

A case study on the impact of large classes on student learning

Michael Loh Epri

Abstract

This paper presents findings on challenges that students face in their learning in large classes as well as the challenges that teachers face when teaching large classes in some of Papua New Guinea schools. With the implementation of the Tuition Fee Free Education policy many schools are experiencing a surge in student enrolment. It has been noted in the last few years that many schools' administration had not planned for increased infrastructure development, purchase of additional teaching and learning resources and classroom furniture, and recruitment of additional staff to cater for the increases in enrolment. This has forced some schools to create large classes to address staff and classroom shortages. The school site in this study had class sizes that ranged from 50 to 88 students. Both students and teachers could not move around the classroom freely during lessons. It was found that class sizes had increased in the school site because there were no additional classrooms built to cater for the increase in student enrolment. Also no additional teachers had been recruited to cater for the creation of extra classes. It was also found that many students who had dropped out of school and had been away from school for a number of years because of school fee issues were re-enrolling in grade 9 in the school site because of free education. It was also found that students faced various difficulties in learning and many were often absent from school because their teachers could not support them in such a learning environment. Teachers' workload also increased with large classes and as a result many were often absent from school because of stress.

Key Words: large class, small class sizes, Tuition Fee Free Education policy, teacher absenteeism, student absenteeism, learning materials, effective learning, classroom management, assessment of student learning.

Introduction

Large classes are an issue especially for town schools around Papua New Guinea (PNG). The school site in this study is a town school. One of the major issues faced by this school is the increase in class sizes since the introduction of the national government's Tuition Fee-Free Education (TFFE) policy. A combination of an increasing population and the implementation of the national policy have caused student enrolment in this particular school to soar in the last few years. This has resulted in the increase in class sizes because the school does not have additional classrooms and additional teachers to cater for the increased student enrolments. The three grade 9 classes that participated in this research each had a student population that ranged between 50 and 88.

Students' learning and teachers' feedback on their learning in such large classes were daily challenges.

Literature review

A research study in Pakistan by Khan and Iqbal (2012, p.162), found 'the average number of students in most classrooms ranges from 70 to 120'. They claimed that effective teaching was not possible in overcrowded classes and a majority of the teachers were facing instructional, discipline, physical and evaluation problems.

National and international literature has established that students gain positive knowledge and skills through effective learning activities in a classroom that is conducive to learning. Effective learning produces quality education through knowledge and skills gained. The word *effective* can be translated as 'something that works well and produces results that were intended' (Sinclair, 1987, p. 451). The word *learning* according to Sinclair (1987, p. 822) means 'knowledge or skill that has been gained through studies'. Students gain knowledge and skills through effective learning and positive interactions with teachers.

The provision of effective learning strategies that enhance quality education is emphasized in the *Papua New Guinea Vision 2050* document (Government of PNG, 2009) which states that human capital development, is essentially about empowering people by enabling them access to quality education. Kukari emphasised in his discussion on quality education that in order for the country to meet the targets set by the Vision 2050 document, effective learning ought to be emphasized at all levels of education.

According to Earthman (2002), and Harbaugh and Cavanagh, (2013), classroom characteristics directly influence students' self-esteem including their educational values, learning outcomes and classroom learning. Khan & Iqbal (2012, p. 162) added to this discussion in stating that, a class consists of a homogeneous group of pupils, who work and progress together. This shows that students can learn various skills from each other and progress if supported well in their learning environments. Khan and Iqbal also argued that school facility conditions affect students' academic achievement. Given the current issue of large class sizes experienced by many town schools in PNG, students' learning and academic performance is under challenge. Teachers need to think creatively about how to make learning in large classes friendly and effective and how to create positive learning environments.

The impact of overcrowded classrooms on students' learning is of interest to educators, parents and the general public. Research literature on large class sizes have highlighted issues that were also found in this research study. For example, according to one research report, (Earthman, 2002, p. 10), 'an overcrowded classroom has more students assigned to a classroom-building than the number of students it was designed to accommodate'. When the capacity of the classrooms is exceeded, it places greater demand on the

schools' existing resources and infrastructure that need to be used for effective learning. According to Ijaya (2000), when poor planning is done, population increases in classes can happen. The issue of large class sizes now seems to be a normal occurrence in this particular PNG town school.

