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Michelle Ronksley-Pavia
Griffith University, m.ronksley-pavia@griffith.edu.au

Georgina M. Barton
University of Southern Queensland, georgina.barton@usq.edu.au

Donna Pendergast
Griffith University, d.pendergast@griffith.edu.au

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Multiage Education: An Exploration of Advantages and Disadvantages through a Systematic Review of the Literature

Michelle Ronksley-Pavia
Donna Pendergast
Griffith University
Georgina Barton
University of Southern Queensland

Abstract: This systematic quantitative literature review explores existent empirical studies with an interest in multiage education in small school settings, with a specific focus on curriculum and pedagogy. Database searches were methodically conducted across six data bases. The inclusion criteria specified the need for empirical research, and publication dates ranged from 1997 to 2017. The article begins by setting the scene for the systematic review, exploring historical and international practices related to multiage complexities and terminology. Curriculum and pedagogical practices are explored to identify key advantages and disadvantages associated with a multiage approach in small school contexts.

Introduction

This systematic literature review aims to provide robust information about multiage education. It specifically shares information about curriculum and pedagogy, including advantages and disadvantages related to multiage education in small school settings. In order to conduct a systematic quantitative literature review about multiage education to establish an understanding of the phenomenon, it is crucial to clarify terminology being used in the field. The literature reveals a number of terms and definitions being used to describe and discuss multiage schooling. These terms include multi-age (multiage), multi-grade (multigrade), composite classes, stage classes, mixed-grade/age classes, non-graded schooling, and multi-classes, which confound research in this area. Cornish (2010) defines multiage as referring to any kind of mixed grade class usually created by philosophical choice. Classes of mixed age students are where “traditional grade designations do not apply” (Mulryan-Kyne, 2007, p. 501). Whereas multi-grade classes are usually created through necessity, for example low school enrolments. For the purpose of this article the term multiage classes is preferred as it is principally used in the literature in referring to a class formed by philosophical choice (Cornish, 2010), on the foundation of philosophical predilection of non-graded, non-age-based classes. We argue that alongside multiage education lies significant implications for curriculum and pedagogy that educators need to carefully consider in contexts such as small schools. This includes whether or not multiage would be beneficial or detrimental in different environments such as those circumscribed by, for example, culture and/or geography.

Systematic Quantitative Literature Review Methodology

Systematic quantitative literature review (SQLR) methodology is a method that systematically explores existent research literature to “produce a structured quantitative summary of the field”

(Pickering & Byrne, 2013, p. 3). This type of systematic review compliments existent literature by reviewing and exploring previous research to produce an overview in order to identify gaps and contribute to building a comprehensive picture of the field (Pickering & Byrne, 2013).

For this SQLR, an initial scan of published literature reviews and research articles that discussed multiage models of education, assisted in finding other relevant search terms in order to capture a more comprehensive range of articles reporting on research in this field. In order to review the empirical research on multiage schooling, searches were conducted across six main databases: Griffith University library journal database, *ProQuest*, *ERIC*, *Web of Science -Social Science Citation Index*, *Informat*, and *ScienceDirect*. The inclusion criteria were that the articles must have been published within the past 20 years (1997-2017), and qualitative, and/or quantitative methodologies were used. Keywords included *multiage schooling/education* (also *multi-age* with the hyphen), *multi-grade schooling/education* (also without the hyphen), *composite classes*, *non-graded schooling/education*, and these aforementioned terms, plus the term *small schools*. This preliminary search uncovered 339 articles. Figure 1 illustrates the methodology used in the SQLR process.

