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Enrolment at a Private-Higher Educational Institution in Jamaica: Is there a need to defeminize higher education?

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Abstract

The enrolment challenges experienced in the Western world has been a cause for concern for decades and this is not limited to higher educational institutions in Jamaica (Reid, 2016; RJR, 2016, 2017; Wilson-Harris, 2015). However, Northern Caribbean University's (NCU) image has been used when speaking about this phenomenon in Jamaica (RJR, 2016). There is no denial that NCU has to address the enrolment dilemma that has befallen it since 2010. In 2016-17, new student enrolment increased by 132.1% (n=918). This represents a historic achievement in 25 years (1994-2017). Prior to the academic 2016-17, there were four consecutive years of dwindling new enrolment at NCU (2013-to-2016). The most striking reduction was the 49.8% in 2014-15. In order to contextualize the drastic change that occurred in the 2016-17 academic year over the last decade (2008-2017), it must be noted that enrolment declined for six of those years. The statistics indicate a change in the dwindling trend of enrolment at the institution for the first in almost 25 years (1994-2017). The new student population outstripped the returning student population, 1613 and 1611 respectively. In 2015, an article in the Jamaica Gleaner that was entitled 'Students shun Christian colleges' **(**Wilson-Harris, 2015) used the declining enrolment at NCU, Regent College of the Caribbean (former Jamaica Bible College), and United Theological College of the West Indies (UTCWI) to make an assertion that it is the Christian based philosophy that is accounting for the enrolment decline at these institutions. The author suggested that Christian based ethics is the reason for declining enrolment with little emphasis on the macroeconomic concerns of the nation. The geometric rise in new student enrolment for 2016-17 is a clear indication that the author misspoke. This paper provides evidence to show that the macroeconomic environment in Jamaica is accounting to some degree for the enrolment dilemma. In fact, there is a positive non-linear association between disposable income and new student enrolment. As such, the improvement in new student enrolment at NCU is undoubtedly attributable to financial resources (i.e., ability to pay or otherwise).

Therefore, using ‘Christian ethics and philosophy' to explain the challenges that the institution is experience is more anecdotal than evidence-based. On examination of the statistics on enrolment at NCU, there is a challenge that requires urgent attention and one that signals a social challenge for the family. Gender disparity in enrollees is striking. Over the last 25 years, the sex ratio (i.e., number of males divided females * 100) has been exponential declining and this has reached an alarming rate of 28 males per 100 females. Although this does not indicate marginalization, it is clearly signaling future social challenges for the society. Given such findings, to what extent are product offerings at higher educational institution attractive to males? Further research is needed to determine the interest of males as it relates to education and training. The feminization of education is somewhat typical in Jamaica and while this is not comforting news for the organization, the matter requires immediate attention and solution.

Keywords: Enrolment, Higher Education, Gender Disparity in Education, Sex-ratio Disparity in Higher Education.

Introduction

Globally, student enrolment at the tertiary educational institution has been a topical issue simply because of its influence on finances and viability of the organizations as well as the fact of the human development (Teichler and Burger, 2005; Angus, 2017; Chipman-Johnson and Vanderpool, 2003). In fact, across the globe, enrolment is of primary concern to leaders in universities and this phenomenon is of concern in Jamaica (OECD, 2009; Matsolo, Ningpuanyeh, and Susuman, 2016; Ministry of Education, 2017; Park, 2017; Cheesman, Simpson, and Wint, 2006; Steyn, & De Villiers, 2006). Studying the European Organization for Economic Co-operation and Development (OECD) member from 1995 to 2001, Teichler and Burger (2005) found that student enrolment had increased by 24 percent, with there being an annual increase of some 2 percent and the figure was 3 percent in Japan. According to Teichler and Burger (2005), "Growth in absolute numbers of students leveled off since the early 1990s in most European OECD member states. It remained high only in countries with previously low enrolment rates, while it falls to about 1 percent annually in the countries with previously high rates" (p. 7).

Unlike what obtains in OECD member states, Caribbean tertiary educational institutions, particularly the private ones have been struggling under declined enrolment (Reid, 2016; RJR, 2016). Hence, there is no surprise at the announcement of the Minister of Education in Jamaica, Mr. Ruel Reid that his government wants to increase student enrolment at tertiary institutions by providing aids and grant (Angus, 2017). One of the challenges for the government as well as higher educational institutions is the liberalization of the education

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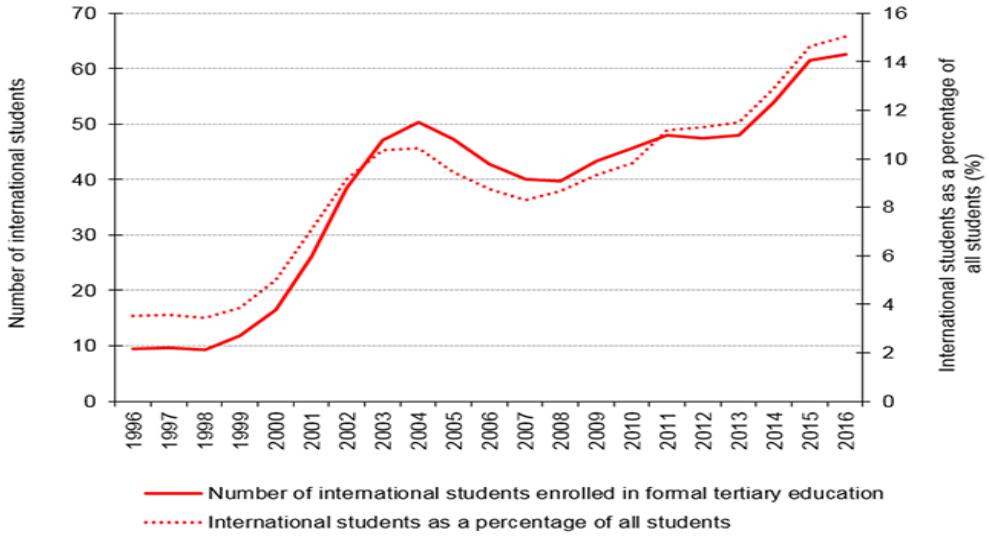
landscape, which has compounded the problems of the economic viability of institutions (Coates, u.d; Portnoi, Bagley, & Rust, 2010). The educational product has been a cause of concerns for decades to the point where many studies have sought to examine issues surrounding the phenomenon (Braithwaite, 1958; Fulton, 1981; Holding and Burke, 2005; Park, 2017). In fact, one writer examined principles and policies in higher education (Fulton, 1981) as the path to understanding a new framework. The new framework for education also extends to the Caribbean. Jules (2010) suggested that policies makers in the Caribbean need to change the old paradigm, as the current realities demand new philosophical assumptions, understanding, and solutions. The importance of this new paradigm must be first articulated, and framed before framework can be fashioned that can use to change the enrolment reality in a higher educational institution. Without this paradigm shift an understanding of the new marketplace including the role of higher education in development, it will be a mammoth task for a government to increase enrolment. It is not difficult for Minister Ruel Reid to increase enrolment in tertiary educational institutions in Jamaica as New Zealand has been experiencing continuous growth in its international student population (see Figure 1).



