

Statistical Analysis of TTC Students' performance in the examinations for the Award of a Primary Teacher Education Certificate

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Abstract

This study aimed at analysing Teacher Training Colleges students' performance in final examinations for the Award of a Primary Teacher Education Certificate "A2". Students' results from 2012 to 2015 inclusively were collected from the Department of Early Childhood and Primary Education at the University of Rwanda-College of Education. In addition reports of academic monitoring and evaluation conducted in all TTCs during May-June 2015 were explored to identify the factors which may influence the observed difference in students' performance. Means, standard deviations and one-way analysis of variance were applied to explore the relationships in students' performance. The study indicated a good performance throughout these years. Even though the variation in students' results among the TTCs was not significant, the study revealed a constant highest performance at Save and a persisting lowest performance at Matimba. This apparent difference may result from different factors such as variation in availability of teaching-learning resources along with the management of students across the TTCs.

Key words: TTC, student's performance, one-way analysis of variance.

Introduction

It is undisputable that education is a key to the socio-economic development of a country (Mamman & Dauda, 2014). Scientific evidence highlights that the level of schooling, cognitive and the labor force quality have direct effect on the economic development of nations (Hanushek & Kimko, 2000; Barro & Jong-Wha, 2001). Furthermore, a positive correlation was seen between the economic growth, quantum and kinds of education provided to the work-force of advanced countries, e.g. United States, Former Soviet Union, Denmark and Japan (Miachi, 2006). It is with that in mind that the Teacher Training Colleges were created in Rwanda with a mission to train qualified pre/primary school teachers in order to achieve the Vision 2020. It is also highlighted in the education policy incorporated in the "Vision 2020" document that education is a key pillar in transforming Rwanda into a middle country income by 2020 from the fact that all Rwandans will be able to read, write and have diverse professional and technical skills (MINEDUC, 2003).

In order to uphold standards of quality in the teaching profession, the Ministry of Education has decided to expand the role of the University of Rwanda-College of Education (UR-CE) towards all teacher training institutions including TTCs (MINEDUC, 2007). Since 2007, UR-CE is mandated to oversee academic quality, the development and delivery of programs as well as the award of degrees, diplomas and certificates whilst the affiliated institutions continue to have administrative, financial and management autonomy (MINEDUC, 2007). However, the implementation of this policy took effect from 2010 with the Ministerial Order No 3243/12.00/2010. These new duties assigned to UR-CE are carried out within the Department of Early Childhood and Primary Education. Since then, the UR-CE has developed and reviewed TTC programs to reflect current trends in teacher's education as a profession and in cog-

nizance of the fact that education is a discipline in its own right. At the TTC level, students were given the opportunity to choose one of the three existing pathways: Modern Languages Education (MLE), Social Studies Education (SSE) or Science and Mathematics Education (SME). In 2013, the Ministry of Education recognized the Early Childhood Development as a vital foundation for learning, particularly for children from more disadvantaged backgrounds. In response to this, the UR-CE opened an Early Childhood Education (ECE) option with the academic year 2013.

At the completion of a TTC programme, a student is awarded a 'Primary Teacher Education Certificate (A2)' subject to having successfully passed national exams set, administered and marked by UR-CE. In this way, examination is one of the most important responsibilities of the UR-CE. On the basis of the results of this final examination, students are not only admitted at any institution of tertiary education but they compete on job market. Therefore, equity and transparency are essential in marking TTCs students, since examination grades have a profound effect on the future careers of students.

In addition, the maintenance of the standards and integrity of the examination process are much taken into account for the international reputation of the University. In this respect, UR-CE considers the administration of TTC national examinations as an important exercise in the process of improving the quality of education. UR-CE and TTCs administration work hand in hand throughout the year for creating a conducive environment towards good practices during the period of TTC national exams.

Notwithstanding that the UR-CE is in charge of examination and award of certificates, other key responsibilities in the hands of the administrators of TTCs affect the performance of students in final examinations. These include the appointment of teachers, the provision of teaching-learning materials, teachers' and students' management, among others. Therefore, these may lead to students' performance variation in examinations for the Award of a Primary Teacher Education Certificate among TTCs in spite of writing the same examinations. In this regard, an analysis of students' performance in examination for the award of a Primary Teacher Education Certificate needs to be conducted to provide useful information on the status and relationships of TTC students' achievement across the four past years (2012-2015). The results can also be used in further exploration such as the causes of poor or good students' performance at a given TTC and/or in a specific subject. This study seeks to inform policy-makers, institutions and authority directly or indirectly linked with the management of TTCs of the level and variations in TTC students' performance across the country. This may help to improve the teacher quality in primary schools and inputs to education colleges in Rwanda.

