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New lenses to understand beginning teacher workforce concerns: Developing and justifying scale items for measuring beginning teachers' and school leaders' perceptions

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1. Introduction

The purpose of this paper is to report on the development and justification of two survey instruments that were used in the *'Beginning Teacher Workforce Planning Project' (BTW Project)*, a study conducted in Queensland, Australia during 2017 and 2018. Stabilising the beginning teacher workforce and retaining beginning teachers not only impacts strategic planning for the teaching workforce but also influences the professional development of beginning teachers. Attrition rates for beginning teachers are broadly referenced (Weldon, 2018), with global figures indicating that between 40% and 50% of beginning teachers in the US and UK (Andrews, Gilbert, & Martin, 2007; Cooper & Alvarado, 2006; Ingersoll & Merrill, 2012) and between 30% and 50% in Australia (Organization for Economic Cooperation and Development, 2005; Queensland College of Teachers, 2013) leave teaching in their first five years. The attrition rates of teachers and beginning teachers highlight vast differences and have been examined by some research and researchers (Australian Institute for Teaching and School Leadership, 2016a; House of Representatives Standing Committee on Education and Vocational Training, 2007; Ingersoll, 2003; Ingersoll & Merrill, 2012; Ingersoll, Merril, & May, 2014; Queensland College of Teachers, 2013; Willet, Segal, Walford, & (Ernst & Young), 2014). The Australian research mentioned claim attrition rates between 5.7% and 50% which clearly underline the need for additional research to fully understand issues linked to attrition. The Queensland College of Teachers (2019) questioned the level of attrition rates published and claims only 13.5% of graduate teachers who were registered between 2006 and 2008 cancelled their registration within the first four years of teaching.

We argue that an in-depth understanding of the beginning teacher workforce (BTW) challenges will not only inform the search for strategies to address attrition and retention rates of beginning teachers but also inform the effective management of this workforce. Losing beginning teachers should be a concern without becoming distracted by the accuracy of *numbers*. The cost to prepare one beginning teacher is approximately AUS$15 000 (Deloitte Access Economics, 2016), while teacher education bursaries in the UK are between £10 000 and £28 000 depending on the programme (Moss, 2018); costs in the US range between US$7 605 and $19 595 per annum (Costhelper Education, 2018).

Retaining beginning teachers is strategically more beneficial for the stability of the profession than just recruiting more teachers. Lindqvist, Nordänger, & Carlsson (2014)

echoed Ingersoll (2007) in emphasizing the need for timely action and metaphorically called for strategies to retain existing teachers rather than recruiting new teachers:

> *...a bucket rapidly losing water because of holes in the bottom. Pouring more water into the bucket will not be the answer if the holes are not first patched* (Ingersoll, 2007, p. 6).

Attrition rates, the cost of teacher training and the extended international research in this field highlight the need to confront issues regarding the stability of the teacher workforce and the effectiveness of education systems. The purpose of this paper is to offer a *new lens* through which an in-depth insight into BTW issues can be obtained. The results reflect the first phase of a development and justification process for two survey instrument scales. The effort embraced a collaborative research project conducted at the Institute of Learning Sciences and Teacher Education, Australia (ILSTE) in partnership with the Independent Education Union – Queensland and Northern Territory Branch (IEUA-QNT), the Queensland College of Teachers (QCT), and the Queensland Teachers' Union (QTU) (in alphabetical order) as industry associates with the common goal of addressing specific workforce needs. The approach to these collaborations was built on mutual motivation to develop a deeper understanding of the challenges teachers experiences in classroom contexts and how to address issues that impact efforts to improve quality education. The history of collaborations involves focus on the out-of-field teaching phenomenon, preservice teachers' professional experience and beginning teachers' challenges. The research aims to fill a gap in the literature identified by Johnson et al. (2014), namely, the need for "an in-depth understanding of the interplay of personal and contextual factors" (p. 532), which could have an important impact on beginning teachers' retention and strategic workforce planning.

The project consists a large-scale survey participation ($n = 2098$) in this two-phase mixed-method investigation with additional semi-structured one-on-one interviews ($n = 47$) to offer a wide variety of factors at play (Creswell, 2014) in the BTW in Queensland, Australia. The information gathered through the instruments will inform future research, policy development and educational leadership and management practices beyond the context in which the investigation was completed. The developed survey items turn attention to the link between beginning teachers' initial teacher education (ITE) programmes, their expectations and needs in the workplace and their lived experiences. It further reflects an awareness of the current concern regarding the disconnect between ITE programmes and the realities experienced by the BTW (Levine, 2006).

International research (Allensworth, Ponisciak, & Mazzeo, 2009; Boyd et al., 2011; Ladd, 2011) has shown that teacher retention, teacher support and school leaders

(principals and middle management) are influential factors for workforce stability. Strategic planning involves an in-depth understanding of beginning teachers' and school leaders' perceptions of the everydayness of teaching. "Solutions" to teacher workforce problems that are frequently based on restricted information, for example, small qualitative studies or studies that only reflect the *lens or views* of beginning teachers, which "has not worked well in the past and is unlikely to be effective in the future" (Johnson et al., 2014, p. 532). However, the current study offers a *fusion of horisons* and the different *lenses* of beginning teachers at different level of teaching experience (one to five years) and school leaders at different levels of leadership to turn focus beyond what seems obvious.

The beginning teacher scale examines perceptions of transition issues, workplace challenges, and career decisions (Beginning Teacher Workforce: Beginning Teacher Impact Factor Scale [BTW-BT-IF Scale]). The school leader scale investigates perceptions of the preparedness of beginning teachers for the teaching profession in specific school contexts, the challenges these teachers encounter and school leaders' support strategies for retaining beginning teachers (Beginning Teacher Workforce: School Leader Impact Factor Scale [BTW-SL-IF Scale]). The central research question in this investigation, "*How can the challenges facing beginning teachers and their school leaders be effectively managed to build a strong and stable beginning teacher workforce?*" aims to reveal issues that need to be addressed with the support of sub-questions. Beginning teachers' perceptions regarding the complexities and challenges they face in the workforce are investigated and guided by two sub-questions (BTW-BT-IF Scale, Appendix A):

- How do beginning teachers perceive the link between initial teacher education preparation and the challenges they encounter in their transition to the workplace?
- How do beginning teachers perceive the everydayness of the teaching context, and what do those perceptions mean for future career decisions?

School leaders' perceptions of beginning teachers and their preparedness for the teaching workforce are investigated with the guidance of two sub-questions (BTW-SL-IF, Appendix B):

- How do school leaders experience and perceive the preparedness of beginning teachers and the influence their preparation has on the school and classroom context?

- What is the interrelationship between leadership decisions and beginning teachers' workforce/workplace experiences and beginning teachers' attrition, turnover and retention decisions?

Johnson et al. (2014) and Borman and Dowling (2008) highlighted important gaps in the existing knowledge about the BTW, although the existing literature has identified some influential factors. The initial development of two scales, the beginning teacher and school leader scales, and their first application in Queensland, Australia, represent an original attempt to inform further research in this field.

2. Literature informing scale development

Concerns identified in the existing literature highlight the educational, social and financial impacts of teacher attrition, which necessitate effective policies and strategies to address workforce planning challenges (Darling-Hammond, 2010; Mason & Poyatos Matas, 2015) and the needs of newly appointed teachers (Ronfeldt, Loeb, & Wyckoff, 2012). Some researchers (Harfitt, 2015; Lindqvist et al., 2014) have argued that despite high attrition rates, a proportion of the leavers will return to the teaching profession in the future. We, however, agree with the comprehensive review and meta-analysis of studies on teacher attrition and retention by Borman and Dowling (2008) that shows that teacher attrition during the early years in the teaching profession is not necessarily "healthy" (p. 396) because it influences the professional development and professional identity of a teacher. Current studies such as Angelle's (2006) further tend to examine teacher attrition and retention only through the lens of teachers' experiences and perceptions. Yet, research has indicated that school leaders have a substantial impact on working conditions and school culture. Research has revealed different views concerning the issues that beginning teachers encounter and the support they are offered (Australian Institute for Teaching and School Leadership, 2016b; Andrews et al., 2007). The following detailed and *issue-based* literature review forms the foundation of the instrument item-development process involved in the beginning teacher and school leader scales (Appendices 1 and 2).

2.1 Major workforce issues concerning beginning teachers

2.1.1 *Preparedness* for the teaching profession (BTW-BT-IF Scale Parts 1 and 2, BTW-BT-IF Scale Part 4)

ITE is frequently criticized as ineffective in equipping future teachers with the skills, knowledge, and experience they need to deal with the complex reality of teaching, such as

student behaviour (Ballantyne, Thompson, & Taylor, 1998; Johnson et al., 2014; Organization for Economic Cooperation and Development, 2005). Thus, the role of ITE programmes in preparing beginning teachers is currently under the magnifying glass. A less positive discourse regarding the teaching profession are common among teachers who withdraw from teacher training courses, choose not to enter teaching even after completing their course, or leave teaching in the first few years (Kyriacou, Kunc, Stephens, & Hultgren, 2003; Wilhelm, Dewhurst-Savellis, & Parker, 2000). Concerns among school leaders and policymakers about beginning teachers' lack of preparedness for the job are often attributed to (1) the quality of beginning teachers' formal training and professional experience before entering teaching (Bahr & Mellor, 2016), (2) their expectations regarding teaching as a career (Watt & Richardson, 2008), and 3) their dependence on additional support to fulfil those expectations (Sæbø & Midtsundstad, 2018).

