Navigating the muddy waters of the research into single sex classrooms in co-educational middle years settings

Leanne Crosswell & Lisa Hunter

Abstract

Establishing single sex classes within co-educational sites is an option that Australian schools are again exploring. To date Australia has experienced three ‘waves’ of interest in establishing single sex classes, the first focused on equitable education opportunities for girls (Alloway & Gilbert, 1997), the second centered on boys’ literacy and engagement (Gilbert & Gilbert, 1998) and this current wave focuses on perceived difference between the sexes in co-educational classrooms (Protheroe, 2009; Gurian, Stevens & Daniels, 2009). With the intersection of middle schooling movement, focusing on learner centered classrooms (Pendergast & Bahr, 2010) and current educational agendas aimed at improving student performance and measurable learning outcomes (Ministerial Council on Education, Employment, Training and Youth Affairs, 2008), it is understandable that schools are exploring such student grouping options. However, after thirty years of international research into the efficacy of single sex classes in co-educational settings, the results still remain unclear. This paper seeks to navigate the ‘muddy waters’ of this body of research and suggests a framework to help guide school communities through the decision-making process associated with considering single sex classes.
Introduction
This paper explores and summarizes the research on the efficacy of single sex classes (SSC) in co-educational settings. Public interest has been reignited on the topic of implementation of single sex classes in co-educational schools. Internationally there has been dramatic increase in the implementation of single sex classes, particularly in the U.S. where the Department of Education published new rules allowing for single-sex classes (Vanze, 2010). Here in Australia we have seen the recent three year pilot of single sex classes in Western Australia (Department of Education and Training WA, 2009). In Queensland there have been a number of schools which have trialled the use of single sex classes, public interest in such pilots can be seen in news items such as: Queensland teachers, parents and students are likely to decide on single sex education (Wordsworld, 2010). Single sex classes gain momentum as Western Australia pilot allows for single-sex classes in co-educational classrooms (Vanze, 2010). Here in Australia we have seen the recent three year pilot of single sex classes in Queensland schools opt to segregate (Caldwell & Gilbert, 1997), and single sex classes, particularly in the high status and high stakes subjects of maths and English (Schools Commission, 1984, 1987). The third assumption is that females and males have different learning needs and outcomes (Bailey, 1992; Sadker & Sadker, 1994). While the disparity of treatment could possibly be explained as teachers attempting to engage the more disruptive boys, there is data that indicates that it is the more competent boys who are benefiting from additional teacher attention (Eccles & Jacobs, 1986). The poten combination of such concerns, along with a call for more learner centred approaches to education (Watterson, 2001; Love &training, 2002; Marshall & Reihartz, 1997). Teachers allow male students to engage the more disruptive boys, seeking their responses more frequently, while female students receiving less teacher attention and learning support (Corbett, Hill & St. Rose, 2008; Marshall & Reihartz, 1997).

Key concerns
The ‘waves of interest’ in single sex classes in Australia
This latest focus on establishing SSC in Australia is the third wave of interest following the initial wave that was in response to calls for equity in girls’ educational opportunities in the 1970s (Alloway & Gilbert, 1997), and the second wave in the mid 1990s which was interested in focussing on boys’ engagement levels with learning (Gilbert & Gilbert, 1999). Table 1 summarises the key concerns within the literature associated with the use of SSC. These concerns include issues such as the reinforcement of binarised stereotypical views based on sex and gender, as well as the under-representation of either sex in particular subject areas.

