistently that increased external control and a lack of personal control and decision-making capability about one's work are related significantly to attrition (Ingersoll, 2001; Wang et al., 2015). The lack of possibilities for growing within the profession has also been revealed as an important predictor of attrition (Ávalos & Valenzuela, 2016; Lindqvist & Nordänger, 2016; Struyven & Vanthournout, 2014). Borman and Dowling (2008), for example, reported that teachers in environments in which there are opportunities to grow as professionals have their probability of attrition reduced by 58%. By contrast, the influence of salary on attrition intentions is not as clear: Ingersoll (2001) did not find a significant relationship, but Borman and Dowling (2008) and Cui and Richardson (2016) did find such a significant relationship.

In summary, according to the current research, it seems that the working conditions that most clearly influence teachers' decisions to quit or to stay are: the workload; the relationships with students and parents; the personal control and decision power about one's work; and the possibilities of growing within the profession.

Attrition and ECT Support

The support provided to ECTs, in particular through mentorship, has been consistently shown to impact on the intentions of these teachers to leave the profession (DeAngelis et al., 2013; Ingersoll & Strong, 2011; Kelly et al. 2018; Smith & Ingersoll, 2004). Research into ECT support has focused upon two key areas (Richter, Kunter, Klusmann, Lüdtke, & Baumert, 2011): the formal support provided through a specified curriculum or structure such as mentoring or induction programs; and the informal social support that teachers provide to one another in various forms of "affect, aid and affirmation" (Kelly & Antonio, 2016). Studies have mainly focused upon the role of formal support, both for methodological reasons and for the potential to impact upon education policy.

A series of studies has demonstrated the aspects of induction and mentorship that impact upon early career retention. In their investigation of teacher turnover after the first

year of teaching, Smith and Ingersoll (2004) found that the strongest predictors of teacher retention were having a mentor from the same field or formally collaborating with other teachers on planning or instruction. Kapadia, Coca, and Easton (2007) reinforced this finding that it is not enough for an ECT just to have a mentor – the mentorship needs to be of high quality for it to impact upon attrition rates. This finding was repeated by DeAngelis et al. (2013), who showed that this impact of high quality mentoring holds true even when controlling for the quality of PSE. However, the notion that mentoring is important for all ECTs was contested by Dupriez et al. (2015), who suggested that "mentoring arrangements are probably most important for teachers who are not prepared for the profession (given their lack of formal training and their much higher propensity to leave)" (p. 17).

In many studies, mentoring is considered as being just one part of a comprehensive induction program, a term used as a catchall for all "support, guidance and orientation programs" (Ingersoll & Strong, 2011, p. 201) that are provided to beginning teachers upon entering a school. Induction is not a once-off at the start of a teacher's career, but rather a sustained program to aid the teacher in developing capacity (Hope, 1999). Induction programs can reduce the risk of burnout by easing the pressure of learning to operate within the school organisational environment (Gavish & Friedman, 2010). Ingersoll and Strong (2011) found in a meta-review that "almost all of the studies we reviewed showed that beginning teachers who participated in some kind of induction had higher satisfaction, commitment or retention" (p. 38).

There is thus reason to believe that early career support, particularly through induction and mentoring, can result in reduced rates of attrition. Beyond formal mentoring and induction programs, other social aspects of the school context have been found to play also a key role as a predictor of teachers' retention. In a large study from the United States, Ladd (2011) found that the working condition of *school leadership* is a key factor for predicting teacher intention to leave the profession. However, a subsequent analysis using the same data and founded on more robust statistical treatment that does not make assumptions about invariance between and within groups found that the factor for *working relationships with colleagues* (Schweig, 2014) was the strongest predictor for wanting to leave the profession. This factor – which was labelled as "teacher empowerment" by Ladd and "distributed leadership" by Schweig involved questions about a sense of mutual trust between teachers and teacher involvement in school decision making.

ECTs also benefit from structured opportunities to discuss experiences with other teachers to enable their reflection and growth (Howe, 2006), and having a common planning period with colleagues or collaborating with other teachers on instruction has a positive effect on ECTs' retention (Smith & Ingersoll, 2004). For example, in one study of high-poverty districts a significant factor in teacher retention was "ongoing support from members of the cohort as well as other professional networks across the early years of teaching" (Freedman & Appleman, 2009). Also, a reduced teaching load in initial years may potentially benefit from a reduced teaching load, with less time spent in the classroom giving them less pressure during the transition into teaching (Howe, 2006).

Research Questions

There is thus a basis within the literature for hypothesising that the three nominated factors for study are likely to impact upon ECT attrition: PSE, job satisfaction, and early career support. However, not enough is yet understood about: how these factors relate to one another; what these factors represent at a fine-grained level of detail; and whether existing empirical findings are generalisable –particularly to education systems internationally since

most large-scale studies addressing teacher attrition have taken place in the USA. Thus, the present study aims to replicate and expand upon elements of previous research on attrition in the context of the Australian education system[1].