The focus on ITE programmes to rectify beginning teachers' perceived *unpreparedness* relates to expectations regarding higher levels of student achievement. Suggestions that a sense of efficacy, the intrinsic motivation and greater exposure to classrooms would help beginning teachers maintain positive and realistic perceptions about teaching and improve retention (Heafford & Jennison, 1998; Kersaint, Lewis, Potter, & Meisels, 2007; Kim & Cho, 2014; Struyven & Vanthournout, 2014; Watt & Richardson, 2007; Wilhelm et al., 2000) raise placement questions. Classroom resilience, or "a strong enough personality to be able to cope with the pressures of the classroom" (Ballantyne et al., 1998, p. 55), enables teachers to effectively manage the complex environments of classrooms (Heafford & Jennison, 1998; Johnson et al., 2014; Peters & Pearce, 2012). Intrinsic motivation influences teachers' feelings of being destined for the teaching profession (Gore, Holmes, Smith, & Fray, 2015; Heafford & Jennison, 1998) and increases the likelihood that they will commit to staying in the profession. However, research has shown that teachers with an exploratory outlook tend to seek new opportunities (Lindqvist & Nordänger, 2016; Lindqvist et al., 2014) and are more likely to leave the teaching profession.

Research has shown a divergence between beginning teachers' expectations and the realities of teaching, for example, the heavy workload, school context, community culture, and complexity of a teaching job (Buchanan et al., 2013; Johnson et al., 2014; Kim & Cho, 2014; Kyriacou et al., 2003). Beginning teachers' reality shock is defined as the gap between what is anticipated and what is experienced at work, and it has long-term effects on teachers and links to attrition (Kim & Cho, 2014). Research has further demonstrated that beginning teachers who hold more positive expectations about teaching, for example, its social

usefulness, the joy of teaching, and the elation resulting from students' success, are more likely to build a long-term teaching career (Kyriacou et al., 2003; Watt & Richardson, 2007; Wilhelm et al., 2000). It is worth noting, however, that overly optimistic expectations can be counterproductive when teachers are faced with less-than-ideal conditions, real-world constraints, and unexpected problems. (Johnson et al., 2014; Kyriacou & Kunc, 2007; Kyriacou et al., 2003). These problems, if unresolved over an extended period, increase teachers' feelings of stress and burnout (Du Plessis, 2017; Goddard, O'Brien, & Goddard, 2006) and deplete their enthusiasm and confidence, leading to higher attrition rates (Kyriacou & Kunc, 2007; Kyriacou et al., 2003).

2.1.2 *Workplace-based experiences***, challenges, and support** (BTW-BT-IF Scale Parts 3, 4 and 6 and BTW-SL-IF Scale Parts 1, 2, 3 and 4)

The context-conscious understanding development (C-CUD) (Du Plessis, et al., 2018) theoretical framing of this investigation is underpinned by a context-consciousness of beginning teachers' situations, lived experiences and expected roles within school contexts and in schools as organisations. The first years of teaching are considered a bridge that "beginning teachers have to cross to enter the teacher's world" (Ballantyne et al., 1998, p. 51). Teachers claim that this period is experienced as a time of survival and discovery (Huberman, 1993; Kyriacou & Kunc, 2007), often leaving beginning teachers feeling exhausted and strained (Angelle, 2006; Ballantyne et al., 1998; Huberman, 1993; Long et al., 2012). Recognising these lived experiences among beginning teachers is vital for retention strategies because, as Borman and Dowling (2008) noted, teachers leaving the profession are not necessarily ineffective teachers. Pogodzinski, Youngs, and Frank (2013) as well as Player, Youngs, Perrone and Grogan (2017) emphasized the value of noticing human capital and the impact of focused person/organization fit and person/job fit in teacher retention. Angelle (2006) clarified that some of the unique difficulties beginning teachers experience include the management of their students' diversity and behaviour, planning responsibilities and a lack of permanent placement opportunities.

Organisational expectations translate into beginning teachers being assigned the same workload and responsibilities as more experienced teachers, which Goddard et al. (2006) and Kim and Cho (2014) noted as inequitable and unrealistic expectations for inexperienced teachers. Organizational or school culture is influenced by its leaders (MacNeil, Prater, & Busch, 2009; Price, 2011) and refers to "shared vision, values, goals, beliefs, and faith" (Roby, 2011, p. 783). School leaders play a crucial administrative role, as principals are

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formally responsible for recruiting, monitoring, assessing, and transferring beginning teachers (Angelle, 2006; Ballantyne et al., 1998; Brown & Wynn, 2009; Organization for Economic Cooperation and Development, 2005; Watkins, 2005; Wynn, Carboni, & Patall, 2007). As instructional leaders, principals can observe, provide feedback to, and act as role models for beginning teachers and help them develop them professionally (Angelle, 2006; Long et al., 2012; Johnson et al., 2014). School leaders' constant channel of communication and construction of positive collegial relationships with beginning teachers (Brown & Wynn, 2009; Peters & Pearce, 2012) promote the in-depth understanding fundamental to developing proactive, responsive, and timely strategies (Brown & Wynn, 2009; Long et al., 2012; Watkins, 2005; Wynn et al., 2007) for retaining beginning teachers. Long et al. (2012) echoed Angelle's (2006) conclusion that "school leadership as the fulcrum for organizational climate and socialization sets the tone for the beginner's first experience … and success" (p. 319).

A school culture that encourages formal and informal socialisation programmes during which beginning teachers have opportunities to learn about and integrate into the school context and are guided into this professional group (Angelle, 2006; Australian Institute for Teaching and School Leadership, 2016b; Hay Group, 2014) stimulates feelings of at-homeness in the school community. This type of culture further stimulates teamwork, collaboration and partnerships in which beginning teachers demonstrate a willingness to learn, are proud of their contribution, feel valued and show less intent to leave teaching (Angelle, 2006; Johnson et al., 2014; Long et al., 2012). The close engagement of experienced teachers with beginning teachers offers the latter on-the-job training and skills to translate teaching theory into teaching practice (Hay Group, 2014; Kim & Cho, 2014). Ballantyne et al. (1998) and Roby (2011) noted practices in schools in which beginning teachers were rarely allowed to create or suggest new norms. However, informed school leaders with a clear understanding of beginning teachers' needs can change this situation and encourage beginning teachers to remain in the profession. Additionally, research has acknowledged the impact of mentoring (formal or informal) and induction opportunities on beginning teacher retention (Glazerman et al., 2010; Schmidt et al., 2017; Smith & Ingersoll, 2004). However, the effects of comprehensive induction on beginning teachers' retention rates have been questioned by Glazerman et al. (2010) and Schmidt et al. (2017).

The current study is the first to simultaneously examine the perceptions of beginning teachers and school leaders regarding the impact of ITE programs on preparedness for the workplace and mentoring strategies within specific workplace contexts. Information about

the effectiveness of these preparation and support programmes in meeting the specific needs of beginning teachers and fostering their professional development, confidence, and identity as competent practitioners will improve the strategic development of a stable BTW.

2.1.3 Factors associated with *beginning teachers' career decisions* (BTW-BT-IF Scale Parts 5, 7 and 8 and BTW-SL-IF Scale Parts 6 and 7)

Research has noted that beginning teachers' ultimate decisions about their teaching career (entering, staying, leaving, transferring, returning, and retiring) cannot be predicted by a universal or simple list of factors (Borman & Dowling, 2008; Lindqvist et al., 2014). Career decisions are affected by complex, multi-layered combinations of personal characteristics (including expectations) and contextual factors such as school resources, organizational features, and student body attributes (Borman & Dowling, 2008; Kyriacou & Kunc, 2007). The interrelationship among these factors defines the influence they will have on beginning teachers' career decisions in non-linear and, in many cases, seemingly irrational ways (Kyriacou & Kunc, 2007; Lindqvist et al., 2014). It is worth noting, however, that school culture and school leaders are perceived as the most important predictors of teacher attrition and retention decisions (Clement & Vandenberghe, 2001; Hay Group, 2014; McNally & Martin, 1998; Peters & Pearce, 2012; Watkins, 2005). Empirical evidence has further suggested that contextual factors have a greater influence on shaping teachers' career decisions than personal and family factors (Borman & Dowling, 2008; Kyriacou & Kunc, 2007). The contextual factors most consistently associated with teachers' decisions to leave the teaching profession are i) the workload which involves stressful work and administrative duties, ii) financial responsibilities, iii) challenging student behaviour, and iv) the status or image attached to the teaching profession (Kyriacou & Kunc, 2007; Kyriacou et al., 2003; Willett, Segal, & Walford, 2014), with a heavy workload being the most influential reason identified by primary and secondary teachers for leaving the profession. We argue, however, that the generalisation of these factors mirrors the gap in the in-depth understanding of the issues relating to, for example, workload and student behaviour.

Additionally, prominent factors include a lack of recognition, insufficient support, and large class sizes. One study found that approximately 16% of teachers rated the impact of family and a perceived lack of aptitude for teaching as factors related to leaving the profession (Willett et al., 2014). Research has indicated that the individual and combined factors influencing career decisions vary among teachers and across their teaching career stages (Borman & Dowling, 2008; Kyriacou & Kunc, 2007; Kyriacou et al., 2003; Lindqvist

et al., 2014; Struyven & Vanthournout, 2014). The complexity of strategising and planning for a stable BTW is recognized in the development of the survey items through the collaborative engagement of industry partners.

