1-1-2023

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Olivia Johnston
Edith Cowan University

Becky Taylor

Johnston, O., & Taylor, R. (2023). A systematic literature review of between-class ability grouping in Australia: Enduring tensions, new directions. Issues in Educational Research, 33(1), 91-117. http://www.iier.org.au/iier33/johnston-abs.html

A systematic literature review of between-class ability grouping in Australia: Enduring tensions, new directions

Olivia Johnston
Edith Cowan University, Australia
Becky Taylor
UCL, United Kingdom

Ability grouping of students into separate classes within a school can be called 'between-class ability grouping'. This practice has persisted in Australia despite evidence that it is socially inequitable and does not improve academic outcomes. A systematic review of peer-reviewed literature about between-class ability grouping in Australia from 2012-2022 reveals only N=28 papers that meet the inclusion criteria. These papers are critiqued and synthesised into four main findings that characterise Australian research about between-class ability grouping from 2012-2022. The findings reveal a lack of substantive inquiry with most studies having limited scope and drawing on outdated or overly generalised data. International studies gloss over vital details about how between-class ability grouping is practised in Australia, while research conducted from within Australia reflects enduring tensions between gifted and talented, and social equity agendas. Further research that characterises the range of Australian grouping practices and their effects on students could be used to inform decisions about how to group students into classes in secondary schools.

Introduction

Most secondary schools in Australia choose to group students into classes based on their 'ability'. International survey data from PISA and TALIS suggest that 89 to 98% of secondary schools used some form of between-class ability grouping within their school contexts between 2015 and 2018 (Luschei & Jeong, 2018; OECD, 2017). The prevalence of the practice has endured in Australia, despite research evidence consistently showing that it does not improve academic outcomes (Francis et al., 2020; Steenbergen-Hu et al., 2016). Furthermore, social equity concerns about between-class ability grouping are evident, including segregation according to students' race and backgrounds, restricted educational opportunities for students in low 'ability' classes, and limited post-secondary pathways (Henry, 2015; Rix & Ingham, 2021). A strong tradition of research in the area has included Australian studies, but a review of the literature shows that little recent research has generated findings useful for the Australian context.

In Australia, a 'policy hiatus' about ability grouping has endured, with no national recommendations about between-class ability grouping practices in schools (Clarke, 2014; Jaremus et al., 2020). This silence has prevailed, despite continued international evidence cautioning educators against inflexible methods of class grouping (Archer et al., 2018; Francis et al., 2020). The lack of policy direction is contrary to our first national goal for education originally stated in the Melbourne Declaration (MYCEETA, 2008) and restated in the Alice Springs (Mbartwe) Education Declaration (DESE, 2019) that "the Australian education system promotes excellence and equity" (p. 3). This primary, agreed-upon goal

of Australian education stands in stark opposition to many practices of between-class ability grouping being used in schools, yet still very little explicit recommending about grouping practices for equity is being made in Australia. Schools make their own decisions about how to group students in Australia, and some evidence suggests that the vast majority of schools continue to choose to employ inflexible methods of between-class ability grouping (Johnston et al., 2022; Spina et al., 2021).

A review of the literature about between-class ability grouping in Australia is presented in this paper, focusing on the years 2012-2022 because they are most recent at the time of writing. The results of the review show that very little recent research within Australia can provide comprehensive findings to inform policy. A total of 28 studies published during the ten-year time frame are critiqued and synthesised in this paper, with four main findings generated from the systematic review.

The review finds that tensions between the social equity problems of ability grouping and the benefits for high 'ability' students have prevailed in the literature from Australia between 2012 and 2022. Research from before 2012 in Australia was largely critical of streaming students into 'ability' based classes and recommended schools decrease the use of practice (Commonwealth of Australia, 2008; Forgasz, 2010; Zevenbergen, 2001), which was consistent with international research about the disadvantages of the practice (Johnston & Wildy, 2016). However, Australian research also has a long history of literature advocating for ability grouping for gifted and talented students (Gross & Smith, 2021; Rogers, 1991). Findings from the literature review presented in this paper show that these conflicting narratives have continued to reflect differing research agendas in the literature. Since 2012, Australian studies about between-class ability grouping have used primarily qualitative methods to produce literature that is small in volume and scale, thus lacking nationally generalisable policy directives about between-class 'ability' grouping (Clarke, 2014; Spina, 2019).

This paper argues that the conflicting messages from the literature and the accompanying lack of policy has provided little direction for schools to make decisions about how to group their students into classes for learning. The result is educators use eclectic and locally developed methods for between-class 'ability' grouping (Clarke, 2014; Johnston & Wildy, 2018). Further research will benefit from being based upon a foundation of understanding about the between-class ability grouping environment in Australia, for which there is currently very little evidence. There is first a need to understand what practices are being employed by schools in Australia, with contextual evidence about how the various practices affect students' educational outcomes.

Defining between-class ability grouping

Reading the literature from Australian and international research requires understanding of how language and descriptions about between-class 'ability' grouping can differ. 'Ability' grouping itself is a contentious term, with some authors opting to use the terms 'attainment' grouping or 'achievement' grouping to avoid endorsing the notion of a pre-existing, innate 'ability' that determines a student's educational needs and pathways

(Francis et al., 2020; Hart et al., 2014). Thus, clarity about the meaning of the words 'ability' and 'between-class ability grouping' was established before the aims of this paper were pursued.

The word 'ability' and the phrase 'ability grouping' is used in this paper, but only in the sense that 'ability' is a social and cultural construct that is used to group students. Educators' notions about students' 'ability' are often based upon evaluations of, and assumptions about, students' prior knowledge and other educational advantages (Hart et al., 2014). Variance in the notion of 'ability' is reflected in difficulties developing consistent and equitable tools for identifying gifted and talented students who are conceptualised as 'high ability' (Thraves et al., 2021). The word 'ability' is connected to a long history of power and privilege, or lack thereof, rather than indication of fixed academic potential (Clarke, 2014; Hart et al., 2014). Scholars including Clarke (2014) and Hart et al. (2014) question how the notion of 'ability' is applied in education, suggesting that it is associated with deficit thinking about students and an educational economy of who gets what from whom. The term 'ability' is thus often placed in quotation marks throughout this paper to draw emphasis to the construct as contestable and problematic, especially when used to group students for learning.