Moreover, the present study aims to extend the understanding of some factors influencing attrition by including a finely grained level of detail considering multiple variables within each factor. Four research questions aim to establish an understanding of relationships among these factors within the context of the Australian school system:

Research Question 1: Controlling for other teacher and organisational characteristics, is preservice preparation, as measured by novice teachers' satisfaction with the quality of their preservice preparation program, associated with career intentions?

Research Question 2: Controlling for other teacher and organisational characteristics, is ECT support, as measured by ECTs' self-reported satisfaction with the quality of the support offered to them, associated with their career intentions?

Research Question 3: Controlling for other teacher and organisational characteristics, is ECT job satisfaction, as measured by self-reported indicators, associated with career intentions?

Research Question 4: Controlling for other teacher and organisational characteristics, is ECT and/or PSE associated with ECT job satisfaction?

Methods
Data

This paper draws upon data from the SiAS 2010, which was conducted by the Australian Centre for Educational Research (ACER) on behalf of the Australian Government. The data were drawn from a total survey population of 4,599 primary teachers and 10,876 secondary teachers (McKenzie et al., 2011). For all teachers, the response rate was 34% for primary schools and 32% for secondary schools which introduces some potential for non-response bias (McKenzie et al., 2011). However, significant steps were undertaken to reduce this bias through a two-stage stratified sample, of first selecting schools and then selecting teachers within the sampled schools, with a full description of this process provided by McKenzie et al. (2011, p. 5). Of the total of 15,475 included teachers, 2,477 were identified as ECTs after self-reporting that they had been teaching for a total of fewer than five years. This was 16% of all responses. The survey was administered through an invitation to principals and, following approval, invitation to all teachers within the school to complete the survey (McKenzie et al., 2011).

The full data set for the SiAS is available on request through the Australian Data Archives with the record number 01278. The survey included 51 questions and was designed by updating previous surveys such as the SiAS 2007 (McKenzie, Kos, Walker, Hong, & Owen, 2008) and those surveys conducted from 1963 to 1999 by the Australian College of Educators (Dempster, Sim, Beere, & Logan, 2001). Appendix A provides a list of the questions whose responses were included in the present study. A copy of the full survey is reported by McKenzie et al. (2011). The survey utilised a four-point Likert scale and these were treated as binary variables for analysis, following the rationale of prior studies in the literature (Darling-Hammond et al., 2002; DeAngelis et al., 2013; Kapadia et al., 2007).

Participants were questioned about "how helpful" their PSE was, with options of very helpful/helpful or of some help/no help for 15 different questions (Table A). Participants were asked about how helpful their early career support was, for six types of support, and for

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[1]An in-depth description of the current context of Australia PSE can be found in Mayer et al. (2017).

each were given these same four options with an additional ability to indicate "N/A" if this type of support were unavailable. Participants were asked to indicate how satisfied they were with aspects of their job as well as their overall satisfaction. These 18 questions allowed respondents to choose very satisfied/satisfied or dissatisfied/very dissatisfied as well as the option tfo select "unsure", which results were not included.

Finally, participants responded to the question "At this stage, how do you see your future in the teaching profession?". Responses were coded as either indicating an intention to leave the profession ("I am thinking about an alternative career"/"I am actively seeking an alternative career") or not have an intention to leave the profession ("I expect that teaching will be my lifetime career"/"I am unlikely to leave teaching"). Whilst this intention to leave the profession is an imperfect indicator of actual attrition there is evidence that it can be used, with DeAngelis et al. (2013) showing that there were significantly higher rates of attrition amongst those who stated an intention to leave than amongst those who did not (with 11.4% of those stating an intention to leave actually leaving after one year and 19.8% after two years).

Of the 2,477 ECTs in the dataset, 2,144 were included after cases with missing data (e.g. "unsure" responses) were removed. The demographics observed in the sample, Table 1, showed similar demographics to those in the study of DeAngelis et al. (2013), which contained a comparable majority of female teachers (79%), secondary school teachers (34%), metropolitan teachers (74.4%, taken as urban plus suburban teachers), and teachers in low SES settings (33%), with a comparable sample size (N=1,159).

Total number of respondents	2,144
Teacher characteristic	
Male	25%
Female	75%
Mean age	30.4 (7.9)
School level	
Primary	32%
Secondary	68%
School sector	
Catholic	24%
Independent	15%
Government	61%
Geolocation	
Metropolitan	63%
Provincial	31%
Remote	6%
SES	
Low (1-3)	32%
Medium (4-7)	33%
High (8-10)	35%
Job Security	
Secure (permanent or >1 year contract)	73%
Insecure (<1 year contract or casual)	27%

Table 1: Demographic variables used in analysis (standard deviation in parenthesis).