Materials and Methods

The data used in this study were obtained from candidate school files and reports on academic audit in the Department of Early Childhood and Primary Education at UR-CE. These data were complemented by the data collected

through a designed questionnaire and focus group discussion during monitoring and evaluation exercise on the field undertaken by 16 UR-CE academic staff members. To date, there exist 16 TTCs located across the country. Three of these are not considered for this study as they were established with the school year 2014 and, therefore, did not have finalist students until 2016. The students' results from 13 Teacher Training Centers (TTCs) were sourced to be used in this study (Figure 1). The population of the study consists of all TTC students who sat for final examination to be awarded the Primary Teacher Education Certificate from 2012 to 2015 inclusively. Thus, a total of 1410, 1866, 2548 and 2653 candidate's results for 2012, 2013, 2014 and 2015 respectively were analyzed. This timescale corresponds with the period in which UR-CE was responsible for assessing TTC students to be awarded Primary Teacher Education Certificates.

The design used in this study was the 'Expost-facto research' (Mamman & Dauda, 2014), that is, researchers attempted to discover the pre-existing casual conditions impacting on TTC students' performance rather than trying to create the treatment. The expost-facto used the nature of the students reflected by examining the effect of the school environment on the students' performance in national Examinations conducted by UR-CE in 13 TTCs. So researchers had no power over data collection.

The simple descriptive statistic of mean, standard deviation, and one-way analysis of variance were applied on the collected data to explore the relationships and significance of variation in mean score. Different graphs were used to present the results in order to facilitate the comparisons of mean scores at different categories. Arc Map 10 software (ESRI, 2011) was used to locate spatially the TTCs across the country.

In order to understand much more the causes of existing spatial variations in students' performance in examinations for the award of a Primary Teacher Education Certificate, a report from monitoring and evaluation exercise conducted by 16 UR-CE academic staffs in all Rwandan 16 TTCs were resourced. This monitoring and evaluation exercise focused especially on factors that directly affect the teaching learning process such as infrastructure and equipment, teaching and learning aids, TTC environment, TTC management, teaching and learning process, teaching and support staff, students' consideration, evaluation and education values.

Results and discussion

Notwithstanding that the 16 TTCs scattered across Rwanda are operational, only 13 have presented the candidates to sit for the national examinations to be awarded a Primary Teacher Education Certificate for the period of 2012-2015 (Figure 1).



Figure 1: Location of TTCs in Rwanda

It is worth noting that the TTC students who sat for the final examinations were slightly increased at the level of 36.5% in 2014 and 3, 9% in 2015 resulting from the additional Early Childhood Education option of which candidates sat for National Examinations in 2015 for the first time in. The following map shows the number of candidates who sat for TTC National Examinations during the period of the study (2012-2015).

