TEACHER JOB SATISFACTION AND TEACHER EXPERIENCE AS PREDICTORS OF STUDENTS' MATHEMATICS PERFORMANCE

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Abstract

Academic performance is a complex concept that depends on many factors, including school values, learners' commitment, employee satisfaction as well as teacher characteristics such as teaching experience, gender, and educational background. The purpose of this study was to assess the extent to which teacher satisfaction and teacher experience predict students' performance in Mathematics in Botswana junior secondary schools. This study adopted a quantitative correlational design, using hierarchical sequential regression analysis. Secondary data of 2015 from the Trends in International Mathematics and Science Subjects for Botswana was used. A total number of (N = 5964) Form Two students were sampled from all the junior secondary schools across Botswana. The findings showed that both teachers' satisfaction and teaching experience are significant predictors of students' performance in Mathematics. These findings imply that the students' performance could be determined by both the level of teacher job satisfaction and their teaching experience. Interestingly, this study uniquely revealed that teacher experience is a better predictor of students' performance in Mathematics and teacher job satisfaction. The findings in this study serve as a reference point to all relevant stakeholders in basic education, especially those involved in policy formulation and those with interest in improving students' academic outcomes in Mathematics.

Keywords: student performance, teacher job satisfaction, teaching experience, Mathematics performance

1.0 Introduction

Teacher job satisfaction enables teachers to commit their time, effort and energy in classroom teaching activities (Gutierrez, Candela & Carver, 2012). The outcome of having teachers who are zealous and keen in their job is reflected in academically oriented and motivated students (Hongying, 2007). Altogether these attributes eventually manifest in higher academic performance by the students. According to Abazaoglu and Aztekin (2016), a teacher's level of job

satisfaction has major implications on how they perform their duties since teacher satisfaction is one of the factors that contribute to their teaching objectives, to motivation, and to the academic achievement of students.

Higher academic achievement is attained when students have teachers who enjoy teaching and think they are making a difference (Ayele, 2014). Teachers with high levels of job satisfaction tend to show better performance at work (IqbaL, Fakhra, Tahir & Shabbir, 2016). Since teachers' job satisfaction and their achievement scores are interlinked they represent a vital potential source for improving the educational process (Patrick, 2011). In view of the potential implications of teacher job satisfaction on teachers' performance and ultimately on students' academic performance, it remains imperative to continuously assess teachers' level of job satisfaction for Botswana's education system to generate interventions that can improve teacher job satisfaction and hence improve the quality of education.

More importantly, to have a clearer understanding of how teachers can impact on students' academic performance, it remains imperative to consider other teacher characteristics such as their teaching experience. Most successful schools have a healthy combination of experienced teachers and new teachers (Staff, 2015). Experienced teachers have been found to give schools stability and serve as mentors to the new teachers while the new teachers bring fresh ideas and enthusiasm. Collins (2016) is of the view that new teachers are a source of new energy and skills and therefore may contribute intangible benefits to students' learning, whereas experience gained overtime by teachers builds their confidence in teaching the subject and further improves the quality of skills and knowledge of the subject (Gail, 2013). Teaching experience in this study was defined by the number of years a teacher had accumulated as a practicing teacher.

2.0 Theoretical framework

Overall satisfaction with a career is a combination of entities that cause individuals to enjoy their jobs, known as motivators, and entities that cause individuals to hate their jobs a little less, known as hygiene factors (Judge, 2013). These two factors, proposed by Frederick Herzberg's 1950 Two-Factor Theory of motivation, drive towards job satisfaction and job dissatisfaction. Herzberg explained the intrinsic factors (job content) as those factors intrinsic to the nature and experience of doing work and cause people to love their job; they are what make the job enjoyable. These factors include achievement, advancement, recognition, the work itself and responsibility. By inference, when appreciated and recognized in their job, teachers become happy and feel satisfied with their profession. Satisfied teachers become highly motivated to put extra effort in their job and motivate the students to learn, which then translates into higher academic achievement.

Hygiene factors include school policy and administration, supervision, relationship with supervisor, work conditions, salary, relationship with peers, personal life, relationship with subordinates, status, and security. To remove dissatisfaction in a school environment, these

hygiene factors must be fulfilled. Paying high salaries and employment benefits would cause teachers to have less dissatisfaction towards their job. When teachers are unhappy with and dissatisfied towards their job, it could result in limited effort towards effective teaching, contributing towards a decline in the performance of students. Herzberg in his theory maintained that hygiene factors counteract physical needs and help workers avoid discomfort, but they seldom produce pleasure.

