

Gender and area of specialization vis-à-vis students' enrolments in undergraduate degree programmes by platform in Public Universities in Kenya

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Abstract

The essence of this paper was to determine the extent to which gender and area of specialization are related with students' enrolment in undergraduate degree programmes by platform in Public Universities in Kenya. The researchers considered the cases of Moi University, Kenyatta University and Nairobi University. The study used secondary data collected from the registration offices of the respective universities for the academic years 2003/2004 and 2004/2005. These data were presented in forms of text and tables. The analysis undertook majorly the quantitative pathway using percentages and Chi Square. The overall findings have shown a discrepancy in students' enrolment per gender and area of specialization and hence lead to the rejection of the stipulated null hypotheses. The study made a number of recommendations that would enhance the universities programmes' cost-effectiveness and labour market orientation. Indeed, further areas of research are portrayed.

Key words: Gender, Enrolment, Regular and Parallel programmes, Public Universities, Kenya

I. Introduction

1.1 Background

Higher education is gradually gaining the consideration of being a strategic key to achieve complete social and economic development (Zhou & Vaccaro, 2011). This trend has imposed academic revolution and modernization of higher education in terms of programmes offered and modes of delivery (Altbach, Reisberg & Rumbley, 2009). Indeed, this move has increased the need to grasp this level of education than ever before. In fact, the increase of access to higher education is more factually attributed to the proliferation of higher education opportunities (Belyakov, Cremonini, Mfusi & Rippner, 2009) which in turn commended for quality and accreditation in higher institutions around the world (Gandhi, 2013).

Nevertheless, across times, universities have experienced imbalances in students' enrolments per area of specialization. Starting by the United States of America, a study pioneered by Zweben (2012) has proven that enrolments in computer science programmes at both degree and postgraduate levels had doubled in relative quite short time. Indeed, a report produced by Heller (2001) had pointed out that tuition fees are at the heart of differences in students' enrolment in higher education in this country.

A study undertaken Teichler and Bürger (2005) has highlighted the changes in numbers and composition of students' enrolments in Europe and Japan. In an attempt to find out the causes of changes in enrolments, Winter-Ebmer and Wirz (2002) have point out public funding to be a major determinant to enrolment into Higher Education in Europe. In the particular context of Germany, enrolments in higher education were found to be much linked to financial assistance and repayment regulations (Baumgartner & Steiner, 2005).

In the case of Africa, a study carried out in Nigeria has confirmed that enrolments' rates differ largely between universities, colleges and polytechnics. Indeed, although the statistical analysis in gender difference could

not be significant; this study has also found out that in secretarial studies, students were predominantly women over the years (Igbinedion, 2011). In South Africa, higher education is acknowledged to have substantially expanded. However, the students' participation in different programmes varies considerably and the major factors behind this scenario are age and socio-economical factors (Steyn, 2009).

In the Sub-Saharan African (SSA), women participation in education is still also lagging behind especially in Science, Mathematics and Technology (SMT) education (Masanja, 2010). In Uganda for instance, back in the year 1993, Kwesiga (1993) had demonstrated that all levels of education, women occupied negligible proportion because of factors such as family structure, lower perceived social value, economic constraints and inadequate educational structures. Although the 21st century has brought in changes in trends due to affirmative action, men are still occupying the big size of participants in Ugandan Higher education especially in the fields of Science, Technology and innovation as identified by the Report on Science and Innovation (Republic of Uganda, 2014).

Rwanda is one the countries that have achieved gender balance in primary education since the year 2001 (USAID/Rwanda, 2014). Nonetheless, the statistics of the early admissions to the University of Rwanda (UR) for the academic year 2014/2015 proved that only 1/3 of the admitted applicants were female (Ijumba, 2014).

In Kenya, university education emerged in the year 1963. Since then, the Government of Kenya has tried to open up more opportunities for higher education. This has been done by setting up universities, colleges and campuses across the country to meet the increasing demand for higher education (Wainaina, 2011). However, due to the slope in funding and the need to reduce the overdependence on grants and donor funded programmes, universities have resorted to establishing income generating initiatives. In this regard, the universities were allowed by the Kenyan government to admit self-sponsored students to make up for the short fall imposed by the Exchequer. In the year 1998, public higher education institutions in Kenya came up with self-sponsored programmes known as Module II (MII) alongside regular programmes (government sponsored programmes) known as Module I (MI) (Nyaigotti-Chacha, 2004).