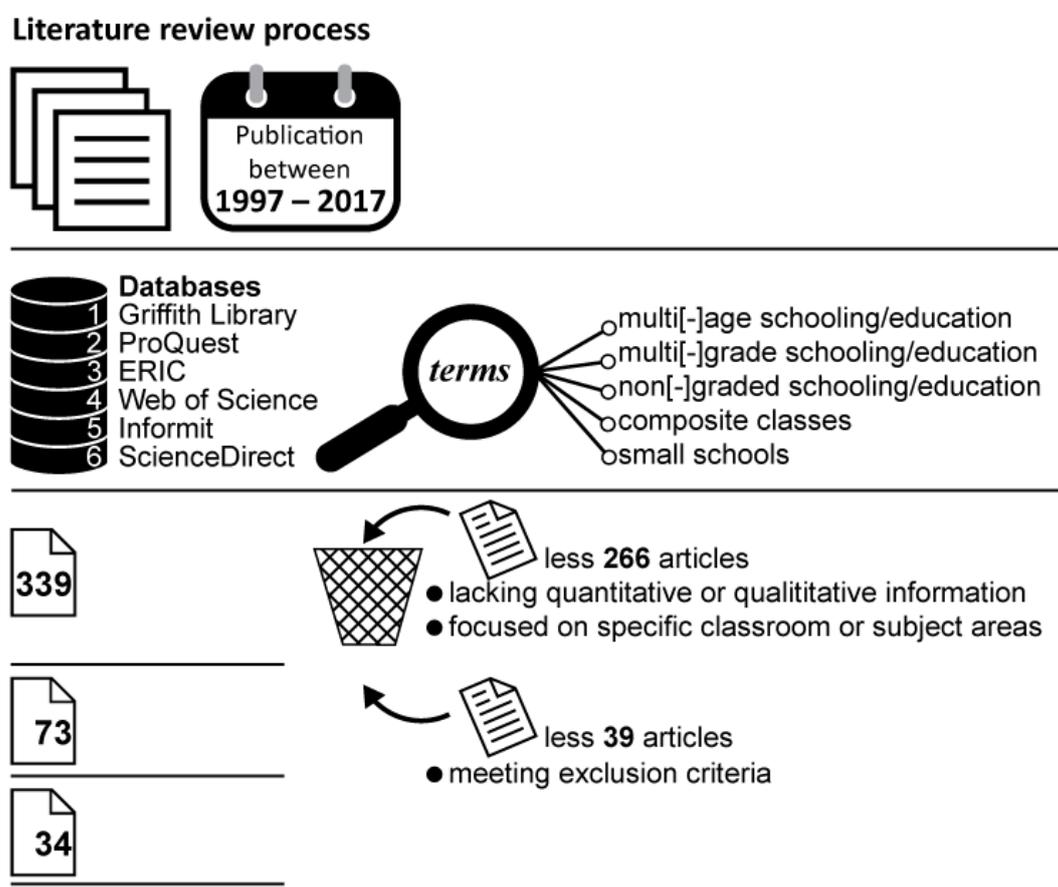


Figure 1: Literature review process

The abstracts of these articles were briefly reviewed according to the inclusion and exclusion criteria outlined below (Table 1). We excluded articles that reviewed specific classroom/subject areas and included those reporting on whole-school approaches to multiage education. We rejected articles that did not stipulate quantitative or qualitative information about multiage education as there was no way of definitively knowing if they were empirical research articles. After applying inclusion/exclusion criteria we narrowed the search down to 73 articles that were read in their entirety to determine their suitability for this review.

Exclusion Criteria	Inclusion Criteria
<ul style="list-style-type: none"> • Full text unavailable • Not empirical research • Not stipulated quantitative or qualitative research methods used • Not published in English, or with a translation available (as the authors' first language is English) • Excl. books/dissertations • Multiple articles about the same studies (usually by the same authors) • Reviewed specific classroom/subject areas, • Articles that only explored specific teaching areas (e.g. mathematics; Arts; Languages) • Articles that explored narrow pedagogical practices (e.g., assessment strategies) • Articles that reviewed specific teaching methods (e.g., ICT, computers) • Articles that were not specifically about small school settings 	<ul style="list-style-type: none"> • Articles reporting on whole-school approaches to multiage education in small school settings • Dates of articles – 1997-2017 • Must be published in English • Published empirical articles

Table 1: Search Parameters for the Review

The final selection included peer-reviewed research articles reporting on whole-school approaches to multiage education published between 1997 and 2017. Of the 73 articles, 39 articles were excluded according to the criteria. The remaining 34 were included.

Defining Key Terms

The literature review uncovered 34 empirical studies relating to multiage and multigrade schooling. Confusion across empirical studies between the terms multiage and multigrade, presents a complicated picture in discussions around mixed-age schooling, which is further compounded by contradictory definitions. This was particularly so where multigrade classes (predominantly formed by necessity), are referred to as mainly occurring in rural and remote areas (Mulryan-Kyne, 2007), whereas multiage classes (formed predominantly out of choice), are referred to as being mainly urban (Saqlain, 2015). Cornish (2010) stresses the need to have clearer definitions and more consistent use of terminology, stating that this can only benefit multiage and multi-grade schools. Of the 34 studies examined, the predominant terms were multiage and multi-grade schooling (with and without hyphens).

Cornish (2010) discussed two umbrella terms in referring to mixed-age classes; multiage, and multi-grade; where multiage refers to any type of mixed grade class usually created by choice, whereas multi-grade classes are usually created through necessity. Cornish (2010) suggests that the reason for creating these classes forms the major difference in the terminology used in describing them, and that those reasons are often varied. These variations which influence the creation of classes are generally economical, the driving forces being: total school enrolments; individual grade (year) level enrolments; number of teachers available; and the availability and effective use of resources (Cornish, 2010; Lindström & Lindahl, 2011; Saqlain, 2015).

A multi-grade class contains two or more grade (year) levels where one teacher has responsibility for teaching all of the children in that class, regardless of grade level. Multi-grade classes are generally found in rural and remote areas, where enrolments are low, and

consequently economic justifications do not support the employment of one teacher for each year level (Mulryan-Kyne, 2007). Hence, students in multi-grade classes normally keep their grade label, and their grade-level textbooks and curriculum, and the teacher instructs students in their grade-level programmes across a range of curriculum areas at the same time (Mulryan-Kyne, 2007).

Mulryan-Kyne (2007) suggests that multi-grade classes can be distinguished from multiage because the latter are classes of mixed-ages “in which traditional grade designations do not apply” (p. 501). Proponents of multiage approaches suggest it is “more developmentally appropriate than single-grade or multi-grade teaching, and hence, much better (Mulryan-Kyne, 2007, p. 501) with some researchers linking multiage classes to better academic and social outcomes (McEwan, 2008). Other researchers suggest that multiage classes do not disadvantage students academically and may benefit them socially and emotionally (Curriculum Directorate, 1997). However, Veenman (1995) suggests there are no significant differences between mono-grade, multi-grade, and multiage classrooms on students’ learning, while others suggest negative effects on students’ cognitive skills on cognitive or standardised test after being in multiage classes (Gerard, 2005; Lindström & Lindahl, 2011).