Table 1: Historical background to current interest in single sex groups in co-educational schools

<table>
<thead>
<tr>
<th>Girls’ education</th>
<th>Boys’ education</th>
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<tr>
<td>Higher incidence of suspension and exclusion for boys (House of Representatives Standing Committee on Education and Training, 2002).</td>
<td>Higher incidence of suspension and exclusion for girls (House of Representatives Standing Committee on Education and Training, 2002).</td>
</tr>
<tr>
<td>Greater focus on maths and English (Schools Commission, 1984, 1987).</td>
<td>Greater focus on science and maths (Schools Commission, 1975; Commonwealth Schools Commission, 1984, 1987).</td>
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<td>The potential combination of such concerns, along with a call for more learner centred approaches to education (Watterson, 2001) and/or engaging boys in learning (Watterson, 2001; Love &amp; Townsend, 2002) would appear to suggest that for schools seeking to improve educational engagement and outcomes for all students, SSC might be a strategy to consider. Therefore, it is timely to investigate the international research around the use of SSC in co-educational settings.</td>
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Suggested strategies
- Single sex classes, particularly in the high status and high stakes subjects of maths and English (Schools Commission, 1984, 1987). |
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While SSC have been implemented in response to equity for girls and also as a reaction to concerns about boys’ education, the current interest revolves about perceived inequity between the sexes in co-educational classrooms (see Protheroe, 2009; Gutian, Stevens & Daniels, 2009). The most often cited concern is the potentially negative influence that male students can have on female students in the classroom (Gilbert & Gilbert, 1998; Jackson, 2010; Mael, 1998; Younger, Watrington & McLellan, 2005), with female students reporting being intimidated by the male students in their co-educational middle years classes (Warrington & Younger, 2000). Alongside this is the evidence of differential treatment of the sexes in co-educational classrooms, including female students receiving less teacher attention and learning support (Corbett, Hill & St. Rose, 2008; Marshall & Reihartz, 1997). Teachers allow male students to engage the more disruptive boys, seeking their responses more frequently, while female students receiving less teacher attention and learning support (Corbett, Hill & St. Rose, 2008; Marshall & Reihartz, 1997). Teachers allow male students to engage the more disruptive boys, seeking their responses more frequently, while female students receiving less teacher attention and learning support (Corbett, Hill & St. Rose, 2008; Marshall & Reihartz, 1997).

Acknowledging contested and hidden assumptions: a caution to reading findings
The purpose of this paper is to investigate the efficacy of SSC in co-educational contexts. However, when we initially analysed the research literature in 2008 it became apparent that a set of assumptions that underpinned the research potentially acted as limitations to the research and findings and even the very nature of what is being asked. By doing this, the contested and problematic assumptions and terminology around sex in the literature are acknowledged here and in the rest of the paper.

Sex
The term ‘sex’ refers to categorisations using bifurcated biological and physiological differences to form two distinct groups, female (genetically XX) and male (genetically XY). While these are often taken to be clearly defined and natural categories there is evidence to the contrary (Diamond & Sigmundson, 1997). Firstly, there is at least one other biological category, although not widely acknowledged, that is those individuals categorised as ‘intersex’ (Cawadias, 1943). The term ‘intersex’ refers to those individuals who may have biological characteristics of both male and female; be genetically XY but present anatomically as male; have an extra X or Y chromosome; or have ambiguous genitalia. A review of medical literature from 1955 to 1998 aimed at producing numeric estimates of the frequency of sex variations, approximated that the number of people whose bodies differ from standard male or female is one in a hundred, or one to two in every thousand receiving surgery to ‘normalise’ genital appearance (Blackless, Charuvastra, Derryck, Fausto-Sterling, Lausanne, & Lee, 2000). Secondly, while classification of students according to their biological sex in itself is not problematic, this assumption (Steele, 1989) argues that there is more difference within each category than there is between the two categories, making such classifications simplistic and divisive rather than complex, blurred and diverse. The third assumption as discussed by Fausto-Sterling (2000), is that sex (biologically constructed) is often conflated, made synonymous with, or assumed to be tightly linked to, gender (socially constructed), a point explored further below.