3.0 Purpose of the study

The purpose of this study was to assess the extent to which teacher satisfaction and teacher experience predicts students' performance in Mathematics in Botswana junior secondary schools. The study was guided by the following research question: To what extent does teacher job satisfaction predict students' performance in Mathematics over and above teacher experience?

4.0 Related literature

4.1 Teacher satisfaction and students' performance

The developments of defining the job satisfaction follow a line from one single perspective to multiple perspectives (Zhu, 2011). Generally, it is agreed that job satisfaction involves the attitudes, emotions and feelings about a job, and how these attitudes, emotions and feelings affect the job and the employee's personal life (Whitle, TedFord & Benson, 2015). Teachers' satisfaction with their work bequests them the means to justify their teaching responsibilities. The teaching profession attracts teachers for its intrinsic factors such as the joy of working with pupils, whereas external rewards (e.g., fringe benefits, salary and prestige) are necessary for very few teachers (Skwakil, 2013). Job satisfaction has also been shown to develop employees' productivity and lower their absenteeism and turnover rates (Hughes, 2013).

IqbaL, Fakhra, Tahir and Shabbir (2016) set out to measure how every aspect of job satisfaction relates with students' academic achievement. They utilized a sample consisting of 322 secondary-school teachers in Faisalabad, Pakistan. They used Pearson's correlation coefficient to explore the relationship between teacher satisfaction and the 9th and 10th grade academic scores of learners. The teacher satisfaction elements they examined were "pay, work, promotion, colleagues and working conditions." The study revealed that students' performance showed no significant correlation with teachers' job satisfaction. These findings are contrary to Crawford (2017) who conducted a correlational study with the purpose of determining whether there was a connection between teacher job satisfaction and student test scores in the school districts of South West Missouri. A Chi-square test of independence was used to determine the relationship between the three-year average district Map Performance Index scores for the 2013-2014, 2014-2015, and 2015-2016 school years and teacher job satisfaction scores. Total teacher job satisfaction scores from participants showed that most teachers indicated a high level of job satisfaction. A positive trend line was drawn indicating the correlation coefficient of 0.1463. This was interpreted as a weak positive relationship between teacher job satisfaction and Missouri Performance Index

scores. Crawford (2017) concluded that to attain school goals, administrators must be prepared to help individual educators obtain the highest possible level of success and performance.

Ekpenyong and Joseph (2017) conducted a descriptive survey study to test if teachers' level of job satisfaction was significantly related to students' academic performance in Social Studies. The hypothesis was that teachers' level of job satisfaction does not significantly relate with students' academic performance in Social Studies. The data obtained from the respondents were subjected to statistical test through Pearson product moment correlation analysis. The findings of this study revealed that the teachers' level of job satisfaction was significantly related to students' academic performance in Social Studies. That is, the more teachers of Social Studies felt satisfied, the higher their job performance, which translated to high performance on the part of the students in the subject. For any study that seeks to discover a relationship between two variables, a correlation test is the most appropriate. This explains why most researchers in literature such as Jyoti and Sharma (2009), Baptiste (2019) used the Pearson's product moment correlation in their study. Their findings support the view that teaching personnel's commitment to service and overall satisfaction with their conditions of service as well as motivation are fundamental factors in students' academic gains.

4.2 Teacher experience and students' performance

The subject of teacher experience as a factor that affects students' academic performance has gained recognition in research over the years and findings have been mixed and inconclusive. Many years of teaching experience affect students' learning outcomes (Apata, 2013; Dial, 2008). A teacher with more experience in the classroom is more effective because they have had an extended time to test procedures and lessons on several cohorts of students (Dial, 2008). Also these teachers select best information in the course of planning and teaching, and make significant use of educational routines (Kheirzadeh, 2018).

