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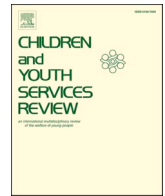
Protocol for a mixed-methods investigation of quality improvement in early childhood education and care in Australia

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A B S T R A C T

International recognition of the early years as a crucial foundational period has led to the design and implementation of quality rating and improvement systems (QRIS) that define, communicate, and monitor the components of quality in early childhood education and care (ECEC). The aim of these policies is to achieve effective quality assurance and improvement through a system-oriented approach to assessment and evaluation. Informed by ecological systems theory, this paper outlines a three-phase, mixed-methods design for researching a national sample of child care centres that showed overall improvement on the Australian National Quality Standard (NQS) assessment and rating (A&R) criteria. The study samples are drawn from a national dataset of centre-based child care services with two or more A&R rounds and an initial rating of Working Towards NQS (N = 1,935). The results of this study will provide insights into the macro-, exo-, meso- and micro-systems level factors and strategies that support quality in ECEC services.

1. Introduction

The past decade has seen the intensification of initiatives, underpinned by the United Nations Sustainable Development Goal 4, Target 4.2 [SDG4.2] (2015), to ensure that all children have access to quality early childhood development, care and pre-primary education. SDG4.2 recognises the early years as a crucial foundational period that demands government attention and investment. A consequence has been the development and implementation, in many countries and state/provincial jurisdictions, of public policies that: (1) support the participation of young children in early childhood education and care (ECEC) programs prior to school entry; (2) set standards to regulate and monitor the quality of educational programs and practices; and (3) drive continuous quality improvement in ECEC services (Klinkhammer et al., 2017; OECD, 2015). Children's participation has been supported by substantial public investment to subsidise the cost of ECEC services through fee subsidies or free access (Krafft et al., 2017; OECD, 2017). Regulatory standards, supported through Government initiatives, have addressed

structural underpinnings of program quality, such as staff-to-child ratios and staff qualifications and training (Oberheimer & Schreyer, 2018). The introduction of state-based and national quality rating and improvement systems (QRIS) (ACECQA, 2017; European Commission, 2019; Tout et al., 2010) and incentives such as tiered, 5-star rating systems (Bassok et al., 2019; Merrill et al., 2020) and financial benefits (Yazejian & Iruka, 2015) provide mechanisms for continuous quality improvement.

Whilst the effectiveness of public policy initiatives to promote participation and regulatory standards has been readily demonstrated, less is known about the effectiveness of approaches to promote and sustain quality improvement. Studies have relied on testing the effects of "enhancement programs" (Joo et al., 2020, p. 1), such as parenting programs (e.g., Grindal et al., 2016), the introduction of skills-based language and literacy or mathematical curricula (e.g., Duncan et al., 2015), and professional development for teachers in language and literacy instruction (Joo et al., 2020), pedagogical leadership (Siraj et al., 2018), or teacher-child interactions (Egert et al., 2020). The

effectiveness of these enhancement programs is measured by improvements in children's school readiness and/or achievement tests (Duncan et al., 2015; Grindal et al., 2016) or researcher-administered measures of classroom quality (Egert et al., 2020; Siraj et al., 2018), but such outcomes do not necessarily translate readily to, or guide, system improvements more generally. What is lacking are improvement studies that relate directly to the government policy frameworks that guide the day-to-day practice of early childhood educators.

A promising alternative is the evaluation of improvements in ECEC quality through the use of administrative data gathered as part of the QRIS processes. Studies in the United States, for example, have suggested that the implementation of QRISs, which are typically designed to define, measure, improve, communicate and reward high quality through the provision of technical, financial and workforce supports (Faria et al., 2016; Holod et al., 2015), can improve the quality of programs for children and families (Boller et al., 2015; Tang et al., 2020; Yazejian & Iruka, 2015). In addition, QRIS processes provide opportunities to "capitalise on the rich information they are collecting and consider new methods for analysing and disseminating it" (Sabol et al., 2013, p.846) to inform government and sector action and investment. Utilising the data generated by the QRIS or similar government-administered quality assurance systems can expose the underlying factors that contribute to and sustain change and improvement in quality.

In this paper, we add to this emerging body of research by describing the protocol for a study that will utilise information gathered through the Australian government's National Quality Standard (NQS) Assessment and Rating (A&R) process (ACECQA, 2012) to investigate the structures and processes that explain and contribute to quality improvement in ECEC services. We outline a sequential, three-phase, mixed-methods systems-approach design for researching a large national sample of child care centres that showed improvement in their NQS ratings over consecutive A&R rounds.

