

PERSPECTIVES ABOUT THE IMPACT OF CLASS SIZE ON STUDENT ACADEMIC ACHIEVEMENT: AN ANALYSIS OF THE LITERATURE

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Abstract

In Botswana there has been growing public outcry about decline in student achievement at all levels of the country's basic education system. The government and some concerned members of the public such as teachers and parents have put blame on large class size for the negative effect on student academic achievement. This literature study which explored scholars' views, insights and perspectives from diverse contexts, reveals no conclusive agreement about the effect of large or small class size on student achievement. What emerges are diverse perspectives, with some strongly stating that class size certainly has an effect on achievement, while others argue that although there is a relationship between class size and student achievement, other factors such as teacher training, professional and quality development, availability of instructional resources, and learners social and economic background, could combine together to have an adverse effect on classroom instruction. Based on the diverse perspectives derived from analysis of the literature, this study makes some recommendations for consideration by policy makers, educators, curriculum developers and other relevant stakeholders with intention to investigate potential factors that could affect student achievement.

Key words: class size, academic achievement, student teacher-ratio, resources

1.0 Introduction

Numerous studies reflect commitment and resolve by nations worldwide to transform their education systems for quality teaching, learning and outcomes. Different stakeholders in the education fraternity such as governments, politicians, policy makers, educators, curriculum developers, parents, trade unions and global entities are consistently engaged through education commissions and collaborative research to identify impediments to attainment of quality

education and how best to address them to improve educational outcomes in the 21st century and beyond. Among the perceived impediments to attainment of quality education especially in developing countries is the number of learners per class and how it impacts learner academic performance (Cakmak, 2009). With regard to Africa Kariuki and Guantai (2005) show that countries like Malawi, Mozambique and Zanzibar have relatively high percentages of learners in the classroom, with classes having 49 or more students. In this study we seek to explore the literature for in-depth understanding of the impact of class size on the quality of teaching and learning. This is significant especially for Botswana's education system as this could trigger more practical and longitudinal studies on potential causes of decline in student academic achievement and measures that could be put in place to remedy the situation.

It is important to point out that, although the topic on class size has been exhaustively researched, the debate has continued without much agreement even in recent years. Studies such as those recently conducted by Leuven and Løkken (2017) and Bettinger and Long (2018) are evidence of the on-going debate. This study reviews the literature on the effect of class size on student achievement tracing it to as far back as the 1990s. The contested impact of class size is discussed under different sub-themes which seem to frequently emerge from the literature. The sub-themes include divergent positive perspectives about class size impact, multiplicity of factors impacting on student achievement, multiplicity of factors in the African context, contrasting results associated with class size effect, policy initiatives on class size, teachers' concerns about class size in Botswana, and lessons for Botswana arising from perspectives about costs of downsizing classes.

2.0 Divergent positive perspectives about class size impact

We note that class size is actually appealing to a wide range of players with stake in education for different reasons. These include those whose views are purely about its impact specifically on teaching and learning, maintaining that reduction in "class size leads to more individualised instruction, higher quality instruction, greater scope for innovation and student-centred teaching, increased teacher morale, few disruptions, less student misbehaviours, and greater ease in engaging students in academic activities" (Hattie, 2005, p. 387). They hold the perception that large class sizes have negative effects on the learning process and learners' achievement (Cakmark, 2009). Contemporary high schools have been criticised for being too big and too impersonal to educate today's students effectively. One reform strategy, supported determinedly in the early 2000s by the influential Bill and Melinda Gates Foundation, has been to reduce these large institutions to make them smaller, and more intimate schools. Both small classes and small schools would seem to be perceived an easy sell, with smaller classes seen as offering teachers more time to address individual needs of each student. Smaller schools are also preferred for fostering a more personal, tightly knit environment in which school staff get to know individual students well. It would seem a considerable number of people believe that smaller, intimate educational settings have potential to provide structure, safety and discipline that cannot be provided in larger school settings (Loveless & Hess, 2007).