The impact of teachers' experience on the students' academic achievement is customarily assessed through scores of students. A series of researchers, for instance Ewatan and Ewatan, (1987), Adeyemi (2008), Akpo (2012) and Daso (2013) used grades of students as the outcomes of results. In particular Ewatan and Ewatan (1987) investigated the influence of teaching experience on the academic performance of public secondary school students in Mathematics and English Language in Ado-Odo/Ota and Ifo Local Government Areas in Ogun State, Nigeria. Ewetan and Ewetan hypothesized that there was no significant relationship between teachers' years of experience and students' academic performance in Mathematics and English Language in the sampled public secondary schools. Regression analysis and t-test were used to test the hypotheses generated for the study at 0.05 alpha levels. Findings revealed that teaching experience significantly influenced students' academic performance in Mathematics and English Language as measured by their performance in the examinations and as perceived by the respondents. These findings were supported by Adeyemi (2008) who conducted a correlational survey to examine teachers' teaching experience and students' learning outcomes in secondary schools in Ondo State,

Nigeria. The data collected were analyzed using the chi square test, correlation analysis and t-test. The findings revealed that teaching experience was significantly related with students' learning outcomes as measured by their performance in the Secondary School Certificate (SSC) examinations.

Akpo (2012) examined the impact of teacher-related variables on students' Mathematics results in junior secondary certificate in Namibia using questionnaire, multi-correlation and regression analysis and found that teacher educational qualifications, teaching experience and classroom management beliefs are related to students' academic achievement. A similar study by Daso (2013) on teacher variables and senior secondary students' achievement in Mathematics in Rivers State, Nigeria, reported that there is a significant relationship between teachers' method of teaching, teachers' attitude, teachers' experience and students' achievement in Mathematics. Findings by Akpo (2012) and Daso (2013) concur with Abu and Fabunmi (2013) who investigated the relationship between teacher variables and adult learners' academic performance in the part-time sub-degree program of the University of Ibadan in Nigeria and found a significant relationship between teachers' qualification, age, years of experience, teacher-learner ratio and adult learners' academic performance. Collectively, findings from these research studies are an indication that having more experienced teachers in schools can lead to improved student performance than having a higher proportion of teachers with less teaching experience.

5.0 Methodology

5.1 Research design

A correlational research design was employed to find out the extent to which teacher satisfaction and teacher experience are associated with students' performance in Mathematics in junior secondary schools in Botswana. The design was appropriate for the study because correlation research design is a measurement of two or more factors to determine or estimate the extent to which the variables are related or change in an identifiable pattern (Weirsma, 2000).

5.2 Population of the study

The target population for this study was all the Mathematics teachers in junior secondary schools who practiced teaching at the time of the study, 2015. The population further comprised all Form Two students enrolled in junior secondary schools in Botswana at the time of the study.

5.3 Sampling

Secondary data was utilized in this study and was extracted from the Botswana Examination Council (BEC) database. Therefore, no specific sampling method was used as (N =5964) students' scores in Mathematics from TIMSS Botswana were used as they were. Also, the teacher background variables (teacher job satisfaction and teacher experience) were used as they were.

5.4 Measure

As this study used secondary data from TIMMS, 2015, the researcher therefore did not design an instrument for the study but adopted the TIMMS instrument. Variables of interest in this study being teacher satisfaction, teaching experience and the students' scores in Mathematics were derived from TIMMS 2015 database to fit the purpose of the study. Authorization was obtained from BEC designated persons to adopt the TIMSS instrument as it is for the study. TIMSS used a questionnaire to collect data from the teachers concerning Mathematics. The questionnaire had a total of 10 sections and a total of 27 questions. The sections sought to solicit information from the teachers under the following headings: teacher as an individual, school emphasis on Advanced Mathematics and Physics Education, the school environment, being a teacher, teaching the TIMSS class, teaching Advanced Mathematics to the TIMSS class, technology for teaching Mathematics TIMSS class, Advanced Mathematics topics taught to the TIMSS class, and Mathematics homework for the TIMSS class. The demographic variables for teachers were also part of the instrument.

5.5 Data collection procedures

The students' examination scores and the teacher background variables were obtained from BEC database. The data was collected as a Statistical Package for Social Sciences (SPSS) file saved in a re-writable compact disc.

6.0 Ethical considerations and entering research setting

6.1 Research permits

Before data collection, the researchers sought ethical clearance from the Internal Review Board at the University of Botswana. Permission was then sought from the Department of Educational Planning and Research Services of the Ministry of Basic Education to conduct the study. The Ministry of Basic Education approval letter was then presented to BEC in seeking permission to use data for TIMSS 2015.

6.2 Potential harms and confidentiality

The researcher adhered to protecting the human rights of the participants by ensuring that data is safe and confidential by keeping it in an encrypted folder with a password. There was no direct contact with the respondents, therefore this eliminated any chances of linking students with their final examination mark.

