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TEACHERS' PERCEPTIONS ON THE CAUSES AND EFFECTS OF HIGH RATE TEACHER-TURNOVER OF MATHEMATICS AND SCIENCE TEACHERS IN RURAL SECONDARY SCHOOLS – A CASE STUDY OF NKAYI DISTRICT

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ABSTRACT: It is an indisputable fact that expert teachers are perhaps the most fundamental resource for improving student learning. Therefore, the need for the retention of qualified teachers particularly in specialist areas cannot be overemphasized. In many developing countries, Zimbabwe included, teacher turn-over has been a problem especially since the outbreak of HIV/AIDS where during the early 1990s, a large number of professionals, teachers included, succumbed to the epidemic in large numbers. Other factors like retirement and resignations have also played a role towards teacher turn-over. However, the most common form of teacher turn-over is whereby qualified teachers leave poor rural schools to better schools particularly in urban areas. Thus, most rural schools fail to attract qualified mathematics and science teachers and resort to using the unqualified and under qualified teachers thereby creating a dilemma, where the least prepared teachers teach the most educationally vulnerable children. As a result, the pass rate of pupils in rural secondary schools at public examinations, particularly in mathematics and science is consistently low. This study draws on a quantitative inquiry to investigate teachers' perceptions on the causes of high-turnover of mathematics and science teachers from rural secondary schools in Zimbabwean secondary schools. The study adopted the descriptive survey design. The target population comprised all secondary school teachers from Nkayi District in Matabeland North Province. The sample consisted of 120 teachers randomly sampled. All the information was collected through a questionnaire which largely had close-ended questions and two open-ended questions. The study revealed that the majority of teachers felt that poor conditions of service forced many mathematics and science teachers to leave rural secondary schools if not the teaching profession altogether. The high teacher turn over caused high failure rates in mathematics and science in the rural secondary schools. The study recommends that Government should allocate more resources to rural schools in order to improve the working conditions of teachers. The study also recommends that there should be a specific rural allowance for mathematics and science teachers to attract and retain more expert teachers in these subject areas.

KEYWORDS: Teachers, Rural secondary schools, Turn-over, Mathematics, Science, District.

INTRODUCTION

The quality of the education system is limited by the quality of its teachers (Vegas, et.al., 2012). According to Hanushek (2013) high quality teachers obtain measurable student learning results, have long-lasting positive impacts on their students' lives, and are irreplaceable. These teachers are irreplaceable because students who learn from them, instead of a low-performing teacher, gain between five and six months of additional learning, and have greater chances of passing (TNTP, 2012). Strong teachers, therefore, are essential for bringing out the best in students which makes the retention of good teachers a top priority for schools and education systems.

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Teacher turn-over causes profound strains in schools in that it destabilizes administrative, academic as well as professional standards. The administrative problem is two fold. Firstly, heads of schools fail to recruit new teachers and secondly, having to put up with ever orienting new teachers in their schools. Another face of the administrative problem is that learners were left unattended when a replacement teacher was not yet found. Learners would come to school only to spend the greater part of the day playing around the school premises. It also means that other teachers will be overloaded by managing classes for those teachers who have left before they are replaced. However, as Guin (2012) states, the most telling impact of high rate teacher turn-over is on learner performance. In Zimbabwe, most schools especially in rural areas have lost experienced highly qualified teachers, only to receive late replacements by inexperienced under qualified university graduates or temporary teachers thereby compromising the quality of instruction that pupils receive. It is on account of the above information that this study sought to explore Zimbabwean teachers' perceptions regarding causes of high-teacher turn-over of mathematics and science teachers in rural secondary schools.

LITERATURE REVIEW

Teacher supply differs by country and in nations where teaching is an attractive profession, schools have little trouble with staffing (Cooper and Avarado, 2006). Other countries, however, struggle to find teachers for certain subjects or for high needs areas (Cooper and Alvarado, 2006). According to Schleider (2012) it is not enough to simply ensure that classrooms are filled by teachers; schools need quality teachers who can produce high levels of student achievement. Interestingly, Ingersoll (2011) argues that some turnover is good for schools. Teachers who do not help students learn should leave the classroom. Unfortunately, weak teachers are not the only ones who exit through teaching's "revolving door" (Ingersoll, 2011:499). High quality teachers are among those most likely to leave, yet they are the teachers that schools struggling to improve student achievement need most (Johnson, et. al., 2005).