'Ability' grouping can occur within classrooms, between-classrooms, or across-schools (Spina et al., 2021). This paper was written in the Australian context, where 'streaming' is a word used to describe all of types of within-school, between-class, ability grouping practices. For example, Australian people might use the description 'fully-streamed' in reference to an academically selective school; or they might discuss a 'top-stream' or 'bottom-stream' class within a school context. What is commonly called 'streaming' in Australia can present some confusion in international discussions, as many countries distinguish between 'streaming' and other between-class 'ability'-grouping practices. For example, researchers in the United Kingdom use 'streaming' to describe between-class 'ability' grouping where students are grouped together for *all or most* of their classes, which they distinguish from the practice of 'setting,' where students are grouped differently according to the subject (Chmielewski, 2014). In the United States and some European countries like the Netherlands, the term 'tracking' is used to describe grouping by class or school that is overtly connected with students' future pathways and uses different curricula according to track (Regan & Jesse, 2019; Van Houtte & Demanet, 2016). This varying language reflects different conceptualisations and contexts of between-class 'ability' grouping internationally.

The phrase 'between-class ability grouping' is chosen for this paper to describe the array of practices that separate students into different classes within a school according to their 'ability'. This phrase is selected to provide clarity for an international audience about what is being discussed here, which is characteristically different from other forms of grouping students by school or according to explicit vocational/academic pathway. In Australia, the national curriculum only requires students to select a vocational/academic pathway in Years 11 and 12 of secondary school, with some flexibility provided for future pathways even then. Yet the vast majority of Australian schools elect to group students into classes

by 'ability' before Year 11, which is referred to in this paper as 'between-class ability grouping.'

History of ability grouping in Australia

Ability grouping in Australia has a long tradition that has been inherited by our colonial ancestors. The school system in Australia was initially tiered vocationally, but followed the lead of British and American antecedents to transition to a comprehensive system in the mid-20th century (Campbell, 2014). Fully academic select schools were once common and still exist in Australia, but are less common in 2022 than in the past (Constantinou, 2022). Instead, most schools group by ability within schools using between-class ability grouping.

Mandatory education was introduced in Australia in the late 19th century, timing which coincided with the development and popularity of intelligence quotient (IQ) tests. At the time, testing of individuals' intelligence quotients (IQs) was believed to be an accurate measure of students' capacity to succeed at school. Many schools used IQ tests and their accompanying conceptualisations of static intelligence to group students by 'ability' for learning (Oakes, 1985; Rix & Ingham, 2021). The rise of intelligence testing in the early 20th century meant that students were often grouped for learning according to their intelligence scores in Australia (Rix & Ingham, 2021; Welner & Oakes, 1996). As Australia transitioned away from tiered schooling towards the introduction of large comprehensive schools, ability grouping within schools increased in prevalence (Rix & Ingham, 2021).

Today, IQ testing is subject to scrutiny in Australia and widely critiqued as indicative of social class and background rather than any genetically determined level of intelligence (Dweck, 2012). But historically, Australia inherited and implemented a regime of ability grouping based on conceptualising students as having fixed capacities for success at school (Rix & Ingham, 2021). Our current notions of Australia's education as a meritocracy where goals of equity are a priority (DESE, 2019; MYCEETA, 2008) are far removed from our educational ancestry, where the quality of education that could be accessed by students was overtly dependent on their social and cultural backgrounds.

Australian Indigenous people were disregarded by an education sector that continued to ignore their existence until the 1950s. Australian Indigenous people were excluded from mainstream education until the mid-20th century, when only 'half-caste' children were educated so that they could be ethnically cleansed through schooling. The White Australia policy allowed these 'half-caste' children to be taken them away from their parents to schools where education aimed to 'assimilate' them into white society. Mainstream Australian schools did not begin to include other Indigenous students until about 50 years ago, and deficits in Aboriginal education were only formally addressed with the *National Aboriginal Education Policy* (Hughes, 1988). Other nations were colonised/invaded, but Australia presents a distinct history of discrimination against Aboriginal peoples in education. This history is also distinct from the British education system upon which so much in Australia was modelled. Australian Indigenous people continue to achieve lower educational outcomes on average (*Closing the Gap*, 2018).

Given this history, Australia's confidence in a meritocratic education system is questionable. Australian students believe in equality of educational opportunity, but it seems a cultural myth, given evidence that socio-economic background, geographic location, ethnicity, gender and school sector are determinants of an individual's success at all levels of education in Australia (*Closing the Gap*, 2018; Hetherington, 2018). One consistent recommendation from the OECD and research for reducing inequality in educational outcomes is to reduce segregation in and across schools, by reducing the use of ability grouping (OECD, 2018; Perry, 2018).

Ability grouping research and policy in Australia before 2012

Historical research and limited policy about between-class ability grouping in Australia has recommended against the practice, because of associated equity concerns and the lack of evidence that the practice leads to improved student academic outcomes (Parliament of Australia, 2001; Zevenbergen, 2001). Research found that students in low ability classes were disadvantaged in groups where they received an inferior education with less educational opportunity than their peers in higher ability classes (Forgasz, 2010; Zevenbergen, 2001). The negative reported effects of ability grouping for students in lower ability classes included their having limitations placed on their educational trajectories and adopting detrimental self-fulfilling prophesies (Forgasz, 2010; Zevenbergen, 2001). However, this research stood in opposition to evidence from research about gifted and talented education, which supported the benefits of between-class ability grouping for students grouped into high 'ability' classes (Gross, 1999; Kronborg & Plunkett, 2006). Different research priorities and agendas were reflected in these contradictory findings about the benefits of between-class grouping practices for students in Australia.

Overall, research in Australia has been influenced by studies conducted in the United States and the United Kingdom, confirming that students' overall academic outcomes are not improved by between-class ability grouping (Hattie, 2009). In the 1980s, researchers agreed widely that Australian policy should not encourage the use of ability grouping, because the practice was unacceptable on ethical grounds (Emmett, 1983; Forgasz, 2010). Government funded inquiries continued to call for a nation-wide policy on 'ability' grouping that considered not only the benefits for gifted and talented students (Parliament of Australia, 2001), but also the potential inequities involved with the practice (Clarke & Clarke, 2008; Commonwealth of Australia, 2008). Lacking an official policy, schools were left to make their own decisions about how to group students for learning, with or without input from the available research evidence (Forgasz, 2010).

In 1984, researcher Herbert Marsh while working in Australia famously introduced the 'Big Fish, Little Pond' (BFLP) theory to the ability grouping literature, including the development of instruments for measuring students' academic self-concepts. The BFLP theory postulates that students use social comparison between themselves and their peers to inform their ideas about themselves as students. For between class ability-grouping, Marsh theorised that students streamed into lower ability classes would have better self-concepts than if they were not grouped because they could favourably compare their

academic success with their peers in those classes. On the other hand, students in higher ability classes would have worse self-concepts when grouped by ability because of more competitive peer reference groups for social comparison. The applicability of the theory to the context of student ability grouping in Australia was verified by Marsh and his associates (Marsh, 2005).