3. Research methodology and design

The convergent mixed-method design (Creswell, 2012) informed the development of the research design for this investigation. The school leader and beginning teacher surveys (including quantitative and qualitative data) were developed and conducted simultaneously. The two surveys are regarded as complementary in terms of constructing a holistic, multidimensional understanding of issues underlying beginning teachers' attrition and retention decisions. The process of conceptualising and developing the scales was underpinned by (1) a strong theoretical framework, including C-CUD theory (Du Plessis et al., 2018) and (2) a carefully designed collaborative process with industry partners and instruments developed against the background of salient themes in the existing literature. The scales developed in this convergent mixed-method study are deeply embedded in the need to develop an understanding of the BTW beyond the numbers (Lingard, 2011). The survey instruments, which include open questions, were also informed by an extensive literature review, which will be discussed in future reporting on the empirical data from the large-scale project.

3.1 Theoretical framing

The context-conscious understanding development theory (C-CUD) acknowledge that beginning teachers' and school leaders' lived experiences and perceptions do not develop in a vacuum but are closely connected to the situated teaching and learning within a specific community, sociocultural learning expectations to be the more knowledgeable other (Vygotsky, 1978), the development of deeper understanding which is seen as dialectical, a 'fusion of horisons' (Gadamer, 1976) and lenses that opens up the lived experiences of being-in-the-world of a beginning teachers. The survey instrument development process embraced an awareness of the unique context-specific factors that influence beginning teachers' teaching practices and performance. The C-CUD theory (Du Plessis, 2018) is built on the theoretical framing of specific situations and contexts (Laverty, 2003; Wenger, 2000), the lived experiences of respondents (Van Manen, 1990), and how these factors influence the development of a deeper understanding while examining the same issue through different lenses (Gadamer, 1975, 1976). Lave and Wenger's (1991) situated learning theory holds that "meaning, understanding, and learning are all defined relative to actional context" (p. 15).

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This postulation underlines the importance of acknowledging perceptions of the *actional context* and related factors influencing the BTW. The theoretical framing further builds on sociocultural learning philosophies (Vygotsky, 1978) to develop a holistic understanding of the teacher's expected role in the classroom. It is also deeply vested in an appreciation for specific situations, contexts, and lived experiences influenced by verbal and non-verbal language and perceptions that impact the workplace and the BTW.

The C-CUD theoretical framework demonstrates a deep awareness of beginning teachers' specific contexts and their "voice" to explain the impact of their lived experiences and perceptions on the development of the knowledgeable other. The framework emphasizes the importance of feelings of belongingness and *at-homeness* among beginning teachers in their classroom and school contexts. C-CUD theory (Du Plessis, 2018; Du Plessis et al., 2018) is an integrative theoretical model that embraces the multi-layered complexities of teaching and acknowledges the expectation that beginning teachers are ready to teach successfully. The context-conscious understanding provided by development theory supports a deeper exploration of recurring themes through an analysis of open-ended questions and a comparative analysis of qualitative and quantitative data. Qualitative or longitudinal research usually draws on a small sample to obtain in-depth and nuanced insights (Heafford & Jennison, 1998; Johnson et al., 2014; Kersaint et al., 2007; Wilhelm et al., 2000). Such restricted knowledge limits the application of the results to policy initiatives and the depth of further research. This dilemma paved the way for the current large-scale study, which pays equal attention to the collection and analysis of both quantitative and qualitative data to introduce and justify the scale items developed to generate new information. The qualitative component is not discussed within the scope of this paper (but will be covered in companion articles).

3.2 Research design: Partnering in innovative survey development

The methodological process included a comprehensive literature review and detailed collaborative discussions about information that is currently absent and that industry partners need for targeted decision making. The industry collaborators (IEUA-QNT, QCT, and QTU) added specific survey items with the objective of generating new knowledge needed to inform effective and targeted BTW planning. Confirmatory factor analyses performed after data collation on both scales showed, however, that some of these additional survey items were found not of great concern for this sample of participants (Appendices A and B).

3.3 The instruments

The two survey instruments were structured around three main sections: demographic questions (age, gender, qualifications, teaching and/or leadership experience, contexts); using seven-point Likert scales designed to clarify perceptions; and open-ended questions to support the development of an in-depth understanding. The response format for both the BTW-BT-IF Scale (91 items) and the BTW-SL-IF Scale (67 items) was a seven-point Likert-type scale (1 = *strongly disagree*; 4 = *neutral*; 7 = *strongly agree*).

Theorising the constructs included in the scales involved i) a comprehensive review of related literature and existing empirical research, ii) discussions with beginning teachers and school leaders, iii) in-depth discussions with industry partners, and iv) the adoption of a context-conscious theoretical philosophy to support the attainment of deep understanding. The chief investigator developed the initial and preliminary survey instruments—the BTW-BT-IF Scale (91 items) and the BTW-SL-IF Scale (67 items)—and the industry partners engaged in discussions to extend and fill possible gaps in the surveys. This phase is considered highly valuable for researchers, regulatory bodies, and unions. The survey instruments developed and discussed in this paper were applied for the first time in this study with the understanding that it will be further adjusted depending on the outcomes of the current BTW project. It further clarifies the research process as piloting the surveys developed and the initial endorsement of scale items. The development of the survey items involved significant attention to the existing literature and the rigour of the methodology prepare for possible future interstate and international research that will inform further adjustments to the current scales.

The Likert scale section (Part B) of the beginning teacher survey investigates transition challenges and is guided by the following research question: "How do beginning teachers perceive the challenges in their transition to the workplace?" The Likert scale section embraces a focus on beginning teachers' expectations versus the realities in the workforce (Section 1 = 10 items), the effectiveness of ITE programmes (Section 2 = 13 items), experiences in the workplace (Section 3 = 10 items) and perceptions of professional identity (Section 4 = 15 items). Further attention is paid to factors influencing beginning teachers' career decisions (Section 5 = 12 items), the challenges teachers experience at work (Section 6 =16 items), the factors influencing retention (Section 7 = 8 items), and the factors influencing turnover (Section 8 = 10 items). Part C examines beginning teachers' perceptions of their career decisions and is guided by the research question, "How do beginning teachers'

perceptions of their workplace influence future career decisions?" (Appendix A). Qualitative data were gathered through open-ended questions in Part D.

The design of this investigation offered an opportunity to examine school leaders' perceptions to add a respected lens and "*second layer*" of understanding to the findings. The school leader survey includes Likert scale items (Part B) guided by the following research question: "How do school leaders' experiences and perceptions of the teaching workplace influence the beginning teaching workforce?" This key question in the school leader survey encompasses seven underlying sub-questions to support a deeper examination of constructs investigating leaders' perceptions of their roles and responsibilities in relation to beginning teachers (Section 1 = 7 items), professional management and support (Section 2 = 10 items), strategies and awareness (Section 3 = 10 items), and the suitability of beginning teachers for specific positions (Section 4 = 10 items). The survey also investigates how school leaders prevent beginning teachers' dissatisfaction (Section 5 = 13 items), what they consider to be effective retention strategies (Section 6 = 7 items), and their perceptions regarding beginning teacher turnover[1] (Section 7 = 10 items). Part C of the school leader survey uses open-ended questions to seek deeper clarification and elaboration of school leaders' perceptions (see Appendix B).

3.4 The participants

The recruitment of participants for this research was supported by the industry partners in Queensland, Australia. Specifically, the QCT, IEUA-QNT, and QTU emailed all their members an invitation to take part in the research and links to the survey. A total of 1362 beginning teachers and 736 school leaders in Queensland, Australia, responded to the survey, including partially completed surveys (beginning teachers n = 858 and school leaders n = 430). The full data will be used in future univariate analyses and the profiling of beginning teachers and school leaders. However, only fully completed surveys and those with a small number of missing values (<10%) were included in the analysis of the first- and second-order factors (determined through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) in the scales. The collaborators sent two reminders during the period the online surveys were active (April 2017 to July 2017). Table 1 summarises the key demographic information about the beginning teacher respondents.

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[1] In this investigation, beginning teacher turnover is defined as moving from one school context to another.

As Table 1 shows, the beginning teacher sample was dominated by females, in line with the gender composition of the teaching workforce in Australia (Weldon, 2015). More than 50% of the respondents were in the 21-29-year age range, and nearly 75% were working at schools in metropolitan areas and regional or provincial towns. More than 70% were in their third to fifth years of teaching. A bachelor's degree was the most common teaching qualification (obtained by more than half), although a substantial proportion had pursued a higher qualification, including a graduate diploma or graduate certificate, master's degree, and doctoral degree.

Table 2 presents information about the school leaders who completed the survey. The number of female school leaders who responded to the survey was nearly double that of male school leaders. Nearly 75% of the total school leader sample was aged 40 years or more. The respondents' schools were concentrated in metropolitan and regional or provincial towns, similar to the school regions of the beginning teacher participants. A major proportion (66.7%) held the position of Head of Department.