Negative impacts of large class sizes on students' learning

Research from other countries has found that large class sizes affect quality learning. Earthman (2002), Yaman and Uygulamada, (2009) and Burnett (1995) found that overcrowded classroom conditions hinder teachers' attention to individual students and slows down the progress of students' learning. As Earthman (2002, p. 11) stated, 'Teachers only had time to cover the basic lessons and could not spend extra time with slow learners'. Teachers had limited time to focus on the needs of slow learners and were forced to neglect them to keep pace with the prescribe time allocation for each learning area.

In large classes, one to one attention on students means that teachers spend a certain amount of time with each learner. Researchers like Yaman and Uygulamada (2009) found that large classes can force teachers to abandon student centred learning and focus more on teacher centred lessons so this teaching strategy then became the culture of teaching. Large class sizes influence students to display learning behaviors such as not responding to the teacher's question and waiting on the teacher to provide most answers to questions on worksheets and exercises. According to Earthman (2002) and Yaman and Uygulamada (2009), large classes hinder the achievement of learning objectives and reduce the completion of learning activities. In such situations quality learning may not be achievable.

Positive impacts of small class sizes on students' learning

In research done by Yaman and Uygulamada (2009), it was found that small class sizes enhance students' effective learning and academic success. Research has also established that there is a relationship between the number of students in a class and their academic success. The quality and academic success are higher in small class sizes than in large class sizes. Small class sizes can also enhance the quality of support for individual students which can have a positive impact on their overall academic performance.

In Eurydice's (2008) research from Portugal, the average class sizes were 17-18 students and 20-26 students. This enabled the teachers to provide quality learning support for individual students. This enabled students to complete all learning activities faster. It also allowed time for the provision of different activities that enhanced effective quality learning. As Earthman, 2002, p. 13 argues, "Evidence continues to accumulate that shows that reducing class size improves students' achievement, reduces discipline problems, and provides a lasting benefit to both students and teachers". Research also shows that the reduction of class size especially in the early grades can improve long-term high student academic performance (Green & Doran, 2000). This is because

sufficient resources are available for the fewer students in small class sizes and individual attention can be provided to the learners' particular needs.

Limited resources

Research shows that shortage of learning materials is common in schools with large class sizes. According to Green and Doran (2000) and Burnett (1995) overcrowded classrooms can cause shortage of instructional materials, inadequate school library collections and limited storage space for learning resources. Students attending schools with insufficient learning material are handicapped in their academic achievement. Ijaya, (2000) emphasised that school facilities should be properly maintained and all areas should be accessible for students' learning.

The problem of shortage of teachers, learning materials and classrooms seems to be complex and worldwide issue. For example, in Nigeria, especially in major towns and cities, many classes have 50 to 100 students (Ijaya, 2000). According to Snipes, Williams and Petteruti (2006), the public schools in big cities also faced overcrowded classrooms which have resulted in shortages of highly-qualified teachers and low students' achievement. PNG urban schools are also facing shortages of learning and teaching resources and challenges with the provision of quality teaching and learning support for students because of increased enrolments and overcrowded classrooms.

The learning environment

The classroom is the heart of any educational system. No curriculum planning is complete without the implementation and evaluation of the curriculum outcome in the classroom where most of the class learning activities take place (Cohen & Manion, 1983). The classroom environment becomes an important aspect of learning for students. Friendly and welcoming classroom environments are vital to efficient student performance (Earthman, 2002; Hall, 2012). A study done in New York urban schools revealed that many schools do not have the room to accommodate increasing numbers of students and therefore large class sizes are created. This situation removes 'the bridge between good physical environment and effective students' learning' (Earthman, 2002, p. 3). On the other hand, with good classroom organization and sound management of appropriate approaches for large class sizes, a foundation for an effective learning environment may be created.

Burnett, (1995) and Earthman, (2002), stated that schools should be able to provide quiet and safe places for students testing and private counseling. According to Plank and Candliffe (2011), good classroom organization provides a strong foundation for quality learning. Their research found that learning outcomes are higher in less noisy schools than in high noise level schools. Students in large class sizes generally tend to make more noise than students in small class sizes. As Earthman (2002) argues, students need a quiet environment to achieve quality learning and be able to hear clearly and understand what was being spoken in order to perform given tasks well. When

this ability is diminished through unnecessary noise, students do not perform well. As Earthman (2002, p. 11) reported, 'Teachers say that overcrowded schools are noisier, create more non-instructional duties and paperwork, and hinder learning'. These studies show that a quiet learning environment enhances students' effective learning.