This creates a confusing picture about what education, such as those above, mean as other definitions for mixed-age classes include: family grouping; blends; non-graded classes; combined classes; composite classes; and stage classes (Cornish, 2010; Saqlain, 2015); all with slightly different variations on the multiage and multi-grade contexts. Further compounding the confusion around terminology is that the terms multiage and multi-grade are often used interchangeably in the literature, though Lindström and Lindahl (2011) use the term *mixed-age* in discussing this type of educational practice. Lindström and Lindahl deem mixed-age to be classes where students from different grades are mixed into one homogenous class mainly demographic/economical, or philosophical reasons to benefit students. However, there are some differences identified in the literature between the two terms and others, these will now be examined in turn.

Multiage Classes

Multiage education is mostly student-centred instead of being curriculum-centred (Stone, 2010). Student-centred in this context means a “focus on designing learning experiences that recognise and respond to the individual needs of each student” (Harris, Spina, Ehrich & Smeed, 2013, p. 3). Instead of focusing on how best to cover the curriculum, multiage schools that practice student-centred education work to understand and support student learning (Harris et al., 2013). For the most part, multiage classes often form part of larger mono-grade schools, which are mainly government-run (Cornish, 2010). In these environments, students are still informally classified by their *unofficial* grade level, predominantly for administrative purposes (Cornish, 2010; Veenman, 1995). In these schools, students still work along grade-specific curriculum requirements and year level activities and in some respects these classes could also be termed multigrade. Students are also occasionally and temporarily separated into age-based grade-levels (year levels) for some activities like school camps (Cornish, 2010). Multiage schooling is a strategy which enables schools to continue to serve their function in educating the local community when student enrolments are too low to support one or two teachers per grade level (Cornish, 2010).

Classroom practices in multiage settings ensure a clear focus on individual students where their individuality is recognised, and their individual learning preferences are taken into consideration. Thus, instead of creating a standardised classroom environment, students in multiage classes are taught according to their individual needs, interests and learning

preferences (Aina, 2001; Finegan, 2001) thus, enabling or at least creating an environment for enabling more personalised learning approaches for students. According to Aina (2001) a multiage class is deemed a “natural community of learners” (p. 219), where the focus is on the interactive quality of the teacher and students based on the assumption that the best way for children to learn is through active engagement with peers and their environment.

Completely non-graded schools are another type of multiage schooling practice which are usually privately (non-government) run. These are truly non-graded classes; there are no curriculum or assessment constraints, or other official connections or restrictions to prescribed grade level teaching practices (Cornish, 2010). In such non-graded, multiage classes students are not referred to by their grade level, but are categorised individually, with no official connection to a particular grade level. These classes enable teacher flexibility in the provision of what Cornish (2010) terms “developmentally appropriate” (p. 8) curriculum, which enables uninterrupted progression through learning. According to Cornish (2010), apart from these minor differences between multiage and non-graded classes, these factors “are differences of degree rather than kind.” (p. 8).

Multi-grade Classes

Multi-grade classes are usually formed out of necessity because of a shortage in personnel or students, or both, this can be the result of low school enrolments (Cornish, 2010; Veenman, 1995) often in rural areas. According to Proehl, Douglas, Elias, Johnson, and Westsmith (2013) multi-grade classes have been formed in rural communities and areas of sparse population because of dwindling or low enrolments. This is particularly the case in sparsely populated areas in countries like Australia (Cornish, 2010), Sweden (Aberg-Bengtsson, 2009), Turkey (Aksoy, 2008) and Finland (Kalaoja & Pietarinen, 2009).

In multi-grade settings, the teacher instructs classes which comprise students from two or more grades at the same time (Proehl et al., 2013). This pedagogical practice is said to be carried out principally for administrative purposes as a means of amalgamating staffing roles in an attempt to tackle dwindling enrolments and unequal class sizes (Proehl et al., 2013).

Composite Classes

Composite classes, like multi-grade classes, are formed out of necessity and are dependent on enrolment patterns in individual grade levels which vary from year to year. These types of classes are usually temporary for one school year; if they are being implemented on a permanent basis then they are termed multi-grade classes (Cornish, 2010). Composite classes are described here as they are mentioned in the literature. Composite classes are seen as a sub-set of multi-grade classes which frequently prevail in urban and suburban areas rather than in rural areas (Cornish, 2010). A composite class is usually made up of a combination of two grade levels where the students go into a single-grade class the following year (Cornish, 2010), and the majority of the school follows the mono-grade, age-based structure. The grade levels for these classes vary from year to year as enrolment patterns may vary, to ensure a standard class size. The class structure usually sees the students divided up according to their grade level and instructed on that basis rather than being taught as a whole class (Cornish, 2011). In the United States of America composite classes are called combination classes and in Canada, they are termed multi-level or multi-program classes (Cornish, 2010). Another term for composite classes is combination classes.

These are classes where students from two-year levels which are adjacent (e.g., K & 1, or 1 & 2), are grouped in one classroom with a single teacher, where quality of teaching and student outcomes are not adversely affected by this grouping (Thomas, 2012).

Stage Classes

In some areas of Australia (particularly in the state of New South Wales), another type of mixed-grade class has emerged called multi-stage, or stage classes (Cornish, 2010; Curriculum Directorate, 1997; New South Wales Government- Education & Communities, 2008). These stage classes are designed to match the way the syllabus is organised through stages of learning while keeping the mixed ability and mixed age component of the classes (Curriculum Directorate, 1997). Stage classes are organised around the stages of expected skill attainment, where Stage 1 classes are made up of Kindergarten, Year 1 and Year 2; Stage 2 classes are made up of Year 3 and 4 students; and Stage 3 classes are comprised of Year 5 and 6 students (Cornish, 2010; Curriculum Directorate, 1997). The primary purpose of organising classes through the stage model is to undo the limitations around mono-grade classes in order to deliver a learning approach based on developmental stages and in so doing encompass some of the associated benefits of multiage schooling (Curriculum Directorate, 1997), which will be explored below.