However, other Australian research identified how experiences of students in between-class ability groups could negate any positive effects of ability grouping for students in 'low' ability classes (Zevenbergen, 2001). Students in low ability classes saw themselves as less capable of studying mathematics in the future because of the *habitus* established in their classes, while students in higher ability classes had positive experiences of mathematics that led to their developing views of themselves as clever and capable students (Zevenbergen, 2005). Further research confirmed that students can be grouped into classes according to their behaviour rather than any objective measure of 'ability', so the students in the lower streams had more difficulty applying themselves in their learning than the students in the higher streams (Kilgour, 2006; Macqueen, 2010).

Research about between-class ability grouping from within Australia before 2012 was usually in the context of secondary mathematics classes (Forgasz, 2010; Kilgour, 2006; Zevenbergen, 2005). In 2008, the Mathematics Education Research Group of Australia did "not support ability grouping in the primary and middle years of schooling" (Commonwealth of Australia, 2008). Research about between-class ability grouping in other subjects was less common. Reviews of the literature focusing on Australia emphasised the concerns with the practice from international literature, but called for further research in the Australian context to explain why between-class ability grouping continued and how it affects students in specific Australian learning environments (Hattie, 2009; Johnston & Wildy, 2016). The literature review presented in this paper focused on research conducted in Australia from 2012-2022 to see if the pre-existing limitations of the literature before 2012 have been addressed.

Literature review methods

A systematic literature review of the literature about between-class ability grouping in Australia from 2012-2022 was conducted, aiming to critique and synthesise all research that provided answers to the following research question: *What findings have been reached by research conducted in Australia about between-class ability grouping from 2012-2022?* A critical analysis and synthesis of the research that answers this research question could begin to explain what further knowledge and understanding has been generated since 2012 and what future research is needed. The systematic review adheres to all guidelines for systematic reviews provided in the *PRISMA 2020* statement (Page et al., 2021). Figure 1 outlines the search methods applied, with further detail supplied in Appendices A and B.

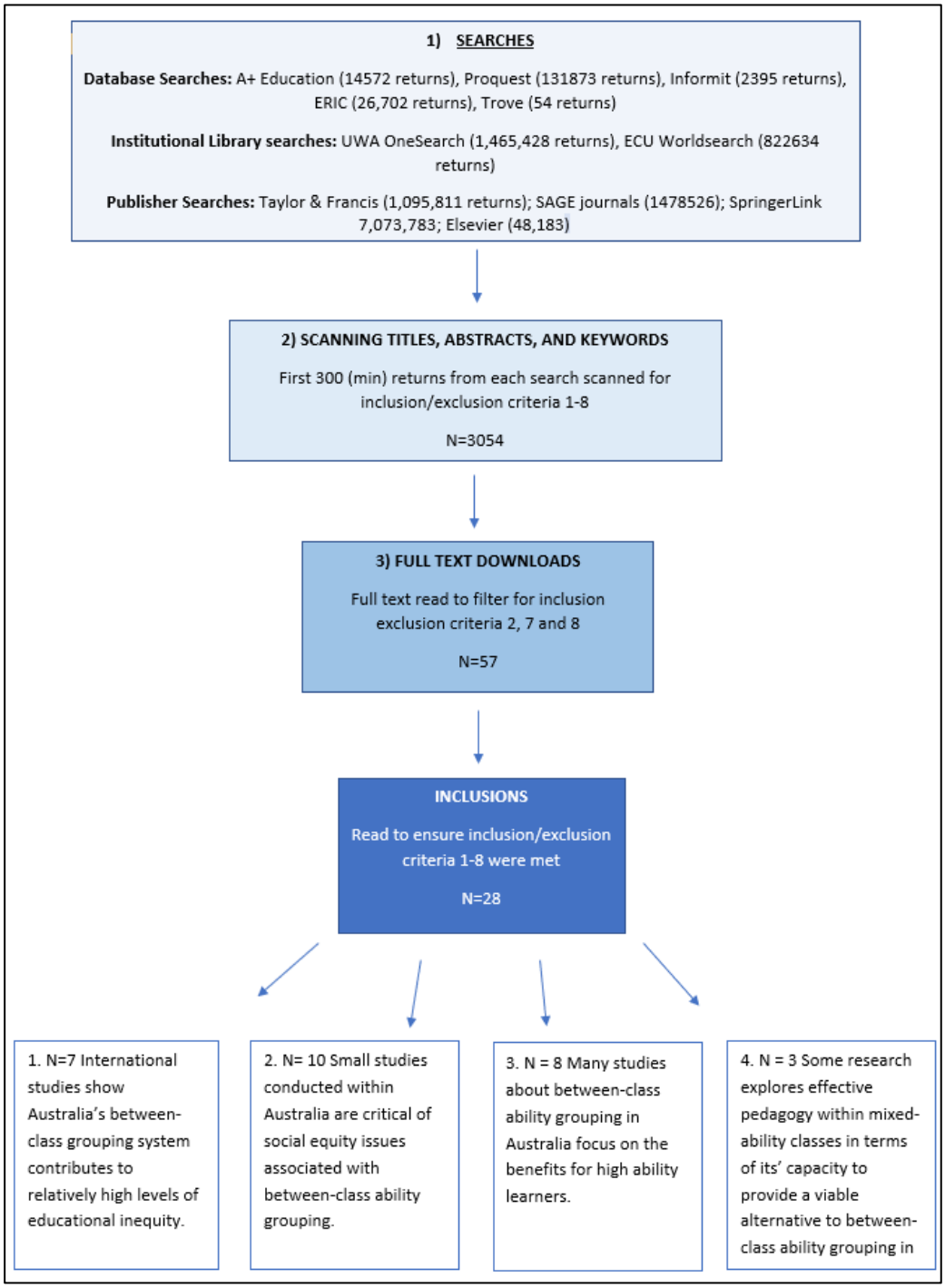

Figure 1: Summary diagram (use 'zoom in' function on web reader to facilitate reading)

The results of the review reveal that only 28 studies have been published between 2012 and 2022 that used data from Australia about between-class ability grouping. The included literature was gathered and synthesised using systematic and replicable methods. First, inclusion and exclusion criteria outlined in Appendix A were applied to research database searches occurring between December 2021 to April 2022. The searches were repeated by both authors of this paper in June 2022.