Analysis

The research questions were investigated by developing a series of six statistical models (Figure 1), modelling the relationship of variables within each of the three factors to

intention to leave the profession. M1 includes 15 variables relating to PSE and their association with intention to leave the profession. M2 includes six variables relating to the quality and presence of early career support and its association with intention to leave. M3 includes 18 dimensions relating to career satisfaction and their association with intention to leave the profession. A further model (M4) was developed including all three of these factors to understand their interaction. Model M4 consists of 47 variables, which makes it the largest and the most complex model in this work; thus subtle covariate effects can be confounded by the sheer size of model M4. For this reason the associations between ECT PSE, support and satisfaction and ECT intention to leave the profession were investigated in smaller sub-models (M1, M2 and M3). Finally, two further models investigated the relationship between PSE and satisfaction (M5) and early career support and satisfaction (M6).
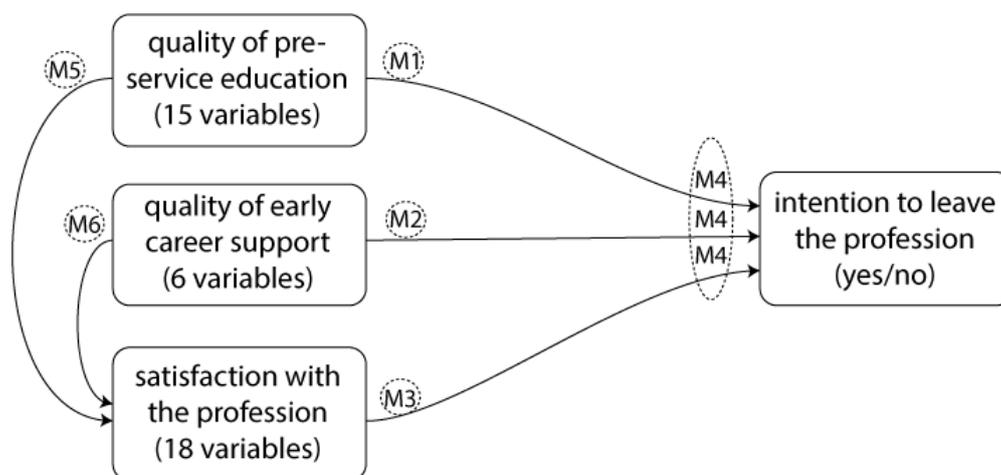

Figure 1: Models developed for analysing relationships among factors.

All seven demographic variables listed in Table 1 were included in the six models in order to account for demographic effects and to compare demographic aspects across models. The procedure to derive each model was an iterative variable selection process chosen to be a trade-off between model fit measured by the Akaike Information Criterion (AIC) value (Bozdogan, 1987) and hypothesis tests (Bilder & Loughin, 2014). In keeping with the literature (e.g., DeAngelis et al., 2013), our significance level used throughout this analysis was $\alpha = 0.05$.

In order to provide an improved model fit and to explain as much of the response variability as possible, we started with a saturated model that included all the relevant survey sub-questions. From this we iteratively reduced the over-fitted model with a series of hypothesis tests to identify significant variables in conjunction with backward stepwise variable selection (based on AIC values) to form a reduced model. The resultant variables in the model were those that significantly explained the variation of the response with optimal goodness-of-fit. The use of both Wald and likelihood ratio as test statistics, in conjunction with step-wise variable selection, provided greater confidence about our results, particularly for hypothesis tests with borderline results (i.e., p values close to α) (Bilder & Loughin, 2014). The combination of multiple statistical tests in our applications repeatedly identified the same key variables, providing a robust framework to reduce the saturated model. Thus the models included in the results contain a subset of the full set of variables (the reduced model). The baseline for each of the variables in the models is indicated in Table 2.

Variable name	Baseline level	Comparison measures
Gender	Male	Female
Level	Primary	Secondary
Sector	Public	Catholic, Independent
Geolocation	Metropolitan	Provincial, Remote
Socio-economic status	Low (Deciles 1-3)	Medium (4-7), High (8-10)
Employment security	Insecure (casual or less than 12 month contract)	Secure (more than 12 month contract)
PSE (12 variables)	Helpful ("At least helpful")	Unhelpful ("Little to no help")
Early career support (6 variables)	Helpful	Unhelpful, Not received
Early career satisfaction (18 variables)	Dissatisfied	Satisfied
Early career attrition	Intention to leave	No intention to leave

Table 2: Baseline variables for logistic regression models M1-6

Results
RQ1: Effect of PSE on Intention to Leave

The full model for addressing RQ1, Model 1, included all 15 factors for PSE and the seven demographic variables. The odds ratios in the reduced model are shown in Table 3, with Model 4 included for comparison.

Model 1 shows that there was between a 34% and an 104% increase in the odds of ECTs responding "no" to having an intention to leave the profession (i.e. an increase in the odds of staying in the profession) where the PSE variable for "working with other teachers" was found to be either helpful or very helpful (when compared with those finding it to be not helpful or of some help), when all other variables were held constant. This variable was also significant in Model 4 where the percentages were between a 16% and an 88% increase in the odds of responding "no" to intending to leave the profession.