The reviewed cases above push to think of the possible association of gender and the area of specialization among other factors that justify the trends in students' enrolments in higher education.

The statement of the problem

Public universities in Kenya are relatively well resourced to run a wide range of degree programmes across platforms. Indeed, the Kenyan Government is emphasizing affirmative action whereby more equity is ensured towards gender, marginalized areas, disadvantaged categories such as students with disabilities and strengthening of Higher Education Loans Board (HELB) and bursary programmes to benefit a larger body of needy students (Mwiria, Ng'ethe, Ngome, Ouma-Odero, Wawire & Wesonga, 2007). Again, opportunities were open up for private sponsorship as Module II/Parallel was put in place aside the common Module I/ Regular. Nevertheless, it has been realized that there is a continued platform's disproportion between platforms and gender among disciplines in the rate of enrolment over the years in public universities in Kenya. This happens indeed while there are processes in place

which are supposed to ensure that the most qualified and academically prepared students are admitted (Yakaboski & Birnbaum, 2013). Therefore, there is a need to understand the extent and the quality of such disproportions in order for both female and male students to have equal chances to higher education and in order to decide whether all the areas of specialization have to remain equally important for the Kenyan society.

The purpose of the study

To determine the extent to which gender and area of specialization are related with students' enrolment in undergraduate degree programmes by platform in Public Universities in Kenya.

Research hypotheses

Ho 1: There is no difference in students' enrolments per area of specialization in undergraduate degree programmes by platform in public universities in Kenya.

Ho 2: There is no statistically significant difference in male and female proportions in undergraduate degree programmes by platform in public universities in Kenya

Review of literature

Determinants of enrolment differentials between areas of specialization

Nowadays, the choice of programme of study is not haphazard. This is mainly because of internalization of programmes and the increasing global labor market as confirmed by Kivinen and Nurmi (2014). As per these authors, the data from twelve different European countries concurred on the factor that the labor market is now looking for skills, competitiveness, knowledge and innovative ideas which gave birth to 'brain circulation' or 'brain-gain' in the sense of 'brain growth' which are in the substitute of the old 'brain drain' sole consideration. Therefore, this dictates the kinds of programmes that university candidates aspire to.

Factually, gender related social expectations have been a determinant of human beings' aspirations and attainments in the past decades and are still an imposing challenge especially in developing nations. In confirmation of this, Ahmad's study in Malaysia (2009) found out that more male than female participate in vocational and technical schools. Indeed, although the university participation of female in science fields gradually increased over the years, yet male's rate continued to dominate in the traditionally male-dominated fields such as engineering and architecture (Ahmad, 2009).

As a matter of fact, there are obvious and hidden factors to why university students enroll in one programme in the expense of the others. In a deep analysis of the factors influencing the choice of physics among Ethiopian university students, Semela (2010) has shown that Physics was receiving few candidates who again had scored very low marks in national examinations. The reasons being that these candidates had received poor pre-university

preparation, acknowledged weak mathematics background or could hardly get any other job chance apart from teaching profession.

Among other factors, Leahey (2007) has shown that the visibility and the level of specialization have also a direct implication on the production and the salary. Indeed, the employability and earnings after study completion were also highlighted to determine the rate of enrolments in programme of studies at university (Shumilova, Cai & Pekkola, 2009). Hence, it is in conformity of this that Malamud (2010) has correlated the graduands' earnings with early or late specialization and proved that for employers of the same qualifications, their earnings were equally the same in England and Scotland.

Social needs and university programmes

Worldwide, universities do have service to the community as one of their third mission. It is in light of this that both private and universities have to do research and disseminate the findings and also to run programs that address the existing demands of a country or society (Raditloaneng, 2013). Indeed, in various countries around the world, some programmes were enforced, respective enrolments widened in order to fulfil an immediate or a long term social need. This is for instance the case of Singapore whereby university enrolments are much oriented towards internationalization and industry education programmes (Toh, 2012).