1.1. Advancing ECEC quality through a systems-oriented approach

The underpinning rationale for the introduction of a QRIS is to achieve "high-quality services in early childhood education and care (that) encourage and foster children's development in diverse ways" (Klinkhammer et al., 2017, p. 9). Ecological systems theory, as explained by Bronfenbrenner and Morris's (2006) Process-Person-Context-Time (PPCT) model and expanded by Dunlop (2014) for ECEC contexts, acknowledges that children's learning, development and wellbeing are influenced by inter-connected, inter-dependent proximal processes and nested systems. The quality of ECEC contexts is evident in children's interactions and relationships with educators and other children within the ECEC setting (micro-system) and in the connections, collaborations and shared values across family and ECEC contexts (*meso*-system). These proximal systems are influenced indirectly by *exo*-system factors, including social policies governing ECEC settings, and further, by the macro-system factors such as political and socioeconomic values (Rosa & Tudge, 2013). Systems thinking has been applied by Torii et al. (2017) and by Kagan et al. (2016) to identify the elements needed for the effective functioning of ECEC systems. The model proposed by Kagan and Roth (2017), for instance, effectively shifted the central focus from the child (as in Bronfenbrenner's model) to "the ECEC system as its unit of analysis" (Kagan & Roth, 2017, p. 137). Notably, their conceptualisation of a set of seven inter-connected elements included "assessment, data, and accountability" as one of the "infrastructural mechanisms" needed for effective ECEC service quality (pp. 147–148), confirming the key role of QRIS and other systematic processes for evaluating quality.

Dalli et al. (2011) identify two broad approaches to defining and evaluating quality: (1) measurement approaches that are informed by goals of "making a difference" (p. 33) and "prescriptive accreditation processes" (p. 31); and (2) "discursive, philosophical approaches" (p. 25) that are informed by cultural and philosophical positions. Examples

of measurement approaches can be seen in state-based QRIS models in the United States (Poppe et al., 2020) and England (Cottle & Alexander, 2012). Discursive approaches to quality are illustrated in Klinkhammer and Schäfer's (2017) analysis of ECEC monitoring systems in Australia and seven European countries and in New Zealand by Dalli et al. (2011), who emphasise the role of self-review in evaluation. Whilst measurement systems of evaluating ECEC quality are relatively similar, being based on standardised instruments such as the Environment Rating Scales (Harms et al., 2005, 2006) and the Classroom Assessment Scoring System (CLASS) (Pianta et al., 2008), discursive approaches vary widely. Discursive approaches are based on diverse understandings of quality and its creation in practice, which are dependent on their contexts and the values held by stakeholders. As such, quality is subject to ongoing processes of negotiation and creation at all levels of an ECEC "system of evaluation, monitoring and quality improvement" that includes the views of all stakeholders, supported by service providers and local or central authorities (Urban et al., 2012, p. 510).

1.2. The Australian QRIS system

Australia is a federated country that operates a national system of quality assurance for ECEC services, along with national subsidy arrangements for parent fees to support high levels of child participation. Initially similar to the United States and Canada, in which federal as well as state or provincial governments administer distinct systems of quality assurance for the ECEC services within their jurisdiction (Childcare Canada, n.d.; Tout et al., 2010), in 2012, Australia made the decision to re-align the eight state and territory regulatory systems into a unified and integrated approach to regulation and quality improvement in ECEC (COAG, 2009; DEEWR, 2009; Logan et al., 2012; Sims et al., 2017). A critical step was the introduction of a National Law and Regulations setting nationally agreed minimum requirements to operate an ECEC service. Focusing on structural characteristics of quality, these included enhanced educator-to-child ratios and increased qualification requirements for educators, including the need for early childhood degree qualified teachers, within the mix of diploma- and certificate-qualified staff. This change provided the legislative foundation for the introduction of the National Quality Standard (NQS), and two Approved Learning Frameworks. Integrated within Australia's National Quality Framework, these legislative documents strengthened the focus on process characteristics of quality and embedded the expectation for critical reflection and continuous improvement in everyday practice (Waniganayake et al., 2017). The NQS includes a five level scale along with a multi-layered and rigorous process for assessment and rating of services and a new national body, the Australian Children's Education and Care Quality Authority (ACECQA), "to guide implementation of the new system and ensure consistency of approach" (ACECQA, 2012, p. 10).

A key difference from the QRIS in the United States is that participation in the NQS A&R process is required for ECEC services to provide access to fee subsidies, ensuring high levels of participation by ECEC service providers. Unlike some funding schemes in the United States, however, the subsidies Australian parents receive towards the costs of ECEC are based on means-testing of household income, not on the service's NQS rating. A key role of ACECQA is to communicate the uptake and results of the NQS A&R process to governments and the public. A&R outcomes are displayed at each ECEC setting and published on a national register. Quality rating information on public access also includes Quarterly Snapshots (ACECQA, 2021) and details on current and previous NQS ratings for all approved services (ACECQA, n.d.-a). This information provides parents with a tool to judge quality and enables them to make informed choices when selecting an ECEC service for their child (Cannon et al., 2017).

In developing the National Quality Framework and NQS, Australia acknowledged "the complexity of quality as a multidimensional construct" (Logan et al., 2012, p. 9). Marking a shift away from

prescriptive to performance standards, the NQS recognises the contextual nature of quality, promoting professional judgment and enabling standards to be met in different and locally relevant ways (Jackson, 2015a; Irvine & Price, 2014). The NQS comprises seven Quality Areas (QA) (Jackson, 2015b), described by Standards (2–3 per QA) and Elements (2–3 per Standard) (Sims et al., 2017). While all seven QAs contribute to overall ECEC service quality, QA1 Educational program and practice is recognised as "the most critical to longer term child outcomes" (ACECQA, 2016, p. 40) and QA7 Governance and leadership as "central" to all quality areas because "the way a service addresses the NQS will be directly influenced by the quality of its leadership and management" (ACECQA, 2017, p. 47).