Source: New Zealand Government (2018). https://www.educationcounts.govt.nz/statistics/indicators/main/student-engagement-participation/international_students_enrolled_in_formal_tertiary_education

Figure 1.Enrolment of the International student in tertiary educational institutions in New Zealand, 1996-2016

Enrolment in higher education is a challenging phenomenon for many universities in the United States (World atlas, 2017) and the Caribbean is no different in this regard (Reid, 2016; RJR, 2016; CaPRI, 2007, 2009; Jamaica Gleaner, 2015a) as well as in small states (Bray and Martin, 2003). To grasp the extent of the catastrophic dilemma of enrolment in tertiary education in the Western Hemisphere, Reid (2016) utter these words, **"**The Caribbean has the lowest enrolment in tertiary education in the Western Hemisphere, and Jamaica is among those countries with the lowest figures in the region" which speaks to the trend in higher education that is also noted by Griffith (2017). Northern Caribbean University (NCU) is a

Christian higher education institution that is privately owned and operates from four physical geographical areas in Jamaica (Mandeville in Manchester; Kingston; Salem in St. James, and Run-away Bay in St. Ann). This higher educational institution is experiencing dwindling enrolment (Jamaica Gleaner, 2015a, 2015b). To overcome the issue identified above, policymakers must first examine 1) determinants of attending higher education, 2) enrolment statistics, 3) liberalization and its influence on domestic products including higher education, 4) financing of education, and 5) policy framework on education, especially tertiary level education.

An article in the Jamaica Gleaner dated July 2, 2015, entitled 'NCU fights dwindling enrolment' (Jamaica Gleaner, 2015b) encapsulates the challenges of privately owned tertiary educational institutions in the Caribbean (see also, Jamaica Gleaner, 2015a). Some context must be brought to the discussion of enrolment as statistics from the University of the West Indies (UWI) revealed that the Mona campus (in Jamaica) has been experiencing increases in enrolment and the reverse is true for the Cave Hill Campus (in Trinidad; University of the West Indies, 2017). The positive trends in enrolment at the Mona Campus, UWI, was noted by the Pro Vice-Chancellor and Principal, Professor Archibald McDonald, that the figure reached a record of 17,200 in 2016 (Jamaica Observer, 2016). NCU, on the other hand, is experienced a 36% decline in enrolment for the 2014-15 academic year compared to a 3.4% reduction at University of Technology, Jamaica, (UTECH) and 1.8% increase at UWI (Jamaica Observer, 2016). Radio Jamaica Reditone (RJR) noted that UWI was the only higher level educational institution that had seen an increase in enrolment for 2014-15, which is even the more for an empirical inquiry into new enrolment at NCU. The current study seeks to evaluate the enrolment of a new student at NCU dating back to 1994 in an effort to provide research findings that can be used to inform decisions.

Methods

For the present study, time series data were used, and these were taken from the University Information Support Systems (UNISS). The timeframe for the present study was from 1994 through to 2017 (2 decades). The date of the collection of the data was May 1, 2018. Data were recorded, stored, and retrieved using the Statistical Packages for the Social Sciences (SPSS) for Windows, Version 24.0. Descriptive statistics were calculated on the matter of new student enrolment from 1994-2017 as well as new-old student ratio. In addition to general descriptive statistics on students-enrolment from 1994-2017, annual percent change, sex ratio, and graphic depictions were used to provide a comprehensive outlook of the enrolment changes (i.e., patterns) at the university for the last 2 decades (1994-2017).

Findings

Table 1 presents the student population at NCU from 1994 to 2017 disaggregated by gender, new-old student ratio per 100, and totally new and entire student population. In 1994, the

new-to-old student ratio stood at 13 per 100 old students and this has been increasing ever since to the current value of 100 per 100 old students (see Figures 2& 2). The population of new students can be fitted with a cubic polynomial function, which is expressed in Equation (1), with 80.1% of the values being fitted by the curve:

$$Y = - 0.4421x^3 + 6.5477x^2 + 146.7x-201.15 \quad (1)$$

Table 1.Student population and new-old student ratio, 1994 to 2017

Year	New Students		Population		New-Old student ratio per 100
	Female	Male	New	Entire	
1994	61	29	90	791	13
1995	79	58	137	1438	11
1996	120	63	183	1561	13
1997	160	78	238	1684	16
1998	326	146	472	2077	29
1999	667	260	927	3092	43
2000	682	242	924	3742	33
2001	1186	360	1546	4492	52
2002	1211	446	1657	5034	49
2003	1237	366	1603	5307	43
2004	1050	279	1329	5267	34
2005	1170	369	1539	5533	39
2006	1225	258	1483	5830	34
2007	1428	433	1861	5819	47
2008	1748	455	2203	6122	56
2009	1565	432	1997	6162	48
2010	1312	451	1763	6078	41
2011	1740	579	2319	5770	67
2012	1843	605	2448	5426	82
2013	1343	535	1878	4887	62
2014	1249	464	1713	4473	62
2015	653	207	860	4066	27
2016	509	186	695	3858	22
2017	1262	351	1613	3224	100