Table 1. *Demographic Information about Beginning Teacher Participants (n = 504) (Only fully completed surveys informed comparisons)*

Demographic variables: Beginning Teachers																					
Variables	Gender			Age				School Region					Teaching experience						Teaching qualification				
	Female	Male	Not specified	21-29 years	30-39 years	40-49 years	50+ years	Metropolitan area	Regional/Provincial town	Rural	Remote	Missing	0-1 year	1-2 years	2-3 years	3-4 years	4-5 years	Missing	Doctoral Degree	Masters' Degree	Graduate Diploma/Certificate	Bachelor's degree	Below bachelor's degree
n	390	113	1	270	111	98	25	191	167	76	69	1	58	86	138	105	115	2	1	20	181	297	5
%	77.4	22.4	0.2	53.6	22	19.4	5.0	37.9	33.1	15.1	13.7	0.2	11.5	17.1	27.4	20.8	22.8	0.4	0.2	2.0	35.9	58.9	1.0

Table 2. *Demographic Information about School Leader Participants (n = 306) (Only fully completed surveys informed comparisons)*

Demographic variables: School Leaders													
Variables	Gender		Age				School Region				Current Position		
	Female	Male	21-29 years	30-39 years	40-49 years	50+ years	Metropolitan area	Regional/Provincial town	Rural	Remote	Principal/Deputy Principal	Head of Department	Other (Head of Curriculum, Year Head, Subject Year Head)
n	201	105	12	68	103	123	155	101	34	16	44	204	58
%	65.7	34.3	3.9	22.2	33.7	40.2	50.7	33.0	11.1	5.2	14.4	66.7	19.0

4. Analysis

4.1 Cleaning the data

The raw survey data were screened to check for any missing values or outliers, as the surveys offered respondents the freedom to answer or skip survey items. For most of the items, missing data accounted for only a small percentage (1% ~ 6%) of the data. Responses to the seven-point Likert-type questions were treated as continuous variables. A multivariate imputation by chained equations (MICE) was used to estimate any missing values (Azur, Stuart, Frangakis, & Leaf, 2011). MICE creates multiple imputations and accounts for uncertainty in the main imputation. It is flexible and can handle complexities in variables. To account for uncertainty in the imputation, the number of iterations in the MICE was set to 20. The MICE imputation was performed using the MICE package in R. (R Development Core Team, 2016).

4.2 The analysis process

Means and standard deviations were calculated for the seven-point Likert scale measurement items. Analysis of the survey items and validation of the instruments were performed using the statistical computing tool R (R Development Core Team, 2016). EFA, hierarchical CFA, and reliability analysis were employed to explore and validate the scales and underlying constructs. The CFA was built using IBM AMOS (Arbuckle, 2014). Spanierman et al. (2011) and Chiang and Liu (2014) underlined the value of EFA and CFA in demonstrating the reliability and validity of scales and subscales in a manner that is consistent with the relevant literature.

We examined 15 overall first-order constructs embedded in the perceptions of beginning teachers and their school leaders, including expectations and realities, ITE effectiveness, experiences in the workplace, professional identity, career decisions, challenges, and beginning teachers' perceptions of retention and turnover. Vogt and Johnson (2011) described first-order constructs as the "interaction of two independent variables" (p. 142), while interactions involving second-order constructs "take place among three independent variables" (p. 143). Perceptions of the implications of leaders' roles and responsibilities, professional management and support, and strategies and awareness; the suitability of beginning teachers' specific position; the prevention of dissatisfaction; effective retention strategies; and factors that influence turnover were examined to develop an in-depth understanding of the BTW as captured in both scales.

In the first stage, an EFA was performed to explore the underlying variables of the Likert scale questions. An EFA model with maximum likelihood extraction and oblique rotation was fitted on the Likert scale questions in each of the survey sections. A parallel analysis (Humphreys & Montanelli, 1975) was employed to determine the optimal number of constructs to retain in the EFA model. Items with factor loadings on constructs larger than 0.3 were retained for further analysis. The remaining items with a low factor loading were further manually evaluated and assigned to one of the underlying constructs based on the literature review. The assignment was then evaluated in the next stages, i.e., the CFA and reliability analysis.

A CFA was performed to ensure that each construct was well represented by the included items. A hierarchical structure of the constructs was proposed, and it was validated using a hierarchical CFA. A reliability analysis (Cronbach's alpha [α]) was also conducted on the second-level constructs to check the constructs' internal consistency. Generally, a Cronbach's alpha of 0.7 is considered an indication of substantial consistency, and a Cronbach's alpha value of 0.6 is acceptable. To improve model fitting and the internal consistency of the constructs, weak items with low factor loadings (<0.3) were manually examined in alignment with the literature, before deciding whether to remove certain items for this specific sample group, as a small factor loading indicates that the item does not fit well to its underlying constructs. This process increased the Cronbach's alpha to near 0.6 or above.

There is still considerable disagreement about the appropriate standards for determining the goodness of fit for hierarchical models with a large sample size (Brown et al., 2009). Goodness of fit indexes, such as the comparative fit index (CFI) and Tucker Lewis Index (TLI), are overly sensitive to complex models (such as models with a hierarchical structure), while the χ^2 statistic is sensitive to large sample sizes (Cheung & Rensvold, 2002). Conversely, the root mean square error (RMSEA) and standardized root mean square residual (SRMR) are more resistant to large sample sizes and complex models (Hu & Bentler, 1999; Vandenberg & Lance, 2000). Generally, a model fitting with RMSEA values less than 0.05 is considered a very good fit, while values as high as 0.10 may still be of interest in social science research (Steiger, 2000). The hierarchical CFA model fit is considered acceptable when the RMSEA is smaller than 0.08 and the SRMR is smaller than 0.1, as found in this investigation, when reflecting on and justifying survey items. It further underlines that the findings of this research project demonstrate a good fit.

5. Results

The focus of this paper is to offer results linked to the development and justification of the two survey instruments that were used to gather data for the *'Beginning Teacher Workforce Planning Project'.* The study is defined as a large-scale study because of the total number of participants (*n*= 2145) involved, it is positioned as the first building block towards further research national and international applying these instruments. The current study accentuates the value of an in-depth understanding, while the triangulation of evidence is ensured through the different lenses of beginning teachers and school leaders, surveys and interviews, which demonstrates some similarities but also disparities in perceptions and experiences. The large scale of responses that were gathered through this project offer a vast amount of informative data and extent of these findings can only be fully discussed in separate papers. The current paper is therefore positioned as a discussion of the piloting of the survey instruments during 2017. The purpose of this paper is to report on the development, design, justification and validation of the survey items used in two scales to measure perceptions of beginning teachers and school leaders in relation to the BTW. Tables 3, 4, 5, 6, 7, and 8 show the results from the factor analysis tests on the survey items in the two scales that were devised to measure the perceptions of beginning teachers (BTW-BT-IF Scale, Appendix A) and school leaders (BTW-SL-IF Scale, Appendix B) regarding the BTW.

5.1 Constructs underlying beginning teachers' perceptions of factors influencing the workforce

Table 3 presents hierarchically arranged constructs indexing beginning teachers' perceptions of the workforce factors related to their transition to the workplace. Cronbach's alpha (α) values from the reliability analysis and factor loadings from the CFA model are provided for all constructs. Survey items with low factor loadings or lacking goodness of fit within the construct (T/B6, T/B7, T/B10), as confirmed by the data in this sample, were removed from the model (Appendix A). The model fit parameters then became $\chi^2 = 3304.04$ ($df = 924, p - $value < 0.001), CFI = 0.86, TLI = 0.85, SRMR = 0.080, RMSEA = 0.072 (CI: 0.069~0.074). These results demonstrated an acceptable model fit (Steiger, 2000).

A preliminary analysis focusing on mean scores and standard deviations, as seen in Table 3, shows broad trends in perceptions among the beginning teacher participants. For example, although the teachers scored relatively high on satisfaction and self-efficacy development (Construct 1.2), they did not see themselves as holding realistic expectations

about the workload and their students' outcomes (Construct 1.3). They also did not appreciate the effectiveness of their ITE programme and were particularly negative about its efficacy in preparing them for the diversity they faced in real-world teaching (Construct 2.4) and helping them link theory and practice (Construct 2.5). Surprisingly, the beginning teachers perceived themselves as having a good understanding of the school context and culture (Construct 3.3), probably because most of them indicated in the survey that the school setting was their personal choice.

Table 3. *Beginning Teacher Workforce: Perceptions about Factors Linked to their Transition to the Workplace*

	BEGINNING TEACHERS' PERCEPTIONS: FACTORS INFLUENCING TRANSITION TO THE WORKPLACE							
First order constructs	Second order constructs	Mean	SD	FL(1st)	α	Items BT		FL(2nd)
1 – Expectations versus realities about the teaching profession	1.1 Realistic expectations about the teaching workforce in general	4.6	1.4	0.79	0.72	T/B1 T/B2		0.70 0.81
	1.2 Satisfaction and self-efficacy development	5.4	1.3	0.91	0.80	T/B3 T/B4 T/B5		0.58 0.89 0.83
	1.3 Realistic expectations about workload and student outcomes	3.7	1.6	0.79	0.73	T/B8 T/B9		0.70 0.82
2 – Perceptions about the effectiveness of ITE programs	2.1 ITE's effectiveness to prepare beginning teachers for teaching	4.4	1.5	0.94	0.90	T/B14 T/B16 T/B17		0.77 0.91 0.92
	2.2 ITE qualifications' relevance to teaching	4.5	1.6	0.82	0.86	T/B21 T/B22 T/B23		0.87 0.89 0.71
	2.3 ITE's effectiveness to equip beginning teachers with interpersonal skills	4.5	1.6	0.84	0.87	T/B15 T/B20		0.90 0.87
	2.4 ITE's effectiveness to prepare beginning teachers for diversity	3.5	1.7	0.78	0.87	T/B18 T/B19		0.90 0.86
	2.5 ITE's effectiveness to prepare beginning teachers to link theory and practice	3.9	1.5	0.91	0.91	T/B11 T/B12 T/B13		0.94 0.92 0.81
3 – Perceptions and experiences in the workplace	3.1 Beginning teachers' capacity and ability are recognized	4.7	1.7	0.88	0.82	T/B26 T/B28		0.91 0.77
	3.2 Beginning teachers' perceptions of self-direction/ confidence	5.2	1.5	0.78	0.80	T/B32 T/B33		0.86 0.79