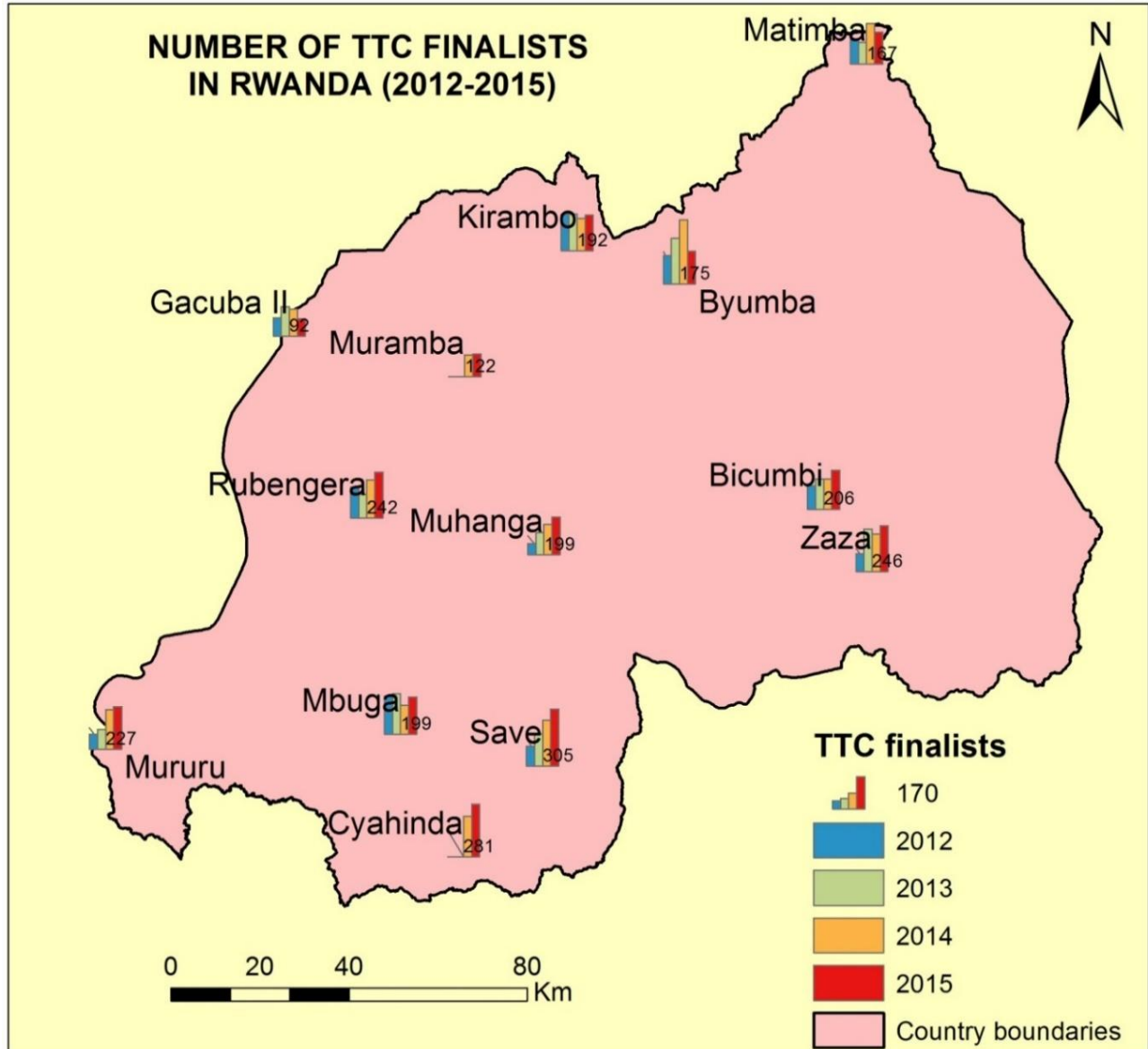


Figure 2: Number of TTC finalists in Rwanda (2012-2015)

The above presented map reveals that Kabarore, Mwezi and Nyamata did not have candidates in National Examinations while candidates from Cyahinda and Muramba started to sit for the examinations in 2014. The same Figure 2 reveals that TTCs did not have a constant number of candidates. However the number of candidates has increased progressively; only Byumba and Gacuba II had a lower number of candidates in 2015 compared to previous years.

With reference to the gender aspect, Figure 3 shows that most of TTCs presented more females than males at national examinations throughout the years with exception of Kirambo and Rubengera where the situation is reversed. However the difference between female and male candidates in terms of number is not significant.