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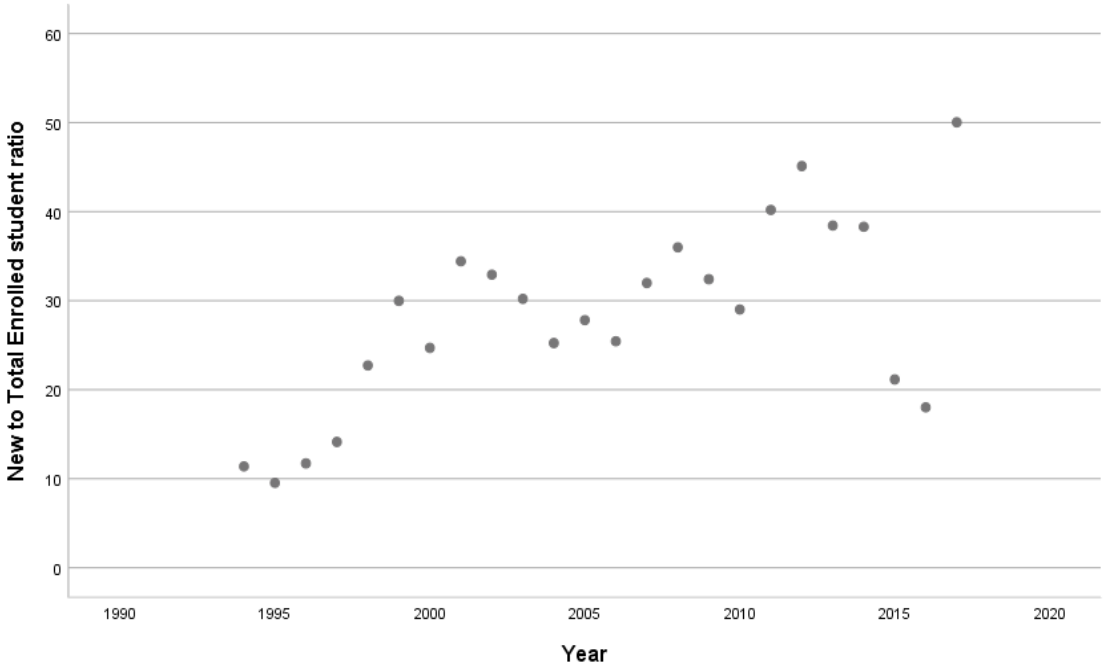

Figure 2.New student population, 1994-2017

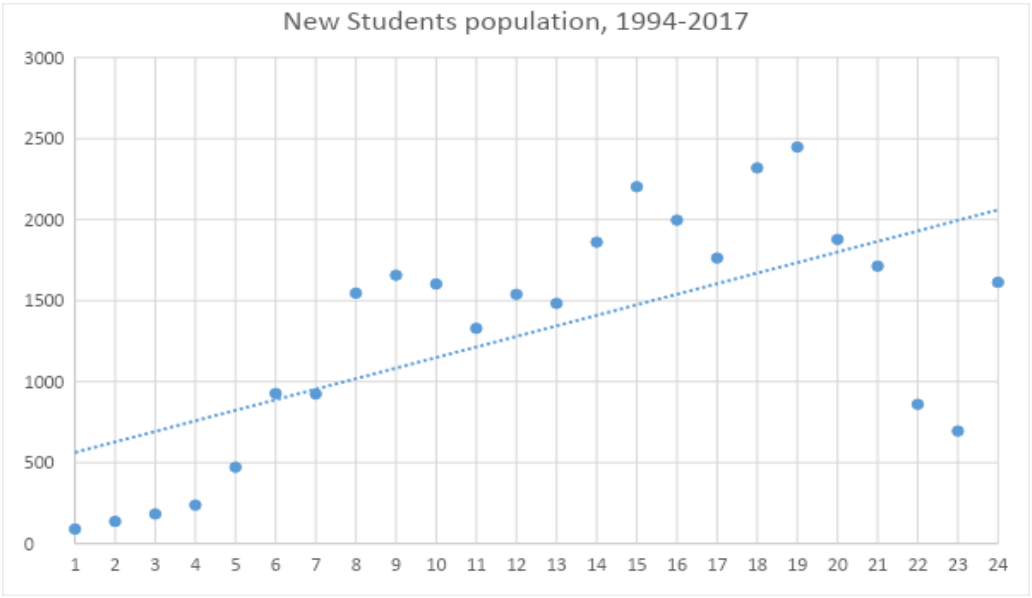

Figure 3.New student population fitted by a polynomial function (cubic), 1994-2017

Figure 4 depicts the student population at NCU between 1993 and 2018 disaggregated by total and new student population.