The foundational assumption that underpins the single sex classrooms literature is that females and males have different learning needs and behaviours in the classroom. Thus, this assumes that by identifying an individual’s biology and physiology one can generalise about their learning needs and behaviours. In this paper we are considering the literature investigating the efficacy of the use of such a strategy.
acknowledging that the literature is using a grouping technique based on a biological category that silences individuals outside the binary of female/male, ignores the various individual characteristics, and attributes within each sex and does so within an unproblematised and naturalised biology/physiology framework.

Gender

Since the 1970s the term gender has been used to categorise, often in relation to social or cultural contexts, rather than biological ones. The concept of gender is a socio-cultural construct that delineates which characteristics are to be considered as masculine or feminine. Therefore, the terms ‘man’ and ‘woman’ are societal constructs that carry with them certain expectations and classifications that shift over time and space. The term ‘gender’ was more commonly used to differentiate between categories that shift over time and space. The term ‘gender’ was more commonly used to differentiate between ‘men’ and ‘women’.

Contested assumptions – do girls and boys learn so differently?

Certainly the most contentious issue within the SCC debate is the assumption that girls and boys learn very differently from each other. While we caution against the assumption of simplistic and dichotomous understandings of sex and gender, we acknowledge that the literature does not acknowledge the associated concepts of gender as a socio-cultural construct that delineates what characteristics are to be considered as masculine or feminine. Practically, in a classroom, what might this mean for males in the class who might identify with so called feminine behaviours or roles? Or females who enjoy learning through physical play? Or a group of males who work more productively with each other rather than in all-male or all-female groupings? Within the current research literature such individuals are unrepresented.

To reinstate stereotypes (for example, Groundwater-Smith, Mitchell & Mockler, 2007; Lingard et al., 2002). Significantly for the readership of this particular journal, the middle schooling literature does not usually differentiate between learners on the basis of sex or gender, instead suggesting that most learners in their middle years of schooling respond well to common pedagogical approaches such as heterogeneous and flexible student groupings, learner centred classrooms and cooperative and collaborative learning (Carrington, 2006). Lingard et al. (2002) too, warn against taking a simplistic position and they advocate for a more complex and considered view to be taken when schools are comprehensively researching what strategies are effective, for which students, as well as investigating the circumstances under which these strategies are successful.

Consequently, a position is taken here that aligns with the broader middle years literature (Knipe & Johnston, 2007), which argues pedagogical approaches should be responsive to the learning needs of the specific cohort rather than based on simplistic and broad generalisations about sex-based learning preferences, sometimes masking gender and age-based assumptions, that are not necessarily applicable to any one class group. Thus the complexity that surrounds the issue of SCC is revealed, and, by acknowledging the contested and hidden assumptions, we also expose the politics that can be associated with sustaining these simplistic categories. If education is to build inclusive and equitable communities then teachers must challenge their educational communities, as well as the young people they work with, to move beyond the binaries of sex and gender categories. We argue that the inclusive role of school communities needs to include understanding, acknowledgement and support for students who are not recognised within the categories of male or female, girl or boy. Schools also should challenge limited notions of who one can be and what one can do, to ensure that there are equitable educational opportunities of young people in our schools during their middle years. Having identified, defined and unpacked (to some extent)

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1 Class is defined as pedagogical spaces where students and teachers work but recognises that these are not confined to a classroom (Lalushner, 2007).

 girls and boys

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the foundational assumptions that underpin the literature discussed in this paper, we highlight the issues in seeing terms such as sex and gender, girls and boys, in simplistic terms. Therefore, attention is drawn to the contested nature and problematic assumptions and terminology used within the particular literature as well as the current paper.