6.3 Potential benefits

There are no direct potential benefits of this study; it is however hoped that the findings of the study would lead to an increased understanding of how teachers' satisfaction as well as their teaching experience can influence students' performance in Mathematics in Botswana.

7.0 Data analysis

The data was analyzed using inferential statistics. Hierarchical linear regression was used to assess the extent to which teacher satisfaction predicts students' performance in Mathematics over and above teacher experience. To compute hierarchical regression, teacher satisfaction and teaching experience were entered as independent variables and the students' Mathematics scores were entered as a continuous dependent variable. Teacher satisfaction was entered first in the model while teacher experience was entered in the second block together with teacher satisfaction. This order of entering the variables was influenced by Field (2005), as cited in Koloi-Keaikitse and Matebekwane (2017), and indicated that when researchers are interested in constructing complex models using several predictors as is the case with the current study, the researcher must indicate the order in which they have entered their predictor variables. When using hierarchical regression to predict the outcomes, predictors from past research are entered first in the model in order of importance, hence the reason behind the sequence in the current research. This is because past research has shown that teachers' satisfaction is strongly related to academic performance and that teacher years of experience may not be related to student achievement (Chamundeswari, 2013; Ayele, 2014).

8.0 Results

The purpose of this study was to examine the extent to which teacher satisfaction could predict students' performance in Mathematics in Botswana junior secondary schools over and above teacher experience. To ensure that the criteria for carrying out hierarchical regression analysis were not violated, preliminary analyses of assumptions were conducted. The first assumption considered was to check if both the predictor variables and the outcome variable were continuous in nature. The assumption was satisfied when both the dependent and the independent variables were continuous. The next assumption checked for was the multicollinearity (inter-correlations between the predictor variables), and to check for a linear relationship between dependent variable and the predictor variables. There were weak inter-correlations between the predictor variables, making it possible to carry out hierarchical linear regression. Tolerance values for the predictor variables showed that the assumption of multicollinearity had been satisfied as the values ranged between .99 and .100. All the assumptions were met satisfactorily making, it probable to compute a simple regression analysis.

To compute Hierarchical regression analysis, teacher satisfaction was entered first as a block Model 1 in the regression model, teacher experience was entered in Model 2. The results showed that in Model 1 teacher satisfaction explained only 10 % of total variance in Mathematics performance. By adding a second variable of teaching experience in Model 2 the total variance explained by the model was 0.21%, an indication that teacher experience explained only 21% of the total variance of Mathematics performance. Overall variance accounted for increased significantly from Model 1 to Model 2 by 11%. Furthermore, the results showed that teacher satisfaction is the least predictor of Mathematics performance though it was statistically significant in all the two models: Model 1 (β = .039, p < .001) and Model 2 (β = .031, p < 001). Teacher

satisfaction had positive slopes in all the two models, an indication that teacher satisfaction is associated with high performance in Mathematics. Teacher experience was also significant and had a positive slope: Model 2 (β = .140, p < 001), which is an indication that teaching experience is associated with high levels of performance in Mathematics. For a summary of hierarchical sequential regression results, see Table 1.

Table 1: Summary of hierarchical sequential regression analysis (N= 5964)

Model	Predictors	R^2	R^2change	T	B (SE)	β
1.	Satisfaction	0.1**	.001**	2.12	.77 (.363)	.039**
2.	Satisfaction	0.21**	.020**	1.72	.62 (.360)	.031**
	Experience			7.76	1.70 (.219)	.140**

Note: * p < .05; Dependent variable: *students' mathematics performance*

9.0 Discussion

9.1 Teacher satisfaction

The findings of this study showed that teacher satisfaction significantly predicts students' performance in Mathematics. These findings therefore imply that increase or decrease in the level teacher job satisfaction could result in an increase or decrease in the outcomes of the students' performance in Mathematics. The findings of this study concur with findings of other researchers such Ekpenyong and Joseph (2017) who reported that teachers' level of job satisfaction in Social Studies is significantly related with students' academic performance in the subject. Also a significant relationship between the two variables suggest that strategies needed to advance teacher working conditions must be put in place and or supported. Teachers who are satisfied with their jobs tend to be more effective in promoting better learning, which could lead to better student performance (Rogler, 2014). Furthermore, teachers' satisfaction can positively influence the quality and the stability of instruction, which, in turn, might translate into better learning outcomes for students (Onah & Ugwe, 2010). Considering that Botswana has been ranked low in the TIMSS international benchmarks (BEC, 2014), execution of the right education strategies aimed at attaining and sustaining the highest teacher job satisfaction at the policy level could drive towards a quality and competitive education system which is recognizable even in the international benchmarks.