Phillips and Schewisfurth (2007) state that significant financial, social, instructional, organizational, and human capital costs of teacher turnover warrant prioritizing the problem of high quality teacher turnover on policy agendas. Johnson, et. al (2005) allude to differences in student achievement between classrooms to affirm the importance of individual teacher quality. In a study of employee turnover, Khatri, et. al (2001) in Waititu (2010) state that three groups of factors influence employee turnover, namely: demographic, uncontrollable and controllable factors. Demographic factors include age, gender, education, tenure, income level, managerial and non-managerial positions. Uncontrollable factors are the perceived alternative employment opportunity and job-hopping. Controllable factors include pay, nature of work, supervision, organizational commitment, distributive justice and procedural justice (Khatri et.al, 2001 in Waititu, 2010: 22).

The consequences of teacher turnover and attrition are too ghastly to contemplate. Smith (1999:58) posits that the impact of turnover is by way of increased costs to the organization, broadly categorized as separation, replacement, recruitment selection, induction and training costs. Ingersoll (2011: 2) postulates that staffing problems are created when employees leave the organization and have to be replaced, especially since teacher turn-over is highest among new teachers mostly within the first five years. Teacher attrition disrupts schooling. This is especially so when teachers leave the profession during the academic year or whilst engaged in critical projects in school (Ingersoll, 2011). According to Ingersoll (2011:4) turnover influences the performance and effectiveness of the school since the school as an organization has production processes requiring extensive interaction among educators and is, therefore, prone to suffer when subjected to high rates of turnover. Consequently, turnover disrupts the quality of school cohesion and performance (Mgadla, 2003).

As Mgadla (2003) postulates, the effects of teacher turn-over necessitates the management thereof. A number of measures have been taken to address teacher turnover in various countries. Among others, aggressive recruitment drives, lowering of standards for enrty into teaching, provision of allowances as incentives have been employed (Mgadla, 2003). A multiplicity of reasons are advanced for teacher turnover. Santiago (2001) in Mgadla (2003) cites an ageing teaching workforce and the possible retirement thereof, low salaries and demands for even complex teaching abilities. On the other hand, Duffrin (2009) cites working conditions as the major reason especially among teachers leaving within the first five years. The biggest cost of teacher turnover is student achievement (TNTP 2012). The reason that students do not have equal access to great teachers is not because there is a shortage of quality teachers; but rather, schools fail to retain their best teachers (Cooper and Alvarado, 2006). As the TNTP (2012) observes, when "irreplaceables" leave the teaching force, they create job openings that get filled by poorer quality teachers.

According to Cooper and Alvarado (2006) allowing less qualified candidates to fill vacancies left by high quality teachers contributes to the de-professionalisation of teaching which may pose organizational costs by damaging school quality and stability. The public may negatively interpret this "revolving door" as an indication of teachers' lack of commitment

(Ingersoll, 2011). Most importantly, as Phillips and Schweisfurth (2007) argue, replacing high quality teachers with weaker teachers results in missed student learning opportunities, which pose an adverse human capital cost to the nation.

Johnson, et.al. (2005) claim that schools are able to retain teachers by offering them both intrinsic and extrinsic rewards and by meeting teachers' standards for acceptable working conditions. Teachers leave when schools fail to outweigh negative working conditions, like school safety or a comfortable classroom. According to Johnson, et. al (2005) there are nine working conditions that influence teachers work. These are colleagues, community support, facilities, governance, principal, professional expertise, resources, school culture, and time. Of all the conditions that teachers consider important for work, conditions that are social in nature are paramount for teacher satisfaction (Johnson, et.al. 2005).

Ladd (2011:237) calls school leadership and collegiality "central" to any consideration of working conditions for teachers. The relationship between these elements is hierarchical because the quality of school leadership largely defined as the principal's effectiveness, determines the levels of teamwork and trust among teachers (Ladd, 2011). According to Cooper and Alvarado (2006) school leaders have direct and indirect control over organizational characteristics, like school culture, teacher autonomy, leadership and support, all of which are commonly reported factors influencing teacher turnover. Many of the "irreplaceables" who left their schools reported that school leadership had made no effort to persuade them to stay (T.N.T.P).

STATEMENT OF THE PROBLEM

The need to retain qualified teachers, especially, specialist teachers cannot be overemphasized. The quality of learning that pupils receive depends upon the quality of the teachers providing instructional guidance to these pupils. This study sought to investigate the causes of teacher turnover of mathematics and science teachers through the lens of teachers.