Benefits associated with smaller, intimate educational settings are also emphasised by Ehrenberg, Brewer, Gamoran and Willms (2001), maintaining that the number of learners in

the class has the potential to affect how much is learned in a number of ways. One possible benefit is that class size could affect how students interact amongst themselves or may result in less noise and disruptive behaviour, and has the potential to affect the kinds of activities teachers are able to promote. The amount of time teachers are able to focus on individual students and their specific needs could also depend on class size. If class size is smaller, it would be easier to focus on one individual, providing teachers with opportunity to among other things, choose varied methods of teaching and assessment that are learner specific and geared towards maximizing the learning process. Further significant are prospects of assigning more writing, or giving more feedback on students' written work, and promoting more discussions, and other activities that could be more practicable with smaller groups of students.

Similar sentiments regarding perceived advantages of small class size are expressed by Kariuki and Guantai (2005) and Rice (1999) who argue that teachers may prefer it for different reasons including reduction in workload. This would make class management easier, with minimal disruptions and minimal behaviour challenges. Other prospective gains consistent with better opportunity for individualized attention to learners are the expectation of better achievement in examinations (Ehrenberg et al., 2001). Parents too could embrace small classes because of the educational gains that come with individual attention from teachers to learners. This notwithstanding, Bruhwiler and Blatchford (2011) aver that class size alone is not the only factor with potential positive impact on student achievement; such impact could arise due to a combination of multiple factors.

3.0 Multiplicity of factors impacting on student achievement

Various researchers have also shown that class size alone does not impact positively or negatively on teaching and learning or student achievement; it is one of the factors at play in this respect. Where class size reduction policy initiatives were adopted such as in California, it was evident that the impact of class size on educational outcomes might depend on a wide range of other factors. In this particular case, the initiative was made difficult by among other things failure to supply qualified teachers and to provide adequate facilities required to accommodate the increase in the number of classes. Furthermore, the utilization of time on the part of teachers allocated smaller classes also has a bearing on the impact on the relationship between class size and academic achievement. A teacher who spends 40 minutes lecturing to a group of 20 students will have the same amount of per student learning with one who spends the same amount of time lecturing to a similar group of 40 students (Rice, 1999). Cheng (2011) notes that in assessing the effect of class size the existing literature uses only student grades and test scores. He argues that these measures alone may not reflect the quality of education from the students' perspective, and that student satisfaction, which is not reflected in grades and test scores, is also an important measure of educational success.

Drawing on the Student-Teacher Achievement Ratios (STAR) project and the Class Size and Pupil Adult Ratio (CSPAR), Bruhwiler and Blatchford (2011) indicate that there is consensus "that small class sizes have a positive effect on student attainment in the early years of school, and that they benefit low attaining and disadvantaged students in particular" (p. 96).

Bruhweiler and Blatchford (2011) however point out that one limitation of large studies such as STAR and CSPAR is that they only took into consideration the effects of class size on account of academic achievement in general, that is its relation to an end-of-year attainment test. They argue that a specific curriculum unit and more focused curriculum related measures should be factored in in consideration of class size. This would be “more valid and authentic since it reflects, and can be designed to be part of, normal class work” (p. 96). Consistent with other studies such as Blatchford et al. (2007), the findings of Bruhweiler and Blatchford (2011) reflect the likely significance of small classes in terms of pedagogical changes. The results show that “teachers in small classes are able to provide more educationally beneficial experiences for students and teachers” (p. 105). Studies further reveal that teachers do not seem to always adapt their teaching to take advantage of the opportunities provided by small classes, instead preferring to continue their usual/traditional teaching approaches. One way of addressing this situation is giving emphasis to classroom contextual features such as class size in the professional development and training of teachers. Studies on Africa (Onwu & Stoffels, 2005) also point to multiple factors that could have an effect on student achievement.

4.0 Multiplicity of factors in the African context

In Africa, research on the effects of class size on student achievement is not as extensive as it is in other parts of the world, including Europe and Asia. As in other countries, from the available information, large classes are a reality for most of the African education systems, a situation that is more prevalent in public schools (Sedibe, 1998). Studies specifically on Africa also show that it is not just class size but a multiplicity of factors that have a significant bearing on student achievement (Onwu & Stoffels, 2005; Habulezi, Batsalelwang & Malatsi, 2017).