Methodology

In order to understand how students cope with learning and how teachers cope with teaching in large class sizes this research addressed these questions:

- How do overcrowded classrooms impact on students' learning?
- How are classroom activities managed by teachers in overcrowded classrooms?
- How do students respond to learning activities in overcrowded classrooms?

The qualitative method of data collection was used to collect data in this research. Qualitative research sought to understand the school setting and the participants through visitations and gathering of data. It generated ideas based on teaching and learning interaction between teachers and students (Creswell, 2014). Data was collected from both teachers and students through semi-structured questionnaires, classroom observations, documents and field notes. Data from different data collection methods were used to triangulate the data collected. The convenience sampling method was used to select the research school site and the participants. This method of sampling was used because of time and financial constraints. Furthermore, it was used because of the willingness of the participants to take part in the study and the ease of access to the school by the researcher.

Discussion and analysis

It is a general assumption that the increase in student enrolment in recent years in PNG has been the result of the implementation of TFFE policy. This study found that there was a general increase in school enrolment because students who were unable to enrol in schools because of school fee issues in the past were being re-enrolled especially at secondary school level. It also found that this particular school had not built extra classrooms nor recruited additional teachers in preparation for the increase in school enrolments in the last few years. This has created challenges for this school in terms students' learning and teachers' support for students' learning. The teachers in the secondary school site were asked why the school had experienced increases in student enrolment in recent years. Teachers were of the view that this was the result of the implementation of the TFFE policy as reflected in the following excerpt from individual teachers' interviews.

Before 2012 we had a teacher to 30 or 45 students, but from 2012 to 2015, student enrolment had increased...classroom overcrowding

started since the introduction of government's TFFE policy, it is almost three years since 2012.

Since the introduction of TFFE, we are having a huge increase in the number of students in our school. We used to have only 30 to 45 students in class but since 2012, the number has increased dramatically.

While the teachers expressed their concern about the increase in student enrolment because of the implementation of the TFFE policy, they also acknowledged that the implementation of the TFFE policy assists parents who are of low economic environments to send their children to school as highlighted in the excerpts from teachers' and students' interviews.

TFFE policy is good because it is helping students' education. It really helps the lower income earners, but again on the other side, it's creating the overcrowded issue. (teacher)

Free education is good, there is a lot of students coming because of free education. (teacher)

It's good to have free education so all children can have a chance to go to school and get a job Good thing about free education is, it's giving a lot of opportunity to students to access education. (teacher)

Free education is good because I came to school and I think the government is too good. (student)

Free education is all right for people to come and get education. I think it is good that we have free education because the government is paying the school fees and we are learning. Our parents are not paying or not paying much. It really helps the parents. (student)

This data suggests that TFFE policy is a good initiative because it allows for more students from all economic environments to have access to basic education. However, they are also aware that the implementation of the TFFE policy has created issues like increase in class sizes.

Impact of increase in student enrolment on learning resources and classroom space

Schools are expected to plan for future increases in student enrolment so that they can purchase additional teaching and learning resources, classroom furniture, build more classrooms and recruit additional teachers in preparation for this. This study could not establish whether schools were informed to prepare for the implementation of the TFFE policy. During the time of the study, the school site was experiencing shortages of teaching and learning resources, classroom furniture, classroom space and teaching staff, as illustrated by the following excerpts from interviews.

They should build new classrooms for students to learn properly. We need more schools and classrooms so that everyone can fit into the classrooms comfortably. (student)

We need teachers to teach our classes. Right now we do not know the number of teachers but one teacher is teaching more than three subjects. We sit two or some sit three to a desk and the space in between desks is not enough for a teacher to walk around. (student)

We do not have the text books to use and teachers bring their own to teach us. They write on the board or photo copy notes and give them to us. (student)

Our facilities and resource materials need to be in order to accommodate the overcrowding issue. (teacher)

It was difficult to teach in such a crowded learning environment with inadequate resources. Grade nine students do not have the text books. (teacher)

Text books are not issued to students. We spend most of the 40 minutes to write on the board and no time to help students. (teacher)

This school is a big school but our students don't have text books. Teachers have one copy each and we do a lot of photocopying or writing on the board. The government seriously needs to look at more universities, more classrooms and more teachers. (teacher)

The government needs to put money into the resources, build extra facilities, teachers' houses and improve teacher's welfare. The TFFE policy would work well if more facilities were built. (teacher)

This data is supported by the following excerpt from the researcher's classroom observation notes.