An overarching aim of the NQS is to "raise quality and drive continuous improvement" (ACECQA, 2022, p. 8), and engagement with the A&R process is a critical component of this system. Services enter a process of preparation including collective self-reflection, submission of a Quality Improvement Plan (QIP), and assessment by state/territory Authorised Officers who determine a rating for each of the seven QAs and an overall rating (ACECQA, n.d.-b). The A&R process sought to introduce a "more balanced approach to data collection" (Irvine & Price, 2014, p. 86), based on observation of practice, professional conversations with educators, and review of documentation. There are two key QRIS documents: the QIP that is completed by the ECEC service, ideally with input from all educators, and the A&R Report that is completed by the state/territory government Authorised Officer during a visit to the service. The aim of the QIP is to enable services to "self-assess their performance in delivering quality education and care and to plan future improvements" (ACECQA, 2012, p. 34). The QIP is submitted before the A&R review and provides a basis for observations by, and conversations with, the Authorised Officer. As part of the continuous improvement process, educators face challenges to meet the NQS obligations while also striving to meet the unique needs of their service (Thorpe et al., 2021; Togher & Fenech, 2020).

1.3. Validation of Australia's national quality standard ratings

A critical question for all governments is whether their ECEC quality assessment and rating system "produces accurate and understandable ratings that capture meaningful differences in program quality across rating levels" (Karoly, 2014, p. ii). In the United States, validation studies of QRIS program ratings have included comparison of researcher ratings on the Environmental Ratings Scales (Harms et al., 2005, 2006) against QRIS rankings of child care centres in Maine and Indiana (Lahti et al., 2015) and on scores on the CLASS (Pianta et al., 2008) against QRIS rankings for preschools in Louisiana (Vitiello at al., 2018) confirmed that services that received higher QRIS rankings also scored higher on researcher scores using standardised instruments. Australia's NQS ratings include four levels allocated by the A&R process (Significant Improvement Required, Working Towards NQS, Meeting NQS, Exceeding NQS) and a fifth level – Excellent, that is available to services rated as Exceeding NQS upon subsequent application. Siraj et al. (2019) assessment of 257 ECEC centres and preschools using the Early Childhood Environment Rating Scale Curricular Extension (Sylva et al., 2003) and the Sustained Shared Thinking and Emotional Wellbeing (SSTEW) Scale (Siraj et al., 2015) showed that scores were lowest for services rated as Working Towards NQS, mid-range for Meeting NQS, and highest for Exceeding NQS. Sub-group comparisons showed significant differences in ECERS-E and SSTEW scores for Exceeding NQS versus Meeting NQS services, but not for Meeting NQS versus Working Towards NQS.

Another approach to validation of QRIS program ratings is to determine if ratings of quality increase over time (Karoly, 2014). The expectation is that participation in QRIS technical and professional activities designed to support quality improvement would lead to improved ratings. ACECQA's (2018) examination of Australian ECEC services that were assessed against the NQS between 2013 and 2017 showed that over 60 % of child care centres and over 80 % of preschools that were initially rated as Working Towards NQS, improved their rating to Meeting NQS or Exceeding NQS.

1.4. Systemic contributors to quality improvement in ECEC services

Several Australian and international studies have investigated systemic characteristics that influence quality and quality improvement. We apply Bronfenbrenner's ecological systems model (Rosa & Tudge, 2013) to review this literature.

Macro-system influences on quality operate through jurisdictional and localised political and socio-economic structures. For example, in the United States, differences in the stringency of state regulations for ECEC services have been associated with National Association for the Education of Young Children accreditation outcomes (Apple, 2006). Urban-rural differences in quality also been identified in the United States (Maher et al., 2008) and China (Hu et al., 2014; Rao et al., 2022). Socio-economic differences across communities have also been identified. Services located in more disadvantaged communities tend to be of lower quality than those in more advantaged neighbourhoods in the United States (Hatfield et al., 2015) and Australia (ACECQA, 2020; Cloney et al., 2016). In addition, quality improvement is less likely in services in low income areas (Yazejian & Iruka, 2015) and more evident in communities where there were more choices of ECEC services and more competition (Bassock et al., 2016, 2019).

Exo-system influences on ECEC services are determined through external structures such as governance, ownership, and licensing. For example, higher quality has been reported for services operated by non-profit organizations compared to for-profit providers (Cleveland, 2008; Cleveland & Krashinsky, 2009; Coley et al., 2016; Mitchell, 2012, Slot, 2018; Warrilow et al., 2021). In addition, large for-profit 'chain' organizations have received lower ratings than independent for-profit services (Rush, 2006; Sosinsky et al., 2007), and Togher and Fenech (2018) question the feasibility of single, stand-alone operators to meet the expectations for quality improvement, above Working Towards NQS. There is also evidence that ECEC services that are licensed for larger numbers of children are associated with lower ratings for performance and organizational support (Ho et al., 2016).