In the case of Africa, governments are much engaged with basic education. This leads to the shortcomings of higher education's promise which engender the accusations that this level of education is not contributing much towards the alleviation of the endemic poverty specifically in the Sub-Saharan part of this continent (Bloom, Canning & Chan, 2006). Besides, higher education in Africa is still suffering from poor use of existing resources, inequitable access and politicization. That is why deep institutional changes and restructures are a must if higher education on this continent is to function adequately (Devarajan, Monga & Zongo, 2011).

In line with the above, African countries have decided to align or enforce their university programmes in accordance with their long terms visions and the international targets such as the Millennium Development Goals. This is for example the case of Rwanda whereby in its Vision 2020, education has to be improved to provide needed efficient and productive workforce (Republic of Rwanda, 2000). For the case of Kenya, the Vision 2030 reads that this country shall ensure that its educational system provides a globally competitive quality education, training and research for development (Republic of Kenya, 2007).

Methodology

This study was carried out three public universities in Kenya namely Moi University (MU), Kenyatta University (KU) and Nairobi University (NoU). These universities were purposively sampled. The reason behind this is that they are well all established and branded public universities (Jambo, 2013) capable to attract many students across a wide range of programmes. Indeed, in Kenya, these universities are influential enough to get required up standards human, infrastructural and financial resources.

The investigated programmes were randomly sampled (Orodho, 2009) and were falling under six broad categories. These are Engineering and Technical degrees, Humanities and Social Science programmes, Agriculture and related programmes, Education Programmes, Health Science Programmes and then Pure and Applied Science Programmes. The study used secondary data on different degree programmes by platform over the 2003/2004 and 2004/2005 academic years. These data were collected from admission offices of the respective universities. For a better presentation, data were summarized in forms of text and tables. The analysis undertook majorly the quantitative pathway using percentages and Chi Square (Gay, 1992) to portray the status and tendency in students' enrolment per area of specialization.

Findings and discussion

A typical student distribution across platforms

In order to show the trends in proportions of students in platforms and degree programmes the researchers randomly sampled engineering and technical programmes. The data collected concerned the enrolment of students for the academic year 2003/2004 and 2004/2005 across the three investigated universities. These data were organized per gender and platform; Module I/Regular and Module II/Parallel coded as MI and MII respectively.

These data have shown that at University of Nairobi (UoN), College of Architecture and Engineering, female enrolment proportions in Module I architecture and engineering programmes did not exceed 15% for the two academic years. This confirms the existence of gender disparity. Indeed, in both MI and MII programmes, male students registered high enrolments, except in B.A. Design, where female and males had almost similar ratings at 51 (44.3%), 64 (55.7%), in MI and 26 (49.1%), 27 (50.9%) in MII.

In 2004/2005 academic year at the University of Nairobi, the trend is similar to 2003/2004 with slight changes noticed particularly in BA Design programme where the total enrolment decreased in MI programme to 96 down from 115 students. Nevertheless, the 2004/2005 enrolments provide a sign of growth among the female compared to other programmes.

In fact, at Moi University (MU), MI female participation in Engineering and Technical degrees was at its highest in the 2003/2004 academic year, scoring 14.5%. In general, however, female participation in this group of degree programmes for both MI and MII platforms has remained at under 10% in the same university. Moi, similar to Kenyatta and Nairobi offers some degree programmes that are hardly known by the Kenyan public or they would be termed as unpopular courses. Most of such courses in Moi included Biotechnology, Agricultural and Biological Systems, which recorded '0' enrolment, across the two platforms in 2003/2004 academic year, but showed new entries in enrolment in MI platform in 04/05 academic year.

Furthermore, comparing enrolment in 2003/2004 and 2004/2005 academic years, Moi University registered some slight shifts. Total enrolment among males in MI increased to 1043 (92.1%) in 2004/2005 up from 752 (85.6%)

in the previous academic year. In the MII enrolment in 2003/2004 and 2004/2005 academic years, enrolments revolved around the 90% point mark among male students while the female students in the same platform indicated a small increase of 2%.