Once the first 300 search returns of titles, abstracts, and keywords had been scanned to see if the inclusion/exclusion criteria were met, 57 articles were downloaded for possible inclusion. Then, the literature was read and inclusion criteria 2, 6, 7, and 8 (Appendix A) were applied further. At this stage, it was common that studies were excluded because they were about within-class or across-school ability grouping or about contexts outside of Australia. For example, papers by researchers from Australian institutions doing ability grouping research in other countries, such as Kaya's (Kaya, 2015) research in Turkey and Wilkinson et al.'s (Wilkinson et al., 2016) research in the United Kingdom, were not included in this synthesis of the Australian literature. Literature reviews were also excluded (Cheeseman & Klooger, 2018) because only research including primary data collected within Australia met the inclusion criteria. A final search of journal publisher websites was conducted, returning 5 further papers that met the inclusion/exclusion criteria.

The systematic review audit trail is provided in Appendix B, which reports where, when, and with what search criterion the literature was retrieved. The search criterion included that the abstract, title, and keywords must contain both the words Australia(n) AND ability grouping OR streaming OR setting, between the dates 2012 and 2022 and peer reviewed. For some databases, different combinations of the keywords were used in the search, as indicated in the 'search terms' column in Appendix B. Six databases and four journal websites were searched, with Google Scholar used to verify that no publications had been missed.

The results of each search were organised and recorded in a summary table, details of which were added to as each return was critically reviewed and it was confirmed that all selection criteria had been met (Page et al., 2021). This literature summary table was used to record the analysis of the papers, including critical points about the research context, participants, methods, and findings. Thematic analysis of the papers was used to assign codes, which led to the synthesis of four main findings from the Australian literature from 2012-2022. The findings answer the research question and highlight how tensions have endured in the literature from Australia, with generally little substantive inquiry into the topic between 2012-2022.

Four findings and their proportionate representations in the literature are summarised in Table 1.

Table 1: Findings from literature review

Finding from literature synthesis		No. articles	% of articles
1.	International studies show Australia's between-class grouping system contributes to relatively high levels of educational inequity.	7	25%
2.	Small studies conducted within Australia are critical of social equity issues associated with between-class ability grouping.	10	36%
3.	Many studies about between-class ability grouping in Australia focus on the benefits for high ability learners.	8	28%
4.	Some research explores effective pedagogy within mixed-ability classes in terms of its capacity to provide a viable alternative to between-class ability grouping in Australia.	3	11%

Some trends regarding how and where the studies were conducted were also evident in the analysis of the literature. Wide-scale quantitative analysis of international testing and survey data was used by all of the studies about research finding 1, but the methods used for the studies that were used to reach research findings 2-3 were almost exclusively qualitative, with no quantitative studies and three mixed-methods studies. All peer reviewed journal publications regarding empirical research about between-class ability grouping conducted in Australia from 2012-2022 have been situated in the Eastern States (New South Wales, Victoria, Queensland, or Australian Capital Territory), with the only exception being from Western Australia by the first author of this paper. However, two of the four postgraduate research theses that met the inclusion criteria were conducted in Western Australia. The Northern Territory, Tasmania, and South Australia were represented only by the studies that drew upon international testing data (Chmielewski, 2014; Parker et al., 2021; Razer et al., 2018).

The four findings that were generated through the critical analysis and synthesis of the literature are outlined below. The report of the findings includes consideration of their relevance in terms of new knowledge and understanding about between-class ability grouping in Australia.

Findings

1. International studies show Australia's between-class grouping system contributes to relatively high levels of educational inequity

Educational inequity in outcomes for Australian students is relatively high compared to the international average for OECD countries with high gross domestic products (OECD, 2018; Schmidt et al., 2015). Some international comparative studies have explored the extent to which grouping practices can explain the pronounced relationship between socio-economic status (SES) and academic outcomes in Australia (Chmielewski, 2014; Parker et al., 2021). This research includes Australia in multi-national comparative studies that draw on international PISA, TIMMS, or TALIS data to provide evidence of the extent and associated outcomes of between-class ability grouping at the secondary level (Castejón & Zancajo, 2015; Luschei & Jeong, 2018). The studies conclude that Australia's

between-class ability grouping practices result in less equitable academic outcomes than countries where students are taught in more heterogeneous classes (Luschei & Jeong, 2018; Parker et al., 2021). However, the broad nature of both the questions and the scope of these international surveys presents challenges for meaningful interpretation of the data in a way that is specific to the Australian context.

Most of the international studies characterise the type of ability-grouping being used within countries to compare the effects of the various ways of grouping students on equity (Chmielewski, 2014). Australia is characterised as a country with high levels of between-class ability grouping, as opposed to more heterogenous grouping or systematised academic/vocational tracking (Chmielewski et al., 2013; Luschei & Jeong, 2018). Equity is reported in some studies in terms of the amount of low SES students that achieve highly at school (Castejón & Zancajo, 2015), the association between academic achievement and SES (Chmielewski, 2014), or the association between ethnicity/SES and academic achievement (Razer et al., 2018). The studies investigate different mechanisms through which this inequality manifests when between-class ability grouping is used, such as differing opportunities to learn and varying teacher quality (Castejón & Zancajo, 2015; Luschei & Jeong, 2018; Schmidt et al., 2015). For example, Luschei et al. (2018) found that between-class ability grouping leads to greater 'teacher sorting' within schools, where teachers with more experience, education, and self-reported efficacy teach classes with more advantaged and higher-achieving students. However, it is problematic to interpret how these findings apply specifically to Australia because they are generalised across education systems that include Australia, but without specific discussion of the data relevant to Australia.

International comparisons often gloss over vital contextual detail about how between-class ability grouping operates in Australia. For example, the Razer et al. (2018) analysis of PISA data found that Australian maths classes are less stratified than Israeli classes in Year 10, because the same content is more often taught in different ability groups in Australia. This contradicts with the premise of another comparison of opportunity to learn in 32 countries, where the reported use of between-class ability grouping is interpreted as meaning curriculum differentiation in various classes (Castejón & Zancajo, 2015). These two studies both use PISA data but draw on different survey questions and come to different conclusions about how students are grouped for learning into classes in Australian schools (Castejón & Zancajo, 2015; Razer et al., 2018). The Israeli study uses the presence of a national curriculum in Australia to conclude that students are not taught differing curriculum, but state curriculum authorities are responsible for what is taught in schools, and some provide differentiated curricula (Jaremus et al., 2020). Furthermore, policy about curriculum and how this policy is enacted in schools are two different matters, and some evidence suggests that different curricula are taught according to which between-class ability group is being taught in Australia (Johnston & Wildy, 2018; Spina, 2019). The problems in interpretation of the data reflect a lack of consideration for the between-class ability grouping context in Australia.