The *meso*-system operates within individual ECEC services, described by inter-relationships among micro-systems that are influenced by leadership structures with the centre and within each classroom (Gibbs, 2022; Sims et al., 2018), and arrangements to support partnerships with families (Hadley & Rous, 2018). In a qualitative study of five ECEC services rated Working Towards NQS, Togher and Fenech (2018) highlighted the role of leadership in facilitating quality improvement. Internationally, researchers have also found that the quality of an ECEC program is influenced positively when the service has a shared vision and philosophy, clear policies and procedures and provides professional development and learning opportunities for the staff (Granrusten et al., 2018; Rodd, 2013; Strehmel et al., 2019). These leadership structures and processes support educators' interactions with children, families and their colleagues and thereby strengthen the quality of the program.

Micro-systems influence quality through the "activities and interpersonal roles and relations" (Rosa & Tudge, 2013, p. 246) of the staff who work in the ECEC service. Togher and Fenech's (2018) analysis identified "educator commitment and capacity … as either a facilitator of or hindrance to quality improvement" (p. 246). For example, participating educators referred to individual and collective motivation and drive to improve practice, as well as their opportunities to undertake professional development. Taking a critical stance, Grieshaber and Graham (2017) question the equity of the NQS, contending that the expectations of QA 1, Educational program and practice require techniques, strategies and knowledges held by degree-qualified teachers, and are "problematic for those who are not qualified teachers" (p. 96). However, Torri et al. (2017) suggest that this problem does not only reside with unqualified staff. They describe that in order to lift quality,

mechanisms are provided to ensure all tertiary courses for educators whether University based or not, furnish educators with the skills required to develop effective interactions with children.

Ecological systems theory can advance understandings of the interconnected contribution of macro-, exo-, meso- and micro-systems to ECEC quality and quality improvement. Prior research has provided evidence of macro- and *exo*-level influences, but as yet, the interconnections among diverse predictors have not been examined. Less evidence is available about the role of proximal processes at the meso- and micro-systems level. In a review of QRIS outcomes in the United States. Holod et al. (2015) concluded that "little is known about which specific quality improvement supports are most closely related to improvements in classroom quality" (p. 17). In this paper, we outline the study protocol to address these questions in an in-depth study of Australia's NQS A&R system. We examine internal supports and strategies within ECEC services as well as the external structures and systems to identify and describe the contributors to quality improvement.

1.5. AIM

The project is designed as a collaborative partnership between researchers and ACECQA with the aim of conducting an in-depth investigation of quality and quality improvement in ECEC services. Through ACECQA's access to longitudinal records of NQS A&R ratings every state and territory of Australia, and de-identified QIP and A&R documents, this study will examine the systemic factors and strategies that support and sustain quality in ECEC to address the following questions:

(i) What macro- and *exo*-system characteristics are associated with ECEC services that improve their A&R rating from Working Towards NQS to Meeting NQS or Exceeding NQS?

(ii) What meso- and micro-system factors and strategies within ECEC services contribute to quality improvement in QA 1 Educational program and practice and QA 7 Governance and leadership)?

(iii) What are the meso- and micro-system level challenges and barriers associated with quality improvement, and the strategies and additional supports that promote quality improvement, particularly for QA 1 and QA 7?

2. Method/design

The project will use a three-phase mixed-methods design that provides both scale and depth in sample identification, data selection and analysis. All three phases draw from a large national data set of approved ECEC services in Australia that: (i) provide centre-based ECEC for children from birth to 5 years, (ii) had participated in at least two NQS A&R rounds between 2012 and 2018; and (iii) include services that achieved improvement from an overall rating of Working Towards NQS to Meeting NQS or Exceeding NQS in the follow-up rating. Phase 1 draws on publicly available A&R ratings held in the ACECQA repository and applies quantitative analyses to examine the effects of indirect, external influences on improvement outcomes. Phase 2 explores the centre's QIP submitted prior to A&R and the assessor's ratings and written report following A&R, using a mix of qualitative methods to analyse documentary evidence of the contributions of QA1 and QA7 to improvement outcomes. Phase 3 adds to these administrative data sources through case studies of selected services in each state/territory of Australia and applies qualitative methods of data collection and analysis to uncover and probe the constraints, strategies and additional supports that promoted and assisted continuous quality improvement.

2.1. Study samples

The data source used to select the Phase 1 study sample is ACECQA's National Quality Agenda IT System (NQA ITS) repository of information about approved ECEC services (https://www.acecqa.gov.au /resources/

national-quality-agenda-it-system) for the period from its commencement in 2012 to December 2018. The population sample comprises 3,433 centre-based child care services that had NQS ratings for two A&R assessments. Table 1 shows the distribution of services for overall NQS ratings at Time 1 and Time 2.

The population sample selected for the project is restricted to services with Time 1 rating of Working Towards NQS (N = 1,935) that improved to Meeting NQA (n = 957, 49 %), improved to Exceeding NQS (n = 381, 20 %), or had no change in their overall NQS rating (n = 597, 31 %). The improvement sample totals 1,338 services (957 + 381). Three study samples will be utilised: Phase 1 will analyse data for the population sample, N = 1,935 child care centres. Phase 2 will select a representative sample of 60 centres from the Phase 1 study, Phase 3 will select a different sample of 15 centres from the Phase 1 study.