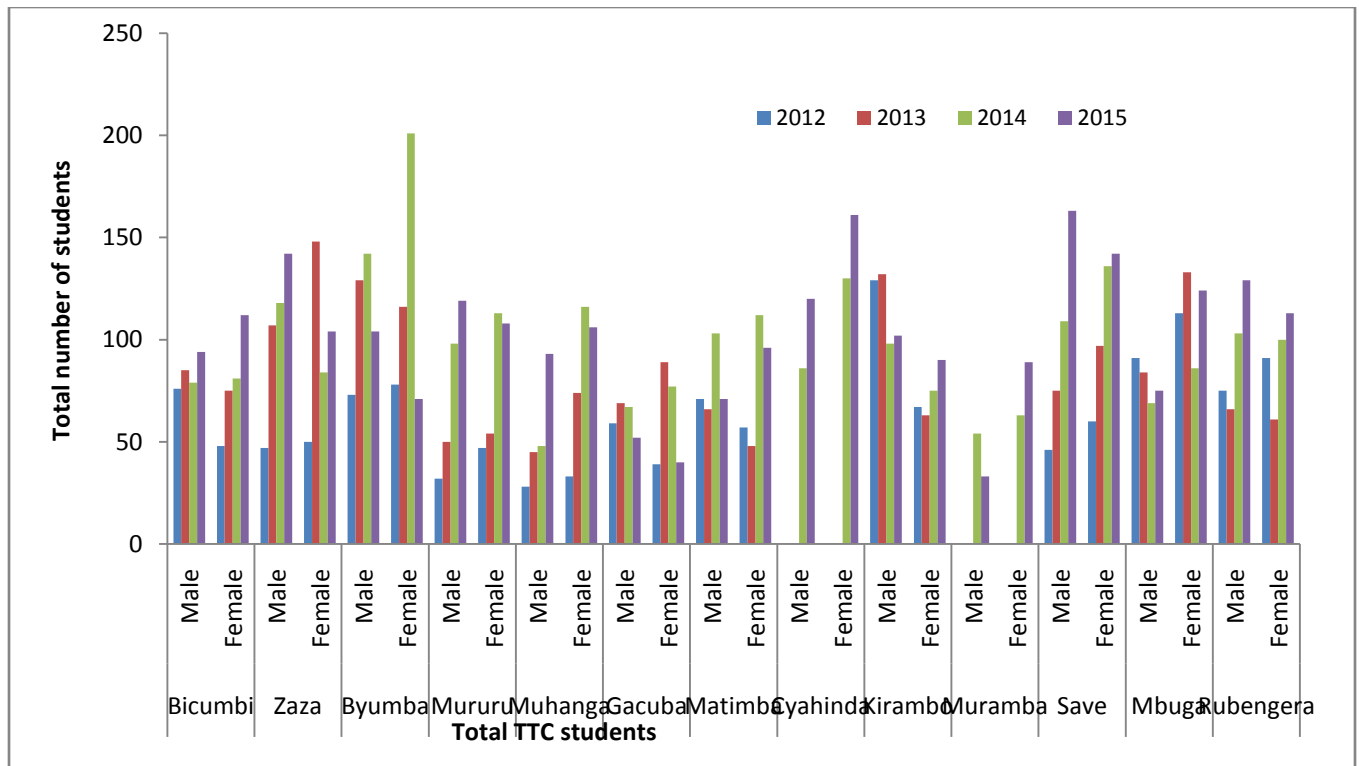


Figure 3: Total TTC students (per sex) who sat for the final examinations (2012-2015)

Figure 3 depicts that most of TTCs had an average of candidates varying between 50 and 150.

From table 1, it can be observed that students' performance was becoming progressively better throughout the years. The mean marks scored by students moved from 53.5, 57.2, and 55.3 to 65.3 percent in 2012, 2013, 2014 and 2015 respectively.

Table 1: The mean marks scored by students at different TTCs for 2012-2015

N°	Year		2012	2013	2014	2015	Mean marks
	TTC						
1	Bicumbi		55	60.1	57.5	64	59.2
2	Byumba		56.6	58.6	61.2	67	60.9
3	Cyahinda		-	-	50.7	65.6	55.6
4	Gacuba II		48.9	54.2	51.4	64.7	54.8
5	Kirambo		57.02	60.1	58.2	67.9	60.8
6	Matimba		51.8	51.9	51.8	59.2	53.7
7	Mbuga		55.1	56.5	56.3	64	57.9
8	Muhanga		51.6	55.9	54.1	61.4	55.7
9	Muramba		-	-	43.2	64.3	52.5
10	Mururu		53	58.8	58.4	68.5	59.7
11	Rubengera		53.4	56.5	55	63.6	57.1
12	Save		54.3	62.2	63	73.7	63.3
13	Zaza		51.7	54.9	57.7	64.6	57.2
Mean			53.5	57.2	55.3	65.3	57.6

It has been seen that the performance of the candidates from Save was consistently the best while the candidates from Matimba was consistently the lowest compared to other candidates (Table 1). The mean scores of TTC students can be classified into three categories as follows: (i) those which score between 60-64 percent (Kirambo, Byumba and Save); (ii) those which scored between 55-60 percent (Cyahinda, Muhanga, Rubengera, Zaza, Mbuga, Bicumbi and Mururu); (iii) and those which scored between 50-55 percent (Muramba, Matimba, Gacuba II).

It should be noted that the calculation of one-way analysis of variance reveals that there is no significant difference in mean scores among the TTCs as long as Prob> F was 0.3516 at 95% level.