PURPOSE OF THE STUDY

The study sought to find out what teachers felt were the major causes of high-teacher turnover of mathematics and science teachers from rural secondary schools so as to suggest mitigatory measures to minimise the problem.

RESEARCH QUESTIONS

1. Why do mathematics and science teachers leave schools?
2. How do schools cope with the successive loss of mathematics and science teachers?
3. How does the loss of mathematics and science teachers affect the learners?
4. What measures can the Government and schools put in place to curb the high turnover of science and mathematics teachers?

SIGNIFICANCE OF THE STUDY

The significance of the study is premised on the fact that it attempted to unveil the underlying causes and effects of high rate teacher turn-over not only in the schools under study, but in Zimbabwe at large so that practical measures can be taken to stop the problem. The research hopes to bring awareness to the problem of mathematics and science teachers' exodus so that authorities can come up with policies that will curb this scourge. The study also hoped that findings would assist in the retention of maths and science teachers in rural schools so as to enable rural pupils to learn effectively in these two critical subjects for their own individual development and for national development.

DELIMITATION OF THE STUDY

The researchers delimited the study to the perceptions of teachers on the major causes and effects of high-rate teacher turnover of science and mathematics teachers in Zimbabwean rural secondary schools using a sample of 120 teachers made up of 70 females and 50 males. Other stakeholders like heads of schools, parents bodies, education officers and pupils were outside the purview of this study.

RESEARCH METHODOLOGY

The study used the quantitative research paradigm and employed a survey research design. According to Colgan (2011) the descriptive survey design looks with intense accuracy at the phenomenon of the moment and then describes precisely what the researcher sees. The questionnaire was used as the instrument for collecting data. As Barbie (2013) observes, the questionnaire increases reliability because of its greater impersonality. However, as Anderson (2011) postulate, its major weakness is that it may invite people to lie and answer questions vaguely. This was mitigated through the pilot testing of the questionnaire. The sample consisted of 120 respondents made of 70 female and 50 male teachers. The study employed simple random sampling because as Blumberg (2008) argues, it permitted every teacher to have an equal chance of participating in the study. The researchers used a questionnaire which largely had close-ended questions and two open-ended questions. Close-ended questions enabled the researchers to collect predetermined respondents opinion regarding the studied phenomena (Kumar, 2008). Researchers were able to obtain the actual perceptions of the respondents regarding the phenomenon of mathematics and science teachers' high turnover in secondary schools from the respondents' open-ended free responses.

DATA COLLECTION AND ANALYSIS

As highlighted in the above section, data were gathered by means of a questionnaire which was largely made up of close-ended questions and a few open-ended questions. The questionnaire was chosen because as Cohen and Manion (2012) observe, it has the ability to reach many respondents who live at widely dispersed addresses and preserves anonymity which encourages greater honesty. However, the questionnaire as Anderson (2011) argues, generally has a low response rate and is inflexible in that it does not allow ideas or comments to be explored in-depth and many questions may remain unanswered. The researchers personally distributed the questionnaires to the schools where the respondents worked. The same method was used to collect the completed questionnaires. Data generated produced descriptive statistics around the variables under study. These statistics were computed and inferential implications from them derived and recorded.

FINDINGS AND DISCUSSION

The study set out to explore teachers' perceptions on the causes of high rate turnover of mathematics and science teachers in rural secondary schools in Zimbabwe. This section is presented in two parts, namely, presentation and discussion of data.

PRESENTATION OF DATA

Table 1: Composition of sample by gender (N=120)

Sex	**Frequency**	**Percentage**
Male	50	42
Female	70	58
Total	**120**	**100**

Table 1 above shows that there were more female respondents than male ones. The datum was considered statistically significant to the extent that it confirmed that most schools in Zimbabwe had more female teachers than male ones.