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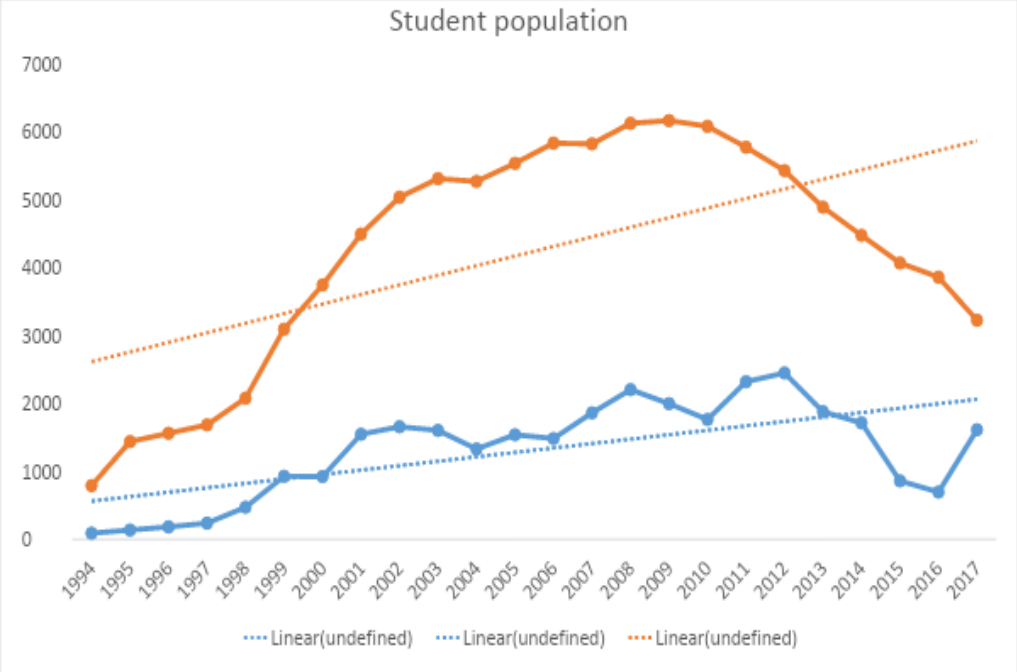

Figure 4.Student Population, 1994-2017

$Y = -0.4421x^3 + 6.5477x^2 + 146.7x - 201.15$ ..... (1)

First derivative: $f'(x) = -1.326x^2 + 13.095x + 146.7$ ..... (2)

Second derivative: $f''(x) = -2.652x + 13.095$ ..... (3)

For turning point, let $f'(x) = 0$,

Hence, $f'(x) = 0 = -1.326x^2 + 13.095x + 146.7$ or $-1.326x^2 + 13.095x + 146.7 = 0$ ..... (4)

Using the quadratic formula to Eqn. (4), gives

$x = -6.7$ or $x = 16.6$ or 17

Given the nature of the question, negative cannot be used and so the value for usage is 17. So, substitute 17 for x in Eqn. (5)

$f''(17) = -2.652(17) + 13.09$ .....(5)

$f''(17) = -31.989$, which mean that the co-ordinate (2013, 17) are maximum turning point. It can be deduced that period 17 (i.e., 2010) was the time when new enrolment at NCU began to decline.

For the studied period (1994-2017), the average number of new students on an annual basis was 1,312±719, 9%CI: 1,008-1,614. Within the context that the standard deviation is 719 and a mean of 1,312, which means that the coefficient of variation was 54.8% this means that dispersions are wide in annual enrolments from the mean. Despite this fact, no extreme

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values or outliers were identified in this distribution (see Figure 6) and the distribution is a relatively normal one (see Figure 5).

Table 2.Descriptive statistics for the New student population, 1994-2017

			Statistic	Std. Error
New student (total)	Mean		1311.5833	146.67273
	95% Confidence Interval for Mean	Lower Bound	1008.1677	
		Upper Bound	1614.9990	
	5% Trimmed Mean		1317.0741	
	Median		1542.5000	
	Variance		516309.384	
	Std. Deviation		718.54672	
	Minimum		90.00	
	Maximum		2448.00	
	Range		2358.00	
	Interquartile Range		1100.25	
	Skewness		-.384	.472
	Kurtosis		-.966	.918

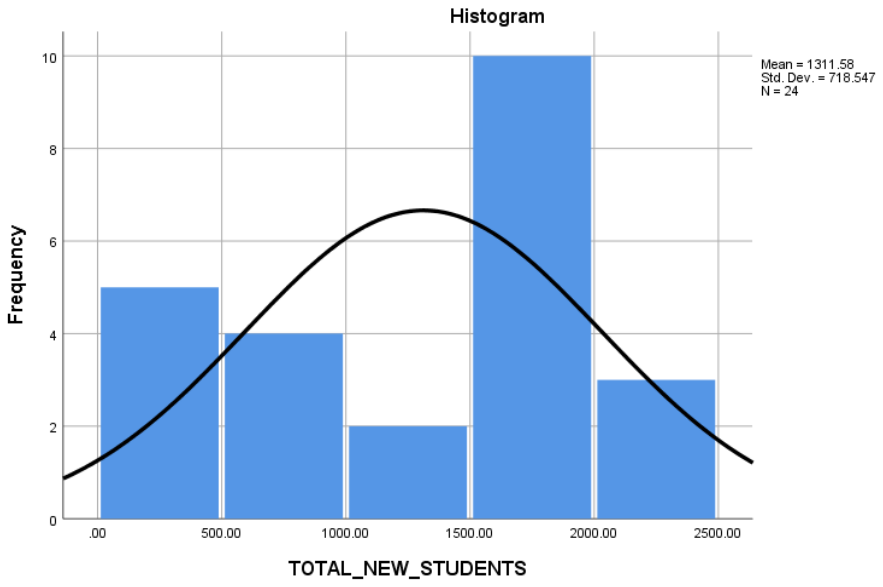

Figure 5.Frequency distribution and polygon of the new student population, 1994-2017