Table 2: Standard deviations from the mean score at different TTCs for 2012-2015

N°	Year					Mean marks
	TTC	2012	2013	2014	2015	
1	Bicumbi	10.9	7.7	10.1	9.5	9.55
2	Byumba	12.1	9.5	10.1	9.9	10.4
3	Cyahinda	-	-	7.9	6.6	8.4
4	Gacuba II	11.1	10.9	10	6.5	9.6
5	Kirambo	13.5	10.3	11.6	7.7	10.8
6	Matimba	10.1	8.4	9.7	9.2	9.4
7	Mbuga	10.4	9.9	10.4	8.6	9.8
8	Muhanga	10.8	10.6	12.4	8.1	10.5
9	Muramba	-	-	8.4	7.1	9.4
10	Mururu	12.2	10.5	11.9	6.7	10.3
11	Rubengera	11	9.5	10.7	8.5	9.9
12	Save	12.9	12.5	14.4	6.9	11.7
13	Zaza	9.97	9.9	10.5	7.7	9.5

Table 2 above shows that the mean standard deviations from the mean scores varies between 8.4 at Cyahinda and 11.7 at Save. This means that there is a big difference between the best extreme students' scores at Save compared to those at Cyahinda. However, there is no clear difference between standard deviations because they fluctuate between 9 and 11 at most of TTCs. Therefore, there is no general specific trend in performance of students observed at any TTC.