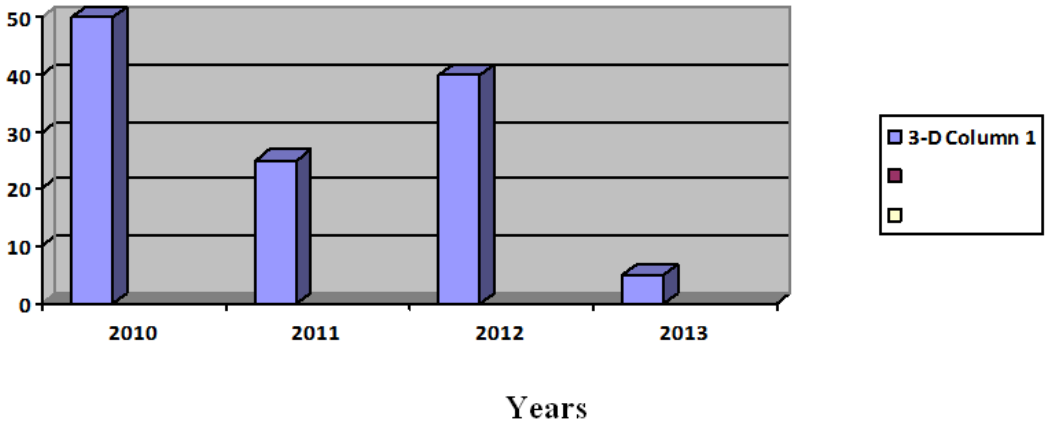

Figure 1: Mathematics and science teachers who left my school between 2010 and 2013 (N=120)

Figure 1 above shows that 42% of the respondents indicated that mathematics and science teachers left their schools in 2010; 21% indicated that their schools lost mathematics and science teachers in 2011; 33% of the respondents' schools lost mathematics and science teachers in 2012 and 4% indicated that their schools lost mathematics and science teachers in 2013. This information reveals that schools continue to lose mathematics and science year-in-year-out.

Table 2: How would you describe the rate at which your school loses mathematics and science teachers (N=120)

Rate	Frequency	Percentage
Extremely high	73	61
Very high	35	29
High	3	3
Low	2	2
Very low	0	0
Not sure	6	5
Total	**120**	**100**

Table 2 reveals that the majority of teachers indicated that the incidence of mathematics and science teachers leaving their schools was extremely high (61%), those who indicated that it was very high stood at 29% and a few (2%) felt that it was low and 5% indicated that they were not sure about this information.

Table 3: Time taken by my school to replace a mathematics or science teacher who has left the school (N=120)

Time taken	Frequency	Percentage
Within one month	0	0
After one month	0	0
Within one term	5	4
After one term	5	4
Within one year	10	9
After one year	5	4
More than one year	95	79
Total	**120**	**100**

The information on table 4 above shows that the replacement of mathematics and science teachers takes considerable time. The figures above reveal that it takes a year for a teacher to be replaced.

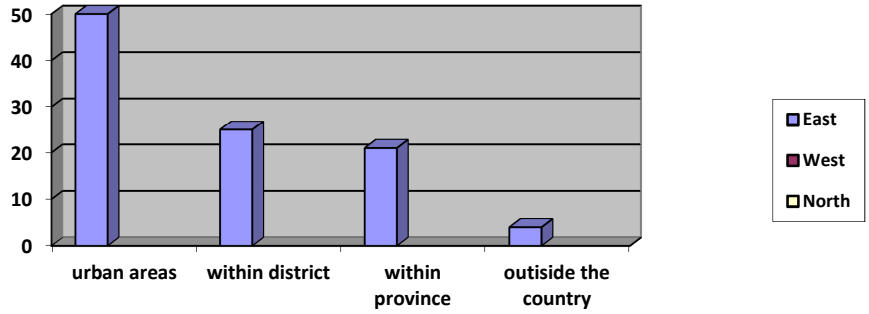

Figure 2: Destinations of mathematics and science teachers on leaving my school

The information on figure 2 above shows that the majority of respondents (50%) indicated that most of the mathematics and science teachers who left their schools went to urban centres within Zimbabwe, 25% of these teachers transferred to schools within the district, another 21% transferred to schools within the province. Those who indicated that teachers left for other countries were 4% of the sample.

The questionnaire had two open-ended questions which bolstered data from the close-ended questions. The first question wanted to find out from the respondents what they thought were the major causes of high rate teacher turn-over in their schools. A number of reasons were put forward. The most common included the following:

- Teachers with higher qualifications especially in specialist areas like mathematics, science and practical subjects have more opportunities elsewhere; and as a result are likely to leave faster to other stations.
- In subject areas where there is work overload as a result of shortages of teachers, teachers are likely to leave for better schools where the teacher-pupil ratio will be normal.
- Young teachers who grew up in urban areas are not used to the rural environment.
- Copying with students who had very weak foundations on difficult subject areas also frustrates teachers and this forces them to leave rural schools.
- The general school climates in most of the schools do not motivate teachers to stay for longer periods.
- Leadership styles also tend to stifle initiative and innovativeness with teaching methods and this drives teachers away as well as lack of resources.
- The second question sought to find out from the respondents what they believed to be the results of high teacher-turnover. Again, a number of issues were raised. The major issues highlighted included the following:
- Poor results at public examinations by pupils in maths and science because they might remain without a qualified teacher for a long time.
- The sudden transfer of maths and science teachers brought about work overload for those teachers who remained since they had to teach those classes whose teachers had left the school.
- Some parents may transfer their children to other schools where there are teachers in these subject areas.
- It increases conflict between teachers and the administration as some teachers may refuse to teach extra loads.