Stage classes extend the time that a student can take to achieve an educational outcome because the syllabus is not rigidly tied to grade level; they are more freely tied to stages (Cornish, 2010). In this way, the use of stage classes ensures that students who may not have attained expected outcomes for Stage 1 by the end of Year 1, have another year to do so and are consequently not labelled as behind (Cornish, 2010). As Cornish states using stage-based class structures moves away from the traditional mono-grade structure in recognition of the diversity of students' development. In this way a Year 2 student by age can be undertaking Stage 1 curriculum, similarly a Year 2 student by age can be undertaking Stage 2 or 3 curriculum. Thus, in any given stage class there will be students of different ages and stages. The philosophical underpinnings for this class type are similar to non-graded classes where students can achieve expected outcomes at different ages which remove the possibility of repeating a grade (Bassett, 1968; Cornish, 2010). Stage classes are expected to continue with the implementation of the Australian Curriculum (Board of Studies NSW, 2014; Jasper Road Public School, 2015).

Curriculum Related to Multiage Education

Curriculum across the studies were often not clearly described and frequently used to mean different things; where they were described the predominant programmes reflected prescribed curriculum from external sources, usually governmental (e.g., McEwan, 2008) and curriculum that was outcomes-based, particularly in New South Wales (Curriculum Directorate, 1997). Aina (2001) states that for multiage teachers to be able to adequately respond to students' needs, they need to move beyond standardised mono-grade curriculum, which is a hard task, and in practice not feasible (Saqlain, 2015). Other descriptions of curriculum being used in mixed-age settings included parallel curriculum, spiral curriculum, curriculum stagger, inquiry cycles, and some limited description of inter-disciplinary approaches (Hry-Beihammer & Hascher, 2015). The 34 studies showed confusion around understandings of the concept of curriculum; the following sections unpack the ways that

curriculum was encapsulated within the literature in an attempt to clarify the main types of curriculum being described.

Prescribed Curriculum

Curriculum that is prescribed through various policies is regarded as being the formal curriculum imposed at relevant policy levels (e.g., federal government in Australia). The review identified curriculum related to multiage education as encompassing a diversity of practices assoc. with implementing the prescribed curriculum.

Prescribed curriculum used in some mixed-age contexts was interpreted by teachers in a variety of ways from teacher-centred practices, to efforts to embrace more student-centred practices (e.g., active learning), however, teachers encountered a number of problems with using prescribed curriculum in these contexts. For example, Lingam (2007) conducted a qualitative study in a small Fijian, four teacher school of 110 students, where pupils were taught in four class groups (classes 1 & 2; 3 & 4; 5 & 6; and, 7 & 8); uncovering that most teachers in this small multi-class setting (teaching two or more year groups in primary classes), used prescribed curriculum and took a *chalk and talk* approach, with lessons dominated by the teachers. Lingam (2007) found that although the children did appear to engage in their work, this approach did not promote active learning, and further that students sitting for external exams (based on the prescribed curriculum), received greater in-class attention from their teachers than did other students.

In a South American study, McEwan (2008) explored rural multi-grade school reforms in three countries; Colombia, Chile and Guatemala. The reforms were meant to provide, then assess, teacher professional learning in multi-grade settings, while also providing specific instructional materials and promoting new instructional practices for small schools in rural areas. In many cases, the implementation of these reforms was hindered by schools not receiving prescribed instructional materials, and even in the best cases, multi-grade practices were not fully implemented. Despite this, McEwan's (2008) study showed consistent evidence of positive effects of multi-grade schooling on student achievement, although causal interpretation was limited between curriculum, practice and student outcomes. Lack of teacher professional learning (pre- and in-service) in multiage education was also identified as hindering reform, although this was not clearly linked to curriculum. Colombian results showed consistent positive effects on students' academic achievements, particularly in early primary, but less for non-academic outcomes.

Many issues around implementing prescribed curriculum were more about not being able to teach the curriculum properly using constructivist principles because many multi-grade students can already be well below grade level. Other issues impacting on the implementation of the prescribed curriculum were: teacher professional learning, with difficulties identified around skills, and skill acquisition for teachers, which impacted on the teaching-learning process; time constraints, such as lack of time for activities from the prescribed curriculum; and, assessment processes, which appeared meaningless given the diverse levels of student abilities.

Parallel and Spiral Curriculum – Opportunities and Challenges

A 2015 study by Hyry-Beihammer and Hascher, interviewed 18 multi-grade teachers from three different rural Austrian schools, and two small, rural Finnish schools (three teachers of three multiage groups), in order to elicit their teaching practices for small multi-

grade school settings. They found that student grouping was the key to organising and teaching multi-grade classes where the teachers organised their practice around *parallel curriculum*, *curriculum rotation* and *spiral curriculum*. Teachers in these small rural Austrian and Finnish schools used what was termed parallel curriculum where students studied the syllabus for their particular grade, so basing their teaching on the grade (year) level of individual students in their classes. All of the students shared the same theme for their work but studied their grade-level syllabus content. The problems with this were that the teachers had to plan and prepare separate materials for all of the grade levels in their multi-grade class (Barber, 2015). This meant a heavy workload for many of these multi-grade teachers, where planning was often hurried and difficult (Kalaoja & Pietarinen, 2009). Usually this practice of parallel curriculum led to time wasting while the teacher worked with one grade-level group, while the other grade levels waited for their turn (Barber, 2015). In the Hyry-Beihammer and Hascher (2015) study, parallel curriculum dominated mathematics and language teaching however, to avoid time wasting, the teachers in the Finnish schools set independent seat-work for one grade, while they worked with the other grade. In the Austrian schools, most teachers implemented *working plans* along with parallel curriculum, as a form of curriculum rotation, whereby students worked through their set work from their plan while the teacher worked with another grade.