As for Kenyatta University (KU), during the academic year 2003/2004, female participation in programmes of the School of Pure and Applied Sciences on both MI and MII platforms was significantly low with a proportion ranging between 22.9% and 25.5% in general. Particular instances of acute female under participation are found in the engineering programmes where female population is in unit figures. The female students registered in MI platform for Bachelor of Science general in KU, were about half (35.4%) of the males ones in the same programme (65%). This scenario was evident in the MII platform where female and male students represented 32.7% and 67.3% respectively in the same degree programme.

In addition, for the 2004/2005 academic year, enrolment in both regular and parallel platforms was not different from that of the previous academic year among male and female students. More male students than the female were enrolled in most of the programmes. However, minimal increases were observed in MI platform in males' total enrolment: 79.1% in 2004/2005, almost 4,6% more than in 2003/2004 (74.5%). On the whole, this female under-representation in these technical degrees could be partly due to a general female under performance in sciences and other technical subjects in Kenya Certificate of Secondary Education (KCSE) examinations that forms the basis of admission into various programmes (Mbugua, Kibet, Muthaa & Nkonke, 2012).

Enrolments' comparison across broaden areas of specialization and platforms between universities

In guidance of the synthesized table 1 below, this section will provide a pictorial view of the situation of enrolment across investigated universities.

Table 1: A comparative view of enrolment in MI and MII platforms between University of Nairobi, Moi University and Kenyatta University for the academic year 2004/2004 and 2004/2005

Area of specialization (Broaden categories)	University of Nairobi (UoN)				Moi University (MU)				Kenyatta University (KU)				Total
	2003/2004		2004/2005		2003/2004		2004/2005		2003/2004		2004/2005		
	T (MI)	T (MII)	T (MI)	T (MII)	T (MI)	T (MII)	T (MI)	T (MII)	T (MI)	T (MII)	T (MI)	T (MII)	
Engineering and technical degrees	1,816	471	1,823	622	878	67	1,132	105	377	218	460	317	8,286
Humanities and Social Science programmes	5,072	3,640	13,357	3,992	2,222	578	2,476	365	468	298	454	442	33,364
Agriculture and related programmes	1,077	118	1,177	185	184	8	574	6	198	96	240	141	4,004
Education Programmes	1,518	3,995	1,598	4,664	2,355	552	3,146	604	944	619	841	745	21,581
Health Science Programmes	1,136	1,082	1,123	1,486	590	53	674	60	144	79	175	19	6,621
Pure and Applied Science Programmes	1,917	371	1,945	756	884	43	793	45	377	218	460	317	8,126
Grand Total	12,536	9,677	21,023	11,705	7,113	1,301	8,795	1,185	2,508	1,528	2,630	1,981	81,982

Table 1 above indicates that generally Humanities and Social Science programmes are very popular at UoN and hence led to the highest magnitude of enrolment when the three universities- UoN, KU and MU- are brought together. The second ranked in popularity is Education Programmes while Agriculture and related programmes come last. These trends might be having a labour market link as defended in Kivinen and Nurmi's study (2014).

Another important consideration from table 1 is that parallel platform (MII) is gaining popularity. For instance, in the particular case of Kenyatta University during the academic year 2004/2005, enrollments in MI and MII were not quite distant with 2,630 students and 1,981 students respectively. This narrow gap may be explained by the fact that at Kenyatta University, education programmes acknowledged many school based and part time students who in majority are in-service Kenyan teachers eagerly motivated to learn so as to advance their qualifications and earnings. Therefore, as opposed to the first null hypotheses, the records above have shown the existence of difference in students' enrolments per area of specialization in undergraduate degree programmes by platform in public universities in Kenya. In fact, the data show that UoN has highest records in enrolments which may be linked with the fact it is oldest and the leading university countrywide that may be translated in the wide range of qualified faculties that attract students. Indeed, it is set down town in Nairobi City which attracts many students because of ease accessibility (Otieno, Bizimana, Ndayambaje, 2015).

Gender cumulative consideration on enrolments per platform

The discussion in this part is focused on gender aspects as observed within individual programmes, platforms and universities and hence abridged under the table 2 and 3 below.