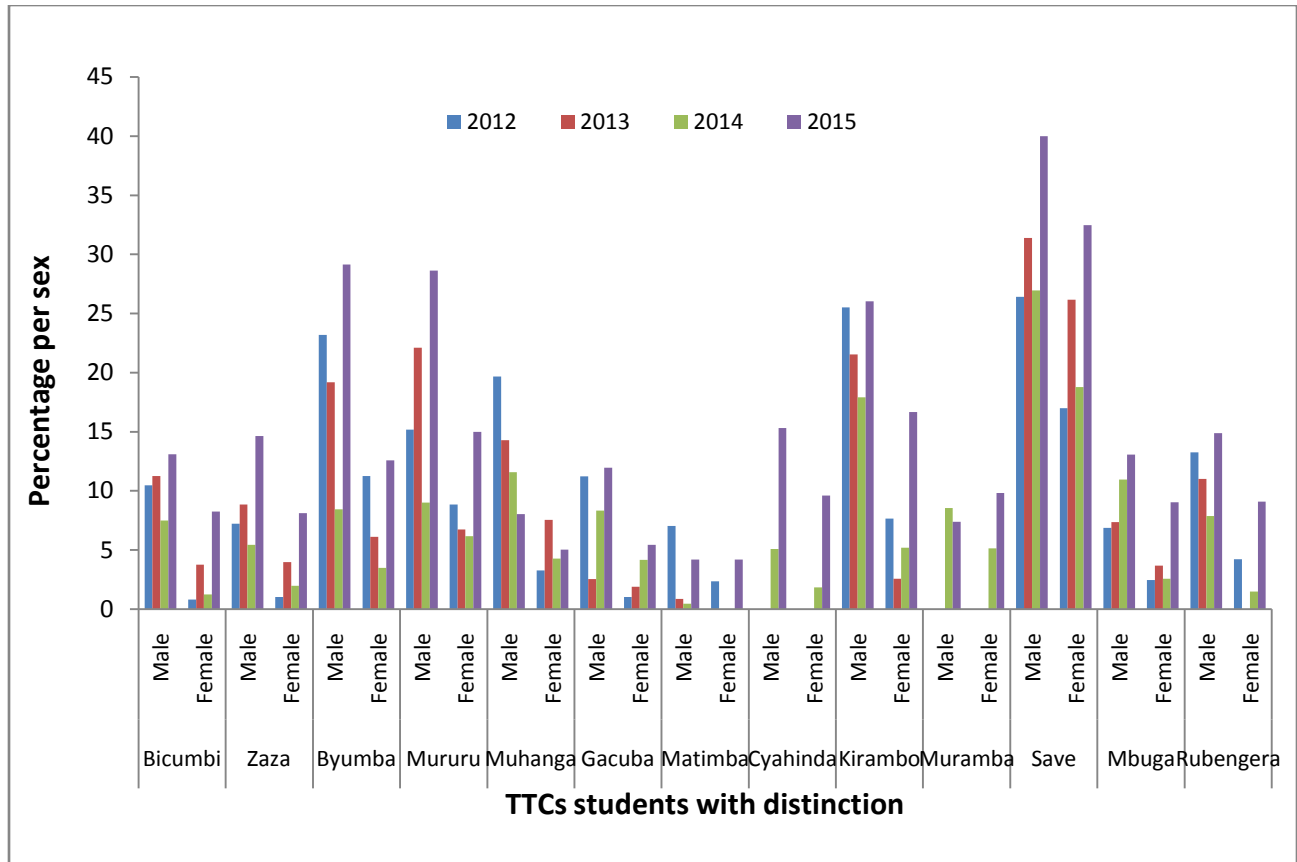


Figure 4: Percentages of TTC students who have passed with Distinction (2012-2015)

Figure 4 indicates that Save has the highest number of students who passed with Distinction followed by Mururu and Byumba while the lowest number of students who graduated with distinction was noted at Matimba and Gacuba II. It can then be concluded that Save had the highest number of candidates admitted to postgraduate studies compared to other TTCs as it has the highest number of candidates who scored with a distinction. Figure 4 demonstrates also that the males graduated with higher scores than the female at most of TTCs. Therefore, it can be hypothesized that more males from TTCs were admitted to postgraduate studies than females. However, further investigation of the matter is needed to confirm the results.