I noted that there were not enough desks and tables in the classrooms, and also no space for new desks and tables. I noted that there was hardly a sign of a single text book (maths, English or social science) during my classroom observations in all three classes. (researcher)

The data suggests that this school site had not prepared well for the increase in student enrolment in the last few years. Both students and teachers were concerned about the shortage of teaching and learning resources and the overcrowding in the classrooms. Teachers were concerned because they spent more time photocopying notes and writing on the board than supporting the students' with their learning needs.

Absenteeism

Students miss school when they feel left out especially in large class sizes. Table 1 presents information on student's absenteeism. Three grade 9 classes were visited on three different days. Student absenteeism was noted on all three days.

Table 1: Students' absenteeism

	9B	9C	9F	Total
No. on class list	85	75	87	247
No. during day of class observation	54	67	76	171
Number absent	31	8	11	50

The data shows that in Grade 9B, 37% of the students were absent from class. The other two classes had lower numbers of student absenteeism. It was suggested that the students were absent from school because of teacher shortage. It was found that students leave the school whenever they do not have a teacher as shown in the following excerpts.

We will always be in class every period if teachers are present. We would feel like we are here for learning if teachers are present in class all the time. When one teacher goes out to teach other grades, we do not have a teacher present in class so we lose interest and our morale is down. Sometimes we go home early. (students)

When I was in the school, I saw students walk out of the school entrance well before the official time of dismissal. The official end of the school day is 3.15 pm. but they go home early because they do not have teachers. (researcher)

We do not have a teacher or the teacher did not come. This is why we are not in class right now and are telling stories outside the classroom now. (students)

This data shows that teacher absenteeism is an issue in this school. The data also shows that students may leave the school whenever they do not have a teacher to supervise them. The data also suggests that leaving school anytime seems to be a common practice in this particular school. The following excerpt from the teachers' interviews indicated that those students who miss class for a month are likely to be excluded from the school.

We exclude students from assessment when they have not been attending lessons. If students do not come to school for 30 days, we exclude such students at the end of the term. However, in the New Year they are back in class, by-passing the administration, so we give them an average mark and add their names in the class list. (teacher)

This data shows that students are dismissed from school when they have missed 30 days of school. However, these students seem able to re-enrol in the following year. The data suggests that enrolment is generally done by classroom teachers. The school administration seemed to be bypassed in this enrolment process. The data also show that teachers give the re-enrolled students average grading before they add their names to the class lists. This study was unable to establish whether records of these students' assessment marks from the previous year were kept by the teachers and were used to work out the students' average marks.

Challenges in teaching a large class

The recommended class size for secondary schools is 30 students (Department of Education, 2004, p. 32). However, the class sizes in grade 9 alone in this school ranged from 50 to 88 students.

Normal to us should be 30 to 35 students per class. The highest number that we had in one grade 11 class was 91 students last year (2014). The number of students in grade nine classes this year (2015) is 50 to over 80 students per class. The current highest number in grade nine is 88 students. I teach three classes; 10 E has 78 students; 9B has 82 students, 9E has 86 students.

