



THE NATIONAL
RESEARCH INSTITUTE
PAPUA NEW GUINEA

DISCUSSION PAPER

COMPARATIVE ANALYSIS OF 2015
AND 2019 KEY UBE INDICATORS OF
PAPUA NEW GUINEA'S PROVINCES

Peter Michael Magury

Kilala Devette-Chee

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Direct any inquiries regarding this publication to:

The Publications Editor
National Research Institute
P.O. Box 5854
Boroko, NCD 111
Papua New Guinea

Tel: +675 326 0300/326 0061; Fax: +675 326 0213

Email: pngnri@pngnri.org

Website: www.pngnri.org

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Table of Contents

List of Figures and Tables	ii
Acknowledgements	iii
Abbreviations and Acronyms	iv
Abstract	v
Introduction	1
Objectives of the study	2
Conceptual Framework	2
Universal Basic Education Context	3
Philosophical context	4
Legal and policy	4
Methodology	8
Reference periods	8
Data sources	8
Calculations	8
Results	9
Access Rates	9
Net admission rates	9
Learning achievement of younger versus overage students	10
Retention Rates	11
Examination pass rates	12
Discussion	15
Existing UBE Policy in Papua New Guinea	15
Implications of the results from this study for Papua New Guinea UBE Policy	15
Recommendations for implementation of Papua New Guinea UBE Policy	18
Direction for future research	19
Conclusion	20
References	21

List of Figures and Tables

Table

Table 1: Means and standard deviations of outcome and explanatory variables	12
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Figures

Figure 1: Universal Basic Education Conceptual Framework	3
Figure 2: Elementary prep enrolment by age, 2015 and 2019	9
Figure 3: Net admission rates for PNG and provinces, 2015 and 2019	10
Figure 4: Grade 8 average exam scores by age in 2019	10
Figure 5: Cohort retention rate and dropout rates in relation to provinces in 2015 and 2019	11
Figure 6: Grade 8 examination average scores by province in 2015 and 2019	13
Figure 7: Grade 8 average exam scores by age in 2015	14
Figure 8: Grade 8 average exam scores by age in 2019	14

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About the Authors

Peter Michael Magury is a Research Fellow with the Development Indicators Research Program at the PNG National Research Institute. Mr Magury received his Bachelor of Science Degree from the University of Papua New Guinea and his Master of Statistics from the Swinburne University of Technology in Melbourne. Mr Magury also received a Master of Business Administration (MBA) at the University of Papua New Guinea.

Dr. Kilala Devette-Chee is a Senior Research Fellow and Program Leader of the Education Research Program at the PNG National Research Institute. Dr. Devette-Chee holds a PhD in Educational Linguistics and Masters in English Language teaching from the University of Canberra and Post Graduate Diplomas in Linguistics & Applied Linguistics from the Australian National University, Australia. She also holds a certificate in Knowledge Co-Creation Programs on Capacity Development for the Analyses of Education, Policy Making and its Effects from the University of Hiroshima, Japan and Chiang Mai University in Thailand.

Abbreviations and Acronyms

COBE	Certificate of Basic Education
CRR	Cohort Retention Rate
DoE	Department of Education
ECCD	Early Childhood Care Development
EFA	Education For All
EMIS	Education Management Information System
MTDP	Medium Term Development Plan
MSD	Measurement Services Division
NCD	National Capital District
PILNA	Pacific Island Literacy and Numeracy Assessment
PNG	Papua New Guinea
SDGs	Sustainable Development Goals
UBE	Universal Basic Education

Abstract

Papua New Guinea (PNG) is one of the countries in the world that puts the Universal Basic Education (UBE) as one of the government's top priority area. The aim of the government is to make basic education accessible, provide better learning environment and quality learning outcomes for all PNG citizens as enshrined by its Constitution. The primary objective of this study is to compare the trends and status of UBE between 2015 and 2019 using three key indicators: access, cohort retention rates and examination pass mark, to see whether they are improving or declining at province level. The trends may assist policy-makers to understand the unique needs of each province, to pay more attention on areas in need and identify gaps on the status of UBE to provide appropriate government's interventions at the provincial level. This study used comparative and descriptive analysis and the following results are obtained. Although, access to school increased from 2015 to 2019, only half of the children enrolled in elementary prep are six-years-old. The other 50 percent are under or over-aged children. Many students dropout (46%) of school before successfully completing Grade 8. This study also shows that although examination results have improved, marked differences among provinces persist, with weaker mathematics performance against national standards. That is the mathematics examination results are significantly lower than English and combined subjects. The results also show that younger children within the correct age group of 15 years or less perform better than older children. Policy implications are discussed, and study recommendations are made to provide better interventions to improve access, participation, and ensure a quality basic education for all.

Introduction

This study looks at the Key 2015 and 2019 Indicators for Universal Basic Education in Papua New Guinea's provinces. The main aim of this study is to present core sets of education indicators for the Universal Basic Education in provinces in the country (Magury et al., 2021) to compare the status to see whether they are improving or declining at province level. The indicators in this report cover basic education starting with Elementary Prep and working through Grade 8 in primary education. In doing so, the report provides an overview of the performance of each province in PNG.

This key indicator set is designed to inform readers on the status of the basic education at the provincial level in order to inform and challenge province, district and community authorities to take appropriate actions and improve the status of universal basic education. The local communities can use the information also to improve policy interventions.

The indicators are based on a variety of sources. These include the Department of Education's Education Management Information System (EMIS) database and the statistical bulletin (Department of Education, 2016 & 2019); data is also provided by provincial division of education and the 2011 National Population Census (National Statistics Office, 2013).

This indicator set provides a good picture of the progress made in 2015 and 2019 towards achieving the three key indicators for the universal basic education sector, as published in the 2010-2019 UBE Plan – Achieving universal basic education for a better future (Department of Education, 2009). The Plan emphasises on the following areas of UBE. They are:

1. Increasing access to schools;
2. Ensuring that students get a full nine years of basic education; and,
3. Improving the quality of education so that all students have acquired all the knowledge and skills that are taught at the basic education level.

These main areas for the UBE takes long discussions among the key stakeholders to arrive at a few key indicators. At the same time, it is a long process to reach an agreement on what indicators to use. It is expected that there will be disagreements among different agencies and discipline on what indicators to use but the final three key measures of UBE are considered to be both appropriate and measurable to define areas of Government interventions. Choice of the three indicators are appropriate at the province level. They are:

- **Access rate** - all children should enter school at a specific age (age six in prep)
- **Cohort retention rates** - all children should complete the elementary and primary cycles of education that constitute a basic education — this is nine years of basic education; and,
- **Examination pass mark** - all children should reach a required standard of literacy and numeracy at the end of these years of education.

Provincial officers can study the trends to see whether the status and trends are improving or declining. The trends may assist them to understand the unique needs of each province, to pay more attention on areas in need and identify gaps on the status of UBE to provide appropriate interventions.

The structure of this paper is now outlined. The next section provides the objective for this study and explains and describes the mutual relationship among the main elements of UBE which consist of the contexts, the goal of UBE, the main domains and their indicators and the country specific strategies for achieving the agreed UBE outcomes. This is followed by a section containing a description of the methodology employed. The penultimate section reports the results followed by the discussion of the existing education policies, its implications of the results, recommendations for changes in Papua New Guinea Education Policies and its relevance for studies of this nature. Then a final section which provides a summary of conclusions.

Objectives of the study

The main objective of this study is to use the 2015 and 2019 data to compare the trends of UBE's three key indicators of access, cohort retention rates and quality to see whether they are improving or declining so that the Government can provide better interventions to boost access, improve participation, and ensure a quality education for all at the provincial level.