Onwu and Stoffels (2005) aver that a large class as “one where the majority of characteristics and conditions present themselves as interrelated and collective constraints that impede meaningful teaching and learning” (p. 82). Reflecting on the South African context, these authors note that the envisaged change from a traditional content-driven curriculum to one that was more learner-centred and inquiry-based was bound to have significant implications on teachers’ practice. They draw attention to the availability of learning materials, instructional facilities, and teacher competence as some of the potential factors at play in the teaching and learning process especially in regard to teaching reform-based curriculum in large classes.

In Botswana Habulezi, Batsalelwang and Malatsi (2017) also express that poor academic performance of learners is influenced by multiple factors. Otukile-Mongwaketsi (2018) also observes that the Botswana Primary School Syllabi for lower and upper classes advocates for a learner-centred approach that promotes learning aimed at enhancing the learners’ intellectual development and creativity. However, she notes examination oriented curriculum and class size among others as factors militating against effective implementation of learner-centred approaches. Some longitudinal studies on class size in the literature (Finn, Gerber & Boyd-Zaharias, 2005) have revealed contrasting results. Such studies were typically conducted over a long period of time and were designed such that they involved repeated observations of the same variable.

5.0 Contrasting results associated with class size effect

Other researchers such as Finn, Gerber and Boyd-Zaharias (2005) who investigated the impact of class size in Tennessee indicate that classes with fewer than 20 pupils were likely to perform well in Mathematics and Reading. They noted that even in such cases, those who seemed to have benefitted more were students in the early grades and those from low-income homes. Related findings by Pong and Pallas (2001) on Mathematics and Science revealed some contrasting results. The research was on the performance of learners from different countries, and the United States was the only country where there was a positive association between Mathematics and class size. Classes with 6 to 18 students outperformed classes with 19 to 29 students. These results buttressed the idea of using small classes for the country's eighth graders. On the other hand the same study showed cases of large classes that outperformed students in small classes. In Hong Kong, the majority of Math classes of 39 to 42 students outperformed small ones with 15 to 38 students. In Singapore, students in very large Math classes ranging between 41 and 43 students performed considerably better than students in classes of 32 to 40. These contrasting results are further evidence that although research is there to support the existence of both positive as well as negative class size effects, there is far less accord about how or why class size influences student achievement.

As just discussed above, literature on the impact of class size on academic achievement shows contrasting and inconsistent results for different education systems. For East and Southern Africa Kariuki and Guantai (2005) report that in a few cases achievement was higher in small classes and in some cases higher in larger classes but that for the most part class size did not seem to have much bearing on achievement. In most cases there was no difference in achievement in classes with between 20 and 40 pupils and those with between 20 and 55 pupils. However, if class size dropped below 15 pupils and if this was accompanied by teachers individualising the instruction then there would be an increase in achievement. Toth and Montagna (2002) also obtained varied results for higher education, with two studies reflecting no relationship between class size and achievement, three showing a negative relationship, two indicating mixed results, and another revealing a positive relationship between these two variables. Leuven, Oosterbeek and Rønning (2008) point to studies that reported negative impact of larger classes, but with considerable variation in terms of the size of this effect, thereby limiting the relevance of such results for policy conclusions. Studies such as that conducted by Blatchford, Bassett and Brown (2011), and Maimela and Monyatsi (2016b) reveal that in spite of this lack of conclusive agreement, countries have continued to develop and implement policies pertaining to class size. What is apparent about these policies is that what constitutes large or small classes varies from one country to another.

6.0 Policy initiatives on class size

While the debate on what constitutes small or large class size remains elusive, there are education systems that have changed their policies in favour of small classes. These include England and Wales where government policy stipulates a maximum class size of 30 for pupil aged four to seven years. Other policies to do with class size or pupil to adult ratio reductions have been implemented in Netherlands, New Zealand, and Asian countries such as mainland China, Macau, Korea and Japan (Blatchford, Bassett & Brown, 2011). Even as countries

formulate policies, studies have been carried out that reveal no credible evidence of unanimity among researchers on the optimal student-teacher ratio and class size, and neither is there clear indication in the literature pertaining to the actual number that constitutes a large or small class (Krueger, 2003).