Table 2: Male and female proportions on MI platform across universities

University names	Male	%	Female	%	Total (MI)
University of Nairobi (UoN)	14,281	68.84	6,465	31.16	20,746
Kenyatta University(KU)	4,313	59.90	2,887	40.10	7,200
Moi University (MU)	7,075	73.36	2,569	26.64	9,644
Total	25,669	68.29	11,921	31.71	37,590

Table 3: Male and female proportions on MII platform across universities

University names	M	&	F	%	Total (MII)
University of Nairobi (UoN)	11,281	63.60	6,456	36.40	17,737
Kenyatta University(KU)	6,939	78.36	1,916	21.64	8,855
Moi University (MU)	752	50.10	749	49.90	1,501
Total	18,972	67.53	9,121	32.47	28,093

The table 2 and 3 sum up gender gaps crosswise platforms and universities. Generally, it is observed that male enrolments are higher than their counterpart. Like in the detailed cases explored; at UoN Pure and Applied Science Programmes male students topped the list by an average of about 1429 (74%) from both MI and MII platforms in 2003/04 and 2004/05 academic years respectively. At MU, data for the School of Business and Economics have shown that proportions of female presence on the MI platform oscillated between 265 (34.5%) and 327 (33%) for the two academic years. Still at MU, Bachelor of Science was again the popular degree programme among male students in the MI platform that registered 644 (77.5%) in 2003/4 and 503 (72.5%) in 2004/05 academic years, far ahead of their female colleagues. The shocking records are found at College of Agriculture and Veterinary Medicine of the UoN where women enrolments remained less than 25%. Similarly, at KU, particular instances of acute female under participation are found in the engineering programmes where female population is in unit figures.

The explanation for women's underrepresentation in the cases exposed above may be associated to two facts. One, there is still a traditional and stereotypical tendency –as the one found out in Malaysia by Ahmad (2009)'s study- whereby some programmes are viewed by female students as largely masculine professions. Two, female students under perform in sciences and other technical subjects in secondary school leaving examinations that form the basis of admission into various university degree programmes.

Literally, exceptions were observed in Humanities and Social Science and Health Science Programmes. For example, at KU, enrolment in the regular platform of male and female students in 2004/2005 indicated a small gap between genders. During the 2004/2005 academic year, female enrolment in Law programmes (56.2%) has surpassed the one of male. Indeed, educational programmes recorded (67%) female students in 2003/2004 academic year. At Moi University female participation in MII in Humanities and Social Science degree programmes was significantly higher. The explanation here of female records crosswise being higher than those of male under Humanities, Social Science, Nursing and Public Health programmes is that these areas of specialization have been historically viewed as feminine in nature.

Nevertheless, the researchers have observed fluctuation in gender enrolments over the years, programmes and platforms. For example, in 2003/2004 academic year, female total proportions in the MI platform in the School of Arts and Social Sciences at MU was 510 (42.6%) but this dropped to 436 (29.4%) in 04/05. MII female population stood at 8 (32%) in 03/04 academic year and then rose significantly to 19 (50%) in 04/05 academic year.

The chi-square statistical analysis reported in tables 4 and 5 below provide a scientific proof against gender discrepancies at MI platform across the three universities investigated.

Table 4: χ^2 test results MI

Observed	Expected	O -E	(O — E) ²	(O — E) ² / E
14281	14166.76	114.24	13050.7776	0.92
6465	6579.22	114.22	13046.2084	1.98
4313	4916.65	603.65	364393.3225	74.11
2887	2283.35	603.65	364393.3225	159.59
7075	6585.58	489.52	239629.8304	36.39
2569	3058.42	489.52	239629.8304	78.38
$\chi^2 = (O — E)^2/ E$			351.37	

Degree of Freedom Df. = (c-1) (r-1) = (2-1) (2-1) = 1
 = (2-1) (3-1) = 2

Table 5: Chi Square distribution Table and Probability level (alpha)

Df	0.5	0.1	0.05	0.02	0.01	0.001
1	0.455	2.706	3.841	5.412	6.635	10.827
2	1.386	4.605	5.991	7.824	9.21	13.815

The explanation from table 4 and 5 presented above is that across the three universities male students occupy dominant positions in undergraduate programmes particularly on the MI platform. As a matter of fact, the computed Chi Square statistic for the distribution as per table 4 is $\chi^2 = 351.37$, the predetermined alpha level of significance 0.05, and our degrees of freedom df = 2 as illustrated in table 5.

