Influence of Teacher Workload on Use of Instructional Materials in Teaching Mathematics Competencies in Malindi Sub County, Kenya

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ABSTRACT

Teachers play a pivotal ingredient in formulation, implementation and provision of quality education its citizens. The main objective of the study was to examine influence of teacher workload on use of instructional materials in teaching mathematics competencies in public pre-primary schools in Malindi Sub County. Mixed methods design embraced the survey. The population comprised 64 head teachers and 197 teachers from which a sample of 19 head teachers and 59 teachers were selected through stratified, random and purposive techniques. Questionnaire, interview guide and observation guide were the tool applied to solicit information. Validity and reliability were strengthened via University supervisors and colleagues in the school of education. A pilot study in two schools were inculcated to refine the tools. Descriptive data was analysed using percentages, means standard deviations and presented in tables. Qualitative data was discussed in prose and narrative forms. Data collection procedures and ethical issues were clearly followed throughout the survey. The study concluded that high teacher workload caused by high learners enrollment, teachers job dissatisfaction, negative attitude, time constrains and teachers professional development influence teachers use of instructional materials in teaching mathematics competencies in public pre-primary schools. Teachers were advised to ensure appropriate utilization of instructional aids during the teaching process to enable learners comprehend mathematics competencies with ease.

Key words: Competencies, instructional materials, teaching, Mathematics

INTRODUCTION

The high teacher's workload is likely to their efficiency and student's performance. Exceeding workload overburdens teachers resulting to exhaustion and stress (Rose & Sika, 2019). This could negate teacher's efficiency in preparation of teaching materials that are crucial in providing quality learning (Hester, Bridges & Rollins, 2020) especially in teaching mathematics competencies. A further case in point is that teachers could have inadequate time for class preparation hence, lack of learner's individual support and ineffective pedagogical strategies and inadequate opportunities for preparing lesson plans. Similarly, high teacher's workload could result to teacher's burnout that affect their health complication issues. Mullen, Backer, Chae and Li (2020) affirm that burn outs lead to job dissatisfaction and disengagement and high turnover. Moreover, high teacher's workload coupled with lack of instructional materials result to loss of student's feedback and class concentration, hence, resulting to frustrations and low performance (Afzal & Rafiq, 2022).

Oluchi (2024) noted that high teacher workload result to teachers job dissatisfaction and desertion, difficult in lesson preparation, mental health and ineffective classroom communication, supervision and management.

Kucuk (2020) noted that unavailability and inadequate instructional materials is a barrier to effective learning of mathematics concepts. Nzii (2019) noted that minimal number of grade one learners in public schools used learning aids during tutoring in the acquisition of mathematics competencies. This may have been affected by high teacher workload due to high learners' enrollment in public schools. Kimwomi, Wambiri and Mweru (2019) averred that teachers' workloads is a challenge to pupils' effective comprehension ability. This implies that lack of instruction aids and heavy teachers' workload does not promote effective comprehension of pupils' mathematics competencies.

Ndambo, Maithya and Mwaura (2021) confirmed that heavy teaching workload negatively influenced sufficient time for preparation of the lesson plans and utilization of instruction materials. The study further affirmed a significant correlation between teacher's workload and student's achievement at p-value less than 0.05 significant level. This means that teaching of mathematics competencies is negatively affected in absence of viable instruction materials due to high teachers' workload.

Oliech, Nzivu and Wambiya (2024) hold that teacher workload, insufficient teacher retooling, increased enrollment, limited infrastructural facilities, congested classrooms and limited pedagogical application were barriers to efficient head teacher's administrative supervisions of the competency based curriculum.

LITERATURE REVIEW

According to Desouky and Allam (2017) teachers are confronted by burn outs, stress and job dissatisfaction as a result of high workloads. This eventually affects teachers scheming and lesson planning, curriculum implementation, class supervision, attending to co-curriculum programmes, students' assessments, preparation and usage of an instruction material, and maintaining and motivating student's discipline and achievement (Desouky & Allam, 2017).

A study by Okiridu and Yiraodi (2021) investigated on teachers workload on effective teaching of Business study subject among Rivers state Universities in Nigeria. The study employed the entire population of 87 teachers. The questionnaire was premised on a four-point Likert scale of very low extent, low extent, moderate extent and high extent. The research question was analysed in mean and standard deviation while inferential statistics was equally analysed using Pearson Product Moment Correlation coefficient. The study concluded that there exist a significant relationship between teacher workload and implementation of the curriculum. However, the present study had a sample of 19 head teachers and 59 teachers, and based on a five-point Likert scale. The study recommended for recruitment of more teachers and the policy on teacher workload.

