

Influence Of Teachers' Professional Development On Students' Performance In Chemistry In Public Secondary Schools In Machakos County, Kenya.

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Abstract

Background: The study aimed to investigate the influence of principals' management of teachers' of chemistry professional development on students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

Materials and Methods: Utilizing James MacGregor Burns' Transformational Leadership Theory (1978) as a framework, the study adopted a Convergent Parallel Mixed Methods Research Design, allowing for the concurrent collection of both qualitative and quantitative information. The study's target population included 545 chemistry teachers and 365 principals. A simple random sampling method was employed to select 109 chemistry teachers and 73 principals. Data collection techniques comprised interview schedules, document analysis and questionnaires. Qualitative data from open-ended questions were examined through content analysis, while quantitative data were analyzed using inferential and descriptive statistics with the assistance of SPSS version 26.

Results: Pearson product correlation of principals' management of teachers' of chemistry professional development and students' academic performance was found to be moderately positive and statistically significant ($r = .670$, $p < .001$). The value of R^2 was 0.449 inferring that 44.9% of the variations in students' academic performance was explained by principals' management of teachers of chemistry professional development. This led to the rejection of the null hypothesis and adoption of the alternative hypothesis that there is a statistically significant relationship between assessment of chemistry teacher professional development by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

Conclusion: The study recommends professional development programmes to be well organised and funded, so as to ensure that teachers of chemistry adapt to the changing education environment brought about by advancement in technology.

Keyword: Professional development, principal, academic performance, teachers, chemistry

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I. Introduction

Teacher professional development includes all the activities in which teachers engage during the course of a career which are designed to enhance their work. Teacher professional development results to improved education quality and student's achievement (Whitworth and Chiu, 2015). Principals who practice instructional leadership are characterized by participating in professional development that is designed to strengthen performance outcomes (King, 2002).

The policy framework on teacher continuing professional development in Kenya emphasizes on effective teacher development and gives a guideline on the aspect of capacity building of teachers. Enhanced professional development of the workforce in education, training and research is a policy that the government has adopted in order to strengthen human resource in the education sector (RoK, 2019). According to Sessional Paper No. 1 of 2005 on Education, education and training in Kenya must incorporate the importance of learning through ones' lifetime as being essential to effective social and economic development (RoK, 2019).

Osamwonyi, (2016) recommends that professional development should include seminars, workshops, conferences, exhibitions and processes that improve teachers and professional development in institutions from initial employment stage to retirement. Therefore, it becomes important that every attention be devoted to teacher in-service (retraining) education to promote professional development and growth. This view emphasizes importance of teacher retraining as an indicator for professional development in learning institutions.

According to Muthaura (2010), teachers need to be trained in order to have the ability to facilitate learning effectively to help learners deduce their future skills for learning. The teacher development programmes should enable them to be culturally competent, talented, innovative, creative problem-solvers, skilled and critical thinkers. Training institutions need to understand that teachers whose competency levels are low will have difficulty in harnessing learners' competency and skills needed for survival which may finally result into low academic performance level.

II. Material And Methods

The study used a Convergent Parallel Mixed Methods Research Design. All five hundred and forty five chemistry teachers and three hundred and sixty five principals in public secondary schools in Machakos County were targeted. A simple random sampling method was employed to select one hundred and nine chemistry teachers and seventy three principals, resulting in a total sample size of one hundred and eighty two respondents. The instruments of research comprised of document analysis, questionnaires and interviews.

To maintain data reliability, errors were detected and removed during the cleaning process. Cleaned information was then coded by allocating numerical values to the responses, followed by both inferential and descriptive statistical analyses. Data coding was conducted using Statistical Package for the Social Sciences version 26. Descriptive statistics, including frequencies, means, standard deviations, and variances, were summarized in tables and graphs, accompanied by a statistical analysis of the findings. Interview responses were recorded and presented as narratives. The interview data was first transcribed and then thematically analyzed to integrate the main themes into a coherent narrative. Inferential statistics included correlation and regression analyses.

III. Results

The study sought to establish if the principals recommend teachers for professional development and the results are reported in Figure 1.



Figure 4.7 Principals Recommend Teachers for Professional Development (N=86)
Source: Survey Data (2023)

From the Figure 1, majority of the teachers of chemistry, that is 57 (66%) reported that the principal recommends teachers' for professional development, while only 29 representing 34% of the teachers of chemistry reported that the principal does not recommend teachers' for professional development. Further probe revealed that majority of the teachers of chemistry attended seminars and workshops with only a few indicating that they had pursued short courses. The study findings show that the principals have embraced professional development since it is clear that continuous improvement in teaching methods and skills is necessary in the teaching environment.

In order to establish the relationship between assessment of teachers of chemistry professional development by the principal and students' performance, Pearson correlation coefficients were calculated and used to find if there is a relationship between the two variables. The correlational analysis results are shown in Table 1.

		Professional development	Student performance
Professional development	Pearson Correlation	1	.670**
	Sig. (2-tailed)		.000
	N	86	86
Student performance	Pearson Correlation	.670**	1
	Sig. (2-tailed)	.000	
	N	86	86

** . Correlation is significant at the 0.01 level (2-tailed).

Pearson product correlation of principals' management of teachers' of chemistry professional development and students' academic performance was found to be moderately positive and statistically significant ($r = .670, p < .001$). This show that an increase in principals' management of teachers' of chemistry professional development would significantly improve students' academic performance.