2.2. Ethical considerations

Phase 1 is based on quantitative analysis of the ACECQA publicly-available dataset. This does not require an ethics application. Similarly, Phase 2 is based on qualitative analysis of secondary data submitted during the NQS Assessment and Rating process, namely the de-identified Quality Improvement Plan submitted by each centre and the Assessment and Rating Report completed by the Authorised Officer, and does not require an ethics application. These documents 'are held by the relevant state/territory regulatory authority. Retrieval and de-identification of the documents will be facilitated by ACECQA.

Phase 3 case studies will require ethics approval from the Human Ethics in Research Committees of the universities where the research team members are employed. Data collection will include observations of practice and professional conversations with the Centre Director, the Educational Leader, and other educators who provide consent to be interviewed. These data will be recorded by the research team member in the form of hand-written notes. No electronic or audio-visual recordings will be made. Pseudonyms will be used to refer to centre staff. Following the visit, the researcher will write and forward a concise report on the information collected to the Centre Director and Educational Leader, who will have opportunity to contribute to and comment on the report prior to analysis.

2.3. Phase 1

2.3.1. Sample

Phase 1 will utilise the project sample of 1935 services (see Table 1) to create three categories of quality improvement: Working Towards NQS to Meeting NQS; Working Towards NQS to Exceeding NQS; and no change from Working Towards NQS.

2.3.2. Method

The NQS ITS data set provides information on seven aspects of ECEC services that, based on previous research, were suitable for testing as possible explanatory variables (see Fig. 1). These comprise three macro-system features: (1) Government jurisdiction across the eight Australian states and territories: New South Wales (NSW), Australian Capital Territory (ACT), Northern Territory (NT), Queensland (QLD), South Australia (SA), Tasmania (TAS), Victoria (VIC), and West Australia (WA); (2) Urban-rural location: metropolitan, inner regional, outer regional, remote and very remote; (3) Community socio-economic advantage/ disadvantage (Australian Bureau of Statistics (ABS), 2018); and four *exo*-system features that are indirectly related to the operations of ECEC services: (4) Type of approved provider, categorised as for-profit and sub-categories of not-for-profit organisations; (5) Size of approved provider organisation; (6) Service size/number of licenced places; and (7) Stability of ownership of the service.

In Phase 1, we will test the unique effects of each of these seven factors in univariate logistic regression analyses, using 'no change' from Working Towards NQS group as the reference category, to assess their

Table 1
Number of child care centres at each overall NQS rating level, at time 1 and time 2 assessments.

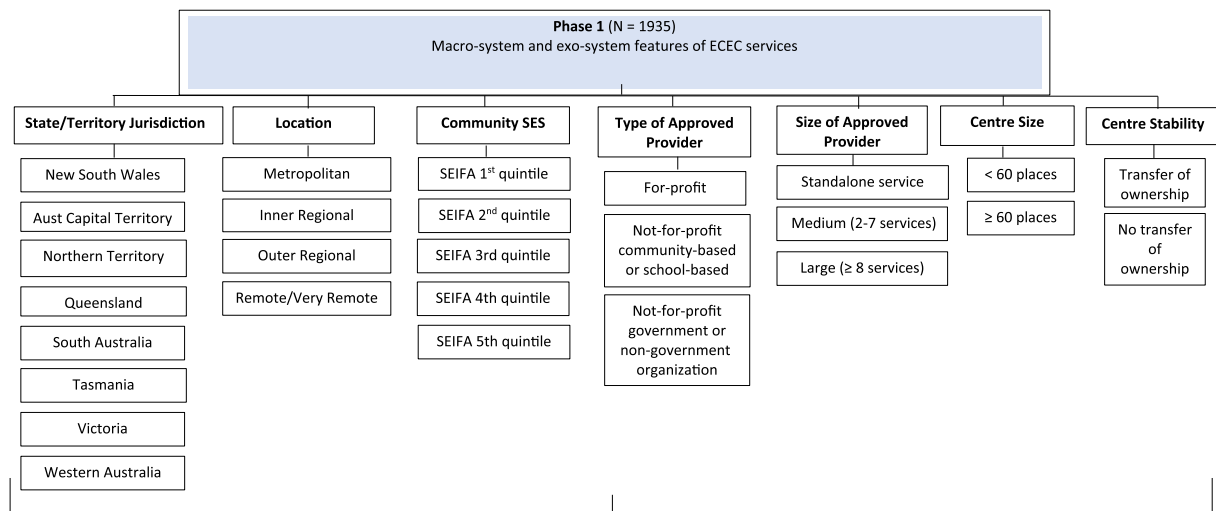|		Time 2				
		Significant Improvement Required	Working Towards NQS	Meeting NQS	Exceeding NQS	Total
Time 1	Significant Improvement Required	2	11	4	0	17
	Working Towards NQS	1	597	957	381	1,936
	Meeting NQS	0	232	608	173	1,013
	Exceeding NQS	0	51	189	227	467
	Total	3	891	1,758	781	3,433

Fig. 1. Phase 1 Design.

contribution to improvement from Working Towards NQS to Meeting NQS and Working Towards NQS to Exceeding NQS. As the seven factors are defined as categorical variables, differences between sub-categories will be tested by comparing results for the first category (the reference category) to each of the other categories. For example, for Jurisdiction, the distribution of services across the three no change/ improvement groups for each state/territory will be compared to the distribution for the state of New South Wales (reference category). We will then conduct multivariable multinomial logistic regression tests to test the combined effects of the full set of variables. The results of multivariable tests are more robust than the results of univariate tests as they take account of overlapping characteristics among the variables in the model.