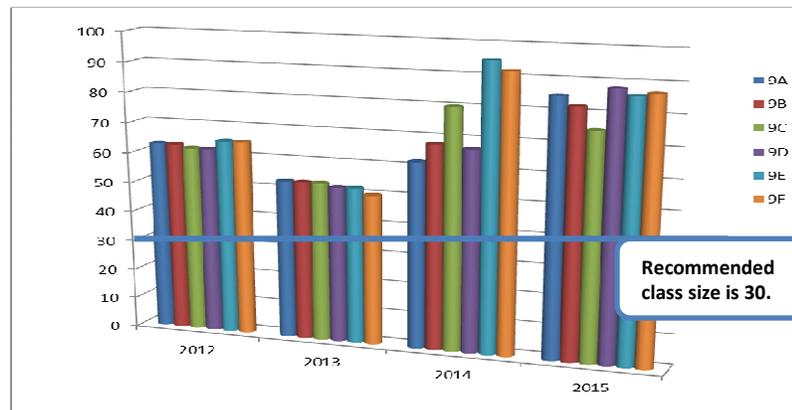


Figure 1: Average students per class yearly

TFFE policy implementation impact on student enrolment

As illustrated in Figure 1, the size of Grade 9 classes 2012-2015 was considerably above the recommended class size of 30 students. The data shows that there was a marked increase in grade 9 intake in 2014 and 2015. The other data presented earlier shows that students' learning in such classroom environments is challenging for both teachers and students.

This study found that the teachers do not know all their students' names in their classes because the classes are too big and some students miss school often. They also do not know the number of female and male students in their classes. This challenge is reflected in the following interview excerpts.

I do not call all students' names, because I do not remember their names. I only call the name of students when I know their names. It is difficult to remember their names, and I only get to know the names of those who come to school every day. Some students come for a month or few weeks and they are not there for the rest of the term. About three quarters of them I don't know their names. Like you saw me in class today, I called a student 'yellow', because he was wearing a yellow shirt. I didn't know his name because he doesn't come to school every day. I feel it's very rude for me to say yellow or blue, tall or short, but I do that. It's not my fault. They don't come to school every day so I don't know their names. Like I reprimanded a girl in front; she just comes and warms the seat. They are not there three-quarters of the term and they expect us to assess them. (teacher)

This data suggests that interacting and getting to know individual students is challenging when the number of students are high. Student absenteeism is an issue in this particular case. Teachers had this to say about teaching too many students in one class.

It is quite challenging when you have a big number of students and no space to move around in the classroom. When we deal with a less number of students, the teacher to students' learning is more effective and you can monitor their academic performance well but when you have larger number of students in one class, you go by who are the bright students. You do not have time for other students. The majority of the students do not understand what we are teaching, because it's hard to check exercise books, and there is excessive work to do. (teacher)

The data shows that in overcrowded classrooms, teachers tend to keep pace with the bright students and neglect the others. It also suggests that the teachers do not have the time to give remedial work to students who miss classes. The data suggests that many of the students in class struggle to learn but the teachers tends to move on because they feel they have to cover the content in the time available. Most teachers use hand-outs and write on the blackboard as a common teaching strategy.

We use group work and give them handouts. I put students in groups and they have to do the work in their own time. They have to sit under the trees or find their own time to do it. Individual work would take more time but groups can think better and work together. (teacher)

I write on the blackboard; give them homework and handouts; but I hardly give one to one attention; I never do it. The only way you find

out is through tests and assessments, or sometimes asking questions generally. (teacher)

I used different teaching methods before; such as group work, reading, listening, oral tests, assignments, individual attention, collecting exercise books etc. In the last three years I have not used all these methods because I do not have the time. Right now I am having difficulties trying to mark test papers. I hardly ever look at exercise books. I don't collect them. When I teach something new, I have to repeat that topic, to reintroduce it so that the very poor ones can catch up with me and they can understand my teaching. (teacher)

I noted during classroom observations that teachers were standing in front, writing on the board and explaining the content. They did not check students' books or homework. I actually did not see any group work during these observation observations. (researcher)

This data suggests that teachers in large size classrooms generally use the teacher centred teaching strategy. As the data show, they stand in front, write and explain things from the board. It also shows that much time is spent on writing on the board. It was claimed that students were sometimes put into groups and given worksheets to work on during their own time. However, there was no evidence of group work in the three classes observed. The data also shows that evaluation assessment strategies such as checking students' exercise books and giving individual attention to students are hardly used in large class sizes. Large class sizes increase teachers' work load as highlighted in the following quote.

Our workload has increased. We have a lot of test papers to mark and report cards to write. The work load is actually punishing or killing us. (teacher)

This data supports what Earthman found, that teachers reported that overcrowding resulted in stressful and unpleasant working conditions," (Earthman, 2002, p10).