In Main's (2008) Australian (Queensland) study of 24 teaching teams from four middle-school multiage classes (Years/Grades 6-9) and one team each from two P-12 multiage classes, she identified some year seven to nine teachers who used this type of curriculum. The teachers used parallel curriculum to align topics across the year levels in order to teach different subjects at the same time. In this study, all of the teachers reported limitations due to lack of understanding and training in developing differentiated curriculum. These teachers also identified an increase in their workload and a tendency to teach to the "middle" of the class (Main, 2008, p. 23), while some of the teachers described "a trial-and-error approach" (p. 23) to developing suitable curriculum for their multiage classes and in organising their classrooms. Main's (2008) study pointed to other external pressures on implementing curriculum in the classroom; pressures of preparing students to sit mandated tests that meant classes had to be physically and constantly divided in to year (grade) levels for teaching.

Spiral curriculum is based on constructivist principles in that key concepts learned in the early grades are then taught more in-depth and extended in the higher grades, with increasing levels of complexity. A spiral curriculum approach in multi-grade teaching practices, is where lessons across the grades share the same themes, but higher grades have more extended materials (Barber, 2015). By undertaking this curriculum practice students in mixed-age settings are able to work on the same theme/subject, however, the content is organised to address the individual stages of the students (Barber, 2015).

Outcomes-based Curriculum

In an Australian study, the New South Wales Curriculum Directorate (1997) surveyed 60 school principals and conducted case studies of 23 schools who had formed multiage classes based on philosophy (belief in educational and social benefits), and found that a curriculum based on outcomes encouraged schools to set up multiage classes. The syllabus arrangement was on stages rather than ages (Curriculum Directorate, 1997). Outcomes-based curriculum is purported to provide a clear view of students' academic growth because it is "set out in stages and supported by effective assessment and reporting procedures" and is thus, "contributing significantly to successful multiage operations" (p. 23). However, this

study is nearly 20 years old, and the curriculum in New South Wales and across Australia has been replaced by a progressive roll-out of the Australian National Curriculum from 2011 through to 2015 across the country (Australian Curriculum Assessment and Reporting Authority (ACARA), 2011). Cornish (2011) identified that the introduction of the national curriculum which is based firmly on grades—connected to national testing and reporting for each grade, may mean that mixed-age teachers would be compelled to separate grades to make sure that grade requirements and national testing requirements would be met, and to ensure that their students would not be at a disadvantage when it came to national testing. There was a general sense from Cornish (2011) that the implementation of the Australian Curriculum would mean that multiage classes would decline as the curriculum focus would be on ages rather than stages.

To address the concerns facing mixed-age teachers following the implementation of the Australian Curriculum, the Queensland Studies Authority (QSA) (2011) (and some other state educational authorities), developed curriculum plans. The QSA's multiage plan makes suggestions as to how mixed-age teachers can go about individualising the curriculum requirements for their specific contexts, and suggests that independent schools have more discretion in the implementation of the national curriculum than state schools (Queensland Studies Authority, 2011). A thorough unpacking of ways that the Australian Curriculum can be implemented in mixed-age settings is beyond the scope of this paper, it would make an interesting research project to see how multiage schools have gone about implementing the Australian Curriculum in their classrooms and an exploration of specific pedagogical practices that teachers have successfully employed in these contexts, both in rural and sub/urban settings.

Integrated Curriculum

Smit, Hyry-Beihammer, and Raggl (2015) briefly discussed integrated curriculum approaches in mixed-age and multiage settings. They suggested these settings were synonymous with integrated curriculum as an approach to teaching and learning, instead of utilising separate curriculum for each grade, they posited that integrated curriculum led to a more cohesive view for managing classroom heterogeneity and providing for individual students' needs. However, Hyry-Beihammer and Raggl (2015) do not define what they mean by integrated curriculum approaches, it can be anticipated that it would mean unifying all subjects and learning experiences for all students in mixed-age setting.

Hoffman (2003) examined four multiage teachers' instructional and organisational practices in intermediate elementary grades three to five. Three of the four teachers were from special education backgrounds, and all four were influential in introducing multiage programs in their school districts. Hoffman found that these multiage teachers created integrated curriculum, where students gained more understanding and meaning from their learning because content/subject areas were integrated, and meaningful connections were able to be made between them. Some teachers in Hoffman's study taught relevant knowledge and skills under umbrella themes across subject areas, making meaningful connections to students' lives, which were often integrated further with students' personal interests so that they were able to expand on initial concepts.

In a qualitative study of five Kindergarten to grade five multiage classes (two 6-7; two 8-9; and, one 10-12 grade classes), Heins, Tichenor, Coggins, and Hutchinson (2000) examined the implementation and effectiveness of multiage schooling in Florida (United States). They found that teachers usually planned their lessons as integrated units focusing on broad, real-world concepts. The focus on integrating subjects and linking them to students'

lives appears to be a feature of several of the multiage settings across studies (e.g., Smit et al., 2015; Hoffman, 2003; and, Heins et al., 2000). Similarly, Main's (2008) study found that two of the multiage schools used integrated curriculum; one solely used integrated curriculum approaches, and the other used New Basics and integrated curriculum.