In Singapore, for instance, language teachers considered class size with the mean of 23 students as large, while in Hong Kong a comparable group of language teachers maintained that 16 students and over would be perceived large (Marcus, 1997). Further evidence about class size variations shows the Hong Kong government's plan to reduce class sizes from 40 to 36 at grade 7 level in 2008. This meant that 37 or above was seen as constituting a large class. In subsequent years government in Hong Kong has revised small class teaching in primary schools to constitute between 25 and 30 students (Harfit, 2013). Sub-Saharan countries and donor financial institutions, notably the World Bank, have confined their definition of large class to pupil-teacher ratios (Onwu & Stoffels, 2005). Countries such as Kenya, Uganda and Tanzania where governments introduced free primary education experienced tremendous growth in enrolments which put great pressure on government to employ more teachers. In these countries the need for optimal class remained a huge "challenge in balancing the pressure for improved quality which is believed to be linked with small class size" (Kariuki & Guantai, 2005, p.3).

In Botswana the Revised National Policy on Education (RNPE) of 1994 recommended the reduction of class size. Initially, class size in primary schools was to be reduced to 40 learners per class, and with the passage of time class size reduced to 30 learners per class (Maimela & Monyatsi, 2016a; Republic of Botswana, 1994). Subsequent to the RNPE of 1994 studies on class size and its impact on classroom instruction were conducted in schools in Botswana. These were, however, not longitudinal studies that would have involved observation made repeatedly, and arguably given more credence (Galton & Pell, 2012) than are those based exclusively on participants' perspectives, as studies on class size in Botswana shows.

7.0 Teachers' concerns about class size in Botswana

There is meagre research in Botswana, if any, about the impact of class size on student achievement. However, some studies have been conducted mainly to hear the voices of teachers regarding class size and its effect on classroom instruction. Participants in a study by Habulezi, Batsalelwang and Malatsi (2017) expressed concern about large class sizes, which in their view lead to huge teaching loads. In another study by Tallman, Metzger and Jorosi (2000), teachers in junior secondary schools in Botswana were concerned about some of the difficulties they encountered in teaching their classes, which had around 40 to 45 pupils in each class as determined by the Ministry of Basic Education. With regard to potential for child-centred teaching in junior secondary schools in Botswana, Mungoo and Moorad (2015) show that participants perceived large class sizes as an impediment to child centred instruction, describing an average class size of more than 40 students as too large for any meaningful discussion. While teachers were in agreement about teaching styles and their approach to the curriculum, they revealed that they had no choice but to feed students with information due to lack of "time in the curriculum to teach skills, debate, or practice critical thinking" (Tallman,

Metzger & Jorosi, 2000, p. 52). Therefore large classes and intense curriculum compelled teachers to 'lecture' at the learners and compelled students to passively listen to their teachers. A similar perspective is noted by Otukile-Mongwaketsi (2018) who avers that the approach to the transmission of knowledge in large classes results in teachers merely passing information and learners acting as passive recipients. Otukile-Mongwaketsi (2018) further notes that despite concern about the adverse effects of large classes in Botswana, the downsizing of classes can be a costly exercise.

8.0 Lessons for Botswana arising from perspectives about costs of downsizing classes

The impact of class size on student achievement seems to be a thorny issue for politicians and educational decision makers, given the fact that there is no conclusive evidence that class size reductions could bring considerable gain in achievement for pupils. An important lesson from the literature that Botswana should take note of is that, given the economic implications, class size reductions may not necessarily be a cost-effective strategy that should be adopted to raise student achievement levels regardless of whether countries are developed or developing (Altinok & Kingdon, 2012).

One argument is that, smallness in terms of reduction in the size of schools or the size of classes might not be cost free, as this could mean spending more money to downsize classes by hiring more teachers and constructing additional classrooms. This therefore calls for researchers and others such as politicians and school reformers not to only concern themselves with the potential benefits of small schools and small classes without paying attention to either the cost or difficulty of downsizing (Loveless & Hess, 2007). Against the challenges of costs, strategies that teachers in Botswana and in other countries can use when faced with large class size are suggested. These include practices such as the need to work in small groups, engaging learners in group discussions, adopting workshop approaches, utilization of teamwork, and allowing students to teach part of the class (Marcus, 1997).