	3.3 Beginning teachers' perceptions and understanding school context and culture	5.8	1.2	0.75	0.61	T/B30	0.87
						T/B31	0.52
	3.4 Collegial support received	4.6	1.5	0.92	0.81	T/B24	0.86
						T/B25	0.83
						T/B27	0.80
						T/B29	0.54
4 – Factors influencing beginning teachers' professional identity development	4.1 Favourable work environment	3.7	1.5	0.96	0.82	T/B39	0.73
						T/B40	0.72
						T/B41	0.69
						T/B42	0.63
						T/B43	0.58
						T/B45	0.64
	4.2 Effective mentorship	3.5	2.0	0.78	0.94	T/B36	0.91
						T/B37	0.92
						T/B38	0.84
						T/B44	0.87
						T/B47	0.76
						T/B48	0.76
	4.3 Personalised attention given	3.9	1.6	0.97	0.73	T/B34	0.71
						T/B35	0.80
						T/B46	0.60

Table 4 represents the correlation matrix of four first-order constructs underlying beginning teachers' perceptions of their transition to work. The correlation matrix in Table 4 shows that all the correlations between the constructs underlying beginning teachers' perceptions of their transition to work were statistically significant.

Table 4. *Beginning Teacher Workforce: Correlations between Constructs Underlying Perceptions about Factors Linked to their Transition to the Workplace*

Constructs	1	2	3	4
Expectations vs realities about teaching profession	-			
ITE effectiveness	0.46	-		
Perceptions and experiences in the workplace	0.84	0.37	-	
Factors influencing BT's professional identity development	0.70	0.30	0.77	-

The strong positive correlation coefficient between *expectations for vs realities of the teaching profession* and *perceptions of and experiences in the workplace* suggests that beginning teachers who held more realistic expectations about the teaching profession were more likely to have positive perceptions of teaching and positive experiences in the workplace.

5.2 Constructs underlying beginning teachers' perceptions of the factors influencing their career decision

In Table 5, beginning teachers' perceptions of the factors impacting their career decisions were hierarchically arranged based on their Cronbach's alpha (α) from the reliability analysis and factor loadings from the CFA model. Again, the factor loadings and Cronbach's alpha for all constructs were inspected. Eleven items (Survey Items BT - C3, C10, C14, C15, C27, C28, C33, C34, C35, C36, C46) that had low factor loadings in this investigation were removed from the model (Appendix A). The model fit parameters then became $\chi^2 = 2479.92$ ($df = 613, p - \text{value} < 0.001$), CFI = 0.80, TLI = 0.78, SRMR =0.098, RMSEA = 0.078 (CI: 0.075~0.081), suggesting that the model fit was acceptable (Steiger, 2000).

Table 5. *Beginning Teachers' Workforce Factors Linked to Career Decisions*

	BEGINNING TEACHERS - CAREER DECISIONS						
First order construct	Second order construct	Mean	SD	FL(1st)	α	Items BT	FL(2nd)
5 – Factors influencing future career decisions	5.1 Employment status influencing future career decisions	4.9	1.5	0.81	0.58	C2	0.49
						C11	0.51
						C12	0.72
	5.2 Responsive school leaders influencing future career decisions	5.4	1.4	0.80	0.62	C1	0.55
						C13	0.81
	5.3 Employment conditions and opportunities influencing future career decisions	5.1	1.4	0.88	0.67	C8	0.70
						C9	0.72
	5.4 Contextual transfer opportunities influencing future career decisions	4.3	1.8	0.48	0.77	C6	0.67
						C7	0.92
6 – Challenges experienced at work	6.1 School community culture issues	2.1	1.3	0.75	0.86	C21	0.72
						C22	0.73
						C23	0.84
						C24	0.87
						C25	0.59
	6.2 Attrition tendency	2.3	1.5	0.54	0.88	C4	0.97
						C5	0.95
						C16	0.60
						C26	0.61
	6.3 School leadership issues	3.0	1.7	0.77	0.74	C17	0.72
						C18	0.81
	6.4 Student-related issues	2.9	1.6	0.80	0.65	C19	0.69
						C20	0.69
7 - Factors influencing retention	7.1 Interpersonal support influencing retention	5.4	1.6	0.98	0.78	C29	0.69
						C30	0.92
	7.2 Administration support program design influencing retention	5.4	1.7	0.96	0.84	C31	0.86
						C32	0.85
8 - Factors influencing turnover	8.1 Administration-related issues influencing turnover	4.7	1.6	0.90	0.71	C37	0.52
						C38	0.68
						C39	0.82
	8.2 School community culture issues influencing turnover	4.4	1.7	0.95	0.87	C40	0.86
						C41	0.83
						C42	0.81
						C44	0.67
	8.3 Subject area and classroom-related issues influencing turnover	3.7	1.7	0.76	0.67	C43	0.73
						C45	0.69

The underlying perceptions of beginning teachers highlight some notable trends. For example, the relatively low ratings for issues and challenges experienced at work (Constructs 6.1, 6.2, 6.3, and 6.4) indicate that these problems are not considered as important as other constructs. In contrast, the mean scores for all constructs influencing beginning teachers' professional identify development (Constructs 4.1, 4.2, 4.3), including favourable work environment, effective mentorship, and personalised attention, were below 4 (on a scale from 1 to 7). These scores reveal that teachers perceive receiving a low level of support for their professional development. The high ratings for constructs influencing retention (Constructs 7.1 and 7.2) suggest that the beginning teachers attach great importance to school leaders' support in increasing their intention to remain in the teaching field.

Table 6. *Beginning Teacher Workforce: Correlations between Constructs Underlying Beginning Teachers' Perceptions of Factors Influencing their Career Decisions*

Constructs	1	2	3	4
Factors influencing future career decisions	-			
Challenges experienced at work	-0.04	-		
Factors influencing retention	**0.22**	0.03	-	
Factors influencing turnover	**0.11**	**0.21**	**0.21**	-

The correlation matrix for the constructs underlying beginning teachers' perceptions of the factors influencing their career decisions reveals that most of the correlations were statistically significant. The positive significant correlation coefficients between *constructs influencing future career decisions, constructs influencing retention, and constructs influencing turnover* indicate that they are consistently related to one another. Therefore, focusing on these constructs could potentially help predict teachers' future career decisions and aid in managing the teaching workforce at the same time. Qualitative data analysis will complement these general trends with a more in-depth understanding of why teachers hold such perceptions. More complete insights resulting from combined analyses will be reported in future papers on this project.

5.3 Constructs underlying school leaders' perceptions of the beginning teacher workforce

Table 7 presents the hierarchically arranged factors underlying school leaders' perceptions of the BTW. The Cronbach's alpha (α) values from the reliability analysis and factor loadings from the CFA model for all constructs were manually inspected. Six items

(Survey Items SL - B3, B4, B5, B16, B25, B30) that had low factor loadings in this investigation were removed from the model (Appendix B). The model fit parameters then became $\chi^2 = 3935.81$ ($df = 1913, p - \text{value} < 0.001$), CFI = 0.83, TLI = 0.82, SRMR = 0.077, RMSEA = 0.059 (CI: 0.056~0.061). The results show that the model fit was acceptable.

Table 7. *School Leaders' Perceptions about the Beginning Teacher Workforce Linked to Specific Factors*

First order construct	Second order construct	Mean	SD	FL(1st)	α	Items SL	FL (2nd)
SCHOOL LEADERS' PERCEPTIONS: FACTORS INFLUENCING THE BEGINNING TEACHER WORKFORCE							
1 – Roles and responsibilities of the school leader	1.1 Engagement with beginning teachers	5.4	1.4	0.82	0.7	B1 B2	0.69 0.79
	1.2 Take responsibility for beginning teachers' development	5.5	1.3	0.95	0.73	B6 B7	0.73 0.79
2 – Professional management, support, and concerns about beginning teachers	2.1 Provide and strategize professional development opportunities for beginning teachers	5.3	1.3	1.00	0.77	B14 B15 B17	0.68 0.74 0.78
	2.2 Transition concerns about beginning teachers	5.3	1.5	0.26	0.76	B8 B13	0.90 0.68
	2.3 Regular communications with beginning teachers	4.6	1.7	0.81	0.79	B11 B12	0.78 0.83
	2.4 Provide uniquely tailored support for beginning teachers	4.9	1.6	0.88	0.8	B9 B10	0.86 0.77
3 – Leadership strategies, awareness, and dispositions	3.1 Personalised support for beginning teachers' professional growth	5.5	1.2	0.97	0.87	B18 B20 B21 B27	0.77 0.85 0.75 0.83
	3.2 Improve the fit between beginning teachers' and their position	5.0	1.4	0.94	0.78	B23 B24 B26	0.71 0.79 0.71
	3.3 Discuss most suitable teaching options for beginning teachers	4.8	1.5	0.87	0.8	B19 B22	0.83 0.80
4 – Assessment of beginning teachers' suitability for a specific position	4.1 Beginning teachers' suitability based on qualifications, knowledge, and skills	4.9	1.3	0.94	0.78	B28 B29 B31 B33	0.51 0.70 0.81 0.75
	4.2 Beginning teachers' suitability based on school's contextual constraints	2.8	1.3	0.36	0.74	B25 B32 B35 B36	0.53 0.50 0.73 0.83