Research methods and procedures

The commissioned report, *Advantage through structured procedures: Operations of Schooling Review* (Tuovinen et al., 2008), investigated the impact of a range of schooling variables, including campus composition, school size, student groupings and flexibility in timetabling and attendance, on student outcomes. The review was conducted across a wide range of databases (e.g. ERIC and ProQuest) that targeted English language academic and government published research since 1965, with an emphasis on literature published after 1990. The review sought to undertake a meta-analysis of the literature; however, the researchers found that the different combinations of factors and/or research approaches of the existing literature meant a meaningful meta-analysis was not possible2. Consequently, the findings were not inherently and independently strong. In the case of the efficacy of single sex classes, the findings are unclear and are dependent upon complex contextual influences coming together (often in unclear ways), hence the use of the term ‘muddy’ in the paper’s title.

2 For the full description of the methodology and approaches used in the review refer to Tuovinen, Aaslund, Allen, Crosswell and Lishaw (2008).

Table 2: Positive outcomes for Single Sex Classes

| Positive Findings in the Research | Research
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<td>enable the teacher to develop a more effective understanding and control of the class’s social structure (Wills, 2003).</td>
<td>Gilmore et al., 2002; Sukhnandan, Lee &amp; Kelleher, 2000; Seitsinger, Barbara &amp; Hind, 1998, Warrington and Younger, 2000; Wills, 2003.</td>
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<td>have benefits for cultural minority groups, particularly boys (Hadley, 1999).</td>
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Table 3: Effects of single sex classes in specific curriculum subjects

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<tr>
<th>Subject area</th>
<th>Research</th>
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<tr>
<td>Single sex classes in Mathematics</td>
<td>improve student learning outcomes (Dollison, 1998; Gierl, 1994; Gilmore et al., 2002; Rowe, 1988; Shapka &amp; Keating, 2003; Sukhnandan, Lee &amp; Kelleher, 2000)</td>
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<tr>
<td>increase discipline issues (Smith, 1996)</td>
<td></td>
</tr>
<tr>
<td>Single sex classes in Science</td>
<td>improve student learning outcomes (Shapka &amp; Keating, 2003; Smith, 1996; Sukhnandan, Lee &amp; Kelleher, 2000)</td>
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<tr>
<td>encourage girls to take more science subjects during their high school education (Shapka &amp; Keating, 2003)</td>
<td></td>
</tr>
<tr>
<td>Single sex classes in English</td>
<td>improve student learning outcomes (Gilmore et al., 2002; Sukhnandan, Lee &amp; Kelleher, 2000)</td>
</tr>
<tr>
<td>increase student engagement (Gilmore et al., 2002)</td>
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However, there also exists strong caution within the literature that indicate all-male classes require teachers to have higher levels of classroom management skills and these classes have a higher incidence of teacher stress and burn out (Baker & Jacobs, 1999; Caranagh, Mollon & Della, 2001; Sukhnandan, Lee & Kelleher, 2000). Indeed, the research into SSC presents inconsistent findings on a number of levels, making the navigation of the conflicting and ‘muddy’ claims difficult. Having looked at the general findings around the use of SSC in co-educational sites we now turn to a discussion that narrows the evidence to specific subject areas.

Effects of SSC in specific curriculum subject

The effectiveness of SSC has also been looked at in specific subject areas, with most research being carried out in Science, Mathematics and English subject areas. While there is contention that the use of SSC is of little benefit (as discussed above) other research suggests there may be improvements in overall student learning outcomes and increasing student engagement in these specific subject areas (see Table 3).

The use of SSC in English, Science and Mathematics has received some, though hardly unequivocal, research support. Such results might warrant investigations into the use of SSC in other subject areas, being mindful of who benefits from such a student grouping and how they benefit. Understanding the key influences at play in each context is important, for the impact of SSC may not be the result of the grouping strategy itself, but indicative of other processes at work such as the
The teacher as the critical element for SSC