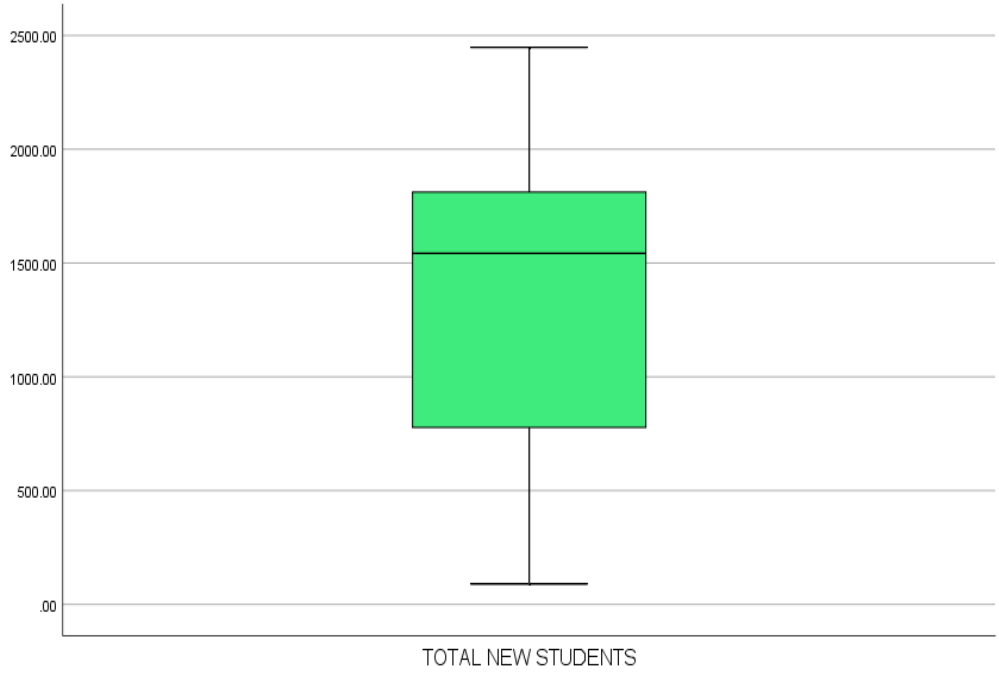

Figure 6.Box plot of the new student population, 1994-2017

Table 3 presents the student population at NCU disaggregated by gender or sex ratio and annual percent change, 1994-2017. For the 23-year period, the greatest annual percent change in enrolment of the new student occurred in 2017 over 2016 (132.1%), with most of this increase being among the female population (351%). The sex ratio (males/females * 100) in new student has been worsening since 1995 (Table 3). In 1995, there were 73 male new students per every 100 new female students, and this has drastically declined to 28 in 2017. It can be deduced from the data that there is a feminization of the education product at NCU. The statistics revealed that only in 1995 that the sex ratio 73 new-male students per every 100 female-new students, which was the highest over the studied period. The sex ratio has fallen to 21 new-male students to every 100 new-female students and this was in 2006 (see Figure 7).

Clearly, there are some positive signals in the new enrolment statistics at NCU was 49.8% decline in 2015 over 2014 and this was reduced to 19.2% in 2016 over 2015, indicating a rise in the new student population over the former period. For clarity, the decline in new student enrolment of 19.2% compared to the previous year is 61.4% improvement in the enrolment numbers. This improvement in new student enrolment showed a marked improvement over the 23-year period to record the highest positive increase in annual enrolment (Table 3). Furthermore, there is somewhat of a fluidity in the new-male student enrolment compared to that of the female (see Figure 8), which showed more sporadic movement.

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Table 3.Student population at NCU disaggregated by gender, sex ratio, and annual percent change, 1994-2017

Year	New Students				Population (new student		
	Female	Annual Percent change (Female)	Male	Annual Percent change (Male)	Total	Annual Percent change (Total)	Sex ratio
1994	61		29		90		47.5
1995	79	29.5	58	100.0	137	52.2	73.4
1996	120	51.9	63	8.6	183	33.6	52.5
1997	160	33.3	78	23.8	238	30.1	48.8
1998	326	103.8	146	87.2	472	98.3	44.8
1999	667	104.6	260	78.1	927	96.4	39.0
2000	682	2.2	242	-6.9	924	-0.3	35.5
2001	1186	73.9	360	48.8	1546	67.3	30.4
2002	1211	2.1	446	23.9	1657	7.2	36.8
2003	1237	2.1	366	-17.9	1603	-3.3	29.6
2004	1050	-15.1	279	-23.8	1329	-17.1	26.6
2005	1170	11.4	369	32.3	1539	15.8	31.5
2006	1225	4.7	258	-30.1	1483	-3.6	21.1
2007	1428	16.6	433	67.8	1861	25.5	30.3
2008	1748	22.4	455	5.1	2203	18.4	26.0
2009	1565	-10.5	432	-5.1	1997	-9.4	27.6
2010	1312	-16.2	451	4.4	1763	-11.7	34.4
2011	1740	32.6	579	28.4	2319	31.5	33.3
2012	1843	5.9	605	4.5	2448	5.6	32.8
2013	1343	-27.1	535	-11.6	1878	-23.3	39.8
2014	1249	-7.0	464	-13.3	1713	-8.8	37.1
2015	653	-47.7	207	-55.4	860	-49.8	31.7
2016	509	-22.1	186	-10.1	695	-19.2	36.5
2017	1262	147.9	351	88.7	1613	132.1	27.8