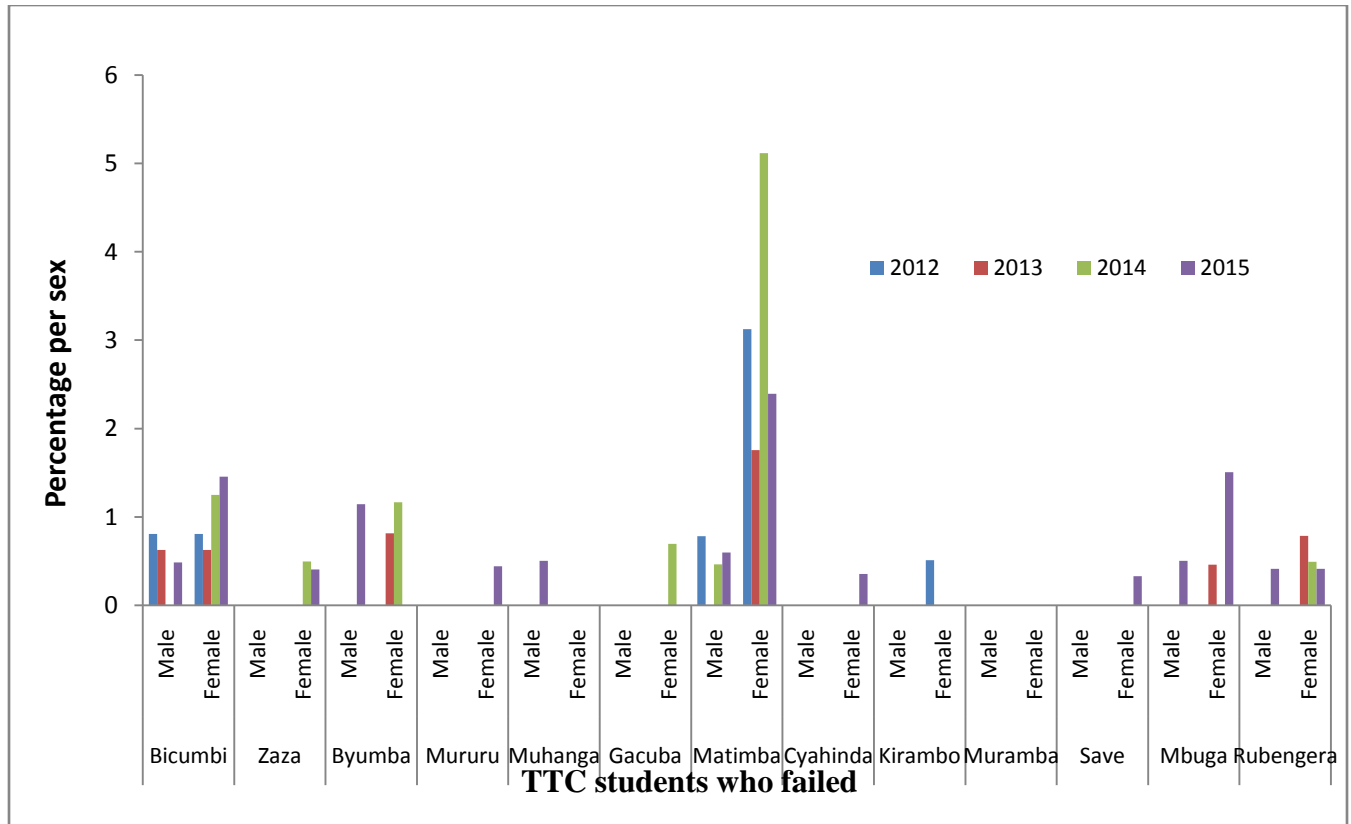


Figure 5: Percentages of TTC students who failed the final examinations (2012-2015)

Figure 5 depicts that the highest number of female candidates who failed (between 2 and 5.5%) was identified at Matimba while the other TTCs have less than 2% of the total students who sat for the national examination. Though Muramba is seen as a TTC which has a lower mean score, it is the only one without a candidate who failed.

The monitoring and evaluation survey conducted by UR-CE academic staff revealed that these observed insignificant variations in students’ performance in examinations for the award of a Primary Teacher Education Certificate may result from existing differences in physical environment and available teaching and learning resources at various TTCs. Thus, TTCs with better physical environment and teaching and learning resources performed better than others.

However, it is surprising to find out that the other surveyed aspects like TTC management, teaching and learning process, student-teacher ratio (Table 3), teaching and support staff, students’ consideration, evaluation and education values do not play any role in variation of students’ performance because they are found to be almost similar at various TTCs. This may be testified by the fact TTC Matimba has the smallest student-teacher ratio of one teacher per 15 students compared to TTC Byumba and Bicumbi which have 22 and 16 students per teacher respectively. This means that theoretically, students are better mentored in TTC Matimba than any other TTC but in practice they perform poorly compared to Byumba and Bicumbi students.

Table 3: TTC population size in June 2015

SN	TTC	Students	Teachers	Student-teacher ratio
1	Bicumbi	604	16	37.7
2	Byumba	705	22	32
3	Cyahinda	917	25	36.7
4	Gacuba II	376	18	20.9
5	Kirambo	583	23	25.3
6	Matimba	555	37	15
7	Mbuga	643	21	30.6
8	Muhanga	671	19	35.3
9	Muramba	665	19	35
10	Mururu	587	22	26.7
11	Rubengera	604	19	31.8
12	Save	803	36	22.3
13	Zaza	769	24	32

TTC Save was found to have relatively better infrastructures compared to the rest; it has enough playgrounds, classrooms, tutors' offices, library, reading space and support staff offices, a well-equipped laboratory for science, clean and secure environment that promotes inclusive, equity and equality of education. On the other hand, TTC Matimba is the less equipped in above mentioned aspects. Thus it is highly recommended to construct and equip science laboratory and extend the computer laboratory in proportion to school population size, to extend and equip the library with enough resources especially the ones related to the curriculum and to avail grounds for all sports. It is worth noting that TTC Save benefit from a governmental support and Marist Brothers while TTC Matimba gets support only from Rwandan government.

The lesson learnt from the monitoring and evaluation survey is that all TTCs follow the same curriculum and most of teachers are academically qualified only the difference comes to their teaching skills, mastering the language of instruction and teaching and learning resources.

Conclusion and recommendations

Based on the findings of this study it could be inferred that the trend of students' performance in examinations for the Award of a Primary Teacher Education Certificate has been consistently improved at most of TTCs. This can be testified by the fact that more than 50% of the total number of candidates were awarded certificate with credit and pass grades while an average of 10% graduated with distinction every year. Save had the best performance in general

while Matimba had a highest number of fails especially in the female category while Muramba had the lowest mean scores. One may infer that the continuous success observed in TTC Save is linked with existing improved teaching and learning resources compared to those available at Matimba.

Though most of TTCs need to be well equipped with textbooks and reference books related to the curriculum, laboratory materials and internet connection to improve the quality, teaching-learning process; these are much more needed at Matimba. Further investigations on factors responsible for the variation in TTCs' performance are highly recommended to have much details of the matter. Furthermore, academic performance of candidates admitted in first year of TTCs should also be investigated to be able to compare the students' performances at the entry and exit points. The similar studies are recommended at various levels to have a clear picture of factors influencing the variations in students' performances in national examinations.

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