Other Curriculum Approaches

Hyry-Beihammer and Hascher (2015) uncovered multiage teachers' practices of using *curriculum stagger*, in addition to parallel, rotation, and spiral curriculum described above. In the practice of curriculum stagger (also called subject stagger), the different grades in the mixed-age classroom study different subjects at the same time. Through this process, each grade is taught by the teacher separately while the other grades work on their own. This was not a common practice and was only occasionally mentioned by one Finnish and one Austrian teacher during the study.

Davenport's (1998) lab school qualitative study at Oregon University, examined teaching practices in seven multiage classrooms, across intermediary classes of seven, eight, and nine-year-old students. In this setting, teachers used *inquiry cycles* to organise curriculum that was predominantly student-driven. Davenport (1998) found that this inquiry cycle provided a framework for planning curriculum, which offered consistency to students' work, with extended time for "meaningful self-directed, learning" (p. 19). Davenport (1998) suggested that inquiry-based learning in this multiage context, enabled students to make discoveries with other students who were older or younger, thus, giving individual students opportunities for success in their learning, while engaging at their own pace. Davenport (1998) posited that this process enabled teachers to have more scope in meeting the individual needs of all of their students.

Pedagogy and the Teacher's Role in Multiage Schooling

The teacher's role across mixed-age settings described in the literature varied, mainly due to the rationale for creating the particular class structures, whether economical, and/or administrative, or for philosophical reasons. There was general agreement across the studies that to be able to teach successfully in mixed-age settings, teachers needed to be experienced, and well-trained in pedagogical practices specifically in these settings (e.g., grouping practices; differentiation), be well-supported (by schools and communities); able and willing to work collaboratively (such as team teaching, and group planning); be flexible; and be able to provide safe, supportive, and nurturing classroom environments (Barber, 2015; Davenport, 1998; Heins et al., 2000; Hoffman, 2002, 2003; Lingam, 2007; Main, 2008; Smit et al., 2015). In many ways teachers in small school settings needed the same expertise in pedagogy for supporting diverse learners, however what differed significantly for teachers in multiage small school contexts was the level of diversity across ages and stages of their students. Therefore, teachers in these contexts need supervised teaching experiences (by already experienced teachers), in multiage small-school settings. Furthermore, they needed to have developed strong pedagogy in areas such as differentiation, curriculum knowledge across year levels and content areas, as well as being adaptable.

Pedagogical Practices

Across the literature, there is general agreement that in order for multiage education to be successful a great deal of emphasis is placed on the teacher, their experience and ability in teaching in multiage settings (Mulryan-Kyne, 2004, 2007; Sag, 2009). This emphasis includes being able to successfully use a variety teaching strategies and grouping practices; therefore, it is vital that teachers have the ability to teach in this type of educational environment. It is acknowledged across the literature that multiage and multi-grade teaching, regardless of definition, are difficult practices and require specific teaching skills and support across schools that implement this practice (Ritland & Eighmy, 2012; Vanblaere & Devos, 2016) irrespective of rural or urban contexts.

To be able to adequately and successfully respond to students needs in a multiage classroom, teachers need to be able to develop and move beyond prescribed curriculum (Aina, 2001). This is needed to address the diversity of student content requirement at different ages and stages in multiage classrooms. However, in practice many teachers are unable to adequately plan, implement and assess multi-grade curriculum. The reasons for this identified in the literature are many and complex: including inadequate initial teacher education (Barber, 2015; Burnsa & Pachlerb, 2004; Heins et al., 2000; Lingam, 2007); limited in-service professional development (McEwan, 2008); limited resources (Kivunja & Sims, 2015); constraints of prescribed curriculum and assessments (Lingam, 2007); time and planning constraints (Hord, 2009; Lloyd, 1997; Mulryan-Kyne, 2007); limited support from school administrators, parents, colleagues and governments (Nawab & Baig, 2011; Sag, 2009); teacher isolation; and, geographical isolation (Aksoy, 2008).

Bailey, Werth, Allen and Sutherland (2016) articulate beneficial support from parents in a K-12 school's transition from mono-age classes to multiage classrooms, yet, uncertainty from teachers with elements like the perceived general ability of students to achieve well in multiage classes. These factors may be perceived as condemning multiage education to failure. Much of the literature acknowledges these distinct challenges that multiage education holds for teachers and emphasises that this type of education practice is generally more challenging than mono-grade teaching (Sag, 2009; Vanblaere & Devos, 2016). However, despite these inherent and ongoing challenges, when teachers, parents and students are willing and are teachers are well-trained, and experienced, and in the presence of supportive administrators and colleagues, then the benefits of multiage schooling can be immense particularly the social and emotional benefits (Barber, 2015; Çiftçi & Aysun Baykan, 2013; McEwan, 2008; Nawab & Baig, 2011; Ritland & Eighmy, 2012). Little (2005) describes some benefits as students developing better self-study skills; and, advanced cooperation and understanding across age groups, all of which result in enhanced wellbeing, collective ethics, concern and responsibility between students, particularly with interpersonal relationships. There is also a suggestion that the benefits of multiage education can include teachers being better able to more discretely organising enrichment and remediation activities for all levels of students than in monograde classes (Little, 2005).