Similarly, the odds of ECTs intending to stay were between 20% and 82% higher when PSE in "using a variety of instructional methods for diverse student needs" was found to be either helpful or very helpful, when all other variables were held constant. However, this variable was not significant in Model 4.

	Model 1			Model 4		
Description	Low CI	Odds ratio	High CI	Low CI	Odds ratio	High CI
School level (secondary)	**0.403**	**0.509**	**0.643**	**0.34**	**0.517**	**0.678**
School sector (Catholic)	0.902	1.148	1.461	0.773	1.017	1.339
School sector (independent)	0.798	1.069	1.434	0.666	0.930	1.300
Geolocation (provincial)	0.779	0.996	1.273	0.818	1.087	1.444
Geolocation (remote)	**0.332**	**0.506**	**0.772**	0.421	0.690	1.131
Socioeconomic status (medium)	0.659	0.843	1.078	0.655	0.871	1.158
Socioeconomic status (high)	0.602	0.792	1.042	0.610	0.838	1.150
Employment security (secure)	0.734	0.924	1.163	0.712	0.931	1.218
Age	0.999	1.012	1.025	**1.016**	**1.032**	**1.048**
Gender (female)	**1.013**	**1.269**	**1.589**	0.966	1.251	1.620
d) Using a variety of instructional methods for diverse student needs	**0.549**	**0.676**	**0.832**	0.651	0.825	1.046
n) Working effectively with other teachers	**0.490**	**0.605**	**0.747**	**0.533**	**0.677**	**0.860**

Table 3: Odds ratio for variables in reduced M1 (PSE factors) and selected variables in M4 on ECT intention to leave the profession.

RQ2: Effect of ECT Support on Intention to Leave

The full model for addressing RQ2, Model 2, included six factors for the presence and helpfulness of six types of support as well as the seven demographic variables. For each type of support, the results distinguished between having helpful and unhelpful support, as well as having no support at all. The factors included in the reduced model are listed in Table 4. Again, Model 4 is included for comparison.

Results from Model 2 showed that the odds of ECT responding "no" to intention to leave the profession were 22% to 186% higher for metropolitan teachers than for remote teachers. However, a significant effect was not observed in Model 4.

The odds of ECT responding "no" to intention to leave were between 47% and 136% higher for primary than for secondary teachers in Model 2. This effect was also observed in Model 4 (between 47% and 194% higher).

In Model 2 the odds of ECT responding "no" for intention to leave in teaching were between 10% and 89% higher for those who had helpful (rather than unhelpful) structured opportunities to discuss their experiences with other new teachers. Similarly, there was a 16% to 100% increase in the odds of ECT responding "no" to intention to leave when structured opportunities to discuss their experiences with other new teachers were helpful when compared with not received at all. Only this second effect was significant in Model 4.

In Model 2, for those with helpful (rather than unhelpful) designated mentors, the odds of staying in the profession were between 35% and 122% higher. There was a smaller effect, of between 11% to 96% increase in the odds of ECT responding "no" to intention to leave, when designated mentors were helpful when compared with not received mentoring. This indicates that, in the model, receiving a non-helpful designated mentor improved the odds of ECT intention to stay in the profession more than not having received a mentor at all. Only the former effect, of helpful when compared with unhelpful, was significant in Model 4.

	Model 2			Model 4		
Description	*Low CI*	*Odds ratio*	*High CI*	*Low CI*	*Odds ratio*	*High CI*
School level (secondary)	**0.423**	**0.536**	**0.680**	**0.340**	**0.517**	**0.678**
School sector (Catholic)	0.920	1.176	1.502	0.773	1.017	1.339
School sector (independent)	0.858	1.153	1.550	0.666	0.930	1.300
Geolocation (provincial)	0.797	1.022	1.311	0.818	1.087	1.444
Geolocation (remote)	**0.350**	**0.536**	**0.820**	0.421	0.690	1.131
Socioeconomic status (medium)	0.649	0.833	1.070	0.655	0.871	1.158
Socioeconomic status (high)	0.594	0.787	1.042	0.610	0.838	1.150
Employment security (secure)	0.685	0.866	1.096	0.712	0.931	1.218
Age	**1.003**	**1.017**	**1.030**	**1.016**	**1.032**	**1.048**
Gender (female)	0.986	1.240	1.558	0.966	1.251	1.620
(a) Orientation program – not helpful	**0.554**	**0.707**	**0.902**	0.784	1.033	1.360
(a) Orientation program – not present	0.616	0.841	1.148	0.719	1.023	1.456
(b) Designated mentor – not helpful	**0.446**	**0.574**	**0.739**	**0.512**	**0.679**	**0.900**
(b) Designated mentor – not present	**0.513**	**0.682**	**0.905**	0.560	0.775	1.072
(d) Follow-up from institution – not helpful	0.356	0.615	1.062	0.432	0.780	1.410
(d) Follow-up from institution – not present	**0.335**	**0.563**	**0.946**	0.444	0.777	1.360
(e) Structured discussion – not helpful	**0.528**	**0.697**	**0.920**	0.556	0.762	1.038
(e) Structured discussion – not present	**0.496**	**0.654**	**0.863**	0.525	0.716	0.977