In fact, as per table 4 of Chi Square distribution and the degree of freedom as it reads along the row, the value of $\chi^2 = 351.37$ lies outside (way above) the critical value 3.841. The corresponding probability is $p < 0.05$ which is above the conventionally accepted significance level of 0.05 or 5%. In fact, the implication is that the implementation of the parallel platform hardly enhanced enrolment among female students across the three universities and this implies a situation where the introduction of the parallel platform seems to have boosted even more the number of male students enrolling at public universities. Hence the second null hypothesis saying that there is no statistically significant difference in male and female proportions in undergraduate degree programmes by platform in public universities in Kenya was rejected. The table 6 and 7 below, validate the existence of gender discrepancy in MII platform programmes.

Table 6: χ^2 test results for hypothesis no. 2 (MII)

Observed	Expected	O - E	(O - E) ²	(O - E) ² / E
11281	11978.3	697.3	486227.29	40.59
6456	5758.7	697.3	486227.29	84.43
6939	5980.03	958.97	919623.4609	153.78
1916	2874.96	958.96	916604.2816	318.82
752	1013.67	261.67	68471.1889	67.55
749	487.33	261.67	68471.1889	140.5
$\chi^2 = (O - E)^2 / E$			805.67	

Df = 2

Table 7: Chi Square distribution Table and Probability level (alpha)

Df	0.5	0.1	0.05	0.02	0.01	0.001
1	0.455	2.706	3.841	5.412	6.635	10.827
2	1.386	4.605	5.991	7.824	9.21	13.815

The table 6 and 7 illustrated that the computed Chi Square statistic for the distribution is ($\chi^2 = 805.67$), the predetermined alpha level of significance (0.05), and the degrees of freedom (df =2). By entering the Chi Square distribution in table 7 with 2 degree of freedom and reading along the row, the value of χ^2 (805.67) lies outside (way above) the critical value 5.991. The corresponding probability is $P < 0.05$. Hence, this is above the conventionally accepted significance level of 0.05 or 5%, so the null hypothesis stipulating that there is no statistically significant difference in male and female proportions in undergraduate degree programmes by platform in public universities in Kenya is again rejected.

Conclusion and recommendations

The impetus behind this study was to determine whether gender and area of specialization are related with students' enrolments in undergraduate degree programmes by platform in Public Universities in Kenya. The overall findings have confirmed the existence of gender discrepancy between Module I/Regular (MI) and Module II/Parallel (MII) across the three investigated public universities in Kenya namely University of Nairobi (UoN), Moi University (MU) and Kenyatta University (KU).

In terms of enrolments per are of specialisation, this study has found out that Humanities and Social Science programmes are very popular while Agriculture and related programmes have known relatively very low enrolments. An interuniversity comparison has mentioned University of Nairobi as the leading in magnitude of enrolments across programmes.

As for gender consideration, male have relatively higher averages and recorded extreme dominance rates in Pure and Applied Science Programmes and Agriculture and related programmes. The possible reasons discussed were the perception of these programmes as much male oriented but also the relative female performance low

performance in sciences and technical courses at secondary school leaving examinations which are determinant to university degree programmes' enrolments. However, the female participation was underlined to be dominant in Humanities and Social Science and Health Science Programmes historically viewed as feminine in nature.

Hence, the existence of discrepancies in students' enrolment per gender and area of specialization lead to the rejection of the stipulated null hypotheses. From there, the study recommends first a deep study that would analyze gender based differentials and motivations behind enrolments at both universities and candidates' sides. Secondly, the study foresees an urge need to make a labour market analysis in order to counteract the possible over supply of graduates in some area of specialization which would worsen the alarming unemployment rate which is on the rise in Kenya. Thirdly, if these public universities are to continue running cost-effectively there is a need to enforce the marketing of the uncommon area of specialization, reorient them to be more attractive or freeze them.