2.4. Phase 2

Phase 2 brings an in-depth qualitative analysis to the study through an exploration of documents submitted to state/territory regulatory authorities during the NQS A&R process. (SEE Fig. 2)

2.4.1. Sample

A sample of 60 services will be selected from the improvement sample of services that improved to Meeting and Exceeding NQS using a process of randomized proportional stratified sampling. This will ensure that the selected sample includes services with all sub-categories of the seven categories identified in the Phase 1 review. Selected services will be confirmed with ACECQA, who will work with each state/territory regulatory authorities to provide the research team with the QIP and the A&R Reports.

2.4.2. Method

Qualitative analytic approaches will be used to identify proactive, consistent, and embedded practices for quality improvement, and
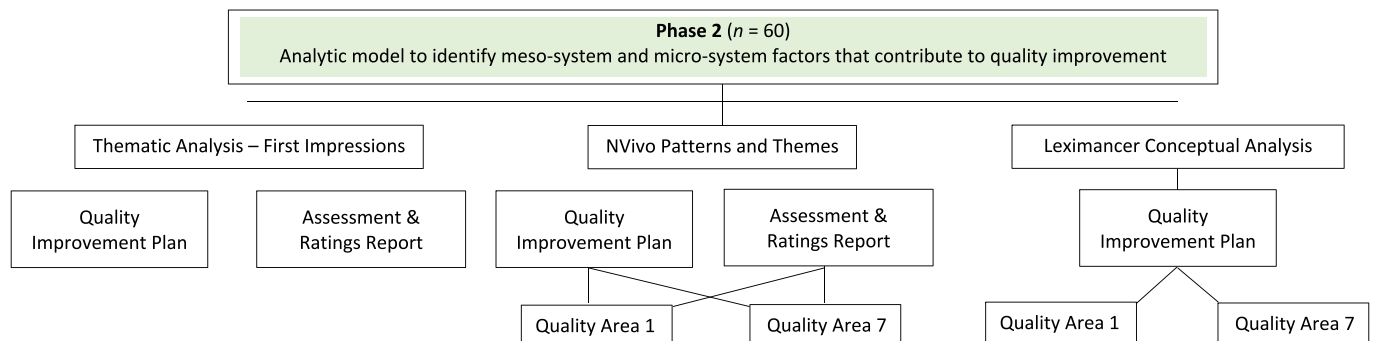

Fig. 2. Phase 2 Design.

explore distinctions between services that improved to Meeting NQS versus Exceeding NQS. Document analysis (Bowen, 2009) will be used as a qualitative research method to systematically review and evaluate the content of the data sources to identify approaches and strategies that support quality improvement within the selected sample. The approach to analysis is iterative, drawing on elements of thematic analysis (Braun & Clarke, 2009) and including inductive and deductive analysis of text. Giving specific attention to the role of QA7, we will draw on early childhood leadership theories to spotlight the role of service leaders (e. g., Centre Director, Educational leader) in enabling quality improvement (Sims et al., 2018; Waniganayake et al., 2017).

First, an initial review of each service's documentation will be undertaken by six members of the research team with state/territory expertise who will take responsibility for reading and analysing paired QIPs and A&R Reports in each jurisdiction. Thematic analysis will be applied to create researcher summary memos of 'first impressions' of the QIP, the A&R Report, and relationships between these sets of documents. Creating a summary statement to support analysis is a common approach in qualitative research, particularly when working with large qualitative data sets. Applying an 'insider-perspective', and exploiting the knowledge and experience of team members, the summary memo captures the researcher's immediate response to the use, efficacy and reciprocity of these two documents as quality improvement tools (Birks et al., 2008). The memos also capture the headlines in terms of emerging strengths and challenges in ECEC practice, as evidenced in the QIP and A&R Report. We will use NVivo software, Version 12, to support the analysis of the memos.

The second qualitative approach will also use NVivo software, Version 12, to support the systematic and sequential analysis of the QIPs and corresponding A&R Reports. NVivo will be used to help organize the data in terms of patterns and themes from the dataset. The proposed approach to analysis is iterative, drawing on elements of thematic analysis (Braun & Clarke, 2009), and will include inductive and deductive analysis of text. The six members of the research team (noted above) will be involved in developing the broad categories for coding the data. A series of steps will be taken to ensure the code book captures the main factors and strategies that services undertook for QA1 and QA7, as well as the strengths and weaknesses evident in these documents. The team will establish detailed guidelines before completing the coding to ensure consistency and high inter-rater reliability. Second pass coding will then be conducted. This will include condensing codes and further delineating codes to ensure similar codes (themes) are merged and grouped under a broader category. Where necessary, codes will be recoded to meet the nuances of the content. The final set of analyses will be run on every theme (factors and strategies) to compare services that improved to Meeting NQS vs Exceeding NQS.