Mathematics is a subject that requires more time to be taught for students to comprehend and demands full attendance of classes by both teachers and learners to achieve maximum performance. Critical to this is the presence of diversified strategies such as having school programs which are inclusive in the delivery of specific subjects to maximize the possibilities of reaching the highest performance for all pupils despite their learning capabilities. Such could be in the form of teachers offering remedial and or tutorial classes after working hours, backed up with reasonable incentives to motivate teachers to improve job satisfaction. It has been

demonstrated that satisfied employees are happy with their jobs and a satisfied workforce is associated with higher productivity due to fewer disruptions caused by absenteeism or good employees quitting their jobs (Onah & Ugwe, 2010). Hughes (2013) noted that satisfied employees have lower rates of both turnover and absenteeism. Teachers are role models for their respective students and, therefore, teachers' job performance, which include class attendance, is crucial for students' success (Agustinus, Wolomasi, Asaloei, & Redan, 2019).

The status of the school's academic performance is the reflection of the standards and efforts put forth by policy makers and program developers. The findings of the current study points to the relevant authorities and stakeholders to encourage initiatives targeted towards improving teacher job satisfaction. There is also need for a continuous revision of educational frameworks and strategies to align them with current teaching and learning and ever changing global educational needs.

9.2 Teacher experience

Findings of this study revealed a positive relationship between teaching experience and students' performance in Mathematics, an indication that more teaching experience can have positive impact on the performance of the students they teach. Through these findings therefore, students' performance in Mathematics can be predicted based on the length of the teacher's teaching experience. These findings concur with findings obtained by Adeyemi, (2008), Akpo (2012) and Abu and Fabunmi (2013). Many researchers contend that the number of years teachers have accumulated in their teaching profession is commensurate with their level of confidence, together with the knowledge they have acquired in all the years of teaching, which is expected to add value to high student academic performance. For instance, Koloi-Keaikitse and Matebakwane (2017) contend that teacher experience can have a positive impact on their classroom practices in general. For Johnson (2017), these practices may include specific teaching strategies such as communication, clear learning objectives and expectations for student performance, utilizing standards-based learning objectives and assessments, and utilizing best instructional practices. In view of the above, Funmolilo and Daniel (2017) argued that as teachers gain experience, their students not only learn more, as measured by standardized tests, they are also more likely to do better on other measures of success, such as school attendance.

Teachers with a longer teaching experience tend to have a richer background of experience to draw from, can contribute insight and ideas to the course of teaching and learning, are open to correction and are less dictatorial in classroom (Dobbie, 2011). In a similar disposition Yusuf and Dada (2002) declared that students taught by more experienced teachers perform better than those taught by less experienced teachers because more experienced teachers may have mastered the content and acquired classroom management skills to deal with different types of classroom problems. Furthermore, more experienced teachers are more able to concentrate on the most appropriate way to teach particular topics to students who differ in their abilities, prior knowledge and backgrounds (Kosgeil et al., 2013). Some researchers hold different opinions when it comes

to the relationship between teacher experience and the learning outcomes, their opinions are contrary to the findings of the current study. For instance, Collins (2016) contends that teachers with more experience, such as twenty years, are effective but not more effective than those with five years of experience. Collins is of the view that the effectiveness of teachers deteriorates with time because teachers become comfortable with teaching styles, the working environment and with doing same thing over years.

10.0 Conclusion

Based on the findings of the study it can be concluded that both teacher satisfaction and teacher experience are significant predictors of students' performance in Mathematics. However contrary to other past research findings, the findings of the current study revealed that teacher experience is a better predictor of student's performance in Mathematics than teacher satisfaction. These findings could be used as point of reference by policy makers and program designers in revisiting educational policies and programs and putting emphasis on the welfare of teachers. A knowledgeable teacher is in a position of confidence to help students acquire the necessary skills and knowledge they need to be globally competitive. Taking into consideration the importance of teacher job satisfaction may help improve the overall education performance in Botswana and position the country to fulfill the goals of universal primary and secondary education and quality education for all as espoused in Sustainable Development Goal 4 that promotes lifelong learning.

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