Successful approaches discussed in the literature used across rural and urban contexts included grouping practices, collaborative learning approaches, process approaches to learning, flexible assessment practices, and combinations of these approaches, used in conjunction with curriculum practices, classroom layout (seating arrangements), and collaborative teacher planning. It is clear from the literature that these practices do not occur in isolation in successful multiage environments. Hoffman's (2003) study suggested grouping in multiage classroom was successful when undertaken heterogeneously, by age and other considerations (e.g., ability grouping—particularly suitable to gifted learners). This flexible grouping fits the philosophical underpinnings of multiage teaching, as it promotes cognitive,

and social and emotional growth, and can reduce behaviour problems (Hoffman, 2003), with Mulryan-Kyne (2004, 2005) adding increased on-task behaviour by students when grouped in this way, and when students' personal interests are taken into consideration with the curriculum being taught.

Collaborative learning approaches, such as social collaboration, and theme-based project collaboration, and other peer activities (e.g., peer helping, peer tutoring, cooperative learning) refers to many different practices where students learn from, and with their peers in mixed-age settings (Barber, 2015). Although this type of practice occurs in many mono-grade classrooms, it is the practices between ages and stages of students that is one of the key features of multiage classrooms and has been linked to more heightened social and emotional development in students who actively participate in these approaches (Barber, 2015; Veenman, 1995), as well as developing collective ethics across potential age barriers. This type of collaboration was facilitated by teachers in Hoffman's (2003) study, where students were seated and organised into heterogeneous groups to encouraged collaboration and cooperative work; as Hoffman states interaction and collaboration were not only encouraged by this arrangement, but expected. This practice encompasses holistic constructivist approaches to learning, where the emphasis is on teaching students rather than teaching curriculum (Heins et al., 2000).

The key messages from the literature for successful teaching and learning in multiage settings, are that teachers: need to be thoroughly inducted into the unique requirements of these contexts and adequately prepared through substantial professional development; need time for planning and teaching (Lloyd, 1997; Mulryan-Kyne, 2007; Saqlain, 2015); need to be well-organised (Saqlain, 2015); well-supported; and, have resources readily available (Kivunja & Sims, 2015). It is the combination and successful use of these factors, which facilitate the success or otherwise of multiage teaching. In terms of school leadership in small multiage schools, Halsey's (2011) research found that nearly half of the 683 principals surveyed stated they had received no preparation to become a school leader in a small multiage school setting. Therefore, there is a substantive gap in preparing school leaders and teachers for roles in these contexts.

Along with appropriate curriculum, and flexible, and appropriate pedagogical practices, the teaching practices are particularly important for mixed-age settings. Much of the research supports student-centred (Heins et al., 2000), holistic (Kivunja & Sims, 2015), hands-on, constructivist principles as being particularly significant in the success of mixed-age schooling (Stone, 2010). Quality of the classroom environment is key—a thorough implementation of philosophical principles of multiage education is needed for it to work (Heins et al., 2000) as well as the knowledge and skill of teachers who have been trained and have supervised experience working on small multiage contexts (Little, 2005; Mulryan-Kyne, 2007; Saqlain, 2015). Supportive environments are needed for both student learning and growth, and teacher development. This comes in part from the philosophical underpinnings and from support of multiage practices by the school administrators and leaders. Students need to be fully supported by teachers experienced with juggling the pedagogical practices (e.g., individualising learning), associated with these contexts and in terms of ongoing professional learning that is targeted to teaching in these unique contexts.

Implications: Advantages and Disadvantages of Multiage Schooling

The literature does not clearly agree on the advantages and disadvantages of multiage schooling, however, there is generally agreement that students' social and emotional growth is supported more in these settings than in mono-grade, and there is general acceptance that

the social opportunities in mixed-age settings facilitate this. This is through collaborative activities that support cross-age understanding and cooperation through systemically implemented pedagogy that develops student skills regardless of age and stage. What are still very contentious issues are the academic and cognitive advantages and disadvantages of mixed-age schooling. There is much disagreement in relation to academic outcomes, with some studies suggesting no differences, others suggesting lowered outcomes, and still others suggesting increased outcomes for students in mixed-age settings. There is a paucity in the literature regarding how both curriculum and pedagogy should be refined to meet the needs of students in diverse multiage contexts, that is, not all school environments will be the same yet, the literature points to homogenous approaches across these types of settings. The key to successful multiage schooling found through this exploration of the relevant literature, appears to be the quality of teaching approaches being used in individual settings. Such environments should determine the types of approaches being adopted in small schools particularly. For example, the geographical location, that is whether a school is urban or rural, or cultural context of the school, would influence choices made around curriculum and pedagogy. Cornish (2006) found that many teachers in multiage settings use traditional pedagogical practices, like teaching using whole class instruction, and teaching each grade separately. Very few teachers utilised the unique aspects of multiage settings to their advantage by utilising the mixed ages in the classroom to actively traverse the grade/age levels using integrated curriculum approaches (Smit et al., 2015). Conversely, the philosophical basis of multiage teaching approaches embraces mixed-age teaching, but it is not yet known if these methods are effectual for all types of small schools.

The normalisation of age-based grading in schools has created a tendency to view other modes of grouping students, like multiage schooling, as being inferior (Veenman, 1995). This causes some issues for parents and teachers, in that multiage classes are sometimes seen as not desirable placements for either students or teachers (Lindström & Lindahl, 2011; Veenman, 1995) and may differ depending on the cultural traditions within these communities. However, schools which embrace the practice of multiage philosophy; structure the classes to enhance students' social and emotional development, where students of different ages are in the same class over several years (Veenman, 1995), on the belief that this is an advantageous way to educate students, often reported more success. There is a belief that many schools that practice multiage teaching have been influenced by *family group* type learning of early childhood settings, particularly those of British infant schools where five to seven-year olds are all taught in the same classroom (Veenman, 1995). This suggests that it is the structuring and pedagogical practices of these classes in relation to their context, rather than the reasoning behind their formation, or their name/definition, which yields some possible positive cognitive and non-cognitive benefits overall.