Third, we will make a conceptual analysis of the 60 QIPs using *Leximancer 4.5* software, a conceptual and relational analysis tool that can analyse large quantities of natural language in text form quickly and systematically. Leximancer produces content analytic visualisations, the 'concept cloud' and the 'themed map', as well as statistical analysis of the concepts in the documents. Calculated frequencies of concepts' occurrence in documents determine the placement of concepts on the maps. The 'concept cloud' has large to small dots to represent most to least relevant concepts. The concept cloud shows visual pathways which connect each related concept. Concepts being mapped closely to each other means a strong semantic relationship (Campbell et al., 2011; Smith & Humphreys, 2006). The themed map creates heat maps and colour codes the themes, where, for example, red and orange are considered 'hot' colours to present the most relevant concepts to 'cooler' colours such as blue and green which denote less relevant concepts across the document (Angus et al., 2013). Concepts found in the hot/ warm heat mapping categories are highly relevant for all the documents across the selection being analysed. The cooler heat mapping categories represent less common themes/ concepts. Leximancer has been found to produce statistically reliable, reproduceable results by measuring both

the occurrence and co-occurrence of words in the text (Smith & Humphreys, 2006). A staged process of analysis will be worked through to produce content analytic visualisations of the QIPS for QA1 and QA7, with analysis of patterns evident for services that improved to Meeting NQS versus Exceeding NQS.

2.5. PHASE 3

Acknowledging the influence of context on quality, Phase 3 aims to investigate the challenges associated with, and barriers to, quality improvement, and to offer insights into factors and strategies that promote and assist quality improvement through in-depth qualitative case studies of 15 services.

2.5.1. Sample

As with Phase 2, identification and selection of the Phase 3 sample will use randomised proportionate stratified sampling to ensure a representation of all sub-categories of the seven categories identified in the Phase 1 review. The 60 Phase 2 services will not be included in the selection process for Phase 3. Nominated services will be confirmed with ACECQA, in collaboration with the state and territory regulatory authorities.

2.5.2. Method

A member of the research team with jurisdictional knowledge of the relevant state/ territory will recruit and conduct each case study. This team member's familiarity with the regulatory authority and processes will support the initial stages of recruitment. Telephone communication or a face-to-face visit will be arranged to explain the nature of the study and the process and expectations of data collection.

Data collection will occur over a period of two days, and include informal on-site observations and informal, incidental conversations with educators, using a 'walk and talk' methodology (Sumsion et al., 2013). Researchers will also conduct professional conversations (Irvine & Price, 2014) with service leaders including Directors and Educational Leaders, educators and, where possible, Approved Providers or their representatives. The focus of these conversations, as outlined in Table 2, will be on participants' views and experiences of the A&R process, the factors and strategies that supported improvement and those perceived to be important for sustaining and promoting quality improvements at each service. The approach aims to elicit factual, reflective, interpretive and decisional information (Stanfield, 2000). Researchers will take

Table 2

Types of questions to be used in Phase 3 case study visits.

Sequence of Conversation	Example questions
Objective questions (conversation starter, what happened?)	Looking at QA1 Educational Programs and Practices, what did you focus on? Why? Who was involved? Why? How did the team work together?
Reflective questions (providing insight into values, beliefs and attitudes that may influence behaviour and learning)	How did you feel about the assessment and rating process overall? What areas of your work did you feel most confident about? Why?
Interpretive questions (provoking deeper thinking, making connections with self and work)	What do you think are the key quality areas to focus on when preparing for assessment and rating? Why? What is the role of leadership in a successful assessment and rating outcome?
Decisional questions (next steps)	What are you doing to maintain momentum and a focus on continuous quality improvement? What challenges you most about supporting educators to commit to continuous quality improvement/ committing to continuous quality improvement?

handwritten notes during these conversations to provide a record of responses including direct quotes.

Following the visit, each researcher will prepare a draft summary report of the case study. Handwritten field notes will be used by individual researchers to develop a summary case study report for each service including: a brief descriptive summary of the centre context; main study participants; views and experiences of the A&R process, including comparison between the first and the second A&R assessment experiences; perspectives on supportive factors and strategies; perspectives on challenges to quality improvement; the role of the QIP in quality improvement; and reflections on learnings from A&R. These reports will provide the focus for a facilitated process of collaborative thematic and content analysis discussion, and facilitated by an expert early childhood researcher acting as a 'critical friend', as described by Sumsion et al. (2013). The purpose of the *meta*-analysis review is to synthesise the findings across all case study services, drawing on the collective insights and experiences of the research team and different areas of expertise and jurisdictional perspectives. See Fig. 3 for the overall case study design.