Conceptual Framework

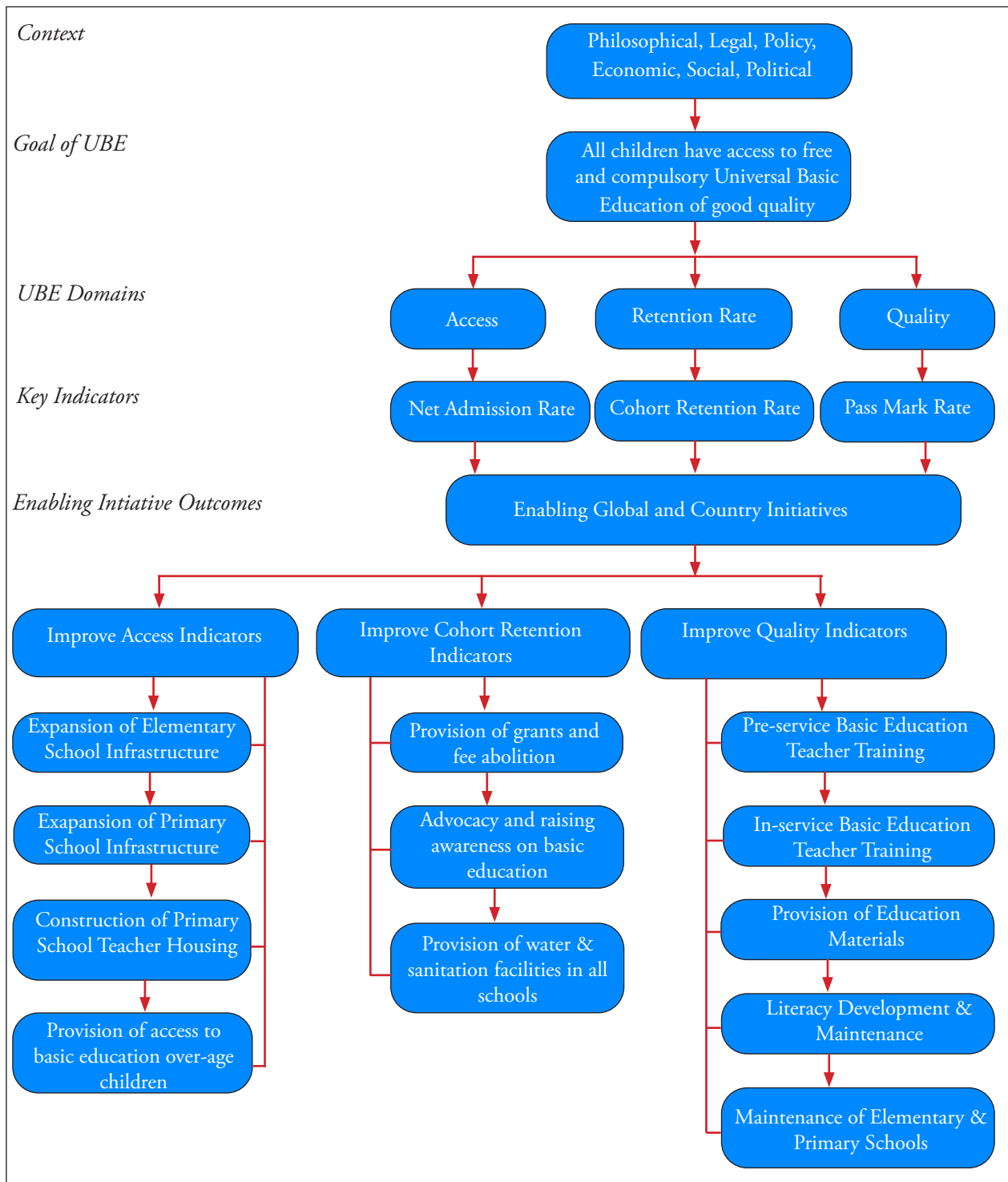
As illustrated in Figure 1, the Universal Basic Education Conceptual Framework provides the foundation for understanding the UBE dialogue by showing and describing the mutual relationship among its main components (Kukari, 2012). The main components consist of the contexts, the goal of UBE, the main domains of UBE and their indicators and the country specific strategies for achieving the agreed UBE outcomes.

The Universal Basic Education conceptual knowledge gaps that are identified from this study are noticed within the three key areas defined for achieving universal basic education – access, retention, quality, help define the conceptual framework. This framework also outlines a two pronged program of action. First, there are outcomes performance reporting consisting of the biannual analysis and profiling of Provinces and Districts in relation to a core set of Universal Basic Education indicators. Second, geared toward bridging the knowledge gaps, suggestions are offered to chart in-depth studies that can facilitate an understanding of factors that contribute to both satisfactory and unsatisfactory performance in the three key priority areas. Figure 1 shows the Universal Basic Education Conceptual Framework.

Universal Basic Education Context

The context of the Papua New Guinea's Universal Basic Education is outlined below as illustrated by the contextual framework (Figure 1).

Figure 1: Universal Basic Education Conceptual Framework



Source: Kukari, 2012

Philosophical context

The goal of Integral Human Development, based on the Five National Goals and Directive Principles and the philosophical characteristic of Papua New Guinean and Melanesian worldviews, were adopted. This report “encompasses the goals and principles of equality, fairness, justice, empowerment, self-reliance, wisdom and sustainable use of resources, and PNG ways. It provides a philosophical framework for informing decisions about access and participation of children, for nurturing and developing children, and for providing a culturally and contextually relevant education” (Kukari, 2015).

Relevant education involves learning of basic literacy and numeracy skills and knowledge in Papua New Guinea that provides a foundation for every individual to improve their quality of life, to identify and use opportunities for increasing income levels and to contribute to the development of the country. It empowers people in communities to reduce poverty, advances health and new technologies to efficient public organisations and private sector growth. For PNG to reap these benefits fully, the country needs to unleash the full potential of its human development. There is no better prerequisite tool for doing so than universalising basic education. Basic education empowers every citizen of the country to improve their lives as well as enhances their contributions as useful members of society.

However, in PNG, many people and communities are unable to see the situations they find themselves in. Therefore, they cannot take necessary actions to transform these situations to free themselves, and at the same time, improve their livelihoods (Kukari, 2012). According to Clark (2016), these people do not have necessary knowledge, skills and values to enable them to liberate themselves from misery and poverty. The main contributing factors are lack of basic literacy and numeracy skills and knowledge at all levels of society in Papua New Guinea. But particularly, more pronounced in remote and isolated areas, those from poor families and those affected by HIV & AIDS, children with disabilities and those affected by tribal fights and natural disasters.

According to Kukari (2015), those people that are illiterate, especially those in less developed countries will continue to be dominated, suppressed, taken advantaged off and made miserable and reduced to poverty. Furthermore, due to modern technological advances, their ability to participate in any developments will be restricted and will place them in dire situations that will lead to more social and economic problems. Therefore, basic education can be seen as an important key to acquiring basic literacy and numeracy skills that will enable people to participate in contemporary PNG society and meaningfully participate in other areas of development in PNG. Access to basic education of good quality will enable children to acquire necessary skills, knowledge and values that can liberate them from a life of misery and provide healthy living.

Legal and policy

The UBE legal and policy context enable children to have access and participate in education. It is based on the PNG Constitution which states that Basic Education is a right for all its citizens. It is further emphasised by the national development policies, principally the Medium Term Development Strategy, that identify education as a priority for development and the UBE Plan 2010-2019 (Department of Education, 2009). The need to achieve the human development and education goals are set out in the Principles of dialogue, engagement, participation, equity and opportunities.

The emphasis and strategies to develop education in Papua New Guinea are also influenced by international conventions associated with this sector. The Education for All (EFA) Goals agreed to in Jomtien, Thailand (1990). Similarly, the United Nations Sustainable Development Goals (SDGs) established in 2016, in addition to the United Nations Convention on the Rights of the Child (1990), and the Universal Declaration of Human Rights (1948), provided further international impetus for education development. According to Kukari (unpublished), “The influence of the EFA Goals and the SDGs on PNG’s development framework and education discussion is very visible and impact on access and participation has been noticeable”.

Universal Basic Education

Basic Education is about providing every individual an education that provides basic skills in literacy, numeracy and general knowledge about the world around them according to UBE Plan 2010-2019. This includes health issues, the society, government, economy, the environment etc. Basic education provides the essential foundation skills for someone to live a better life in the community as well as providing a firm foundation for further education. In a world that is now technologically advancing at a very fast rate, every person requires basic education to survive as well as to develop their full capacities over their lifetime.