Table 1: Odds ratio for early career support factors on ECT intention to leave the profession (M2 and selected variables in M4)

RQ3: Effect of ECT Satisfaction on Intention to Leave

The full model for addressing RQ3, Model 3, included 17 factors relating to satisfaction with on-the-job conditions as well as to the broad satisfaction question, "Overall, how satisfied are you with your current job?", and the seven demographic variables. The factors included in the reduced model are listed in Table 5; Model 4 is included for comparison. All nine variables relating to on-the-job satisfaction that were included in Model 3 were also significant in Model 4, indicating that these variables had a stronger association with intention to leave the profession.

Model 3 shows that the odds of responding "no" to intention to leave in teaching were between 330% and 820% increased for teachers who were overall satisfied with their current job (q50r) when compared with those who were dissatisfied, holding all the other variables constant. A similarly strong effect size was observed in Model 4 (328% and 822%).

In Model 3, the odds of ECTs' responding "no" to intention to leave the profession were 10% to 116% higher for ECTs who were satisfied with the amount of teaching work that they were expected to complete compared with those who were dissatisfied, holding all other variables constant. Similarly, also in Model 3, the odds of ECTs' responding "no" to intention to leave the profession were 35% to 120% higher for ECTs who were satisfied with the amount of clerical/administrative work that they were expected to complete compared with those who were dissatisfied, holding all other variables constant.

Three other strong effects were from satisfaction with opportunities for career advancement (25-109%), satisfaction with what participants were currently accomplishing with students (23-134%), satisfaction with the value that society places on teachers' work (24-100%), and working relationships with parents/guardians (8-125%) – where in each case the range indicated that teachers who were satisfied were up to twice as likely to stay in the profession as those who were not.

Other variables that showed sufficient evidence to have an effect on overall teacher intention to leave or stay, but to a lesser extent, were freedom to decide how to do the job and salary. In all of these cases, Model 4 showed similar effect sizes.

	Model 3			Model 4		
Description	*Lower CI*	*Odds ratio*	*Upper CI*	*Lower CI*	*Odds ratio*	*Upper CI*
School level (secondary)	**0.397**	**0.517**	**0.674**	**0.34**	**0.517**	**0.678**
School sector (Catholic)	0.755	0.989	1.296	0.773	1.017	1.339
School sector (independent)	0.649	0.903	1.255	0.666	0.930	1.300
Geolocation (provincial)	0.796	1.052	1.390	0.818	1.087	1.444
Geolocation (remote)	0.399	0.647	1.049	0.421	0.690	1.131
Socioeconomic status (medium)	0.673	0.889	1.176	0.655	0.871	1.158
Socioeconomic status (high)	0.630	0.858	1.169	0.610	0.838	1.150
Employment security (secure)	0.703	0.914	1.189	0.712	0.931	1.218
Age	**1.008**	**1.024**	**1.039**	**1.016**	**1.032**	**1.048**
Gender (female)	0.936	1.206	1.553	0.966	1.251	1.620
(a) Amount of teaching expected	**1.097**	**1.537**	**2.155**	**1.021**	**1.438**	**2.026**
(b) Amount of clerical/administrative work	**1.352**	**1.723**	**2.196**	**1.330**	**1.700**	**2.174**
(c) Freedom to decide how to do the job	**1.057**	**1.446**	**1.978**	**1.042**	**1.432**	**1.968**
(e) Opportunities for career advancement	**1.249**	**1.616**	**2.090**	**1.128**	**1.468**	**1.911**
(g) Salary	**1.053**	**1.335**	**1.693**	**1.071**	**1.361**	**1.731**
(j) Currently accomplishing with students	**1.233**	**1.699**	**2.342**	**1.212**	**1.551**	**2.145**
(p) Relationships with parents/guardians	**1.077**	**1.557**	**2.252**	**1.007**	**1.462**	**2.121**
(q) Value society places on teachers' work	**1.237**	**1.573**	**2.000**	**1.182**	**1.510**	**1.928**
(r) Overall, how satisfied with the job?	**4.335**	**6.332**	**9.251**	**4.280**	**6.283**	**9.223**

Table 5: Odds ratio for satisfaction factors on ECT intention to leave the profession (M3 and selected variables in M4)

RQ4a: Effect of PSE on Teacher Satisfaction

For addressing RQ4a, the development of Model 5 began with the 15 factors for PSE and the seven demographic variables. Rather than predicting intention to leave the profession, this model predicted the measure of overall satisfaction with the job. Notably, the hypothesis tests for the saturated model did not support any PSE variables as being significant. Unlike the other models, these variables that were chosen to explain the effect of PSE on teacher satisfaction were deduced only by the backward step-wise variable selection method. The factors included in the reduced model are listed in Table 6.