Another study by Mugabo, Ozawa and Nkundabakura (2021) investigated on relationship between school factors and implementation of competency based curriculum in Rwanda. The study revealed diverse professional development, inadequate infrastructural and teaching materials, high enrollment and parental un-involvement were barriers to successful implementation of the competency based curriculum. However,the study failed to focus on teachers workload and teaching of mathematics competencies among pre-school learners.

Findings from the study indicated that variations in the implementation of CBC between teachers were caused by the differences in their professional development, inadequate training on CBC, inadequate teaching learning resources and lack of infrastructural capacity of the schools.

Kibet (2017) opined that availability of sufficient and reliable instruction learning materials aids in learners improved numeracy, writing and reading competencies. The survey further affirmed that teacher's workload and pedagogical application of instructional materials are pivotal in pupils' acquisition of learning competencies.

Wagura (2015) conducted a survey on teachers challenges in the use of instructional materials in teaching mathematics competencies in public secondary schools in Nairobi County, Kenya. Descriptive design was embraced for the study. Stratified sampling technique was employed to select 50 teachers from 10 schools. Mathematics Teachers' questionnaire was utilized to solicit data. The finding established that insufficient instructional materials, lack of sufficient teachers' continuous development, high class enrollment, inadequate in-service teacher training and teacher workload were barriers to effective utilization of teaching mathematics competencies. Nonetheless, the mentioned study did not focus on how teacher's workload influence use of teaching aids during teaching of mathematics competencies among pre-primary learners in a Sub County as the case to this investigation.

Muia, Kimiti and Ndivo (2020) did a survey on how teachers' workload of English use ICT devices in teaching English among secondary schools in Tulimani Division, Mbooni-West Sub-county, Kenya. The

sample comprised 16 principals and 25 teachers. Questionnaire was used to collect information for analysis. Descriptive statistics of percentages and frequencies was applied for data analysis. The study confirmed that teachers with few lessons often utilized Information Communication Technology devices in teaching of English while those with more lessons rarely used ICT devices in teaching of English. The study advised for employment of adequate teachers and school administrators to enhance conducive environment for teachers to use instruction materials in teaching of English. Notably, the current study focused on teacher's workload o utilization of instruction materials in teaching of mathematics competencies among PP1 and PP2 grade levels of learning in Malindi Sub County, Kenya.

Muthengi, Kalai and Njagi (2024) carried out a survey on teachers' workloads and implementation of digital literacy among public primary schools in Kitui County, Kenya. The study embraced descriptive survey design. The sample encompassed 24 head teachers, 213 teachers and 155 learners identified via simple random sampling. Focused Group Discussion administered on head teachers and questionnaire administered on teachers aided in gathering data. The finding revealed that teacher's workload and insufficient Information Communication Technology resources affected use of digital literacy in classroom teaching. The study advised Teachers Service Commission to increase teacher staffing to bridge the gap between teacher workload and efficient utilization of an instruction material during class methodology. However, the current study centered on teacher's workload and usage of instructional materials in teaching mathematics competencies among pre-primary PP1 and PP2 grade levels.

METHODOLOGY

This study adopted descriptive research design that encompassed qualitative and quantitative aspect of data collection and analysis. It had a population of 64 head teachers and 197 teachers from which a sample of 19 head teachers and 59 teachers were selected via stratified and random sampling approaches. Questionnaire, interview guide and observation guide were utilized to gather information.

Content, face and construct validity was enhanced through expert judgement from University supervisors and colleagues. Test-retest method was applied to strengthen instrument's reliability. Pilot study was done in two public pre-primary schools that were excluded from the final study to identify and refine the flaws in the instruments before the actual study. The study ensured ethical considerations throughout the survey.

RESULTS AND DISCUSSIONS OF THE STUDY

Questionnaire return rate

Out of the 59 questionnaires distributed, 42 were duly filled up and returned for collection and analysis of data. This represented a percentage of 71.2% that was high for generalization of the findings of the study.