DISCUSSION

Information from the study revealed that mathematics and science teachers continue to leave rural secondary schools without any signs of abating. Every year all the schools one way or the other, lose a mathematics or science teacher. This situation profoundly compromises the quality of education that pupils in rural areas receive. As Hanushek (2013) argues, high quality teachers obtain measureable student learning results, have long-lasting positive impacts on their students' lives and are irreplaceable. These teachers are irreplaceable because students who learn from them, instead of from a low-performing teacher, gain between five and six months of additional learning and have greater chances of passing. Strong teachers, therefore, are essential for bringing out the best in students.

Findings also indicate that in most of the schools it took at best a term for schools to find a replacement for mathematics and science teacher who would have left and at worst, a whole year. The implications of this finding are that pupils left by these teachers lose in terms of concepts, and coverage of the syllabus is thoroughly compromised. This situation also affects

the overall staffing in the school since teachers have to be reassigned to accommodate classes left by the teacher who transferred. This also affects the time-tabling which should be re-done at a high cost in terms of time and labour. This is corroborated by observations by Ingersoll (2011) who postulates that staffing problems are created when teachers leave the organization and have to be replaced. It is therefore; very clear that teacher turn-over disrupts schooling. This is especially so when teachers leave the profession during the academic year or whilst engaged in critical projects in school, like preparing classes for final public examinations. According to Ingersoll (2011) turnover influences the performance and effectiveness of the school since the school as an organization has production processes requiring extensive interactions among educators.

The study also revealed that copying with students who had weak foundations for "difficult" subject areas like mathematics and science, frustrated teachers, particularly the young ones who are inexperienced. Mathematics and science teaching begins from primary school. Concepts in these subject areas should be well grounded from the very formative cognitive stages of children so that at secondary schools these are developed rather than started.

Findings also reveal that some teachers leave schools due to work overloads as a result of large class sizes and high number of periods. In subjects like mathematics and science, schools struggle to recruit qualified teachers and as a result the few qualified teachers available have to take all classes including for those teachers yet to be recruited. This, affects the morale of these teachers, and as a result, they would rather transfer to schools where the classloads are normal. As Johnson, et.al (2005) posit, teachers leave when schools fail to outweigh negative working conditions like school safety or a comfortable classroom.

The study also shows that the leadership styles and general school climates tend to stifle initiative and innovativeness of teachers in terms of teaching methods and this does not motivate teachers to stay for longer periods in these schools. As Ladd (2011) observes, school leadership and collegiality is central to any consideration of working conditions for teachers. The relationship between these elements is hierarchical because the quality of school leadership largely defined as the principal's effectiveness, determines the levels of teamwork and trust among teachers. According to Cooper and Alvarado (2006) school leaders have direct and indirect control over organizational characteristics like school culture, teacher autonomy, leadership and support, all of which are commonly reported factors influencing teacher turnover.

Findings also indicate that high rates of teacher turnover in mathematics and science contribute towards poor results of pupils at public examinations. The sudden transfer of maths and science teachers brought about work overload for those teachers who remained since they had to teach those classes whose teachers had left in addition to their own workload. This situation has a potential to create conflict between teachers and the administration team as some teachers may refuse to take the extra loads. This is in congruence with findings by Guin (2012) who states that, the most telling impact of high rate teacher turnover is on learner performance. Teacher turn-over causes profound strains in schools in that it destabilizes administrative, academic as well as professional standards. The administrative problem is two-fold. Firstly, heads of schools toil to recruit new teachers and secondly, having to put with ever orienting new teachers in their schools. Another face of the administrative problem as postulated by Guin (2012) is that learners were left unattended when a replacement was not yet found. Learners would come to school only to spend the greater part of the day playing around the school premises.