References

- Ahmad, A. (2009). Gender Differences and Trends in the Participation of Malaysians in Education: Implications on Employment Outcomes. *The Journal of International Management Studies*, 4 (2), pp. 65-74.
- Altbach, P.G., Reisberg, L. & Rumbley, L.E (2009). *Trends in Global Higher Education: Tracking an Academic Revolution*. A Report Prepared for the UNESCO 2009 World Conference on Higher Education, Paris: UNESCO & SIDA/SAREC.
- Baumgartner, H.J. & Steiner, V. (2005). *Student Aid, Repayment Obligations and Enrolment into Higher Education in Germany – Evidence from a 'Natural Experiment'*. Retrieved from http://userpage.fu-berlin.de/~vsteiner/forschung/Baumgartner_Steiner_BAFOEG_Schmoller.pdf, accessed April 23rd, 2015.
- Belyakov, A., Cremonini, L., Mfusi, M. & Rippner, J. (2009). *The Effects of Transitions on Access to Higher Education. Issue Brief*, Washington D.C.: Institute of Higher Education Policy.
- Bloom, D., Canning, D. & Chan, K. (2006). *Higher Education and Economic Development in Africa*, Human Development Sector, Africa Region.
- Devarajan, S., Monga, C. & Zongo, T. (2011). Making Higher Education Finance Work for Africa. *Journal of African Economies*, 20 (3), pp.133 –154.
- Gandhi, M.M. (2013). International Initiatives in Assessment of Quality and Accreditation in Higher Education *International Journal of Educational Planning & Administration*, 3 (2), pp. 121-138.
- Gay, L.R. (1992). *Educational Research: Competencies for Analysis and Application*. 4th Ed. New York: Macmillan Publishing Company.
- Heller, D.E. (2001). *The effects of tuition prices and financial aid on enrollment in higher education: California and the Nation*. Retrieved from http://www.eastwestcenter.org/fileadmin/resources/education/ed2020_docs/Heller-effects_of_tuition_and_financial_aid_-_pdf.pdf, accessed April 20th, 2015.
- Igbinedion, V.I. (2011). Analysis of gender enrolment pattern into secretarial studies programmes in tertiary institutions in Edo state of Nigeria. *European Journal of Educational Studies*, 3(2), pp. 325-337.

- Ijumba, N. (2014, August 4). Female enrolment in universities: Looking beyond affirmative action. *The NewTimes*, available at <http://www.newtimes.co.rw/section/article/2014-08-04/214/>
- Jambo (June 26, 2013). Seven Kenyan universities ranked among Africa's best 100. *JamboNewsPot.com*, from <http://www.jambonewspot.com/seven-kenyan-universities-ranked-among-africas-best-100/> accessed on April 30th, 2015.
- Kivinen, O. & Nurmi, J. (2014). Labour Market Relevance of European University Education. From Enrolment to Professional Employment in 12 Countries. *European Journal of Education*, 49 (4), pp. 558–574.
- Kwesiga, J.C. (1993). *Access of Women to Higher Education In Uganda: An Analysis Of Inequalities, Barriers and Determinants*, Unpublished PhD thesis, London: University of London Institute Of Education.
- Leahey, E. (2007). Not by Productivity Alone: How Visibility and Specialization Contribute to Academic Earnings. *American Sociological Review*, 72, pp.533–561.
- Malamud, O. (2010). Breadth versus Depth: The Timing of Specialization in Higher Education. *Journal of Economic Literature*, 24 (4), pp. 359–390.
- Masanja, V.G. (2010). *Increasing Women's Participation in Science, Mathematics and Technology Education and Employment in Africa*, United Nations Division for the Advancement of Women (DAW, part of UN Women) United Nations Educational, Scientific and Cultural Organization (UNESCO).
- Mbugua, Z.K., Kibet, K., Muthaa, G.M. & Nkonke, G.R. (2012). Factors Contributing To Students' Poor Performance in Mathematics at Kenya Certificate of Secondary Education in Kenya: A Case of Baringo County, Kenya. *American International Journal of Contemporary Research*, 2 (6).
- Mwiria, K., Ng'ethe, N., Ngome, C., Ouma-Odero, D., Wawire, V. & Wesonga, D. (2007). *Public & Private Universities in Kenya: New Challenges, Issues & Achievements*. OXFORD: James Currey & NAIROBI: East African Educational Publishers.
- Nyaigetti-Chacha, C. (2004). *Reforming Higher Education in Kenya: Challenges, Lessons and opportunities*, Naivasha.
- Orodho, J.A. (2009). *Elements of Education and Social Science Research Methods*, 2nd Ed.. Maseno: Kenezja Publisher.
- Otieno, M. A., Bizimana, B. & Ndayambaje, I. (2015). Considering Gender and Socio-economic Factors as determinants of Students' Enrolment in Regular and Parallel Undergraduate Study Platforms: A case of Public Universities in Kenya. *International Journal of Education and Research*, 3, (3), pp.741-752.
- Raditloaneng, W.N. (2013). Impact of "Implementing the Third Mission of Universities in Africa (ITMUA) collaborative research project, 2010-2011". *International Journal of Peace and Development Studies*, 4(5), pp. 90-99.
- Republic of Kenya (2007). *Kenya Vision 2030*, Retrieved from http://theredddesk.org/sites/default/files/vision_2030_brochure__july_2007.pdf, April 30th, 2015
- Republic of Rwanda (2000). *Rwanda Vision 2020*, Kigali: Ministry of Finance and Economic Planning.