Basic Education is both a human right as well as fundamental for social and economic development of a society (Sida, 2001). Being literate, numerate and having access to knowledge and information liberates an individual and empowers the individual to improve him or herself as well as enhances the person's contributions as a productive member of the society. It is the foundation building block for a person's development, the family unit and the community in which a person lives. Harnessing the full potential and contribution of every individual is important for the development of a country.

Basic education can be just three years of elementary education. It may also comprise elementary and primary education as defined in the National Education Plan 2015 - 2019 (Department of Education, 2019). In the future, Basic Education may consist of the full 12 years of education (current primary and secondary levels), as the nation's capacity to meet the demands. Some authors suggest that at least four years of basic education is seen as essential for someone to develop the skills of literacy and numeracy and to be able to retain them over a lifetime (Fardon & Furniss, 1994).

Global development experiences also indicate the importance of everyone or at least a large majority of the population of a country to have basic education for sustained social and economic development (Ozturk, 2001). The countries of Europe and the USA as well as Asia in the 1900's organised schools for their children where classes focused mainly on reading, writing and arithmetic (Garrouste, 2010). Formal schools, secondary and tertiary education expanded rapidly following the second world war as the foundations of a mass literate society had been achieved. The experiences of most other countries are that having a literate, numerate and enlightened population is seen as the foundation for higher levels of education much later, as well as for other forms of developments to happen.

The PNG Universal Basic Education Plan 2010 - 2019 emphasises on providing every child a basic education. The plan defines basic education as elementary Prep to Grade Eight (8) of primary school. Other Education Plans at Independence had desired for Universal Basic Education. However, after 48 years of independence, PNG is far from achieving quality basic education for all. It remains a critical obstacle to PNG's Progress and Development.

To fully eradicate the obstacle, it is first necessary for the country and policymakers within PNG to appropriately understand the full benefits and high requirements towards an appropriate and effective education system. For instance, with this fast pacing world and wider outside environment, there are several obstacles which would lead to the inability in the overall country and its youth towards ceasing various opportunities where it is very necessary to have basic, yet effective education. In addition to this, a widespread access to education would later benefit PNG in its economic and social welfare. Up till now the provinces and districts of PNG have experienced a very hard time, of not being accessible to education.

Goals of Universal Basic Education

The Department of Education's strategy to achieve the goal of Universal Basic Education was detailed in the UBE Plan 2010– 2019, to ensure the department focuses attention on improving this important goal. The overarching goal of the UBE Plan (Department of Education, 2009) is that “All children of school age must enrol in school, complete nine years of basic education and should have learnt skills, knowledge and values covered in the basic education curriculum”.

Objectives of Universal Basic Education

On the basis of the UBE definition, the essential ingredients that are identified to measure UBE are common throughout and are best summarised in the key objectives of the UBE Plan as:

- Access – all children should enter school at a specific age (age six years in prep);
- Retention – all children should complete the elementary and primary cycles of education that constitute a basic education – this is nine years of basic education; and
- Quality – all children should reach a required standard of literacy and numeracy at the end of these years of education.

Three key indicators (domains) of Universal Basic Education

UBE is underpinned by the three common indicators of access, retention and quality education. These indicators help us to calculate the number of school-aged children having access to basic education, the number of children retained to participate and complete the full cycle of basic education and how much children have learnt in their nine years of basic education.

If early PNG education policy had focus mainly on these three key indicators of basic education in an equitable manner, as desired by the locals, perhaps the attainment of UBE would no longer be an issue. The World Bank, with hindsight, points out that many countries with high economic growth rates such as South Korea and Taiwan expanded at the base (basic education) before expanding at the secondary and tertiary level and recommend that developing countries should learn from this.

Access

In PNG, according to Thompson (2018), access to the first level of education is measured in terms of the proportion of the six-year-old children admitted to elementary prep compared to the six-year-olds of related school-age population. This measure is described as the net admission rate (NAR).

The NAR is a useful indicator because it tells us about the number of six-year-old children that are able to enroll in elementary prep, the first grade of basic education, as well as the number of those being denied access to enroll. In order to achieve UBE goals, enrolment at the first grade of basic education at the correct age (6 years of age) is crucial and this is why access rate is so important.

In the area of access, the national education plan aims to provide school facilities and classrooms in all provinces to enable access for all children to elementary and basic education.

Retention

The cohort retention rate is used to measure the percentage of a particular cohort or group that started in the first grade and remain in school until they successfully complete the final grade of primary school.

The retention of children who entered the basic education system is to be improved. To facilitate this objective, there is a gradual abolition of school fees and a simultaneous expansion of school grants. Parents and children were made fully aware of the importance of Basic Education and adequate toilets and drinking water facilities are planned for all basic education schools.

Quality

Quality of education is improved through the curriculum that helps children master appropriate skills, knowledge, values and attitudes. To move toward this goal, sufficient qualified teachers are also trained to meet the increased demand for quality education. Teachers' skill and knowledge are updated and pupils and teachers have access to the textbooks and resource materials required for mastering subject matter as per the curriculum. Libraries are well stocked with sufficient and appropriate books to cater for the needs of both pupils and teachers. Emphasis is put on maintaining standards for schools with regard to weatherproofing, chairs and benches, and water and

sanitation facilities. The expectation is that students are taught for the prescribed number of hours.

Enabling global and country-specific strategies

According to Kukari (2012), both the development partners and country-specific strategies work hand in hand to achieve the goal of UBE. At the global level, development partners have to support the less developed countries with sufficient funding to achieve the goals of UBE. PNG usually develops country-specific strategies as a guide to implement the UBE. UBE in PNG is embedded in the Vision 2050; the National Strategic Plan, 2010 – 2030; National Education Plan, 2021 – 2029; and the UBE Plan, 2010 – 2019.

Methodology

Reference periods

The reference year for the number of schools, teachers, enrolments and Grade 8 examination data is the school year 2015 and 2019. The reference years, was chosen due to the availability of data to make comparison at provincial level.

Data sources

School enrolments

- Most numerical data used in this report are based on the Department of Education's annual school census data collection in 2015 and 2019. Data is obtained from the Education Management Information System (EMIS) (Department of Education, 2021).

School-aged population

- Population estimates for school-aged group were projected using the 2011 National Population Census as the baseline data and provincial growth rates from the National Statistics Office (National Statistics Office, 2013). School-aged population projections are a result of statistical modelling and may contain a degree of prediction errors.

Examination Result

- The examination pass mark of 80 were for the Grade 8 Examination in 2015 and 2019. These examination data were obtained from the Measurement Services Division and Provincial Division of Education offices.

Target population

Elementary prep to Grade 8 students enrolments and school-age population of six to 14-years-old population.

Calculations

- **The net admission rate** values are calculated based on the number of children aged six in the first grade of elementary in 2015 and 2019 divided by the projected population of six-year-old school-aged population in 2015 and 2019. The projected figures are calculated based on the 2011 National Population Census estimates from the National Statistics Office.

The Net Admission Rate is the number of six-years-olds entering Elementary Prep as a percentage of the population of six-years-old school age children.

- **The gross enrolment rate:** The gross enrolment rate in the Universal Basic Education is calculated based on the total number of children enrolled in elementary prep to Grade 8 of all ages as a percentage of the total school-aged population of six to 14-years-olds in 2015 and 2019.
- **The net enrolment rate:** The net enrolment rate in the Universal Basic Education is calculated based on the total number of children who are enrolled in elementary prep to Grade 8 (aged six to 14), as a percentage of the total school-aged population of six to 14-years-olds.
- **The cohort retention rates** for 2015 were calculated based on the number of children who completed Grade 8 in 2015 as a percentage of pupils who started in the elementary prep in 2007.

The cohort retention rates for 2019 were calculated based on the number of children who completed grade 8 in 2019 as a percentage of pupils who started in the elementary prep in 2011.

- **The examination mean** is an estimate of the average achievement in the subject and is found by dividing the sum of marks scored by the number of students. Examination for each of the subject is out of 50, hence the sum of the three subjects is 150. The average score of the three subjects is divided by 150 and multiply by 100 to get a percentage score. The target would be 100 percent.