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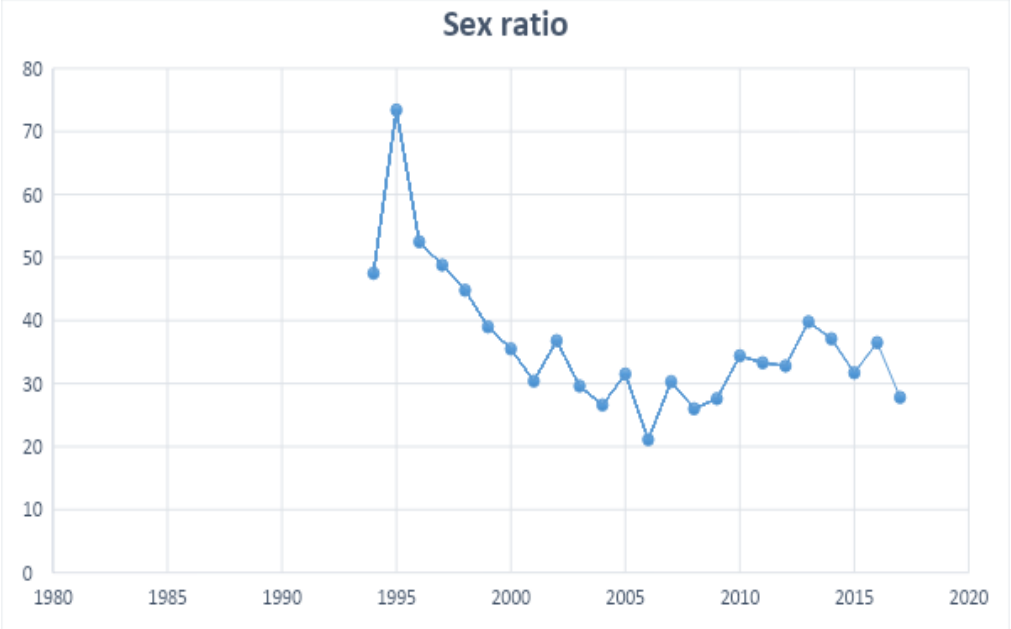

Figure 7.New student sex ratio, 1994-2017

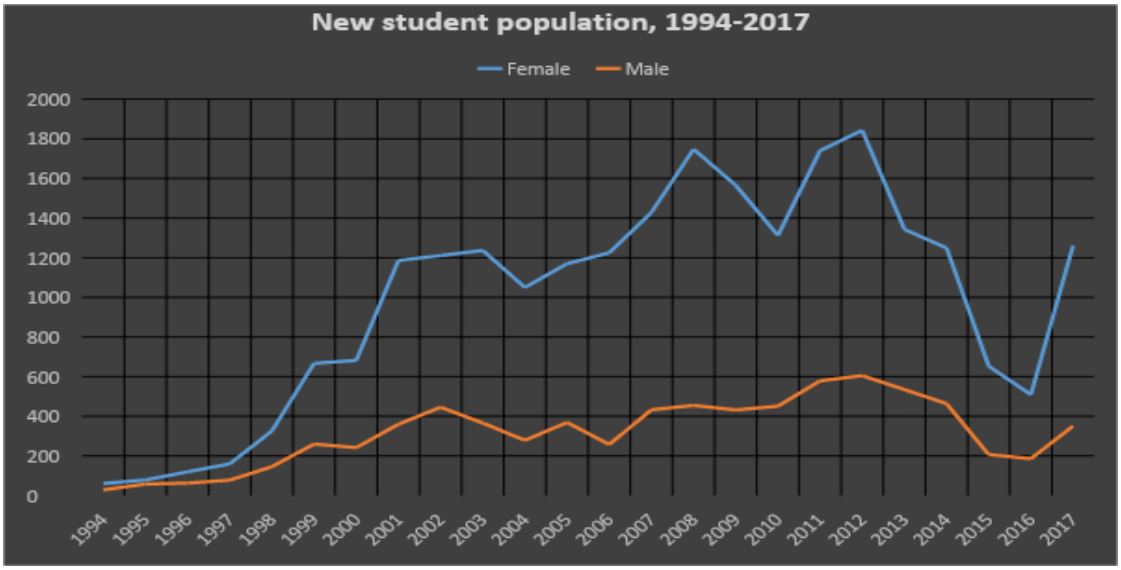

Figure 8.New student population by gender, 1994-2017

Economics and New Enrolment

This section of the paper addresses the issue of the finances and its influence on new student enrolment at NCU. Finance is taken from a macro perspective (the economy-exchange rate and Gross Domestic Product (GDP) per capita). The exchange rate is used to determine prices of imported goods in a nation, which means the valuation of goods. With Jamaica being a net import of many raw materials as well as products to include rice, wheat, machines and equipment, a rise in the exchange rate means higher prices for many items. As such, these allow for an examination of economic climate and in this case its association with new

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student population at NCU. Figure 9 shows that association between new student population at NCU and the exchange rate (i.e., US to Ja. $) is a curvilinear one. This suggests that a positive association exists between both variables reaches a peak, and then begins a decline, which can be obtained by differentiating equation (6), overleaf:

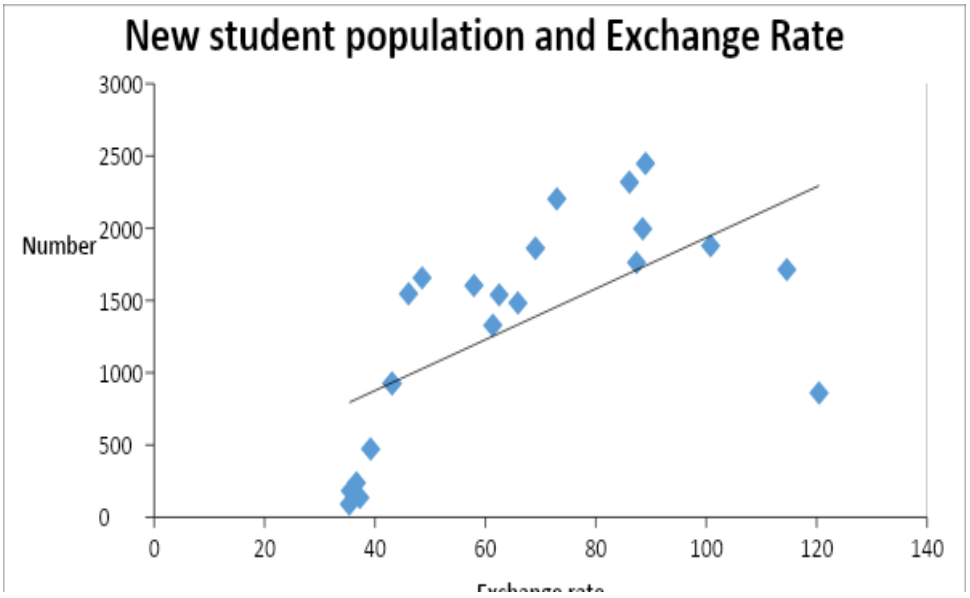

Figure 9.Scatter plot of new student population and exchange rate (US to Ja. $)