Including Australia when comparing countries with different kinds of grouping systems necessitates generalising Australia as using a certain 'type' of grouping system, yet different

case studies reflect that there is wide variation in Australian processes and decisions about grouping students into classes for learning (Johnston & Wildy, 2018; Macqueen, 2013; Spina, 2019). International comparisons label Australia as a country that tends to use 'course-by-course tracking' where students are tracked into different groups according to subject (Chmielewski et al., 2013; Parker et al., 2021) or an 'a-la-carte' system where schools make their own decisions about how to group students (Castejón & Zancajo, 2015; Luschei & Jeong, 2018). The latter of these descriptions is more accurate than the first for describing a country where each school makes its own decisions about how to group students for learning. Ironically, categorising Australia as an 'a-la-carte' system still generalises across the sweeping and important differences between schools' practices.

The lack of recognition of Australia's eclectic grouping practices makes international comparative studies less useful for generating knowledge applicable to the Australian context. However, some general trends in the findings about the consequences of grouping on equity are evident. Studies that have drawn on international testing data for comparison have all found that increased ability grouping leads to increased inequity in educational outcomes. Parker et al. (2021) confirmed that ability-based stratification of any kind always negatively impacts overall student self-concept. In addition, the more ability-based stratification in an education system, the greater the association between ability-group placement and student self-concept. Thus, across the 28 countries examined in Parker et al's (2021) study, students in lower mathematics ability groups had lower mathematics self-concepts and students in higher ability groups had higher mathematics self-concepts. The authors attributed this to the signals the students get about their ability when they are placed in ability-based classes (Parker et al., 2021). Furthermore, Chmielewski et al. (2013) showed that the 'course-by-course tracking' used by countries like Australia is associated with greater subject-specific academic self-concept effects. The authors hypothesised that this is because when students are only grouped for some classes, it encourages social comparison because they are exposed to other reference groups than when students are steamed for all classes (Chmielewski et al., 2013). These studies emphasise that between-class grouping practices in Australia tend to have negative effects on student academic self-concepts. The effect of between-class ability grouping on student self-concept is an important consideration for those making decisions about ability grouping, because high self-concept is associated with improved educational outcomes (Marsh, 2005).

The influence of students' background on achievement in Australia is higher than most countries compared in international studies, which can be interpreted to mean that Australia has an 'educational debt' to our disadvantaged students (Datnow & Park, 2018; Schmidt et al., 2015). All these studies recommend reduced ability stratification across schools and between-classes within schools for improved equity in educational outcomes (Castejón & Zancajo, 2015; Luschei & Jeong, 2018; Parker et al., 2021; Schmidt et al., 2015). However, these recommendations must be considered together with the fact that this research does not aim to specifically inform or understand the Australian educational context where between-class grouping practices vary widely. Studies that draw on international testing data make assumptions about Australia's grouping practices that have not been verified in empirical research and are overly generalised. Assumptions about

between class streaming methods being used in Australia are based on the PISA, TIMMS, or TALIS data from limited survey questions that gloss over important within-country differences.

Research conducted within Australia, about specific Australian learning contexts, is more useful for informing our national understanding of between-class ability grouping. This research is also critical of equity issues that stem from the use of between-class ability grouping, which is the second main finding from the literature review.

2. Small studies conducted within Australia are critical of social equity issues associated with between-class ability grouping

Australian research continues to present critical analyses of how between-class ability grouping is associated with social inequality, because students from disadvantaged backgrounds are segregated into lower streams than more privileged peers (Keeves et al., 2013). In the lower streamed classes, these students can receive a less rigorous education (Black, 2021). However, the quantity of research around this finding is less than that preceding the 2012-2022 timeframe covered in this literature review. From 2012-2022, ten publications about how between-class ability grouping can perpetuate social disadvantage in Australia have been published. These studies report examples of how teachers conceptualise and treat students differently according to students' class placement, where students are regarded as part of homogenous class groups with specific educational trajectories (Jaremus et al., 2020; Spina, 2019). Most of these studies explore how existing inequalities are exacerbated and reinforced within the Australian between-class tracking system, with one study from Keeves et al. (2015) providing an exception.

The research from Australia around equity issues includes findings about how teachers view students in streamed classes and treat them differently. Students' academic self-concepts and academic achievement can be affected by their teachers' thoughts and actions, for example when students grouped into lower ability classes adopt limited imagined futures (Black, 2021; Jaremus et al., 2020; Prieto & Dugar, 2017; Spina, 2019). Many educators who have participated in Australian studies believe that between-class streaming allows them to cater for a wider range of achievement, reflecting confusion about the difference between curriculum differentiation according to class group and differentiation according to individual student need (Mills et al., 2014; Tomlinson, 2017). Curriculum differentiation has been found by research to be inequitable, whereas classroom differentiation as conceptualised by Tomlinson (2017) enhances equity (Perry, 2016). Small, contextualised Australian studies have found that teaching in 'ability'-grouped classes can lead to teachers using less classroom differentiation in their practice than teachers of non-ability grouped classes (Johnston & Wildy, 2018; Macqueen, 2013). Some evidence from Australia has continued to show that between-class ability grouping does not improve students' academic outcomes (Macqueen, 2012). This research suggests that educators are holding onto beliefs that between-class ability grouping can help them meet students' educational needs.

Research in the Australian context from 2012 to 2022 also continues to find between-class ability grouping can be associated with educational inequity, consistent with pre-2012 findings from the literature. More recent findings stipulate that this association is complex and contingent on additional factors including how students are treated by their teachers within the class and how data is used to group students (Datnow & Park, 2018). Australian teachers and students both perceived that teachers of students in higher classes were more committed to the students in those classes, than students in the lower streams (Black, 2021; Spina, 2019), using between-class ability grouping to manage under-performance in previous years of schooling (Jaremus et al., 2020). Gender inequity may also follow, with a primary school-based study of Year 5 and 6 students who were 'regrouped' for reading and maths finding that boys were over-represented in lower ability groups (Macqueen, 2012; Macqueen, 2013). A study conducted in New South Wales about gender inequity in mathematics also found that many female students were precluded from high-level mathematics courses in upper secondary school by being streamed in lower secondary school (Jaremus et al., 2020).