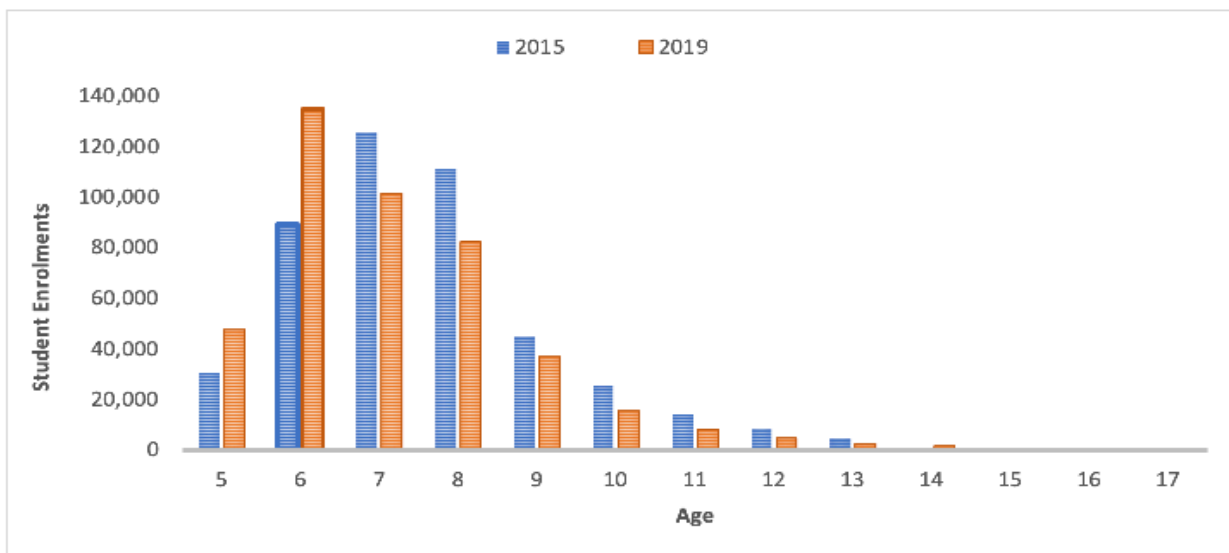
Results

Access Rates

Elementary prep enrolment by age

The 2015 and 2019 education data show some interesting statistics, of particular interest, is the number of children enrolled in elementary prep who are outside of the 'correct' age group. Figure 2 shows the number of children by age enrolled in elementary prep between 2015 and 2019. Children should be six years of age to enter elementary prep. It is encouraging to note from Figure 2 that 140,000 (54 percent) of six-year-old children were enrolled in 2019 as opposed to 90,000 (42 percent) in 2015. However, there was an increase of five-year-old children. The number of over-age children decreased steadily with over-aged children from seven to 15-year-old children for both 2015 and 2019.

Figure 2: Elementary prep enrolment by age, 2015 and 2019



Source: Calculations from the 2015 and 2019 education statistics by the authors

As illustrated in Figure 2, there are high enrolments of underage and overage children. Analysis of student enrolment data shows that at the national level, the admission of six-years-olds to elementary prep increased progressively since 2015, however, this increase was slower than the increase in the admission of overage and underage children, which increased markedly between 2015 and 2019 and at a steady pace thereafter. Underage and overage children take up space that otherwise will be filled by children from the population of correct school-age.

Net admission rates

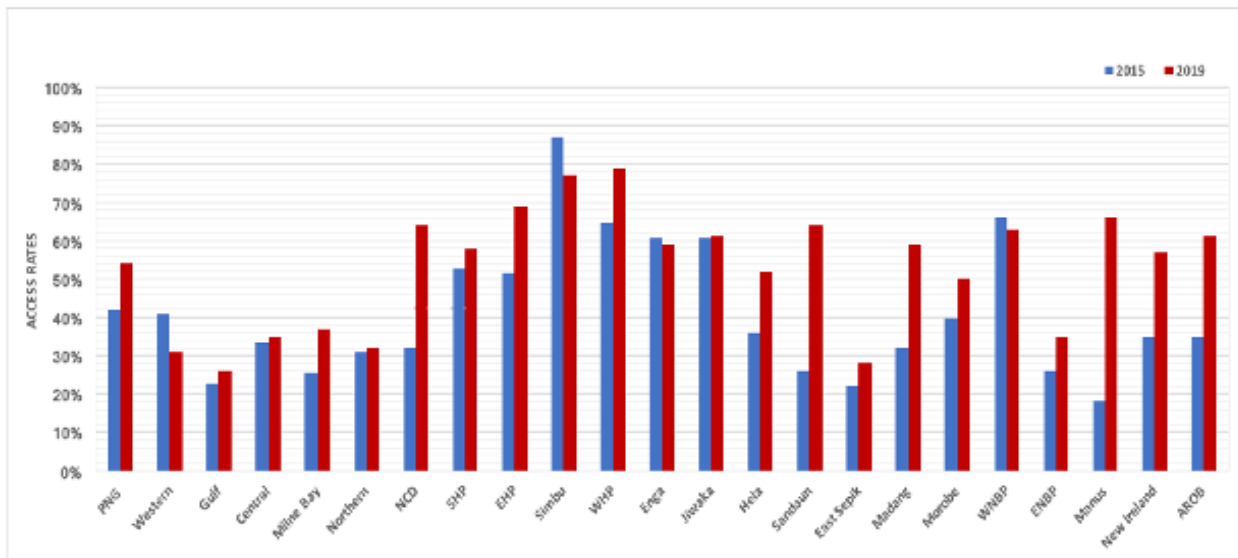
Figure 3 shows that the net admission rate (total number of six-year-old entrants in the preparatory grade, expressed as a percentage of the six-year-old population) increased from 42 percent in 2015 to 54 percent in 2019. An increase of 12 percentage point.

There is considerable variation on the net admission rates. Most notably, Simbu is doing very well. Western Highlands Province has the second highest net admission rates. In contrast, net admission rates are extremely low for Gulf, Oro, East Sepik, and East New Britain provinces.

According to the Universal Basic Education Plan, 2010 – 2019 (Department of Education, 2009) possible factors in the low net admission rates in PNG as a whole are the cost of school, although this is a factor that applies regardless of age. It may be a question of lack of space due to available classroom spaces being occupied by older

students. It may be a case of parents not wanting to send very young children long distances to school or out of concerns for safety and ability of young children to cope with walking long distances. Better understanding of the reasons will help in designing effective strategies for getting parents to enroll their six-year-old children in school.