$f(x) = -0.781x^2 + 131.61x - 3425.4$ …… (6)

Where f(s) represents population of new student

first derivative (i.e., $f'(x)$): $f'(x) = -1.562x + 131.61$

For turning point, let $f'(x) = 0$, so $0 = -1.562x + 131.61$,

then $x = 84.26$ and $f(84.26) = 2119$

second derivative - $f''(x) = -1.562 < 0$ indicating that the coordinate (Ja. $84.26, 2119) is a maximum turning point

It is interpretation from the positive statistical correlation exists between new student population and the exchange rate in Jamaica whenever the exchange rate (US D to Ja. $) is less that Ja. $84.26 and reverse is true when is exceeds Jamaica 84.26 to US 1$. It follows that NCU pricing strategies as the exchange rate in Jamaica (US D to Ja. $) has exceeded Ja. $120 to US 1$. Such finding offers some insights into the challenges of NCU as it relates to tuition fee pricing.

Figures 10 and 11 shows scatter plots of the exchange rate (US D to Ja. $) and new student population disaggregated by gender of respondents. Both scatter plots are best fitted by two-degree polynomials (or quadratic equations). Within the context that the distributions are

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fitted by quadratic functions, this offers an explanation that there is the point after which new student enrolment at NCU will begin to decline. The change in new student enrolment is captured in differentiating the respective quadratic functions that seen overleaf (Equations (6) and (7)).

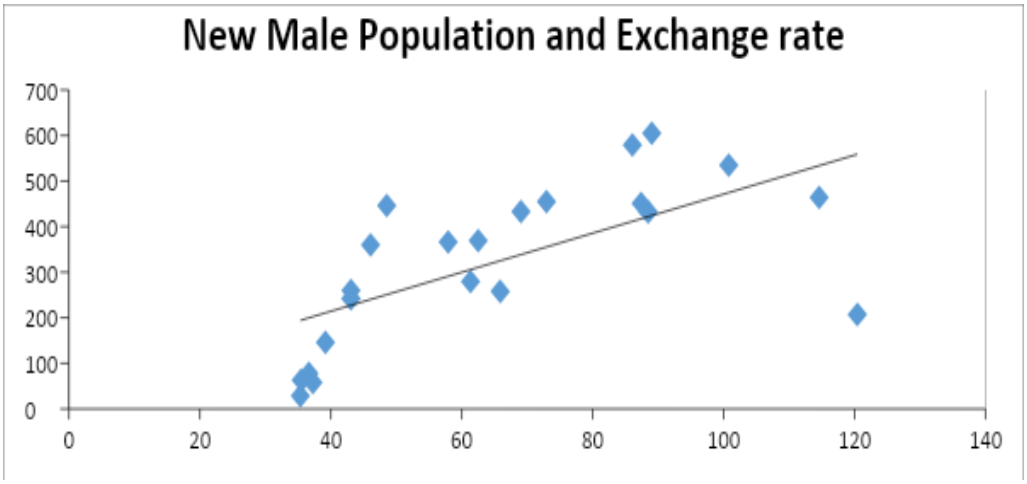

Figure 10.Scatter plot of new male student population and exchange rate (US to Ja. $)

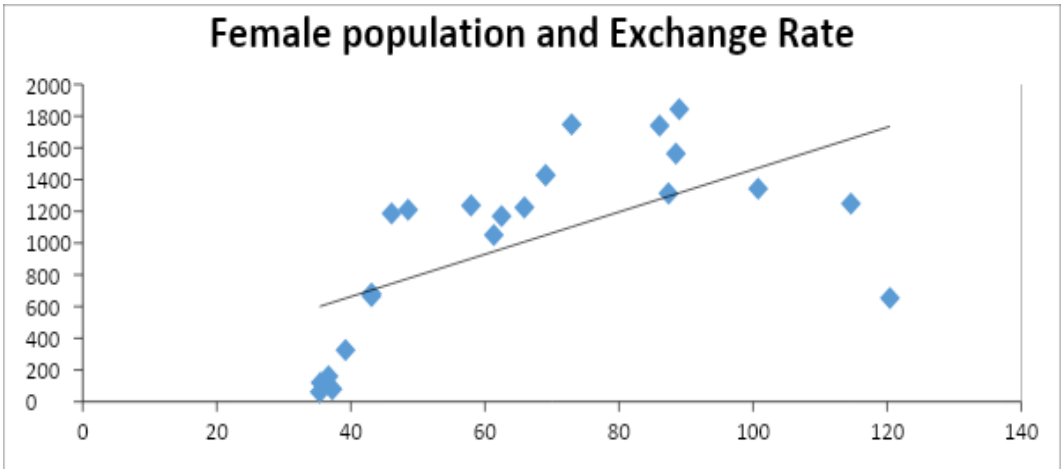

Figure 11.Scatter plot of new female student population and exchange rate (US to Ja. $)

The quadratic functions below depict the relationship between enrolment based on gender by the exchange rate, where (6) summarizes the male and (7) is that for the female:

Male:

$f(x) = -0.1563^2 + 27.091x - 676.9$ ……...……(6)

where f(s) represents population of new male student

first derivative (i.e., $f'(x)$): $f'(x) = -0.3126x + 27.091$

For turning point, let $f'(x) = 0$, so $0 = -0.3126x + 27.091$,

then x = 86.66 and f (86.66) = 497 (new male students)

second derivative - f" (x) = -0.312 < 0 indicating that the co-ordinate (Ja. $86.67, 497) is a maximum turning point.