However, some research findings about Canberra junior secondary school achievement and grouping data for science classes suggest that when other variables are sufficiently accounted for, schools that did not use between-class ability grouping actually *increased* the impact of students' socioeconomic status and educational aspirations on achievement in science (Keeves et al., 2013). The authors suggested that this could be because they have taken more sociological variables into account in their statistical analysis than other studies about ability grouping, by including class size and school level variance in achievement. Such findings contradict other Australian and international research and support the need for more studies within Australia that explore specific ability grouping practices in situ and their impact on students' educational outcomes. More recent data is needed, as the Keeve et al. (2013) publication draws on an outdated dataset from 1973. The only study in Australia that has collected any quantitative data specifically about between-class ability grouping was Macqueen's (2012, 2013).

These studies about equity issues associated with between-class ability grouping begin to consider additional layers of complexity associated with evaluation practices, such as differences in class size, teaching quality, and school contextual factors, such as intake area and fee-paying status (Black, 2021; Keeves et al., 2013). Teaching effectiveness also matters – a study found that effective teaching methods could be even more advantageous for students in lower streamed classes than higher grouped classes because their potential to improve was greater (Mobbs, 2016).

Australian research about equity and between-class ability grouping assumes prevalence of the practice. New qualitative data about between-class ability grouping is drawn upon to present theoretical arguments about why schools continue to group students by ability, despite the lack of evidence that the practice is beneficial for student educational outcomes and is associated with social inequity (Black, 2021; Clarke, 2014). Some academics renewed the call for clear guidelines about ability grouping because the 'policy hiatus' has allowed the practice to burgeon, creating ethical conflicts for educators practising in Australia (Clarke, 2014), but scarce policy recommendations have followed,

except very recent recommendations for the context of mathematics teaching in Victoria (Siemon, 2022). Critical theorists have associated the continued prevalence of between-class ability grouping with rising neoliberal sentiment in Australia (Black, 2021; Spina et al., 2021). For example, Black (2019) presents a critical ethnography of eleven students' retrospective reflections on their experiences of between-class ability grouping in twelve secondary schools. Her interpretation of the students' stories reveals how an agenda of productivity and competition was reinforced in the students' experiences of between-class ability grouping during their schooling, which reflected their 'underclass' status and pushed them into vocationally oriented pathways. Other researchers have made arguments consistent with Black's (2021) findings that between-class ability grouping serves to reinforce neoliberal agendas, particularly around school competition in a climate of high-stakes testing (Spina et al. 2021). These critical theorists present evidence-based arguments that between-class ability grouping is increasingly accepted by people in the Australian context because of the cultural focus on economic growth and competitive prosperity.

This research suggests that in the Australian context, educators might see ability grouping as a common-sense and culturally congruent approach, one that is 'naturalised' in our setting despite continued evidence about the disadvantages of between-class ability grouping for educational equity (Perry, 2016). For example, two case study Australian schools using between-class ability grouping were less sensitive to the problems of labelling and deficit thinking about students than schools have been historically (Spina, 2019). While it may be culturally acceptable, qualitative evidence from Australian contexts has continued to show that students in higher streamed classes are often offered more, and better, educational opportunities than students in lower streamed classes (Jaremus et al., 2020; Johnston & Wildy, 2018; Prieto & Dugar, 2017; Spina et al., 2021). A human rights perspective on between class ability grouping in Australia argues that it is a practice contrary to the international rights of the child to an education that "develops the child's personality, talents and mental and physical abilities to their full potential" (Spina et al., 2021, p. 124).

Recent advocacy of these same educational rights for gifted and talented students has been accompanied by Australian research about how educational needs of 'high ability' students can be met through between-class ability grouping.

3. Many studies about between-class ability grouping in Australia from 2012-2022 focus on the benefits for high-ability learners

Of the research conducted about between-class ability grouping in Australia that was published between 2012 and 2022, a significant proportion has been about between-class ability grouping for the gifted and talented, top-quartile, or high achieving students. This has created an enduring tension in the ability grouping research in Australia between social equity issues and benefits for gifted and talented learners, consistent with the pre-2012 literature (Gallagher et al., 2012; Noor, 2018). The findings from this research continue to lend support for grouping for students identified as high 'ability', but also begins to explore ways that the needs of these students have been met effectively in mixed-ability environments.

Many of the studies about grouping high 'ability' students tout the benefits of between-class grouping for gifted and talented students for their self-esteem and their educational attainment (Gross & Smith, 2021; Roth, 2017). An inherent problem in this research is the lack of consistency in literature defining 'gifted and talented' students. Research about between-class ability grouping in Australia does not thoroughly explore the differences and overlaps between 'high achievers' and 'gifted and talented' (Thraves et al., 2021). Many of these studies use the placement of students in high ability classes, or top percentiles of achievement history, as identifiers of 'high achieving'; 'high ability'; 'gifted'; 'academically gifted'; or 'gifted and talented students' (Gross & Smith, 2021; Noor, 2018; Roth, 2017; Vialle et al., 2015).

Studies about students, teachers, and parents' perspectives of between-class ability grouping for students identified as 'gifted and talented' in Australia are favourable towards the practice, because of perceptions that it benefits students. Interviews with parents of upper primary students in Queensland, New South Wales, and Western Australia were conducted to generate findings that parents of gifted and talented students see between-class ability grouping as beneficial for their children's learning (Gallagher et al., 2012; Noor, 2018; Roth, 2017). The parents experienced how between-class ability grouping met their children's socio-emotional needs by grouping them with 'like-minded' peers and that it also met their academic needs by challenging them and allowing them to learn at a more suitable pace (Gallagher et al., 2012; Noor, 2018; Roth, 2017). Students also reported that between-class ability grouping in upper-primary school in New South Wales 'opportunity classes' or Western Australia's 'GATE' (Gifted and Talented Education) classes in the final stages of primary school allowed them to achieve more academically than if they had not been grouped in this way (Noor, 2018; Roth, 2017). Such studies abut Australian educational stakeholders' perspectives show that many students grouped into higher ability classes experience between-class ability grouping as leading to better social and academic outcomes.

Other research about between-class ability grouping in Australia published between 2012 and 2022 has explored the self-esteem of high 'ability' students who have been grouped for learning, finding some evidence of a connection between improved self-esteem for gifted and talented students and forms of between-class ability grouping (Gross & Smith, 2021; Vialle et al., 2015). Gross and Smith (2021) found that Year 7 students in New South Wales who were accelerated for learning within a selective school, were protected from the self-esteem 'dip' that occurred for other Year 7 students when starting secondary school. However, other research found that when students were grouped heterogeneously for learning, the self-esteem of gifted and talented students was not different from other secondary students in an academic select school (Vialle et al., 2015). The academic achievement of gifted and talented students was not related to their self-esteem in the academically select school as the students in top classes continued to obtain better academic outcomes than students in lower classes (Vialle et al., 2015). These studies longitudinally measured the construct of 'self-esteem' using tools such as the 'Rosenberg self-esteem scale' and the 'Coopersmith self-esteem inventory' (Gross & Smith, 2021; Vialle et al., 2015), both applying tools that were designed for different contexts and drawing data about gifted and talented students from historical wide-scale studies in

Australia. The findings suggest that gifted and talented students' self-esteem can be improved when between-class ability grouping is used in some contexts, but further research is required to explore this suggestion.