Figure 3: Net admission rates for PNG and provinces, 2015 and 2019

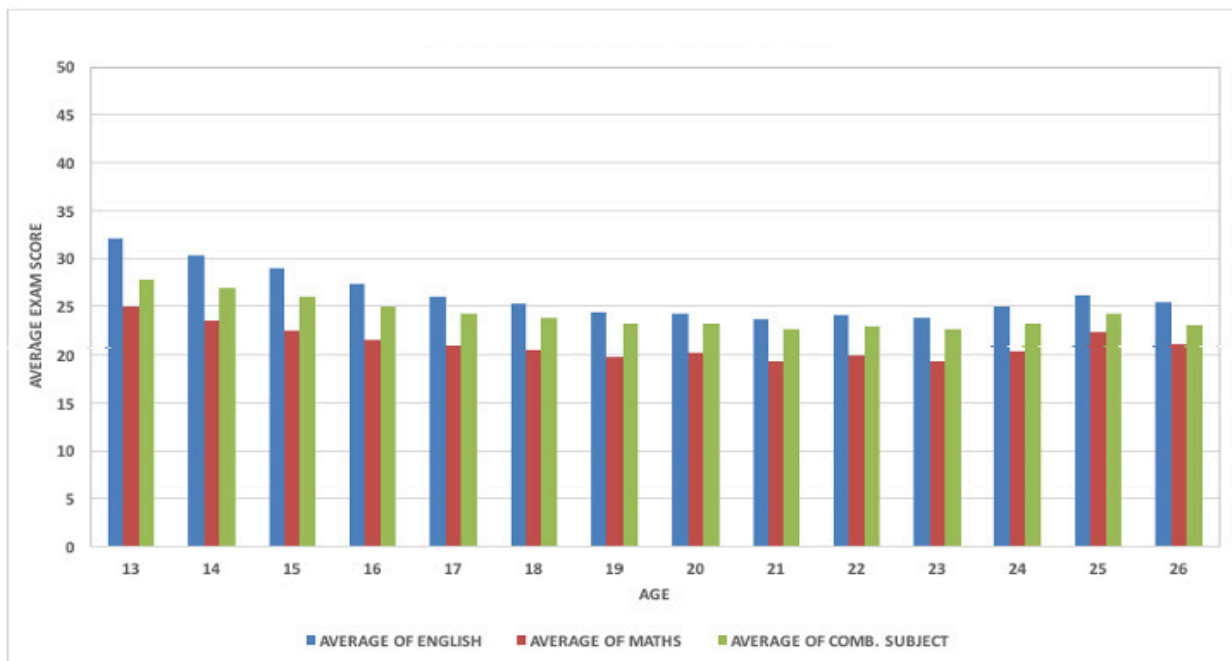


Source: Calculations from the 2011 National Population Census (NSO, 2013) and Education Statistical Bulletin (DoE, 2015 & 2019) by the authors

Learning achievement of younger versus overage students

It has been established through research that younger students perform better than the older ones, hence, age of students at entry into any educational level should not be of major concern but the ability of such student to cope with the demand of such level (Adejumo & Adetunji, 2013).

Figure 4: Grade 8 average exam scores by age in 2019



Source: Calculations from the Department of Education’s Examination data, (2019) by the authors

As illustrated in Figure 4, this study suggest that achievement decreased for older students. Age factor is one of the most important variables that affects student achievements. Low student academic achievement correlates with older students.

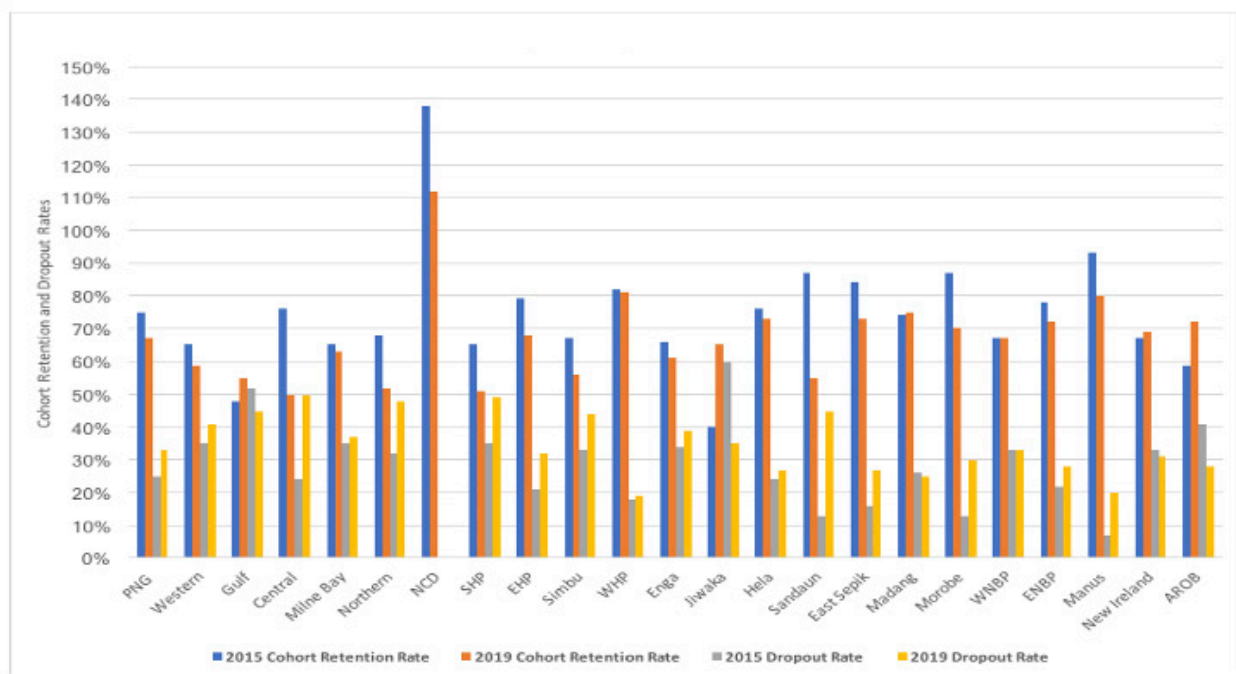
Figure 4 shows that age has some impacts on students performance but more research needs to be conducted to confirm the findings of this report.

An analysis comparing data from the 2015 and 2019 Grade 8 average examination score to students enrolment data by age from the 2015 and 2019 showed that overage students progressing to Grade 8 have lower rates of examination scores than their younger counterparts. Figure 4 shows that among those writing, the scores obtained by the overage students were marginally lower.

Retention Rates

The Cohort Retention Rate has been adopted as a measure of the UBE Plan 2010-2019 of universal basic education. In other words, the goal is not just to have all children participating in basic education, but that all should complete a basic education (UBE Plan 2010-2019). The agreed definition in PNG context is to take the number of students enrolled in the final year of basic education (Grade 8), minus the number who started the elementary prep. The number enrolled also include the number of repeaters from the previous year currently enrolled in Grade 8. In PNG, at present there are no data available on repeaters. The policy is not to have repeaters, but in reality, there will be some repeaters. In the absence of data on repeaters, a proxy estimate of basic education completions has been taken of only the first component – that is the number enrolled in Grade 8, as a percentage of the number who started in elementary prep nine years earlier (start of school at elementary prep and continuous progression).

Figure 5: Cohort retention rate and dropout rates in relation to provinces in 2015 and 2019



Source: Calculations from the 2015 and 2019 education statistics by the authors

The basic education cohort retention rate declined from 75 percent in 2015 to 67 percent in 2019 for PNG, which corresponds to a decline by 8 percentage points. This decline rate is notable in all provinces except Gulf, Jiwaka, Madang, New Ireland and Autonomous Region of Bougainville. There is a wide variability in this indicator, which is above 70 percent in 11 provinces in 2015: Central, National Capital District, Eastern Highlands, Western Highlands, Hela, Sandaun, East Sepik, Madang, Morobe, East New Britain and Manus.

In contrast, it is over 70 percent in only eight provinces in 2019: National Capital District, Western Highlands, Hela, East Sepik, Madang, Morobe, East New Britain, Manus and Autonomous Region of Bougainville.

Cohort Retention Rates would be difficult to calculate given the high rates of migration to Papua New Guinea's capital city. The cohort retention rate is 100 percent if there are no dropouts. This normally occurs in an efficient education system. However, in the case of NCD, the cohort retention rates were 138 percent in 2015 and 112 percent in 2019, which is over and above 100 percent. This does not mean that NCD's education system is completely efficient but rather implies that there are some students repeating, more students transferring into NCD due to economic activities, parents' employments opportunities or parents are just looking for better services, particularly in education.

High dropout of children in basic education

Although student enrolment increased substantially at the basic education level, retention of children at the basic education level declined slightly between 2015 and 2019. The proportion of children who left school (25%) in 2015 and those who left school in 2019 (28%) were quite high. According to the PNG Household and Income Expenditure Survey (2006), children drop out of school in PNG for a variety of reasons. These include no school fees, no interest, did not pass exam, family did not allow, school too far, work, safety and harassment, and overcrowded classrooms. These factors should be addressed at the national and the sub-national levels, at the school level, and by local communities to provide a barrier-free environment for children to attend and remain in school, and complete the full nine years of basic education.

Examination pass rates

This section looks at the data on the examination pass rates for Grade 8 Certification of Basic Education (COBE). This study analysed COBE data from the years 2015 and 2019.

Descriptive Statistics

Table 1 shows the means and standard deviations for the examination results by subjects. Descriptive statistics are in their original scales: academic achievement, gender and age.