Female:

$f(x) = - 0.6248x^2 + 104.52x-2748.5$ ……(7)

where f(s) represents population of new female student

first derivative (i.e., f' (x)): f' (x) = -1.2496x + 104.52

For turning point, let f' (x) = 0, so 0= -1.2496x + 104.52,

then x = 83.64 and f (83.64) =1623 (new female students)

second derivative - f" (x) = -1.2496 < 0 indicating that the co-ordinate (Ja. $83.64, 1623) is a maximum turning point. The findings indicate that the maximum number of new males attend NCU were 497 when the exchange rate was Ja. $86.66 and this was Ja. $83.64 for 1,623 new female students.

The new aspects of finances and new student enrolment were that of using GDP per capita. GDP per capita is an indication of the average income of each person in a society and therefore can be used to represent people's earning on average. Figure 12 depicts the new student population at NCU and per capita income. It was revealed that both variables are fitted by a power function that accounts for 79.6% of the data values. Such findings mean that direct correlation exists between people's income and attendance to NCU. This finding is revealing as it can be gleaned from the statistics that people are more likely to forego work if they have disposable income. Furthermore, Figure 12 shows that during the periods of new student enrolment that exceeds 1500, average disposable income stood at least US $4,400 per annum (or Ja. $389,356).In addition, using the concept of slope for the power function, there is evidence that a 1% rise in disposable income produces a more than 1% increase in newly enrolled students at NCU. It can be extrapolated from the findings that education switching occurs among new students to NCU at per capita income beyond US $5,600 (or Ja. $484,400). Obviously, NCU is an attractive product to poor students and this must be of values in the decision-making apparatus.

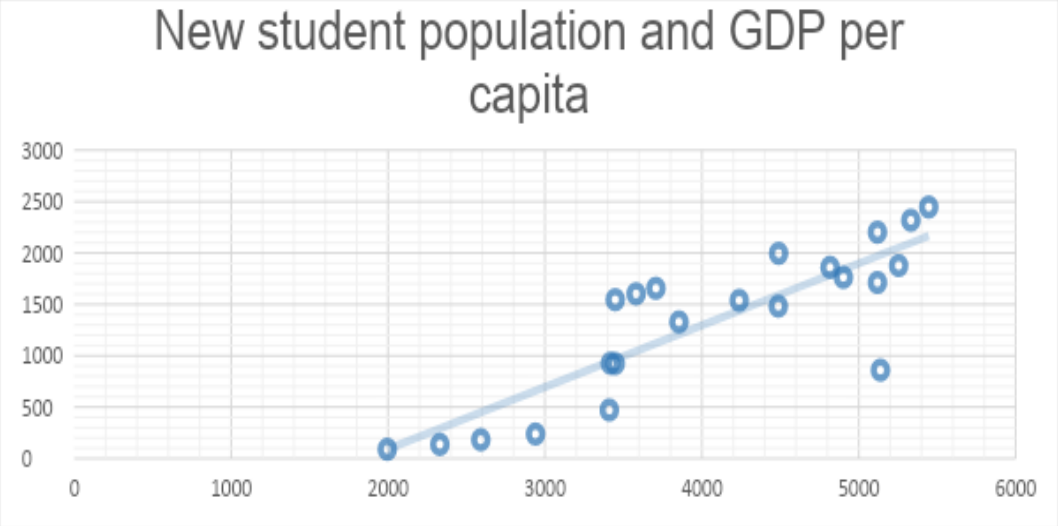

Figure 12.Scatter plot of new female student population and GDP per capita

Discussion and conclusion

Enrolment in educational institutions is a critical component in their survivability. The matter of the going concern principle (i.e., financial viability) is a rationale for educational institutions of their enrolment statistics, particularly private higher educational ones. Like other educational institutions in the Western Hemisphere, Northern Caribbean University is equally mindful of its student enrolment phenomenon, which accounts for the present analysis of new student enrolment data. In fact, the extent of the 'dwindling' enrolment of NCU is not secret as this has been featured in the print and wired media (RJR, 2016, Jamaica Gleaner, 2015a, 2015b), which is not the case for the University of the West Indies (RJR, 2017; University of the West Indies, 2017). The enrolment challenges of NCU has been labeled by one institution as 'Student shun Christian colleges' (Jamaica Gleaner, 2015a) to summarize the state of what accounts for challenges. The enrolment data for NCU on new student enrolment would support the claim that students are avoiding the institution, particularly males.

The new student enrolment statistics revealed that measures must be implemented to curtail the general dwindling in enrolment of this cohort, and this is more so for males. In 2017, the sex ration at NCU was 27 new male enrollees for every 100 new female enrollees and this highlights the feminization of the educational product. The decline in male enrolment at NCU to 1995 and this has worsened since 2013, with the exception of 2016 that saw an improvement in the gender imbalance in new applicants. Although NCU experienced an exponential growth in the newly enrolled students for 2017 over the previous year, the gender disparity was evident as 147.9% of the increase was due to female applicants compared to an 88.7% rise in male applicants. With the information that the government seeks to double enrolment in the tertiary educational institution by 2030 (Angus, 2017; Jamaica Observer,

2017), this is welcoming information for NCU, but the increase must be tailored to focus on male students.

The gender enrolment disparity must be carefully and directly addressed in order to curtail the feminization at NCU. The expected should be about 4 new male students for every 1 female student as well as a special programme that is formulated to aid the current male population. If the current feminization of new entrants is addressed by policymakers at NCU, this would be to aid the male marginalization so eloquently argued by Professor Errol Miller in his book entitled 'Marginalization of the Black male: Insights from the development of the teaching profession' (Miller, 1986). The social issues from such marginalization are accounted for in the murder pandemic that has been eroding the social fabric of the Jamaican society and Barry Chevannes speaks of this in a lecture entitled 'What we sow and what we reap' (Chevannes, 1999).

The new enrolment statistics must be seen as a call to service that should be dubbed 'Reap Male through Education and taking back Jamaica from criminalization'. The statistics are revealing much are encoded in enrolment numbers and consorted effort must be launched to comeback the feminization in higher education.

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