The research from Australia from 2012-2022 about between-class ability grouping for 'high' ability students does not provide evidence about the benefits of the practice for *all* students. Although students and parents have reported that students experience affective and academic benefits (Gallagher et al., 2012; Noor, 2018; Roth, 2017), there is very little further evidence to support these experiences being more widespread to students across the 'ability' range. This finding is surprising, given that a high proportion of Australian research about ability grouping since 2012 has continued to focus on high 'ability' students. Little evolution has occurred since the pre-2012 tension between the advantages of grouping for high 'ability' students and social equity concerns for students overall, with enduring competing agendas that seldom consider each other's perspectives.

There has been a new interest in effectively meeting high 'ability' students' learning needs in mixed-ability classes, which is a topic not developed in the Australian literature before 2012.

4. Some research contrasts pedagogy used by teachers within between-class ability grouped classes with pedagogy used by teachers in mixed-ability classes

Some studies about high 'ability' students in Australia since 2012 have begun to consider if, and how these students' learning needs can be met without between-class ability grouping. Research in this new area considers ways that effective differentiation can be implemented to cater for all students' needs in mixed ability classes. High 'ability' students in mixed-'ability' classes can experience teachers as not effectively differentiating by pace, depth, or complexity of learning, even when other students in the class perceive the teacher to be differentiating effectively (Ireland et al., 2020).

The research in this area highlights that differentiation in mixed ability classes is challenging for teachers, but that effective strategies exist. One study on health teachers found that they wanted more education, time, and space to plan to differentiate for high 'ability' students in mixed ability classes (Pedersen & Kronborg, 2014). Time invested is worthwhile, as planning for learner diversity and having high expectations for all students leads to growth for high 'ability' students (Berry, 2015). When effective pedagogies for teaching science reasoning were introduced in two grouped classes, the lower ability class achieved even more significant academic gains than a higher ability class (Mobbs, 2016). These findings suggest that it is pedagogy that matters, because pedagogy shapes students' results whether they are grouped for learning or not. One author conducted a self-study of her practice of incorporating challenging tasks in her heterogeneous Year 7 mathematics classes, finding that students' self-belief was improved when they were given opportunities to engage in challenging learning (Perkins, 2016). The teacher related her classes' improved self-belief and growth mindset to research about between-class ability grouping

and the challenges of disentangling the practice from traditional ways of teaching mathematics.

Successful pedagogies for teaching in mixed ability environments is an area of research that has evolved in Australia from 2012-2022, which might suggest increasing questioning about naturalised habits of between-class ability grouping in Australia.

Discussion and conclusions

The four findings from the literature review show that the historical tension in research about ability grouping between social equity research and research about gifted and talented education has endured from 2012-2022. Social equity concerns around ability grouping are the main area of findings about ability grouping in Australia, both in international comparisons and Australia-specific studies (Black, 2021; Parker et al., 2021). At the same time, several studies have continued to generate findings in support of the benefits of between-class ability grouping for gifted and talented and/or high achieving students (Gallagher et al., 2012; Gross & Smith, 2021). Emerging research about meeting students' needs in the context of mixed-ability classes reflects how between-class ability grouping is not the only option for ensuring that gifted and talented students reach their educational potential (Perkins, 2016).

Literature about effective pedagogy for learners within mixed-ability learning environments suggests an alternative to between-class ability grouping, and this may be an area that continues to evolve in Australian research. Such research can draw on already well-established literature about effective within-class differentiation that does not employ inflexible grouping methods (Mills et al., 2014; Tomlinson, 2017). This avenue for future research could begin to reconcile the historically prevalent tensions between the advantages of grouping for gifted and talented students and their teachers, within the literature that emphasises social equity issues arising from between-class ability grouping. However, such a research program would also face increased acceptance of between-class ability grouping in Australian schools because of increased competition and productivity agendas (Black, 2021; Spina, 2019).

There are some missing items in the findings of the literature review, including that very little national research has explored the relationship between students' self-concepts and between-class ability grouping since 2012, despite this being a theme before 2012 in Australia and in international publications (Johnston & Wildy, 2016; Steenbergen-Hu et al., 2016). Perkins' (2016) study suggested increased self-belief in Year 7 students taught with effective pedagogies, and some of the international research has confirmed that countries under study, including Australia, use between-class ability grouping practices that affect students' academic self-concepts negatively (Chmielewski et al., 2013; Parker et al., 2021). Yet none of this research is contextualised in Australia and relies on generalised measures of grouping and self-concept applied across many countries in international tests like PISA.

Most glaring is the lack of any quantitative evidence about grouping practices in Australia and their effects on educational outcomes for Australian students. In depth studies can produce meaningful and significant answers to many research questions, but there are many unanswered questions about ability grouping that would be best addressed through quantitative research. Foundational research questions like: 'What between class grouping practices are being used in Australian schools?' and 'What relationship is there between grouping practices and student demographics and outcomes?', have not been posed in the Australian context but seem pivotal to provide context for future research about between-class ability grouping in this country.

Almost all of the quantitative studies about ability grouping in Australia, both international comparisons and the few in domestic research (Gross & Smith, 2021; Keeves et al., 2013), have drawn upon existing and outdated datasets to generate findings about ability grouping. The result is that variables used to reach findings about ability grouping in the Australian context are not based on data from research designed to collect information about ability grouping or about the Australian context specifically. Even the studies about ability-grouping in Australia that draw on Australian data interpret already existing data that was collected for other purposes, rather than drawing on data that was collected for research about ability-grouping specifically. Aside from Macqueen's (2012, 2013) research, no findings drawing on quantitative data specifically about ability grouping in Australian contexts have been published since 2012.

The review of the literature about between-class ability grouping in Australia shows that there is a need for modern data from Australia collected specifically for research about between-class ability grouping. Such data could generate research findings more representative of the various populations that comprise Australia and provide a foundation from which future research can draw. International testing data glosses over the within-country differences in how between-class ability grouping is implemented in Australia, where each school makes their own decisions about if and how to group students into classes for learning. Further research that considers the range of grouping practices being used might be able to reveal findings specific to the Australian context. Such findings could be used to inform policy development about between-class ability grouping processes, or by schools, to inform the practices that they decide upon for their students.