The sample consisted of English ($N=73,044$), Maths ($N=73,071$) and Combined Subject ($N=73,004$). Students' age ranged from 14 to 27 years ($M=17.41$, $S.D.=1.21$) and 41.8 percent were female.

Table 1 shows that students scored higher in English and Combined Subject. There are wide variations in academic achievement among students in English ($M=28.0$, $S.D.=8.95$), Mathematics ($M=21.0$, $S.D.=9.37$) and Combine Subject ($M=25.0$, $S.D.=7.65$). The wide variations suggest that provinces were very different regarding student achievements in the three subject areas. However, the wide variation in Maths ($M=21.0$, $S.D.=9.37$) suggests large differences among students in Maths achievement.

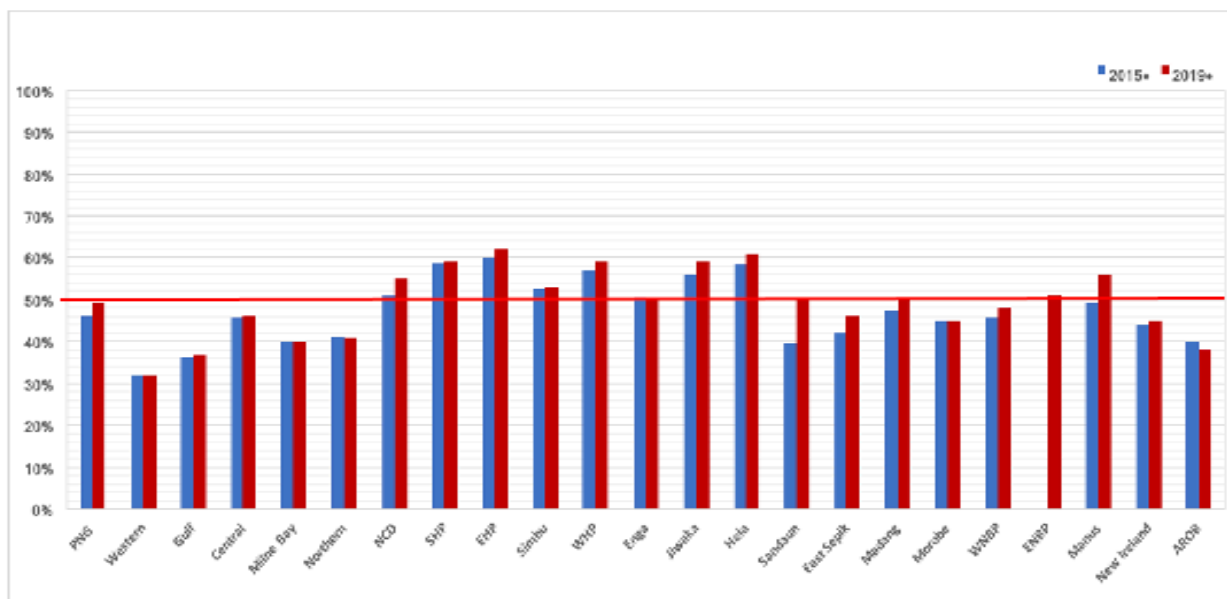
Table 1: Means and standard deviations of outcome and explanatory variables

Subject	N	Mean	Std. Deviation
English	73,044	28.0	8.95
Maths	73,071	21.0	9.37
Combined Subject	73,004	25.0	7.65

Papua New Guinea does not have standardised assessments that allow comparisons of performance between provinces and districts over time. However, using Grade 8 national examinations in a range of subjects show causes for concern as many fall well below national averages for learning outcomes. There are alarming differences in performance and attainment between provinces and districts.

Grade 8 examination results from the Measurement Services Division (MSD) database show pronounced differences between provinces (Figure 5) and weaker maths performance against national standards (Figure 6). This was confirmed by the PILNA student assessments (PILNA, 2015).

Figure 6: Grade 8 examination average scores by province in 2015 and 2019



Source: Calculations from the Department of Education’s Examination data (2019) and (2015) by the authors

The current general agreement is that, overall, the quality of learning in basic education is gradually improving from 2015 to 2019 but still below the expected national standard. One of the ways to assess the quality of learning is using Grade 8 Examination pass rate. A sample of Grade 8 Certificate of Basic Education results analysed in 2015 showed low literacy, numeracy and combined subjects’ skills in the three examined subjects compared to 2019. As illustrated in Figure 6, the Grade 8 examination results also show pronounced differences between provinces. Further, the results show that 14 of the 22 provinces scored below the all-PNG cut off mark of 50 percent in 2015. Even the provinces that have attained high access rates, the quality of education is poor.

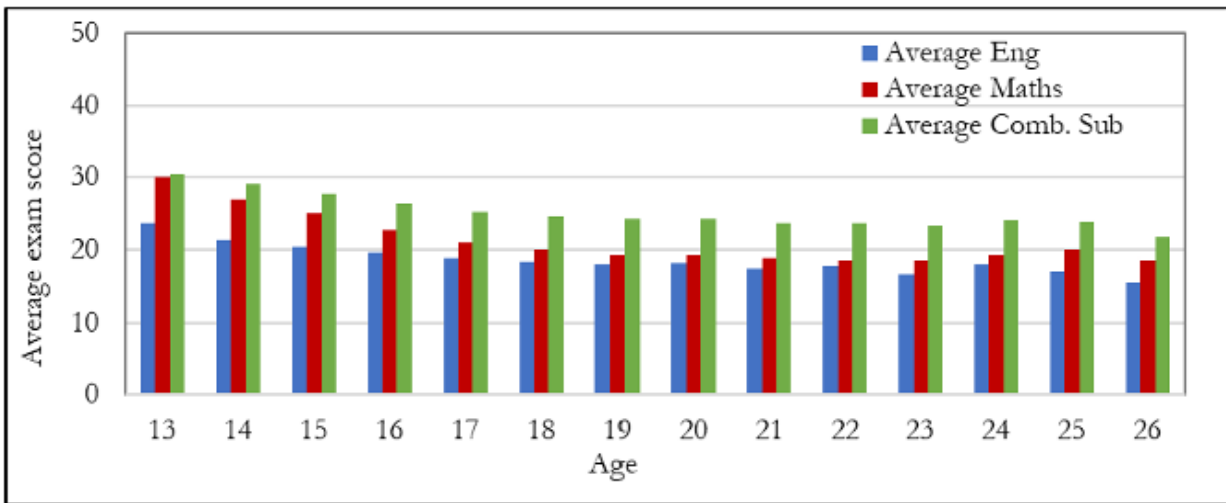
From the exam data in Figure 6, it is possible to say that most of the Highlands provinces as well as the National Capital District performed well above average in both 2015 and 2019. Although, the all-PNG pass mark is slightly below average, there is a slight improvement in the Grade 8 exam in 2019 (49%) when compared to 2015 (46%). Provinces that have shown improvements include National Capital District, Southern Highlands, Eastern Highlands, Simbu, Western Highlands, Jiwaka, Hela, Sandaun, ESP, Madang, WNB, Manus and New Ireland.

The Momase and New Guinea Island’s provinces have shown some improvements in 2019 compared to 2015 performance except for Autonomous Region of Bougainville which declined in 2019. Sandaun, Madang, East New Britain and Manus have scored above average in 2019.

By contrast, the Southern Region provinces have performed well below the average pass rate in both 2015 and 2019. They really need to improve on their academic performance.

Currently, most students enter school well past the official entry age of six, and overage students occupy a large part of the available classroom space. A major emphasis of the UBE programme will be to increase net admission rates; that is to have children enter school at the official age and progress through the system at or near the typical age. An analysis comparing data from 2015 and 2019 grade eight average examination score to enrolment data show that overage students progressing to Grade 8 have lower rates of examination scores than their younger counterparts, and among those sitting for the exam. The scores obtained by the overage students were marginally lower (Figure 7 and Figure 8).