CONCLUSIONS

Given the background of the above findings the researchers make the following conclusions:

- Both theoretical and empirical data in this study converge on the fact that most rural secondary schools in Zimbabwe are losing mathematics and science teachers at an alarming rate.
- It takes a long time for schools to find a replacement for a mathematics and science teacher who has left the school, thereby, adversely affecting the learning of pupils.
- Copying with students who had weak foundations in mathematics and science frustrated teachers; particularly the young and the inexperienced.
- Some mathematics and science teachers leave certain schools due to work overloads as a result of class sizes and high number of teaching periods and exercise books for marking.
- Leadership styles and school climates tend to stifle initiative and innovativeness of teachers.
- High teacher turnover in mathematics and science is a major contributory factor to poor results of pupils at public examinations in the two subjects.
- Teacher turn-over causes strains in schools in that it destabilizes administrative, academic as well as professional standards.
- Teacher turnover may force some parents to remove their high performing children to other schools, thereby reducing the number of students likely to perform well at public examinations in these schools.

RECOMMENDATIONS

In light of the findings of this study, the researchers would like to make some recommendations.

- A stimulating and supportive work environment should be created by school leaders in order to retain mathematics and science teachers.
- There should be an allowance for mathematics and science teachers who opt to be deployed in the rural secondary schools. This allowance would help retain teachers for mathematics and science and also help encourage prospective student teachers to specialise in mathematics and science thereby creating a large pool of these teachers in the employment market.
- The Government should implement alternative certification programmes to increase teacher-supply; for example, retraining teachers without science and mathematics on these subjects through open and distance learning.
- The Government should also provide bonuses for new recruits and stipends for teaching "in hard to staff areas".
- Employment of mathematics and science teachers from Zimbabwe by other countries should be formalized so that the Zimbabwean Government exports these professionals for a fee and the revenue so collected be channeled back to losing schools to benefit teachers who would opt to replace those went outside the country.
- The Government should provide grants for the training of mathematics and science teachers. This might encourage more students to take up mathematics and science in their studies at school.

REFERENCES

[1] Anderson, C. (2011). *Research in education.* Sydney: Alwin.
[2] Barkie, E. (2013). *The practice of social research.* California: University of California.
[3] Bardach, E. (2012). *A practical guide for policy analysis.* Washington, D.C: C Q Press.
[4] Blumberg, C. (2008). *Research methods.* Boston: Irwin.
[5] Cohen, L. and Manion, L. (2012). *Research methods in education.* London: Routledge.
[6] Colgan, R. H. (2011). *Educational research.* New York: Eaglewood Cliffs Practice.
[7] Cooper, J. M. and Alvarado, A. (2006). *Preparation, recruitment and retention of teacher.* Pris: UNESCO.
[8] Duffrin, E. (2009). *Tackling the teacher dropout rate.* London: Hodder and Staughton.
[9] Guinn, S. T. (2012). *The failure of input based schooling policies.* The Economic Journal, 113 (10) 64-98.
[10] Ingersoll, R. M. (2011). *Why do high-poverty schools have difficulty staffing their classrooms with qualified teachers?* Reviewing our schools, securing our future. A national task force on public education. New York: Institute for America's Future.
[11] Johnson, S. M., Kraft, M. A. and Papay, J. P. (2005). *How context matters in high-need schools.* The effects of teachers' working conditions on their professional satisfaction and their students achievement. Teacher College Record, 114 (10):1-39.
[12] Kumar, F. S. (2008). *Research in educational settings.* London: University of London.
[13] Ladd, H. F. (2011). *Teachers' perceptions of their working conditions.* How predictive is planned and actual teacher movement? Educational Evaluation and Policy Analysis, 32 (2): 235-261.
[14] Mgadla, I. X. (2003). *Managing teacher turn-over.* South African Journal of Education, Vol. 23, 4:283-291.
[15] Phillips, D. and Schweisfurth, A. (2011). *Comparative and international education.* An introduction to theory, method and practice. New York: Continuum International Publishing Group.
[16] Schleider, A. (2012). *Preparing teachers and developing school leaders for the 21st century:* Lessons from around the world. Paris: OECD Publishing.
[17] The New Teacher Project (TNTP) (2011). *Keeping irreplaceables in DC public schools.* Lessons in smart teacher retention. Washington DC: UNESCO.
[18] Vegas, E., Loeb, S., Romaguera, P., Paglayan, A., Goldstein, N. Ganimian, A., Trembley, A. and Jainovich, A. (2012). *Systems approach for better education results.* New York: World Bank.
[19] Waititu, G. M. (2010). *An analysis of factors influencing turn-over of teachers in public high schools in Limuru District.* Nairobi: Kenyatta University.

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