Table 2 shows the regression analysis findings between principals' management of teachers of chemistry professional development and students' academic performance. From the Table 2, the value of R^2 was 0.449 inferring that 44.9% of the variations in students' academic performance was explained by principals' management of teachers of chemistry professional development. These findings showed existence of significant relationship between principals' management of teachers of chemistry professional development and students' academic performance in public secondary schools in Machakos County. This means that effective management of teachers of chemistry professional development significantly influences students' academic performance in chemistry. Table 4.29 shows the results.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.670 ^a	.449	.443	.269

a. Predictors: (Constant), Professional development

The comprehensive significance of the model is detailed in Table 3. With an F-statistic of 68.553, the overall model demonstrates statistical significance. The findings suggest that the notable improvement in students' academic performance within public secondary schools in Machakos County, Kenya can be primarily attributed to the effectiveness of principals in managing teachers of chemistry professional development. Table 3 shows the results.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.959	1	4.959	68.553	.000 ^b
	Residual	6.076	84	.072		
	Total	11.035	85			

a. Dependent Variable: Student academic performance
b. Predictors: (Constant), Professional development

The adopted regression model fitted was $Y = 0.669 + 0.181X_1$ with corresponding p-value of 0.00 which was less than 0.05. The implication was that there was a significant relationship between principals' management of teachers of chemistry professional development and students' academic performance in public secondary schools in Machakos County. Table 4 shows the results.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.669	.065		10.282	.000
	Professional development	.181	.022	.670	8.280	.000

a. Dependent Variable: Student academic performance

Therefore, the study rejects the null hypothesis that, there is no statistically significant effect between assessment of chemistry teacher professional development by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya. This study concludes that there is a statistically significant relationship between assessment of chemistry teacher professional development by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

IV. Discussion

Findings of the study revealed that principals recommend teachers of chemistry for professional development leading to significant improvement in teachers' competency. Pearson product correlation of principals' management of teachers' of chemistry professional development and students' academic performance was found to be moderately positive and statistically significant ($r = .670$, $p < .001$). The value of R^2 was 0.449 inferring that 44.9% of the variations in students' academic performance was explained by principals' management of teachers of chemistry professional development. This led to the rejection of the null hypothesis and adoption of the alternative hypothesis that there is a statistically significant relationship between assessment of chemistry teacher professional development by the principal and students' academic performance in chemistry in public secondary schools in Machakos County, Kenya.

The current study concurs with Kirui and Osman (2012) who pointed out that the principals' management of professional development is extensively regarded as a critical source of competitive advantage in the ever changing demands of a school setting. These findings are in agreement with Omaali, Kalule, and Baguwemu (2019) who postulated that professional development is an essential element for the continued effective performance of teachers in a school and should be considered as both ongoing and recurring in their schools. In line with the study findings, Glickman, Gordon, and Ross-Gordon (2017) postulated that in-service training courses in the form of workshops and seminars, as well as distributing relevant instructional literature, equip teachers with knowledge in the form of professional development.

In concurrence, Darling-Hammond, Hyler, and Gardner (2017), established that successful instructional supervisors encourage teachers to attend workshops and seminars and provide them with current information on educational programmes in regards to teachers' professional development. In contrast, the findings of a study by Dechassa (2019) revealed that training programs organized at secondary schools were found ineffective with regard to focus towards achieving continuous professional growth of teachers.

V. Conclusion

The study recommends professional development programmes to be well organised and funded, so as to ensure that teachers of chemistry adapt to the changing education environment brought about by advancement in technology.

References

- [1] Darling-Hammond, L., Hyler, M. E., Gardner, M. (2017). *Effective Teacher Professional Development*. Palo Alto, Ca: Learning Policy Institute. Isa Y. K. & Jailani M. Y. (2014). *The Impact Of Quality Control In Nigerian Secondary Schools*. *Educational System International Journal Of Scientific And Research Publications*, 4(6), 2250-3153.
- [2] Dechassa, F. (2019). *The Current Practices Of Instructional Supervision Approaches And Teachers' Professional Development In Secondary Schools Of Bale Zone Of Oromia Region*. *Research On Humanities And Social Sciences*, 9(9), 1–16. <https://doi.org/10.7176/Rhss>
- [3] Glickman, C.D., Gordon, S.P., & Ross-Gordon, J.M. (2017). *Supervision And Instructional Leadership: A Developmental Approach* (10th Ed.). New York: Pearson.
- [4] King, D. (2002). *The Changing Shape Of Leadership*. *Educational Leadership: Journal Of The Department Of Supervision And Curriculum Development*, 59 (8).
- [5] Kirui, P.K. And Osman, A. (2012). *Headteachers' Perception Of Their Roles In Secondary Schools In Kenya: A Study Of Kericho Day Secondary School In Kericho County*. *International Journal Of Humanities And Social Science*. 2 (23), 270-271.
- [6] Muthaura, J. (2010). *The Role Of Kenya's Public Service In A Changing Global Environment; Opportunities And Challenges*, Kenya Association Of Public Administrators And Managers.
- [7] Omaali, D., Kalule, L., & Baguwemu, A. (2019). *Management Of Instructional Supervision And Teacher Professional Development In Secondary Schools In Soroti District, Uganda*. *Researchjournal's Journal Of Education*, 7(1), 1–14.
- [8] Osamwonyi, E. F. (2016). *In-Service Teacher Education For Teachers. Overview, Problem And Way Forward*. *Journal Of Education And Practice*, 7(26), 83-87.
- [9] Republic Of Kenya (2019). *Sessional Paper No. 1 Of 2019 On A Policy Framework For Reforming Education And Training For Sustainable Development In Kenya*. Nairobi: Government Printers.
- [10] Whitworth, B. A., & Chiu, J. L. (2015). *Professional Development And Teacher Change: The Missing Leadership Link*. *Journal Of Science Teacher Education*, 26(1), 121- 137.