It is possible to observe (weak) effects of certain aspects of PSE on teacher satisfaction; however, the upper 95% confidence interval was close enough to 1 that this interpretation is questionable. The odds of ECTs being satisfied overall in their current employment were higher for ECTs having received an at least helpful PSE about: handling a range of classroom management situations (1-90%); using standards to improve practice (1-87%); and working effectively with parents/guardians (1-112%).

Description	Lower CI	Odds ratio	Upper CI
School level (secondary)	0.528	0.731	1.013
School sector (Catholic)	0.843	1.199	1.705
School sector (independent)	0.718	1.103	1.695
Geolocation (provincial)	0.568	0.800	1.127
Geolocation (remote)	**0.255**	**0.434**	**0.739**
Socioeconomic status (medium)	0.580	0.813	1.139
Socioeconomic status (high)	0.637	0.953	1.425
Employment security (secure)	0.863	0.182	1.618
Age	0.963	0.979	0.996
Gender (female)	0.872	1.917	1.642
(a) Handling classroom management situations	**0.526**	**0.722**	**0.992**
(l) Using standards to improve practice	**0.534**	**0.723**	**0.991**
(o) Working effectively with parents/guardians	**0.471**	**0.684**	**0.995**

Table 6: Odds ratio for PSE factors on ECT satisfaction (0 = dissatisfied; M5).

RQ4b: Effect of Support on Teacher Satisfaction

Model 6 can be used to understand the relationship between early career support and teacher satisfaction. The full model for addressing RQ4b included the six factors for support and the seven demographic variables that measured overall satisfaction with the job. The factors included in the reduced model are listed in Table 7.

There was sufficient evidence to show that an orientation program designed for new teachers (q12a), a designated mentor (q12b), a reduced face-to-face teaching workload (q12c) and observation of experienced teachers teaching their classes (q12f) all had an effect on overall ECT satisfaction.

Teachers receiving a helpful (q12a) orientation program were 80-272% more likely to be satisfied with their job than those who received an unhelpful orientation when holding all the other variables constant. By contrast, those receiving a helpful orientation program were 0.4-150% more likely to be satisfied with their job than those who received no orientation at all. This shows that receiving an unhelpful orientation was even more closely related (in a negative way) to ECT satisfaction than receiving no orientation.

Other significant areas of ECT support such as q12b, q12c and q12e showed approximately the same odds ratios for not received and non-helpful support. Another strong result was seen in a reduced face-to-face workload. Teachers who had this and found it helpful were 26-231% more likely to be satisfied with their role.

Description	Lower CI	Odds ratio	Upper CI
School level (secondary)	0.515	0.721	1.009
School sector (Catholic)	0.830	1.193	1.715
School sector (independent)	0.772	1.196	1.852
Geolocation (provincial)	0.558	0.790	1.120
Geolocation (remote)	**0.264**	**0.455**	**0.787**
Socioeconomic status (medium)	0.569	0.807	1.143
Socioeconomic status (high)	0.591	0.896	1.356
Employment security (secure)	0.786	1.087	1.505
Age	0.971	0.987	1.004
Gender (female)	0.857	1.190	1.653
(a) Orientation program – not helpful	**0.269**	**0.387**	**0.556**
(a) Orientation program – not present	**0.400**	**0.631**	**0.996**
(b) Designated mentor – not helpful	**0.449**	**0.655**	**0.954**
(b) Designated mentor – not present	**0.435**	**0.656**	**0.990**
(c) Reduced face-to-face workload – not helpful	**0.302**	**0.489**	**0.793**
(c) Reduced face-to-face workload – not present	**0.331**	**0.598**	**0.749**
(f) Observation of teachers – not helpful	**0.425**	**0.639**	**0.961**
(f) Observation of teachers– not present	**0.438**	**0.640**	**0.935**

Table 7: Odds ratio for M6 (ECT career support) on ECT satisfaction (0 = dissatisfied).

Discussion

This investigation has studied the relationships among ECTs' intentions to leave the profession, the PSE that they had received, the support offered to them as beginning teachers, and their satisfaction with on-the-job working conditions. The results are limited in that they show statistical correlations within the models – they do not provide evidence of causality and explanations for the results may not be what they appear. However, in many cases the results showed a strong effect size in conjunction with findings that fit with established theory as well as similar prior studies. Another significant limitation is that the self-report of intention to leave the profession is not a perfect indicator of actually leaving the profession in future.

PSE and Intention to Leave Teaching

Our study has found that one key element of PSE was significantly predicted intentions to stay in the profession. This replicates the findings of Darling-Hammond et al. (2002) and DeAnglis et al. (2013), who found a direct link between perceived quality of PSE and the intention to leave the profession.