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	4.3 Beginning teachers' suitability based on school's strategic development plan	5.0	1.5	0.83	0.76	B34	0.77
						B37	0.81
5 – Strategies to prevent beginning teachers' dissatisfaction	5.1 Preventing beginning teachers' dissatisfaction through active professional engagement	5.6	1.1	0.95	0.92	B40	0.85
						B41	0.72
						B42	0.76
						B43	0.84
						B44	0.72
						B45	0.84
						B46	0.67
						B47	0.81
	5.2 Preventing beginning teachers' dissatisfaction by assigning beginning teachers according to their strengths and passion	5.1	1.4	0.93	0.85	B48	0.75
						B49	0.90
						B50	0.81
	5.3 Preventing beginning teachers' dissatisfaction by matching beginning teachers with the most suitable teaching option	4.9	1.5	0.76	0.81	B38	0.87
						B39	0.79
6 – Perceived effectiveness of retention strategies	6.1 Perceived effectiveness of professional support in retaining beginning teachers	5.9	1.1	0.98	0.81	B51	0.75
						B52	0.79
						B53	0.77
						B54	0.70
	6.2 Perceived effectiveness of administrative support in retaining beginning teachers	4.8	1.5	0.73	0.66	B55	0.73
						B56	0.65
						B57	0.47
7 – Perceptions of factors influencing turnover	7.1 Perceived impact of adjustment issues on turnover	4.4	1.4	0.88	0.79	B61	0.67
						B62	0.67
						B63	0.79
						B64	0.67
	7.2 Perceived impact of employment conditions and status on turnover	4.1	1.6	0.40	0.76	B58	0.47
						B59	0.81
						B60	0.90
	7.3 Perceived impact of teaching-related issues on turnover	4.6	1.4	0.85	0.72	B65	0.69
						B66	0.72
						B67	0.63

A preliminary analysis of the mean scores and standard deviations in Table 7 further reveals interesting trends in the perceptions of the school leaders. For instance, they generally believed that their roles and responsibilities included professionally and personally engaging with beginning teachers (Constructs 1.1 and 1.2), and they valued the importance of professional support in retaining beginning teachers (Construct 6.1). However, few had regular communications with beginning teachers (Construct 2.3), and few discussed the most suitable teaching options for these teachers (Construct 3.3), possibly because they did not consider it an effective strategy to prevent beginning teachers' job dissatisfaction (Construct 5.3). Although the school leaders were concerned about beginning teachers' transition to work (Construct 2.2), their strategies focused more on support for new teachers' professional development (Construct 3.1) than administrative support (Constructs 6.2 and 7.2).

Table 8 represents the correlations of seven first-order constructs underlying school leaders' perceptions of workforce issues concerning beginning teachers. The correlation matrix for the first-order constructs underlying school leaders' perceptions of their responsibilities and strategies to support and retain beginning teachers shows that all the correlations were statistically significant. However, the authors acknowledge that it is easy to obtain significant results, even after adjusting the instruments and assessing the scales multiple times, but the level of depth achieved during the interpretation of meaning revealed the realities in the field.

Table 8. *Correlations between Constructs Underlying School Leaders' Perceptions about Workforce Issues Concerning Beginning Teachers*

Constructs	1	2	3	4	5	6	7
Roles and responsibilities of leaders	-						
Professional management, support and concerns about BT	0.92	-					
Leadership strategies, awareness, and dispositions	0.89	0.88	-				
Assessment of BT suitability for a specific position	0.66	0.73	0.82	-			
Strategies to prevent BT dissatisfaction	0.82	0.82	0.92	0.86	-		

| Perceived effectiveness of retention strategies | **0.55** | **0.62** | **0.65** | **0.58** | 0.72 | - | |
| Perceptions of factors influencing turnover | **0.26** | **0.26** | **0.28** | **0.29** | **0.30** | **0.27** | - |

The positive coefficients further suggest that these constructs are all positively related to one another. The particularly high correlation coefficients between the *roles and responsibilities of leaders; professional management, support for and concerns about beginning teachers;* and *strategies to prevent beginning teachers' dissatisfaction* indicate a strong alignment between school leaders' perceptions and concerns and their strategising actions. The support and strategies they implement are influenced by whether they have concerns about teachers and whether they consider it their role and responsibility to address those concerns. The detailed qualitative and quantitative evidence generated through this pilot about school leaders' and beginning teachers' perceptions and expectations will be discussed in future publications.

6. Discussion

Retaining beginning teachers has important implications for education systems' strategies to build a strong, stable, and quality workforce (Harris & Sass, 2011), and school improvement efforts. *Noticing*, *knowing* and *acting* on evidence about factors and underpinning realities that most influence beginning teachers' career decisions (Table 5) benefit leaders' strategy decisions. The aim of the *Beginning Teacher Workforce Planning* project is to build on previous theoretical and empirical literature to obtain a deeper understanding of the factors underpinning workforce issues. The project is guided by the need to create strategies to effectively manage this workforce by developing a clear understanding of the multi-layered factors that impact attrition and retention. A pre-requisite for the identification of workforce issues is the development of robust and consistent measurement scales, and this study developed these scales for both beginning teachers and school leaders.

Development of the BTW-BT-IF Scale was informed by concerns discussed in the national and international literature regarding beginning teachers' transition to the workplace (Skaalvik & Skaalvik, 2011: Wang, et al., 2016), professional identity (Bullough, 1997; Canrinus et al., 2012), attrition (Andrews, Gilbert, & Martin, 2007), turnover because of *"significant effects of school characteristics and organizational conditions"* (Ingersoll, 2001,

p. 501), retention (Feiman-Nemser, 2003), and workplace experiences (Ingersoll & Kralik, 2004), as well as support (Andrews et al., 2007), school leadership (Du Plessis, 2017), student behaviour (Lavigne, 2014), classroom context (Barrett & Davis, 1995; Flores, 2001), and perceptions of the wider school community in which beginning teachers function (Flores & Day, 2006).

The first- and second-order constructs (factors or themes) developed in this investigation were validated through EFA and CFA. The justification and validation process showed that some survey items in the BTW-BT-IF Scale used with the current sample were inconsequential; therefore, these items were temporarily removed for this investigation and for the EFA and CFA exercise. However, these items (Survey Items BT – T/B6, T/B7, T/B10, C3, C10, C14, C15, C27, C28, C33, C34, C35, C36, and C46) were identified by collaborators as valuable information for BTW planning; therefore, they will be slightly rephrased for further exploration in future investigations (Appendix A).

The BTW-SL-IF Scale captures school leaders' perspectives, understanding and perceptions regarding beginning teachers' transition issues (Huberman, 1993; Kyriacou & Kunc, 2007) and preparedness for the workplace and workforce (Darling-Hammond, 2003) and their skills to effectively engage with students (Brewster & Bowen, 2004; Harris, 2011), parents (Oplatka & Eizenberg, 2007; Veenman, 1984) and colleagues (Long, et al., 2012). The BTW-SL-IF Scale further closely associates such items with school leaders' perspectives on their own professional engagement and responsibility, which are linked to professional support, professional learning, and development (Flores, 2004) opportunities for beginning teachers.

Six items (Survey Items SL - B3, B4, B5, B16, B25, B30) with low factor loadings in this first process of analysis and endorsement of scale items were temporarily removed (Appendix B). These items will be assessed again in future research projects to finalise the validation of the survey items. The temporary removal of survey items does not indicate that these concepts are not as important as the included items, but it does suggest that either the structure of the statements or the construct orientation of the items needs to be reconsidered.

The two scales unveiled *well-differentiated* and *latent factors* that offer a deeper understanding of the data, which is what the researchers were pursuing in alignment with research completed by Veiga (2016). The constructs were categorized according to the strength of their Cronbach's alpha values. In the context of building a stable BTW, issues identified as important were included in the BTW-BT-IF Scale and the BTW-SL-IF Scale. The claim in the literature that school leaders' perceptions and contextual factors have an

important influence on beginning teachers' decisions aligns with the theoretical framing that underpinned the development, design, and critical reflections on the factor analyses of the BTW-BT-IF Scale and the BTW-SL-IF Scale. The C-CUD theoretical framing (Du Plessis, 2018) acknowledges the unique impact of beginning teachers' individual contexts, teaching situations, and experiences on their professional identity and development as the most knowledgeable other in the classroom.

Table 3 links the first- and second-order constructs to beginning teachers' transition concerns and issues related to the workplace identified in the national and international literature. The search for a deeper understanding of perceptions of the factors influencing teachers' entry into the teaching workforce was guided by the research questions. The focus on information and knowledge about the factors impacting beginning teachers' transition to the workplace will inform ITE institutions and leaders in the workplace.

The first- and second-order constructs in Table 3 connect school leaders' experiences, concerns, and issues identified in the national and international literature to this investigation's search for a deeper understanding of the perceptions of school leaders regarding beginning teachers and how school leaders impact the BTW. Table 5 demonstrates, through the first- and second-order constructs, the consideration of issues that beginning teachers experience in the teaching profession as discussed in the national and international literature.