- Republic of Uganda (2014). *Science, Technology and innovation: A status report 2012/2013*, Ministry of Finance, Planning and Economic Development.
- Semela, T. (2010). Who is joining physics and why? Factors influencing the choice of physics among Ethiopian university students. *International Journal of Environmental & Science Education*, 3 (3), pp. 319-340.
- Shumilova, Y., Cai, Y. & Pekkola, E. (2009). *Employability of International Graduates Educated in Finnish Higher Education Institutions*, VALOA-project, Career Services University of Helsinki.
- Steyn, A. G. W. (2009). *Measuring Student Participation in the Higher Education Sector in South Africa*. Retrieved from http://sun025.sun.ac.za/portal/page/portal/Administrative_Divisions/INB/Home/Documentation/Documentation_Internal_publications/Measuring%20student%20participation%20in%20the%20HE%20sector%20in%20RSA.pdf, Accessed April 21st, 2015.
- Teichler, U. & Bürger, S. (2005). *The Changing Numbers and Composition of Student Enrolment in Europe and Japan*. Retrieved from <http://www.oecd.org/innovation/research/37552327.pdf>, accessed on April 24th, 2015.
- Toh, M.-H. (2012). *Internationalization of Tertiary Education Services in Singapore*. ADBI Working Paper 388, Tokyo: Asian Development Bank Institute. Retrieved from <http://www.adbi.org/working-paper/2012/10/12/5263.internationalization.tertiary.educ.singapore/>, accessed on April 22nd, 2015.
- USAID/Rwanda (2014). *Gender Analysis: Learning Enhanced Across Rwanda Now!* (LEARN) Project, available online at <http://www.usaid.gov/sites/default/files/documents/1860/GA%20-%20LEARN%20project%20-%20FINAL%20Sept%2018%202014%20-%20Public%20Version.pdf>, accessed on April 22nd, 2015.
- Wainaina, M. (2011). Gendered Challenges and Opportunities in Module II Programs in Kenyan Public Universities: A Critical Appraisal. *International Journal of Humanities and Social Science*, 1 (20), pp. 95-109.
- Winter-Ebmer, R. & Wirz, A. (2002). Public Funding and Enrolment into Higher Education in Europe. *Discussion Paper Series*, (503), Bonn: Forschungsinstitut zur Zukunft der Arbeit, Institute for the Study of Labor.
- Yakaboski, T. & Birnbaum, M. (2013). The challenges of student affairs at Kenyan public universities. *Journal of Student Affairs in Africa*, 1 (1&2), pp. 33-48.
- Zhou, M. & Vaccaro, L.C. (2011). *Strengthening the Relationship between Higher Education and Regional Economic Development*. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download>, accessed on April 29th, 2015
- Zweben, S. (2012). *Computing Degree and Enrollment Trends*, Washington D.C.: Computing Research Association.