In addition, within the literature on multiage education a focus on academic achievement as well as social and emotional outcomes, and whether these positively or negatively affect students is evident. Some studies have shed light on pedagogical practices as being key to successful student outcomes in multi-grade settings (e.g., McEwan, 2008) and other studies have suggested no effect (Corrigan, Hemmings, & Kay, 2006) or negative effects on academic outcomes (Gerard, 2005). However, there appears to be some agreement that the social and emotional benefits of multiage settings can be immense (Broome, 2009; Curriculum Directorate, 1997) given a high-quality classroom environment (Heins et al., 2000) and supportive community (Davenport, 1998). Much of the literature is in agreement that better pre-service and in-service professional learning is needed, that explicitly targets multiage pedagogical practices, in order to fully support teachers in doing their jobs in these unique environments (Barber, 2015). For example, the types of approaches that support personalised and individualised learning for students. Heins et al. (2000) went as far as to

state that starting a multiage program in a school, is a two-year process in order to effectively plan for high quality teaching and learning. It is critical that educators also consider the context in which they are working.

Given the prevalence of mixed-age teaching across the world and across differing contexts, rural and urban, we found there is limited research on the impact of pedagogical approaches on student outcomes (Quail & Smyth, 2014), nor on the types of effective pedagogical practices which teachers use when teaching students of different ages in the same classroom (Mulryan-Kyne, 2005). Therefore, we suggest more observational research and interviews involving students and teachers is needed.

Research that distinguishes between the cognitive outcomes of multiage classes is also needed, rather than just looking at mixed-age or multi-grade classes. However, Lindström and Lindahl (2011) did not distinguish between multiage and multi-grade settings because the effects of attending either class type could differ from context to context, an area they suggested needed further research. There have been limited opportunities for researchers to observe and understand pedagogical practices within multiage settings (Ritland & Eighmy, 2012) and consequently more research is needed in this area.

Another research gap observed by Barber (2015) relates to teachers' need for more knowledge on how to facilitate peer-learning and grouping practices which promote this, in order to improve students' "social pedagogic potential" (p. 107). This supports suggestions across the literature that more knowledge and professional development on how to use curriculum to support student heterogeneity in multiage classes is needed. Future research also needs to address selection bias for multiage classes as a threat to validity of studies when comparing academic achievements—sometimes higher achieving students are placed in multiage classes to "lighten the teaching burden" (p. 206) for teachers of these classes (Ong, Allison, & Haladyna, 2000).

As can be seen with this SQLR there are clear parameters limiting the literature included in this study, however, there are many advantages to multiage education. If all essential elements were in place for a rural or urban multiage school, then it would be feasible to predict that given the research across mixed-age settings outlined in this review, such a school could be successful in teaching its students, and in improving outcomes both academically, and social and emotionally. Aina (2001) outlines that in order for mixed-age schooling to be successful, there needs to be strong and coherent alignment between time for planning and teaching; management and administration; flexibility (in planning, teaching, and programming); practical initial teacher education and ongoing professional development; and, just as importantly ongoing open communication. Initial teacher education and ongoing professional learning are needed to address issues identified with regards to, for example, planning for students at different levels of learning and individualising education in these contexts.

The essential elements which need to be in place for small, rural and urban multiage schools to be successful have been outlined throughout this paper and include elements such as experienced well-educated and prepared teachers, who have had explicit professional learning in teaching students in mixed-age settings. International studies of mixed-age (multiage and multi-grade) schooling are of varying quality and have frequently generated contradictory results (Lindström & Lindahl, 2011). This means there is considerable need for good-quality, well-researched, and thoroughly contextualised studies, particularly in the context of small, rural and urban multiage schools in order to fully explore the academic, social-emotional, best teaching practices and environmental variables needed for teacher, student, and school success in these settings. With all the essential elements in place we could surmise that small rural and urban multiage school would have the capacity to advance

students' cognitive capacities, and academic achievements, and to thoroughly support the development of students' social-emotional capacities.

Limitations of the SQLR Process

In any methodology there are limitations. The SQLR method has many advantages including comprehensively mapping existent research in the field to produce a picture of what has been covered and gaps in the area. However, there are limitations to this method in that it does not set out to weigh studies for the rigour of their methodology (e.g., sample sizes and effect sizes) or their conclusions. The focus of a SQLR is to map the breadth of the literature rather than its depth, in this way focusing on what has been conducted in any given field (Pickering & Byrnes, 2013). There are other limitations, such as missing literature in other languages, missing literature that did not contain any of the search terms (Pickering & Byrnes, 2013), and contextual nuances in the setting for particular studies.

Conclusion

It is clear from this review of the literature that the terms multiage and multi-grade need to be used with precision given the diversity of contexts in which they are used, and that definitions need to be clear so that both teachers may implement consistent and coherent practices in schools. This clarification is also important so that future research show consistency and clarity around the definitions and contexts being explored to add depth and clear any confusion in the field. . As a result of the apparent amalgamation of these terms in many previous studies from varying contexts, there has been much confusion and misguidance as to the possible advantages and disadvantages of multiage schooling. Approaches to curriculum and pedagogy have potential to be as diverse as the schools in which they are implemented. Not all small multiage schools are the same and all represent diverse communities with differing needs. Therefore, more focused studies in specific contexts across the globe are needed in order to adequately address some of these issues. This literature review provides a solid foundation for multiage schools in exploring ways to improve educational outcomes in aspiring to become world-class education facilities

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