This study has further investigated *which* aspects of PSE are related to intention to leave the profession, finding that the strongest relationship was from a perception of high quality training in "working effectively with other teachers", which led to a 30-104% increase in the odds of intending to remain in the profession (up to twice as likely to stay in the profession). This fits with the findings of Mayer et al.(2017), who concluded from their investigation that, within teacher education programs, "[i]nsufficient attention seems to be being given to the role of relationships in learning teaching and doing teaching, including relationships with students and with colleagues and other members of school communities" (p. 128). It also fits with the findings of Skaalvik & Skaalvik (2011) "that belonging and emotional exhaustion are key variables in mediating the impact of school context variables on job satisfaction and motivation to leave the teaching profession" (p. 1036), where a sense of belonging is likely to be enhanced by being able to work with other teachers. This study thus

adds to the evidence that being able to form relationships and to work with other teachers is of great importance to ECTs, for their satisfaction in the job and for remaining in the profession.

However, we note that this finding within the present study may potentially be influenced by selection bias. For example, it is possible (although perhaps unlikely) that teachers who have training in working with other teachers are self-selecting into schools with high levels of collegiality.

The results from the present study also show that quality training in the use of "a variety of instructional methods for diverse student needs" predicted intentions to stay, but this has been found only in Model 1, not in Model 4. Thus, when introducing working conditions in the model, training for various instructional methods ceased to be predictive, which suggests that there was an association between the importance given by the participants to this aspect and the conditions in which these participants worked. It seems that this kind of training made a difference especially when teachers worked in conditions that would predict intentions to leave.

Early Career Support and Intention to Leave Teaching

Consistent with other researchers (e.g., Smith & Ingersoll, 2004), our findings indicate that having a helpful mentor and enabling structured discussions significantly predicted ECTs' retention. These results have been found in both Model 3 and Model 4.

Additionally, they suggest that having a quality orientation program also significantly predicts retention, consistent with the findings of Ingersoll and Strong (2011), but this result was found only in Model 3 and not in Model 4. Again, this suggests that those for whom a good orientation program made a difference in terms of intentions to stay were those who worked in particular working conditions, which at the same time predicted intentions to leave (and that is why when introducing working conditions in the model the orientation program ceased to be predictive). This suggests that having quality orientation programs was especially important with those teachers who worked in conditions that would predict intention to leave.

Job Satisfaction and Intention to Leave Teaching

In all models in which job satisfaction variables have been included to observe their influence on intention to leave the profession (Models 3 and 4), the workload, the decision-making power, the opportunities for career advancement, the relationships with students and parents, and the social valorisation of the profession were all significant predictors of intentions to stay or leave, with appreciable effect sizes. These findings are consistent with the current literature on these issues (e.g., Cui & Richardson, 2016; Linqvist & Nordänger, 2016; Wang, Hall, & Rahimi, 2015). As described in the background section, the literature includes some contradictory results about the significance of the characteristics of the schools and salary in relation to intentions to stay (Borman & Dowling, 2008; Dupriez et al., 2015). In this regard, our research has consistently found, in all involved models, that satisfaction with the salary on the one hand, and working at the primary schooling level (in comparison with working at the secondary schooling level) on the other hand, significantly predicted retention.

The findings also showed that working in remote areas significantly predicted intentions to leave. This last result was found in Model 1 and Model 2, but not in Model 3

and Model 4. In other words, when introducing the variables of working conditions, geolocation was not predictive any more. This suggests that the working conditions that are predictive for leaving or staying are associated with the urban or rural location of schools: working conditions that predict intentions to leave seem to be associated with rural schools, and working conditions that predict intentions to stay seem to be associated with urban schools. This finding may be idiosyncratic in relation to the Australian context, where many rural schools are located a long distance from metropolitan centres.

As was found in prior studies, the results indicate that general satisfaction with the job strongly predicted intentions to leave (Skaalvik & Skaalvik, 2011; Wang, Hall, & Rahimi, 2015). This was the strongest effect observed in the study, with those teachers who were overall satisfied with their job between 4 and 9 times more likely to stay in the profession. Whilst the presence of this relationship is not surprising, this finding represents a quantification of the effect of poor workplace satisfaction on intention to leave the profession.

The present study replicates the finding that the issue of salary, whilst important, is not the most salient when compared other factors that are also present within the literature – namely: the amount of teaching required; the amount of clerical/administrative work required; what teachers were accomplishing with students; the value that society places on teachers' work; and the relationships with parents/guardians.

Association of PSE and Support on Job Satisfaction

The findings also provide insight into what makes a difference for teachers' on-the-job satisfaction. Given the size of the effect of job satisfaction upon intention to leave, it follows that attention ought to be turned to how job satisfaction can be improved. Theory suggests that the school context as well as the individual teacher characteristics are likely to have the strongest effects upon satisfaction – variables that were not included in this study. Nevertheless, the data allowed us to examine what elements of PSE and early career support are related to teacher satisfaction.