According to Graue and Rauscher (2009), to conclude that achievement improves just by changing the number of students in a classroom is an idealistic perception that can afflict much of education. They argue that class size reduction is not a panacea that can address the damage that poverty, violence or lack of child care that some children encounter while attending school. While some have maintained that adding resources for class size reduction is a positive step toward the inequities that form the foundation of schooling, Graue and Rauscher (2009) argue that it is not good enough.

It is imperative to caution educators in Botswana and elsewhere that school systems globally are different in terms of examination systems, performance incentives awarded for teachers' performance, remedial interventions for slow learners, enrichment classes targeting exceptional learners, the quality of teachers and class size. With these differences, findings from a particular education system may not necessarily be generalised to other education systems (Wößmann & West, 2006). For instance, in South Africa, evidence in the literature shows that teachers' difficulty with large classes have been compounded by a number of other disabling factors including lack of electricity, under-resourced laboratories, dilapidated

chalkboards, learners whose home language is not English—which is the country’s medium of instruction, insufficient and vandalised desks chairs which compelled learners to either share desks and chairs or sit on bricks; all of which make conditions of learning very unbearable (Onwu & Stoffels, 2005). Finally, given the divergent perspectives derived from review of the literature, this study discusses implications for the study and makes some recommendations for consideration policy makers, educators and other stakeholders.

9.0 Implications for practice and recommendations

This study explored the literature for the views of different scholars regarding the extent to which class size has an impact on student academic achievement. It has emerged that the debate has been protracted over many decades without any consensus on whether class size has any impact on learner performance. On the one hand there are researchers whose critique of smaller classes is positive. They argue that smaller classes avail an opportunity for individualized attention, more follow-up on issues that learners find problematic or challenging, learner-centred teaching and assessment, among other things. They further maintain that with smaller classes there is greater use of homework, oral tests and others forms of assessment, and more direct interaction with students. This is in contrast to large classes which are perceived as dominated by use of the lecture method, less interactions between teachers and students, higher noise levels, and more management challenges than smaller classes (Zyngier, 2014).

On the other hand, there are researchers who state that while class size reduction is generally regarded as providing more favourable conditions for teaching and learning, the benefits of a small class environment will not come automatically if teachers do not make changes to their teaching (Blatchford et al., 2003). They argue that effective teaching in small class settings requires concrete adjustments by teachers in their approach to the curriculum, instruction and assessment in effort to enhance learning opportunities for their pupils (Brophy, 2000; Graue & Rauscher, 2009; Graue, Rauscher & Sherfinski, 2009). Furthermore, there are views which argue that the impact on student academic achievement cannot be attributed to one factor only, class size. Rather, there is a multiplicity of factors such as under-resourced laboratories (Onwu & Stoffels, 2005), teachers failing to adapt their teaching to maximize on small classes (Bruhwiler & Blatchford, 2011), and the quality of teachers in general (Wößmann & West, 2006).

10.0 Recommendations

Findings of research have been varied regarding the impact of class size on student academic achievement. It is therefore incumbent on researchers and education authorities in different education systems to contextualise to their own unique situations in their conduct of research. While findings from other education systems could be informative, it is still critical that whatever decisions are made about education should mainly be informed by local research. The study thus recommends that the education system of Botswana make decisions about class size informed by local, contextualized research, and not on account of circumstances and contexts in other countries. It is further emphasised that these studies should include large-scale and longitudinal research which have potential for researchers and practitioners to repeatedly

observe practical teaching of both small and large classes over long periods of time to be able to make comparisons. One advantage of locally conducted studies is that they are bound to take into account different contexts, such as the location of the schools, availability of resources, quality of teachers and conditions under which teachers work. The study further noted that trimming down from large classes to smaller classes can be costly in different ways. For instance, if one class is split into two, that would require additional funds to employ and pay an additional teacher and construct another classroom for the new class. Education authorities therefore need to take into consideration such costs and weigh the challenges, and be able to determine whether it is necessary to split the class or to maintain the status quo.

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