Challenges with assessments

Large class sizes also influence the amount of time spent on setting assessment tasks, marking and providing feedback. In order to cope with large numbers of students they had to assess, teachers in this school site generally used multiple choice questions for assessment purposes because they were easier to mark. Short answers and essay type questions were generally not used because they would take longer to mark and cause delays in the dissemination of results. This issue is reflected in the following excerpt from teachers' interviews:

When it comes to assessment, multiple choices items are easy to mark but short answer questions and essays are really difficult. This affects assessment and term assessments are delayed. Many of us are having

difficulties with the large number of students. This year, students' term one reports were given almost towards the end of term two and term two reports will be given in term three. (teacher)

The teachers expressed the concern that they are unable to assess students' learning well as highlighted in the following excerpts from interviews.

I do not know how well they are learning and understanding what I am teaching. Due to time constraints I have to move on with lessons and my topics of teaching. Those slow learners are left behind and that is where majority are. (teacher)

I get confused whether students learn or not because it is hard to monitor their progress. If they do not understand, I am sorry but I move on for the ones that had learnt, otherwise slow learners drag us down and we will be late with completing our units. (teacher)

Because of time constraints I have to move on with lessons and my topics of teaching. Majority of the slower learners are left behind. (teacher)

This data show that teachers are unable to support students' learning well in large class sizes. They are unable to provide feedback on their learning because they are unable to mark all the students' assigned tasks or do informal assessment in order to establish students' understanding of content taught. The data show that most students are not supported well in their learning because of time constraints.

Key findings

In contrast to a recommended class size of 30 to 35 students, the study found that grade nine classes involved in this study had 50 to 88 students in each class.

The recommended class size is 30 to 35 students per class (The Department of Education, 2004). However, as a result of the implementation of the TFFE policy, the school enrolment exceeded this recommended number and therefore the school site administration had to make the decision to increase the number of students in each class due to classroom and staffing shortages. Students in each class ranged from 74 to 88 students per class from 2012 to 2015.

Teachers expressed the concern that they were unable to assess the students' learning well because there were too many students in each class. They found it difficult to assess students individually and establish individual students' learning capabilities. They were also concerned that they were unable to support students with special needs well because they had too many students to cater for in each class. Only a few students were able to score well in assessment tasks. The rest struggled with their learning as teachers did not have the time to provide quality feedback on their learning progress.

Despite contributing to the problem of overcrowded classrooms, the study found that teachers and students viewed the Tuition Fee Free Education policy as a good policy. It had created the opportunity for more children to access education and parents from low economic background were able to send their children to school because the financial burden was removed. However, this research found that the increase in school enrolment from 2012 to 2015 created challenges for the school site's school administration. The increase in school enrolment forced the school administration to increase the number of students in each class because it had not built additional school infrastructure or recruited additional teachers to cater for the increase in enrolments. Also, additional teaching and learning materials had not been purchased to support the increased number of students in each grade. This created a shortage in teaching and learning resources. Also teachers were unable to apply student centered teaching strategies well because the class sizes were too large. This also created challenges for assessment of students' learning. For example teachers were unable to provide one to one support to cater for individual students' learning needs. They were also unable to mark students' work to provide feedback to individual students because there were too many books to mark so they ceased marking of students' books or did minimal marking.

This study found that both teachers and students were frequently absent from classes. Students were often absent from school because of teacher shortage. They left the school whenever they did not have a subject teacher. It was found that teachers in the school site were under pressure and were sometimes absent from school. Teacher absenteeism resulted in students' absenteeism.

Teachers were overloaded because of the increase in class sizes. They spent a lot of time photocopying worksheets and writing notes on the board and had limited time to teach and support students' learning well. Marking students' exercise book was a challenge because they had too many books to mark. These caused stress for the teachers.

Conclusion

Increase in school enrolments has been experienced in most schools around PNG as a result of the implementation of tuition fee free education policy. Many more children are able to come to school because of free education. However, while this initiative promotes provision of education for the majority of school age children, it has brought about challenges for teachers and schools' administrations through overcrowded classrooms. This study has reported some of the impacts experienced by teachers and students. Until attention is given to training and deploying more teachers and building more classrooms and teacher houses, the challenges will continue.

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Author

Michael Loh Epri completed his Masters in Educational Leadership (MEdL) degree in 2015 at the Divine Word University. He has been teaching and working with the Catholic Church for the last ten years. This article was extracted from his research report that was completed in 2015 for one of the course units in the MEdL program.