While there are tensions in the current literature around the efficacy of SSC in co-educational sites, what is evident from the research is that the critical mediating variable, as with all educational reforms, is the teacher. For effective outcomes in SSC the teacher must differentiate the curriculum to cater for the range of abilities within the class (Cavanagh, Dellar & Mollon, 2001; Ferrara, 2005; Love & Townsend, 2002) and at the same time employ appropriate pedagogical approaches, depending on the specific needs of the classroom (Bracey, 2006; Smith, 1996; Sukhnandan, Dellar & Mollon, 2001; Ferrara, 2002) and at the same time demonstrate the rationale and benefits of the approach and summarizing the literature that informs such a strategy. The analysis of the literature suggests there is no 'right' answer due to the multiple variables that could be playing out in any class. However, the current body of research does suggest specific factors a school should consider as a way of unlocking the potential practical impact of undertaking SSC, we posit that schools consider questions such as:

- Who benefits from the current approach to student grouping and how?
- In what ways might SSC enhance learning and for whom?
- Is SSC appropriate overall or relative to/appropriate for particular subject area changes for now?
- What part do teachers play in student learning in differentiated classrooms and to what extent is any form of social engineering enhancing their efficacy in student learning?
- How do we know? What reflexivity, critique and systematic data collection informs us of the effects of our practices?

In conclusion

This paper investigates the issues around the implementation of single-sex classes in co-education schools by uncovering the language and assumptions behind the approach and summarizing the literature that informs such a strategy. The analysis of the literature suggests there is no 'right' answer due to the multiple variables that could be playing out in any class. However, the current body of research does suggest specific factors a school should consider as a way of unlocking the potential practical impact of undertaking SSC, we posit that schools consider questions such as:

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Seeking answers to such questions will assist schools in considering some of the complexity surrounding the possibility of SSC approaches. We look forward to engaging with schools that seek such rigour.

Discussion for schools considering the use of SSC

As we have demonstrated throughout this paper, the international evidence around the use of SSC is problematic, inconclusive and ‘muddy’. For schools looking for decisive evidence to guide their thinking around the use of SSC, we direct them to consider some of the questions emerging from the literature. These include broad questions such as:

- What are the goals (cognitive, affective and behavioural outcomes) of taking a SSC approach?
- Are SSC the best way to accomplish this goal?
- What are the costs and trade-offs of establishing SSC?
- What other considerations such as age or ethnicity are employed, explicitly or implicitly, and what are the effects of not considering them?
- Who benefits from the current approach to student grouping and how?
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Implementation underpin such discussions. It is argued that schools must ask questions such as:

- What definitions and assumptions are held around the terms sex and gender, the characteristics we ascribe to each, and how do these play out in our school practices?
- How do sex and gender define who can learn, how they learn and why?
- How do sex and gender interact with other identity categories and why?

How are categories such as female/male, girl/boy, woman/man, feminine/masculine inclusive or exclusive useful or not useful? What other categories such as age or ethnicity are employed, explicitly or implicitly, and what are the effects of not considering them?

In amongst these emerging questions, there are others that are prompted and they are sufficiently important to be brought to the attention of schools investigating the possibility of SSC. These other questions have been raised in order to highlight the complexity of the underlying assumptions, the foundational beliefs and values and the potential impact of reality) of high stakes outcomes that ultimately contributes to the improvement in outcomes for SSC (Younger et al., 2005). This phenomena, where the attention and focus on the new idea brings about an improvement, for a continued period, is referred to as the ‘Hawthorne Effect’ (Clark & Sugare, 1991) and has been posited by some researchers as being responsible for the reported positive effects of SSC (Smithers & Robinson, 2006).

While the potential impact of the ‘Hawthorne Effect’ adds to the muddying of the SSC research findings, it does highlight the importance of the teacher in any new classroom reform. Teacher involvement, understanding and ownership are imperative for effective classroom reform.

Preparation to undertake an initiative of this nature should be carefully considered, not only with the wider school community, but also critically with the involved teaching staff about the rationale and benefits of the suggested innovations (Warrington & Younger, 2000). The strong consensus in the literature that the teacher is the critical element in the effective uptake of SSC has implications for those considering SSD approaches, as well as for implications for research, practice, and policy.