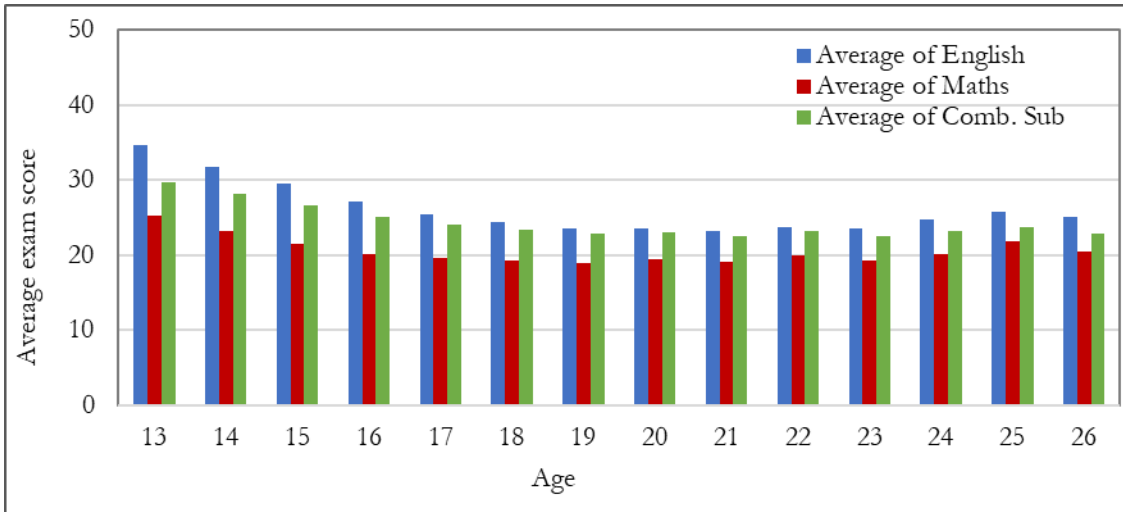
Figure 7: Grade 8 average exam scores by age in 2015



Sources: Calculations from the Provincial Division of Educations and the MSD data, (DoE, 2015) by the authors

Figures 7 and 8 show Grade 8 examination average scores by subjects and age in 2015 and 2019. The examination results have increased overall, marked differences among subject persists, with students performing better in combined subjects, followed by maths and English in 2015. By contrast, students perform better in English followed by combined subjects and maths in 2019. Overall, maths performance seems weaker against national standards. That is the examination maths results are significantly lower than English and combined subjects.

Figure 8: Grade 8 average exam scores by age in 2019



Sources: Calculations from the Provincial Division of Education and the MSD data, (DoE, 2019) by the authors

About 65 percent of average Grade 8 students aged 16 and above sat for the Certificate in Basic Education Exam – meaning that 35 percent either dropped out during the school year or were still in school but did not sit for the examination. Those not writing the examination are likely to have lower learning achievement than those writing it. In contrast, 85 percent of Grade 8 students aged 15 and younger sat for the examination. As a result, these percentages should be considered a rough indication only – with the general tendency for average students to be less likely to sit for the examination than the younger students. Moreover, the average score of older students sitting the examination was 23.0, lower than the average score of 26.0 obtained by students aged 15 and below. The poorer learning achievement results obtained by average students support the thrust of the UBE plan to focus on getting children in school at the official age and decreasing the numbers of average students in the system.

Discussion

Existing UBE Policy in Papua New Guinea

The Universal Basic Education agreed goal and objectives are set in the Universal Basic Education Plan, 2010 – 2019 and other related documents like MTDS, Vision 2050 and the National Education Plan, 2021 – 2029 (Department of Education, 2020).

The Universal Basic Education Plan clearly defines UBE in PNG context as a full cycle of basic education, all children of school age must have access to education, stay and participate in school to complete a full nine years of basic education which comprises of three years of elementary and six years of primary education, and should have learnt skills, knowledge and values covered in the basic education curriculum (Department of Education, 2009).

The Universal Basic Education Plan, 2010 – 2019, (Department of Education, 2009) emphasised that if all children of school age have access to a school, whether they are participating and retained to complete the full nine years of basic education cycle and have acquired the knowledge, skills and competencies to equip them for work and life in their rural village settings, they can participate in meaningful tasks that have the potential to bring rewards to improve their lives.

On the basis of UBE definition, the essential ingredients that are identified to measure UBE are common throughout and are best summarised in the key objectives of the UBE Plan as follows:

- Access – All children should enter school at a specific age (age six in prep);
- Retention — All children should complete the elementary and primary cycles of education that constitute basic education – this is nine years of basic education; and,
- Quality — All children should reach a required standard of literacy and numeracy at the end of these years of basic education.

Implications of the results from this study for Papua New Guinea UBE Policy

At access rates, this study shows that access to basic education is gradually improving for most of the provinces in Papua New Guinea. Less than half (46%) of the children who are yet to have access to basic education were excluded at the point of admission. This was due to, amongst other factors, a high enrolment of underage and overage children. Analysis of student enrolment data shows that at the national level, the admission of six-year-olds to elementary prep increased progressively since 2015 but still below the national standard. This increase was slower than the increase in the admission of overage and underage children between 2015 and 2019.

A low access rate indicates there is a need to open new schools and expand existing schools to create more opportunities for children turning six years of age to enroll at a school. A 100 percent access rate is the target where all children reaching six years of age enter school.

Low enrolment of six-years-old and high enrolment of underage and overage children

Slightly below half (46%) of children who are yet to have access to basic education were excluded at the point of admission. This was due to, amongst other factors, a high enrolment of underage and overage children. Analysis of student enrolment data shows that at the national level the admission of six-year-olds to elementary prep increased progressively since 2015, however, this increase was slower than the increase in the admission of overage and underage children, which increased markedly between 2015 and 2019 and at a steady pace thereafter. Underage and overage children take up space that otherwise will be filled by children from the population of correct school age. To minimise the enrolment of overage and underage children, the implementation of enrolment policies should be closely monitored to ensure that there is compliance at the provincial, district, and school levels to ensure that all children are admitted to elementary prep when they are six-years-old. This will

help minimise the admission of underage and overage children in the long term. Moreover, alternative modes of schooling such as Flexible, Open and Distance Education should be provided to enable out-of-school youths and adults to progress through the education system to achieve similar outcomes provided by the formal school system.

Learning achievement of younger versus overage students

Currently, most students enter school well past the official entry age of six, and overage students occupy a large part of the available classroom space. A major emphasis of the UBE programme will be to increase net admission rates; that is to have children enter school at the official age and progress through the system at or near the typical age.

An analysis comparing data from the 2019 Grade 8 average examination score to enrolment data from the 2019 school census showed that overage students progressing to Grade 8 have lower rates of examination scores than their younger counterparts, and among those writing. The scores obtained by the overage students were marginally lower (Figure 2).

About 65 percent of overage Grade 8 students aged 16 and over sat for the Certificate in Basic Education Exam – meaning that 35 percent either dropped out during the school year or were still in school but did not appear for the examination. Those not sitting the examination are likely to have lower learning achievement than those who are sitting for it. In contrast, 85 percent of Grade 8 students aged 15 and younger sat for the examination. As a result, these percentages should be considered a rough indication only – with the general tendency for overage students to be less likely to sit for the examination than the younger students.

Moreover, the average score of older students sitting the examination was 23.0, lower than the average score of 26.0 obtained by students aged 15 and less. The poorer learning achievement results obtained by overaged students supports the thrust of the UBE plan to focus on getting children in school at the official age and decreasing the numbers of overage students in the system.

Factors promoting and restricting achievement of indicator

The delay entry will most likely disadvantage children entering school, especially where it is related to poverty. Those children enrolling in school at later years are most likely from the disadvantaged or marginalised families that have low ability to pay the costs of elementary schooling.

The basic education school curricula are generally not multi-graded. All children in a grade receive the same curriculum independent of their level of cognitive development. With wide ranges in age, the natural differences in ability within an age group is over laid on that which comes from age related cognitive development. Mono-grade curricula assume learning readiness across class groups of children who can progress at the same pace. Wide age in grade ranges with mono-grade learning and teaching seem likely to increase the chances of failure and drop out of those much overage for their grade. Amongst the reasons will be repeated failure to succeed and the effects this may have on motivation; social tensions arising from different levels of maturation in the same group with older less capable children alongside younger peers; and pedagogies that may be suited to one age group necessarily being experienced by children in other age groups.