Although the objective of this paper is to discuss the development and validation of scale items and survey instruments, some key preliminary interpretations are offered with the aim of informing more detailed interpretations in future publications. The key interpretations include the following:

    i) beginning teachers and school leaders perceive that ITE programmes do not sufficiently prepare beginning teachers for diverse classroom challenges or the effective linking of theory and practice,

    ii) both beginning teachers and school leaders identify support as one of the most influential aspects that impact the BTW, but the data in this study reveal significant differences in how available support is perceived by each group,

    iii) there is incoherence in the conceptualization of what is perceived as induction, mentoring and coaching,

    iii) the data offer evidence of the impact school leaders have on beginning teachers' future decisions, highlighting the difficulties that arise for beginning teachers because of a disconnect between leaders within the same school,

iv) the concern regarding the workload of beginning teachers is well established;
however, this study reveals additional detail and defines the deeper
management issues associated with the workload of beginning teachers.

The outcome of the research discussed in this paper is the future adjustment of the survey instruments, which will entail regrouping the scale items based on evidence from this investigation.

Future papers will report on salient themes drawing on specific evidence. The multidimensional scales described in this paper make it possible to test the relationships between the identified constructs. These multidimensional scales can be used in different educational settings to reveal perceptions of specific contextual influences on the BTW. The findings stimulated by the BTW-BT-IF Scale and the BTW-SL-IF Scale contribute to a broader understanding of how perceptions of specific aspects of the teaching profession and workplace impact workforce planning and stability. Specific results and empirical evidence generated by the justified scale items will be discussed in future publications.

7. Conclusion

Justification and validation of the scales is part of the multidisciplinary paradigm employed by this investigation to develop and design scales to quantify the importance of various components influencing the professional experiences of beginning teachers. Deeper understanding supports the process of pursuing clearer explanations and truths (Johnson et al., 2014, p. 532). It is vital that evidence regarding support and additional factors be clearly communicated (Australian Institute for Teaching and School Leadership, 2016b; Johnson et al., 2014) or adequately supported (Australian Institute for Teaching and School Leadership, 2016b; Rikard & Banville, 2010).

Consciousness of the context in which beginning teachers function highlights the complexity of how perceptions of significant factors, either individually or collectively, might influence teachers' career decisions (Table 5). Recognising the value of the context-conscious approach identified by Johnson et al. (2014), an approach that acknowledges the impact of the environment, our research reflects an awareness of the value of in-depth understanding and multi-layered perspectives of "the dynamic and complex interplay among individual, relational, and contextual conditions that operated over time" (Johnson et al., 2014, p. 534) have for support and retention strategies. The investigation acknowledges the value of effective human capital management in agreement with researchers, highlighting the

importance of paying attention to person-organization fit and person-job fit in efforts to retain beginning teachers (Player et al., 2017; Pogodzinski,et al., 2013).

The scale justification and validation portion of this pilot reveal gaps in the existing knowledge and offer a foundation for further research examining beginning teachers' and their school leaders' perceptions and understanding of the BTW in order to confront the gaps in knowledge identified by Johnson et al. (2014). The study reflects an awareness that "the research has only scratched the surface in many respects and has not produced a strong cumulative body of evidence and theory for informing future work" (Borman & Dowling, 2008, p. 400) and describes collaborative research committed to supporting beginning teachers and their school leaders.

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Appendix A

Beginning Teacher Workforce Planning: Beginning Teacher Impact Factor Scale (BTW-BT-IF scale)

Likert scale components			
Beginning Teacher Workforce Planning: Beginning Teacher Impact Factor Scale (BTW-BT-IF Scale)			
Part 1: How do beginning teachers perceive the transition to the workplace and related challenges?			
First-order constructs - Section 1: Expectations versus realities about the teaching profession			
Second-order construct themes		Survey item BT-T/B	Statement: During my transition:
Realistic expectations about the teaching workforce in general	1.1	T/B1	The expectations I had for my teaching career match the realities in the teaching workforce.
		T/B2	My position in the school context is what I expected.
Satisfaction and self-efficacy development	1.2	T/B3	I expect to develop into a more effective teacher over the next five years.
		T/B4	I feel satisfied in the teaching workforce.
		T/B5	I feel happy with my current teaching position.
Realistic expectations about workload and student outcomes	1.3	T/B8	As a beginning teacher, my workload is realistic.
		T/B9	Expectations that I will achieve significant student outcomes are realistic.
Removed for this sample		T/B6	Entering the teaching workforce made me reconsider my passion for teaching.
		T/B7	Realities in the classroom made me reconsider my passion for teaching.
		T/B10	My current school environment impacted my successful adjustment to the teaching profession.
First-order constructs - Section 2: Perceptions about the effectiveness of initial teacher education (ITE) programs			
Second-order construct themes		Survey item BT-T/B	Statement: Initial teacher education (ITE) programs:
ITE effectiveness to prepare beginning teachers for teaching	2.1	T/B14	Provided me with the professional experience I need to be successful.
		T/B16	Prepared me as a classroom-ready graduate.
		T/B17	Developed me as a profession-ready graduate.
ITE qualifications' relevance to teaching	2.2	T/B21	The academic efforts I made during my initial teacher education (ITE) benefit my teaching practice.
		T/B22	My achievements during ITE feed into my current teaching position.
		T/B23	My ITE program and qualifications are closely linked to my current position.

ITE effectiveness to equipping beginning teachers with interpersonal skills	2.3	T/B15	Prepared me with the interpersonal skills I need to be an effective teacher.
		T/B20	Developed the communication skills I need for the teaching workplace.
ITE effectiveness to prepare beginning teachers for diversity	2.4	T/B18	Prepared me for the diverse learning needs of students in my classroom.
		T/B19	Prepared me for diverse school environments (e.g., low socio-economic, indigenous students, rural and remote classrooms, student with a language other than English).
ITE effectiveness to prepare beginning teachers to link theory and practice	2.5	T/B11	Provided me with the professional experience I need to be successful
		T/B12	Prepared me for my transition from university to the workplace.
		T/B13	Developed my skills to effectively link teaching theory and practice.

First-order constructs - Section 3: Perceptions and experiences in the workplace

Second-order construct themes		Survey item BT-T/B	Statement: In my workplace:
Beginning teachers' capacity and ability recognised	3.1	T/B26	I have opportunities to share my teaching ideas in my school.
		T/B28	Experienced colleagues ask for my views about school-improvement strategies.
Beginning teachers' perceptions of self-direction/confidence	3.2	T/B32	I am confident in who I am as a teacher in my current school workplace.
		T/B33	I have a clear sense of direction for my teaching career.
Beginning teachers' perceptions and understanding of school context and culture	3.3	T/B30	I have a clear understanding of the values in this school community.
		T/B31	Knowing the socio-economic context of the school is important for my teaching.
Collegial support received	3.4	T/B24	I receive enough support from teaching colleagues.
		T/B25	I receive support without asking for help.
		T/B27	There is teamwork between me and my colleagues.
		T/B29	I have regular opportunities for discussions with the principal.

First-order constructs - Section 4: Factors influencing beginning teachers' professional identity development

Second-order construct themes		Survey item BT-T/B	Statement: My professional identity as a beginning teacher depends on how:
Favorable work environment	4.1	T/B39	I am invited to have regular one-on-one discussions with members of the school leadership team.
		T/B40	My working conditions are what I expected.

		T/B41	I receive the professional development needed to perform my job effectively.
		T/B42	My workload relates to my level of experience.
		T/B43	I have non-contact time in my timetable to spend on collaborative lesson planning with more experienced colleagues.
		T/B45	I have been released from class duties to have professional learning discussions with my mentor.
Effective mentorship	4.2	T/B36	I have access to a trained mentor.
		T/B37	I am mentored by a teacher trained in mentorship.
		T/B38	I rely on my mentor teacher's specialist knowledge.
		T/B44	I have opportunities to discuss my teaching concerns with a mentor
		T/B47	I have had a mentor teacher assigned to me.
		T/B48	I have had the opportunity to change mentor teachers where a conflict has arisen.
Personalised attention given	4.3	T/B34	The ideas I share are respected in my workplace.
		T/B35	I am supported through a personalised induction program.
		T/B46	My induction meetings take place on a regular basis.

Likert scale component
Part 2: How do beginning teachers' perceptions about their workplace influence future career decisions?

First-order construct - Section 5: Factors influencing future career decisions

Second-order construct themes		Survey item BT-C	Statement: Perceptions that will influence my career decisions are:
Employment status influencing future career decisions	5.1	C2	My current employment status.
		C11	My options to change employment status from temporary to full-time, permanent.
		C12	My opportunities to secure a position in the school of my choice.
Responsive school leaders influencing future career decisions	5.2	C1	How my needs are met by school leaders.
		C13	My professional bond with my school leadership team.
Employment conditions and opportunities influencing future career decisions	5.3	C8	Ideas on how to improve current working conditions.
		C9	Opportunities to access professional learning opportunities.
	5.4	C6	My options to change to a different school setting.

Contextual transfer opportunities influencing future career decisions		C7	The attention educational leaders give to my request to transfer after I have completed the minimum placement requirements.
Removed for this sample		C3	Additional qualifications will improve my chances to make a career change in the future.
		C10	My current employment status will influence decisions to make a career change.
		C14	My access to subsidized teacher accommodation will impact my decisions to make a career change.