The findings from Model 5 support the literature in suggesting that the quality of PSE (as indicated by teacher perceptions) does not have a significant effect upon job satisfaction, with the possible exception that good training for classroom management, the use of standards to improve practice, and how to work with parents might have a small impact. A stronger effect was observed (Model 6) when considering the early career support that was available to teachers, where it was observed that quality orientation programs (between 1.8 and 3.7 times as likely to feel satisfied with their job) and a reduced face-to-face workload (between 1.3 and 3.3 times as likely to feel satisfied with their job) had the largest effects on improving satisfaction.

Recommendations and Implications for Policy and Practice

The research study has addressed relationships between PSE, early career support, job satisfaction, and intentions to leave the teaching profession. From these results and their consistency with the literature, some recommendations for policy and practice can be framed.

Firstly, regards PSE, we are currently in an era in which teacher education institutions are subjected to increasing scrutiny about their curricula, teaching strategies and assessment practices, including in relation to the degree of alignment between these elements and the requirements of state/provincial and increasingly national standards for PSE. It is encouraging to note that these foci – "working with other teachers" and "using a variety of

instructional methods for diverse student needs" – resonate strongly with both the spirit and the tenor of such PSE standards.

Based upon the present study and the evidence found in the literature, we suggest that there is a basis for the recommendations that:

- Teacher education institutions and teacher educators should evaluate what they provide currently for their preservice teachers specifically in relation to "working with other teachers" and "using a variety of instructional methods for diverse student needs". While most if not all PSE programs have offerings related to these foci, clearly from the perspectives of ECTs these offerings vary in their effectiveness and impact.
- Furthermore, teacher education institutions and teacher educators should extend their existing contributions to maximising ECTs' retention and job satisfaction by helping to facilitate ECTs' membership of the broader community of teachers.

The study has additional implications for school leaders and education policy-makers. In relation to the perceived quality of support provided to ECTs, the response to RQ2 was that ECTs in metropolitan and provincial schools were more likely to remain in their roles than their counterparts in remote schools, although the extent to which this finding related specifically to the kinds of support afforded to rurally based ECTs rather than to the greater tendency for rural ECTs than urban ECTs to resign from teaching observed in the literature is unclear. In addition, the response to RQ2 was that ECTs were more likely to remain in the profession if they experienced extensive opportunities to communicate with other ECTs, and also if they interacted with helpful designated mentors.

Cognisant of the importance of focusing on the "alterable characteristics of teachers' work environments" (Borman & Dowling, 2008, p. 401) that have an impact upon attrition, the study combined with the literature can be interpreted as providing a basis for recommending that:

- School leaders and education policy-makers should prioritise strategies designed to improve the working conditions that are predictive of intentions to leave. If these strategies are directed at all teachers, ECTs will benefit in the process.
- School leaders and education policy-makers should ensure that all teachers have access to appropriate training to facilitate their collaborative work with colleagues. This work should yield efficiencies in day-to-day work; perhaps even more importantly, it should contribute to a sense of esprit de corps and a feeling of belonging to a valuable and valued community of teachers.
- Consistent with the literature, school leaders and education policy-makers should provide all ECTs with mentors and opportunities for structured discussions in daily teaching. These initiatives should be monitored and evaluated to ensure that they are as effective and sustainable as possible, and that they also generate benefits for the mentors and the other participants, and not only for the ECTs.
- School leaders and education policy-makers should provide for ECTs with relevant and targeted orientation programs, and accompanying supplementary training (e.g., in relation to using different instructional methods to deal with the diversity of students in ECTs' classes). This is particularly the case for those ECTs working in conditions that are predictive of intentions to leave.

Conclusions

Part of the intended contribution of this paper lies in the authors' articulation and application of a theoretical model for explaining and to some extent for predicting the

phenomenon of teacher attrition. The posing and addressing of the four research questions have functioned to extend current understandings of the complex interactions and relationships among PSE, early career support, job satisfaction, and intentions to leave the teaching profession.

The other key contribution of the paper lies in its analysis of the reported aspirations and experiences of 2,144 Australian ECTs in the SiAS. This analysis has highlighted the double-pronged affordances of analysing such a large data set to extend current understandings of this multifaceted policy issue. On the one hand, the breadth and depth of the SiAS, and hence of the analysis presented here, are likely to increase the confidence of policy-makers and other stakeholders in the empirical significance of the data and in the methodological dependability of the accompanying analysis. On the other hand, that same breadth and depth enable insights into and understandings of the considerable diversity of experiences, and reflections on those experiences, pertaining to Australian ECTs. On this basis, the theoretical model outlined here, and the associated elaboration of the complex relationships canvassed above, are intended to contribute to the burgeoning literature in this crucial policy and research domain.

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