Being overage almost certainly has unfavourable effects on girls' participation where cultural practices in PNG give preferences to boys schooling, young ages of marriage are common, and puberty occurs whilst still in the primary grades. Two patterns exist in low enrolment countries. In the first, fewer girls enter school than boys in Grade 1 and differences in enrolments persist throughout the primary grades. This problem has to be addressed at the point of entry with incentives to enroll girls and public campaigns to change attitudes.

Cohort Retention Rates

At Cohort retention rates, this study indicates that high number of children are dropping out of school before successfully completing grade eight in 2015 and 2019. A high number of students leaving school is more notable in the Southern and Highlands regions.

This study shows that low retention rate indicates that many children are leaving school without completing the full cycle of primary school. Efforts must be made to address school and community problems that contribute to poor retention. A 100 percent cohort retention rate is the target indicating that all children that enter first grade complete the full cycle of basic education.

Data presented in this report show that more than one-third of the children who enroll into elementary prep in elementary schools do not complete Grade 8. This is a common problem across PNG. Of the children that started school in 2011, about 72 percent completed Grade 8 while nearly 29 percent had left school. There are great variations between provinces. Close monitoring is needed to identify districts that are performing poorly in order to provide appropriate interventions to keep students in school so they can complete the full nine years of basic education.

High dropout of children in basic education

Although student enrolment increased substantially at the basic education level, retention of children at the basic education level declined slightly between 2015 and 2019. The proportion of children who left school (25%) in 2015 and those who left school in 2019 (28%) was quite high. According to the PNG Household & Income Expenditure Survey (2006), children drop out of school in PNG for various number of reasons. These include no school fees, no interest, did not pass exam, family did not allow, school too far, work, safety and harassment, and overcrowded classrooms. These factors should be addressed at the national and the sub-national levels, at the school level, and by local communities to provide a barrier free environment for children to attend and remain in school, and complete the full nine years of basic education.

Factors promoting and restricting achievement of indicator

A factor which could be a very prominent driver towards promoting attainment of this indicator is related to the fact that there are engagement strategies which must be taught to educators and made mandatory in the facilities. These strategies would ensure that each student realises the value of education and must be taught to them, along with enhancing their interests towards completing the same. However, peer pressure could be one of the major roadblocks towards achieving the targets, to which student loans could be organised to ensure proper and effective engagement of students.

Examination

This study shows that distribution of examination scores showed wide provincial disparities. In the Highlands Region, Eastern Highlands, Southern Highlands, Hela, Jiwaka and Western Highlands provinces are notable outliers in that more than 50 percent of pupils sitting for the Certificate of Basic Education (COBE) scored above the all-PNG performance benchmark. By contrast, fewer than 20 percent of pupils in Western, Gulf and Northern in the Southern Region were able to score the same results. In New Guinea Islands, Manus and East New Britain provinces were able to score more than 50 percent while West New Britain, New Ireland and Autonomous Region of Bougainville scored below the performance benchmark. In Momase Region in Sandaun and Madang, 50 percent of students reached this level, while Morobe and East Sepik provinces fell short of the performance benchmark.

At the other end of the scale, only 90 percent of Western, 87 percent of Gulf and 80 percent of the Northern provinces' pupils were at the lowest performance benchmark. This is to say that in Western and Gulf provinces, nine out of 10 students (90%) scored below the all-PNG pass mark of 80, and eight out of 10 (80%) did so in Northern Province.

What do these numbers indicate about education quality and provincial disparities in PNG? In part, the answer depends on conceptual approaches. PNG's Constitution emphasises human capital. These scores would roughly translate into basic skills and knowledge that will be utilised in PNG's contemporary societies and in higher institutions. According to Menefee & Bray (2015), lower performance scores would indicate lower levels of human capital being produced in education systems.

So, this analysis shows that large number of children scoring low pass mark early in their lives will remain at a disadvantage level and are more likely to drop out of school early, even if they are allowed to progress to secondary education. This is to say that in PNG, there is real fear that those 51 percent of children scoring below the all-PNG benchmark are facing the educational struggles of the 'poverty trap'. It will be difficult for them to reach secondary schools and then to compete for higher institutions.

But since the average score across provinces and districts is low and far below the National cut off mark of 80, provinces and districts would lower the National cut off mark in order to select students to continue Grade 9, which in turn would cause the quality of learning in those provinces, districts and PNG as a whole to decline. If provinces and districts continue to set their cut off marks below 80, then this will have a downside effect on students' academic performance at the secondary education for the same group of students who have been enrolled with low cut off marks into Grade 9. This approach poses high risks for these students to drop out even before completing lower secondary education. This will lead to poor quality of learning which suggests that rigorous efforts are needed to improve quality of learning, especially at the basic education at village, ward, LLG, district, province and national levels.

Factors promoting and restricting achievement of indicator

Factors that can contribute to effective learning from PNG and Global research can be used to inform school and community as well as District officials to undertake relevant activities that can improve learning opportunities at the school level. As mentioned above, many are simple low-cost interventions such as ensuring that teachers and students are engaging in learning activities every day of the school week. The provision of textbooks and good classroom learning environment are other low cost-effective community-based interventions.

Recommendations for implementation of Papua New Guinea UBE Policy

The key UBE indicators that impact students' access to education, retention and learning outcomes are sensitive to changes in government policy and practices.

Age factor is one of the most important variables in this study that affects student access to the first year of basic education.

The results of this study further highlighted the need to urgently address issues of access and quality of education in PNG. Study data indicates that low student achievements are evident in older students. According to Department of Education Statistics (2021), enrolment of overage students either through repetition or at admission denies access to education of those in the correct age. This issue is severe and can be found in many elementary and primary schools in Papua New Guinea. To ensure appropriate education of good quality, it is crucial that efforts are made to increase the enrolment of students by correct age, while seeking alternatives for those students who are in need of relevant learning opportunities.

The government has to acknowledge the fact that access to education, retention rate and poor quality and learning outcomes are some of the problems that exist in basic education and has to do something about them now.

Direction for future research

It would seem to merit further investigation into the factors behind the low participation rate of six-years-old and better understanding of the reasons will help in designing effective strategies for getting parents to enroll their six-year-old children in school.

Similarly, there are a number of gaps in the literature where more research could be carried out. In particular, there is little research on the processes of cohort retention rates and drop out, with very limited or no studies in PNG focusing on who drops out and why. There is little literature on dropping out of school in PNG.

Future research can be conducted on why some children stay in school and others leave; how Early Childhood Care Development (ECCD) may reduce drop outs; motivational factors around choices to continue schooling; and the role of school teachers and parents in facilitating the retention of students and/or pushing students out of schools.

More research can also be conducted to identify new teaching methods that could support different learning styles of various students. This research can also identify factors such as high pupil to teacher ratios, non-availability of text books, teachers' absenteeism that can contribute to effective learning at the school level. These simple and low-cost interventions can ensure that teachers and students are engaged in learning activities every day of the school week.

Conclusion

This study indicates that almost half of the children enrolled in Elementary Prep are overage or underage. Possible causes of this would include learners starting school early or late. The mix of these and any other contributory factors in early or late admission of children in the first year of basic education is not clearly known and is an issue that begs further investigation.

It is also clear that students' scores in the English, maths and combined subjects' examinations confirm the declining state of learning which characterises the system: the seeds of low pass rates at Grade 8 level, and declining participation and cohort retention rates in upper basic education is sown in the early years of schooling, especially in elementary. What this study adds to this picture is that overage children perform less well than appropriate age cohort. This finding also needs further research for confirmation. But whatever the real relationship between overage and underperformance, it is a major problem in the system, and requires attention to address the low performance in learning outcomes of the school system, and the high rate of dropouts in basic education level.

In order to help under and overaged children, low performing learners to achieve at acceptable levels and minimise high dropout rates, further research has to be conducted to fully understand the reasons and identify the factors. These will provide better interventions that will help in designing effective strategies in getting parents to enroll their six-year-old children in school, address low performance in learning outcomes of the school system, and the high rate of dropouts in basic education. Providing better interventions in these areas will further boost access, improve participation, and ensure a quality education for all.

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