3. Discussion

This article highlights and addresses the international goal to promote continuous quality improvement in ECEC services (OECD, 2015). While existing literature has focused on the contributors to quality in ECEC, to date, very little research has addressed the question of how improvement in quality is supported and sustained, particularly in countries that apply discursive, non-prescriptive approaches to the evaluating quality. In this paper, we describe the design for a comprehensive study of Australian ECEC services that will examine the systemic characteristics and the factors and strategies within the service that are associated with quality improvement. The three-phase design uses quantitative methods to analyse administrative records for ECEC services in a national data repository, qualitative methods to analyse documentary data provided to state/territory regulatory authorities during the NQS A&R process, and case study methodology to gather and analyse centre constraints, strategies and additional supports that promoted and assisted continuous quality improvement in context. The sequential nature of the design allows for findings from each phase to inform the analyses in subsequent phases, and the synthesis of data across all three phases.

We anticipate that our study will contribute new knowledge about systems-oriented approaches to quality improvement assessment in ECEC services. From Phase 1, we expect that the identified service characteristics will combine in different ways to influence quality improvement between the initial and the follow-up A&Rs. We will examine combinations not previously investigated, such as for-profit and not-for-profit services operated by standalone single operators and large providers, and located in communities with differing levels of socio-economic advantage. Given the QRIS process within Australia has been implemented for all ECEC services at the national level since 2012, we will investigate and control for state/territory jurisdictional effects that may influence re-assessment outcomes. We expect that our qualitative findings will identify the priority areas to support and sustain quality improvement as evidenced by improved A&R outcomes from the QIPs and A&R documents of services participating in Phase 2 and the involvement of services in Phase 3.

4. Conclusion

Analysis of national administrative data gathered as part of quality assessment and rating systems offers important opportunities for analysis (Sabol et al., 2013). We foresee that the outcomes of the study will provide information and insights on how to improve quality across diverse systems levels. The activation of this research by ACECQA, and their key role in supplying the data has enabled a rich opportunity for Australia's early childhood education sector to extend the discussion of quality improvement measures both locally and internationally. As a co-designed national research study, it will also enable new partnerships between government regulatory authorities and early childhood researchers.

5. Role of the funding source

ACECQA provided the financial support for the conduct of the research and has reviewed the manuscript and approved its submission for publication. ACECQA provided the dataset for quantitative analysis in Phase 1, and collaborated with state/territory regulatory authorities to approve the selected services identified for data collection in Phases 2 and 3. ACECQA also supported the provision and de-identification of Phase 2 documents prior to data analysis.

Author Contributions

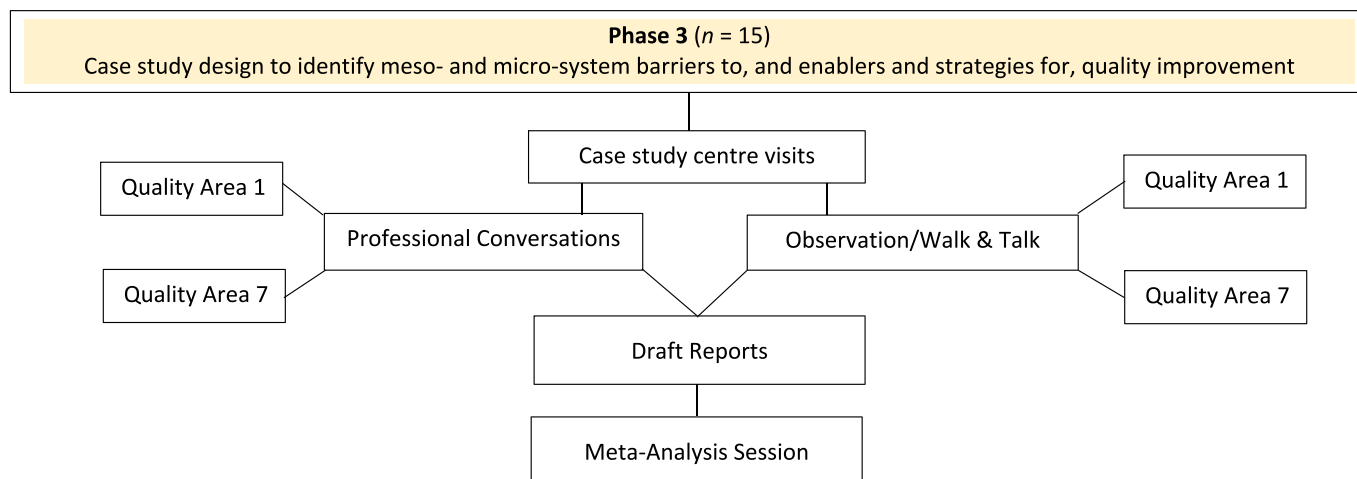All authors made a substantial contribution to the conception and

Fig. 3. Phase 3 Design.

design of the work; the acquisition of funding; contribution to the literature review; and the writing or revising the paper for important intellectual content. All authors have provided approval of the revised version to be published.

Linda Harrison took the lead role in writing and revising the paper.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The ACECQA dataset referred to in this paper are publicly available from the ACECQA national register, https://www.acecqa.gov.au/re-sources/national-registers

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