First-order constructs - Section 6: Challenges experienced at work

Second-order construct themes		Survey item BT-C	Statement: My teaching career challenges are defined as:
School community culture issues	6.1	C21	I do not have a professional bond with my teaching colleagues.
		C22	I do not identify with school culture.
		C23	The school community finds it hard to accept me.
		C24	I feel like an outsider when I am at school.
		C25	The requirements of my position and my qualifications are not compatible.
Attrition tendencies	6.2	C4	How I can get out of teaching.
		C5	How I can pursue an alternative career.
		C16	I have made the wrong career choice.
		C26	Teaching is not the career for me.
School leadership issues	6.3	C17	My principal/deputy principal delegate is not interested in my concerns.
		C18	My working conditions are not satisfactory.
Student-related issues	6.4	C19	My students do not achieve the expected results.
		C20	My students do not respect me.
Removed for this sample		C15	My personal circumstances impact the challenges I face in the workplace.
		C27	My teaching skills development impacts the challenges I face in the workplace.
		C28	My teaching salary is part of the challenges I face in the workplace.

First-order constructs - Section 7: Factors influencing retention

Second-order construct themes		Survey item BT-C	Statement: My decision to stay in the profession will be impacted by:
Interpersonal support influencing retention	7.1	C29	In-school collegial support.
		C30	Designated mentor teacher support.
Administrative support program design influencing retention	7.2	C31	Induction programs.
		C32	'Time release support' for paid mentor programs.
Removed for this sample		C33	My close discussions with school leaders.

		C34	Leadership action to reduce my current workload.
		C35	Clarity about the targeted support offered by the head office.
		C36	My easy access to personal support from close friends and family.

First-order constructs - Section 8: Factors influencing turnover

Second-order construct themes	Survey item BT-C		Statement: My decisions to change/relocate to another school will be impacted by:
Administrative-related issues influencing turnover	8.1	C37	Change in employment status/type.
		C38	Leadership concerns.
		C39	Transition issues.
School community culture issues influencing turnover	8.2	C40	Feeling that I do not belong.
		C41	School culture difficulties.
		C42	Community culture issues.
		C44	Challenges with colleagues.
Subject area and classroom-related issues influencing turnover	8.3	C43	Challenges with subject areas.
		C45	Challenges with students.
Removed for this sample		C46	My access to personal support.

Appendix B

Beginning Teacher Workforce Planning: School Leader Impact Factor Scale (BTW-SL-IF scale)

Likert scale component			
Beginning Teacher Workforce Planning: School Leader Impact Factor Scale (BTW-SL-IF Scale)			
How do school leaders' experiences and perceptions of the teaching workplace influence the beginning teacher workforce?			
First-order constructs - Section 1: Roles and responsibilities of the school leader			
Second-order construct themes		Survey item SL	Statement: In my responsibilities as school leader:
Engagement with beginning teachers	1.1	SL-B1	I engage with beginning teachers on a regular basis
		SL-B2	The wellbeing of beginning teachers is my main priority
Take responsibility for beginning teachers' development	1.2	SL-B6	I am responsible for beginning teachers' professional growth
		SL-B7	I make additional time available for discussions with beginning teachers
		SL-B3	Involve delegating beginning teachers' management to the heads of the department
Removed for this sample		SL-B4	Involve delegating beginning teachers' management to the deputy principal
		SL-B5	Is to manage beginning teachers' recruitment to fit the school budget
First-order constructs - Section 2: Professional management, support and concerns about beginning teachers			
Second-order construct themes		Survey item SL	Statement: As a school leader:
Provide and strategise professional development opportunities for beginning teachers	2.1	SL-B14	I ensure professional development opportunities are available for beginning teachers
		SL-B15	I have specific strategies in place to manage beginning teachers' workload
		SL-B17	I create opportunities for beginning teachers to discuss their professional challenges
Transition concerns about beginning teachers	2.2	SL-B8	I perceive beginning teachers' transition from university to the workplace as a concern
		SL-B13	I am concerned about the beginning teachers' readiness for the teaching profession
Regular communication with beginning teachers	2.3	SL-B11	I have regular informal one-on-one meetings with beginning teachers' mentors
		SL-B12	I have regular formal one-on-one meetings with beginning teachers
Provide uniquely tailored support for beginning teachers	2.4	SL-B9	I ensure additional support is available for beginning teachers with uniquely tailored induction programs
		SL-B10	I assign mentors with specialist knowledge for each beginning teacher

Removed for this sample		SL-B16	I ensure support through adjustments to timetables to allow beginning teachers more time for lesson planning and preparation

First-order constructs - Section 3: Leadership strategies, awareness, and dispositions

Second-order construct themes		Survey item SL	Statement: My leadership decisions and strategies focus on beginning teachers to:
Personalised support for beginning teachers' professional growth	3.1	SL-B18	Ensure that they will stay in the teaching profession
		SL-B20	Further develop their strengths
		SL-B21	Identify specific weaknesses and issues
		SL-B27	Encourage professional discussions about their teaching future
Improve the fit between beginning teachers and their positions	3.2	SL-B23	Improve the working conditions of beginning teachers to impact turnover rates
		SL-B24	Nurture beginning teachers' capacity for specific positions
		SL-B26	Support beginning teachers to secure a full-time position in education
Discuss the most suitable teaching options for beginning teachers	3.3	SL-B19	Stimulate discussions about the most suitable positions for them in my school environment
		SL-B22	Discuss different options in the school context that are most suitable for them
Removed for this sample		SL-B25	Discuss the most suitable employment contracts with beginning teachers (Assignments to short term contracts)

First-order constructs - Section 4: Assessment of beginning teachers' suitability for a specific position

Second-order construct themes		Survey item SL	Statement: As a school leader, I assess beginning teachers' suitability for a certain position according to:
Beginning teachers' suitability based on qualifications, knowledge and skills	4.1	SL-B28	Their teacher performance assessment tasks completed while at university
		SL-B29	The degree of alignment between position-specific requirements and beginning teachers' qualifications and experience
		SL-B31	The need to develop a strong teaching workforce within my school budget (where applicable)
		SL-B32	The benefits of the lower pay rate of a beginning teacher
Beginning teachers' suitability based on the school's contextual constraints	4.2	SL-B25	Discuss the most suitable employment contracts with beginning teachers (Assignments to short-term contracts)
		SL-B33	The evidence of their readiness for the teaching profession
		SL-B35	Their willingness to be moved around to different positions

		SL-B36	The short-term nature of certain teaching positions
Beginning teachers' suitability based on the school's strategic development plan	4.3	SL-B34	How they will fit into the school improvement strategies at my school
		SL-B37	The specific school culture I want to develop in the workplace
Removed for this sample		SL-B30	How soon they can start in a specific position

First-order constructs - Section 5: Strategies to prevent beginning teachers' dissatisfaction

Second-order construct themes	Survey item SL	Statement: As a school leader, I assess beginning teachers' suitability for a certain position according to:	
Preventing beginning teachers' dissatisfaction through active professional engagement	5.1	SL-B40	Demonstrating continuous interest in their personal teaching concerns
		SL-B41	Demonstrating continuous awareness of their personal circumstances (e.g., accommodation and travel arrangements)
		SL-B42	Making regular inquiries about dissatisfaction with their experiences in the teaching workforce
		SL-B43	Modelling collegial respect for beginning teachers by encouraging them to voice their concerns
		SL-B44	Developing targeted professional learning opportunities
		SL-B45	Responding quickly to signs of dissatisfaction among beginning teachers
		SL-B46	Engaging beginning teachers in the wider school community
		SL-B47	Ensuring that beginning teachers experience a sense of belonging to our school environment
Preventing beginning teachers' dissatisfaction by assigning beginning teachers according to their strengths and passion	5.2	SL-B48	Appropriately placing beginning teachers in positions for which they are fully qualified
		SL-B49	Ensuring that I am aware of what exactly their passion for teaching entails
		SL-B50	Strategic initiations to keep focus on the passion that made them choose teaching as a career
Preventing beginning teachers' dissatisfaction by matching beginning teachers with the most suitable teaching option	5.3	SL-B38	Ongoing discussions about suitable subject areas to teach within the school
		SL-B39	Continuous discussions about future teaching choices (e.g., subject area, employment type, supply vs. contract or full-time) within the teaching profession

First-order constructs - Section 6: Perceived effectiveness of retention strategies

Second-order construct themes	Survey item SL	Statement: As a school leader I perceive successful strategies to retain beginning teachers as follows:	
Perceived effectiveness of professional support	6.1	SL-B51	In school collegial support
		SL-B52	Designated mentor teacher support
		SL-B53	Induction programs

		SL-B54	Teacher relief scheme (TRS) for paid mentor program
in retaining beginning teachers			
Perceived effectiveness of administrative support in retaining beginning teachers	6.2	SL-B55	Principal/Beginning teacher discussions
		SL-B56	Reduced workload
		SL-B57	More support from the head office

First-order constructs - Section 7: Perceptions of factors influencing turnover

Second-order construct themes		Survey item SL	Statement: Key factors that cause beginning teachers to move to another school involve:
Perceived impact of adjustment issues on turnover	7.1	SL-B61	Leadership concerns
		SL-B62	Transition issues
		SL-B63	School culture
		SL-B64	Community culture
Perceived impact of employment conditions and status on turnover	7.2	SL-B58	Change in employment conditions
		SL-B59	Beginning teachers' understanding of moving from provisional to full registration
		SL-B60	Opportunities created for beginning teachers to move from provisional to full time registration
Perceived impact of teaching-related issues on turnover	7.3	SL-B65	Challenges with subject areas
		SL-B66	Challenges with colleagues
		SL-B67	Qualification not suitable for specific position