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Appendix A: Table 2: Inclusion and exclusion criteria

Inclusion criteria		Exclusion criteria	Application method
1.	Published from 2012 to 2022	Published before 2012 or after Jan 2022	Search filters for these dates were applied
2.	Primary research (includes qualitative, quantitative or mixed methods studies)	Secondary research (includes literature reviews, theoretical papers, commentaries or speculations without empirical data)	The abstract of search returned papers were scanned to ensure that the literature reported on primary research. Further critical reading of the paper confirmed primary research was being reported on and secondary research was excluded.
3.	Peer-reviewed (Includes articles in peer-reviewed journals, book chapters or theses)	Not peer-reviewed	Data-base searches included only peer reviewed returns and journal standards were verified via the journal websites. Australia's online National Library Database *Trove* was used to search for higher-degree-by-research theses. [https://trove.nla.gov.au/]
4.	The keywords 'Australia(n)' and 'ability-grouping' or 'streaming' or 'setting' or 'tracking' both appear in either the title, abstract, or keywords.	Neither of the keywords appear in the title, abstract or keywords	All search result titles, abstracts, and keywords were read to see if these terms were included
5.	Article published in English	Article/thesis published in a language other than English	No returned papers were in another language
6.	Full text available	Full text not available	Where full texts were not available through the first search, two university library search tools were used to verify the availability of the literature.
7.	Data collected within Australia	Data collected overseas and does not include Australia	Where all above criteria were met, the full paper was read to confirm that the article draws on data that was collected in Australia.
8.	Research included findings about between-class ability grouping	Research did not include findings about between-class ability grouping	Where all of the above criteria were met, the full paper was read to confirm that the findings were about between-class streaming rather than other forms of ability grouping

Appendix B: Table 3: Retrieval details

Database	Dates search and repeat searches	Searches, terms, and criteria	No. inclu-sions	Citations of inclusions
A+ Education	24/11/21; 13/6/22	Australia* AND All fields: 'ability grouping' OR All fields: streaming OR All fields: setting OR All fields: tracking AND Limit to: Peer reviewed AND Publication date: (01/01/2012 TO 31/12/2022)	5	(Gallagher et al., 2012; Macqueen, 2012; Mobbs, 2016; Pedersen & Kronborg, 2014; Vialle et al., 2015
Proquest Central	5/12/21; 13/6/22	1. noft(Australia*) AND noft("ability grouping") OR noft(tracking) OR noft(streaming) OR noft(setting) 2012-2022 and peer-reviewed 2. noft(Australia*) AND noft("ability grouping") Date range applied 2012-2022 and peer-reviewed	5	Clarke, 2014; Johnston & Wildy, 2018; Parker et al., 2021; Razer et al., 2018; Spina, 2019
Informit	5/12/21; 13/6/22	1. All fields: Australia* AND All fields: 'ability grouping' OR All fields: tracking OR All fields: streaming AND Limit to: Peer reviewed AND Publication date: (01/01/2012 TO 31/12/2022) 2. Australia* AND All fields: 'ability grouping' AND Limit to: Peer reviewed AND Publication date: (01/01/2012 TO 31/12/2022)	4	Ireland et al., 2020; Keeves et al., 2013; Perkins, 2016; Prieto & Dugar, 2017
ERIC	22/1/2022; 13/6/22	Australia(?) AND "ability grouping" OR streaming OR setting OR tracking	0	
Institutional database search (ECU Worldsearch)	22/1/2022; 13/6/22	1.Australia* AND "ability grouping" OR "tracking" OR "streaming" OR "setting" AND (eu:Peerreviewed) AND (yr:2012..2022) 2.kw:(Australia*) AND kw:("ability+grouping") AND (eu:Peerreviewed) AND (yr:2012..2022)	2	Datnow & Park, 2018; Macqueen, 2013
Trove	26/1/2022; 13/6/22	Australia* AND "ability grouping" 2012-2022; research - thesis	4	Berry, 2015; Black, 2021; Noor, 2018; Roth, 2017
Google Scholar, UWA OneSearch, (checking for missing)	3/2/2022; 13/6/22	1. Australia* AND "ability grouping" OR streaming OR setting OR tracking; Custom range: 2012-2022; Peer-reviewed 2. Australia* AND "ability grouping"	3	Chmielewski, 2014; Gross & Smith, 2021; Spina et al., 2021

Publisher searches: Taylor & Francis; SAGE journals; SpringerLink; Elsevier	30/4/2022	[All: australia] AND [All: "ability grouping"] AND [All: streaming] AND [All: tracking] AND [Publication date: (01/01/2012 TO 31/12/2022)]	5	Castejón & Zancajo, 2015; Chmielewski et al., 2013; Jaremus et al., 2020; Luschei & Jeong, 2018; Schmidt et al., 2015

Dr Olivia Johnston is a lecturer in the School of Education at Edith Cowan University, Western Australia. She has completed two previous research studies on between-class ability grouping in Australian secondary schools. Her work around the topic has had impact on educational research and practice in Australia, with mentions across multiple media outlets and citations from five policy documents. Olivia is an Early Career Researcher who completed her PhD under the Australian Research Training Program, graduating in 2021 with multiple awards acknowledging the high calibre of her doctoral research. She also has more than eight years' experience as a secondary school teacher, and has conducted research with young people to convey their voices back to their educators.
ORCID: https://orcid.org/0000-0003-3314-9031
Email: o.johnston@ecu.edu.au

Dr Becky Taylor is Principal Research Fellow in the Centre for Teachers and Teaching Research at IOE, UCL's Faculty of Education and Society, London, UK. She is co-PI of The Student Grouping Study, a large-scale naturalistic study of attainment grouping in mathematics in English secondary schools. Previously she was PI of the Secondary School Grouping Survey and project manager and researcher practitioner for the Best Practice in Grouping Students study. Becky has extensive experience of designing and conducting surveys with teachers and students in England, and in leading mixed-methods research in the area of attainment grouping.
ORCID: https://orcid.org/0000-0002-7257-4463
Email: becky.taylor@ucl.ac.uk

Please cite as: Johnston, O. & Taylor, B. (2023). A systematic literature review of between-class ability grouping in Australia: Enduring tensions, new directions. *Issues in Educational Research*, 33(1), 91-117. http://www.iier.org.au/iier33/johnston.pdf