Teacher workload and use of instructional materials in teaching mathematics competencies

Teachers workload per week

The total number of lessons taught by teachers per week is indicated in table 1

Table 1: Teachers workload per week

Workload per week	Frequency	Percentage
13 – 18 lessons	1	2.4
19 – 24 lessons	2	4.8
25 - 30 lessons	39	92.8

As noted, 39 teachers had a workload between 25 – 30 lessons per week that translates to 92.8%. The recommended number of lessons in a week is 30. This means that teachers are overwhelmed when preparing instructional materials during implementation of teaching mathematics competencies among PP1 and PP2 grade levels.

Table 2: Teacher workload and use of instructional materials in teaching mathematics competencies

	Statement	**SD**	**D**	**N**	**A**	**SA**
i	High workload result to teacher burn outs and inefficient use of instructional materials in teaching mathematics competencies	1 (2.4%)	2 (4.8%)	1 (2.4%)	19 (45.2%)	19 (45.2%)
ii	High workload reduces teachers time for preparing instructional materials for teaching mathematics competencies	1 (2.4%	1 (2.4%	2 (4.8%)	21 (50.0%)	17 (40.5%)
iii	High workload affects teachers use of instructional materials and effective pedagogical strategies in teaching mathematics competencies	-	1 (4.8%)	3 (7.1%)	19 (45.2%)	17 (40.5%)
iv	Teaching more subjects decreases teacher's capability of using instructional materials in teaching mathematics competencies	1 (4.8%)	2 (4.8%	2 (4.8%	21 (50.0%)	16 (38.1%)
v	High teacher workload results teachers inadequate application of instructional materials that lead to lack of learners' performance, feedback and class concentration	2 (4.8%	1 (4.8%)	1 (4.8%)	23 (54.8%)	15 (35.8%)
vi	High teachers workload affects teachers use of instructional materials and learners performance in teaching mathematics competencies	1 (4.8%)	1 (4.8%)	2 (4.8%	20 (47.6%)	18 (42.9%)

It can be established from the finding that a large percentage of the teachers response 19 (45.2%) both agree that teachers high workload result to teacher burn outs that results to ineffectiveness to use of instructional materials during the teaching and learning process. This deters learners from comprehension of the knowledge and skills required of them. It was observed that teachers were unable to manage time preparation of professional records and materials for efficient teaching and learning. The finding is consistence with Kibet (2017) who note that availability of sufficient and reliable instruction learning materials aids in learners improved numeracy, writing and reading competencies.

From the findings, half (50.0%) of the teachers hold that inadequate time for preparation of instructional materials is an impediment for teaching mathematics competencies. Majority head teachers argued that lack of sufficient time for teaching and preparation of instructional materials is an impediment among public pre-primary school teachers. Mathematics teaching and learning requires use of diverse instructional materials that should be simple, available and for follow-up activities. Mathematics is the threshold for learners Science Technical Engineering and Mathematics (STEM) learning. Not only inadequate time affected mathematics but also other subject areas that are equally important. Wagura (2015) finding is consistence with this finding that established that insufficient instructional materials, lack of sufficient teachers' continuous development, high class enrollment, inadequate in-service teacher training and teacher workload were barriers to effective utilization of teaching mathematics competencies.

Another majority of teacher response 19 (45.2%) held that the high teacher workload has a negative effect on teachers use of IM and effective pedagogical strategies in teaching mathematics competencies. One of the head teacher reiterated that *" The balance between high teachers workload and high enrollment is difficult to*

effectively utilize instructional materials (Head teacher 2.)" The survey further revealed inadequate teachers utilization of instructional materials. Teaching mathematics by use of different methodological approaches supported by instructional materials allows learners to understand mathematics skills, knowledge and competencies rather than abstract learning yield to learners negative attitude and low performance. This finding was corroborated with Muia, Kimiti and Ndivo (2020) who revealed that teachers with few lessons often utilized Information Communication Technology devices in teaching of English while those with more lessons rarely used ICT devices in teaching of English.

Majority teachers 23 (54.8% confirmed that high teacher workload results to low learners' performance, feedback and class concentration. Head teachers opined that lack of teachers use of instructional materials was attributed to low teachers commitment, inadequate evaluation procedure, lack of adequate supervision of learner's homework assignments and low motivation. This assertion was echoed by Mullen, Backer, Chae and Li (2020) who affirmed that burn outs lead to teachers' job dissatisfaction, disengagement and high turnover. Moreover, Afzal and Rafiq (2022) concur that high teacher's workload coupled with lack of instructional materials result to loss of student's feedback and class concentration, hence, resulting to frustrations and low performance.

The study also established that high teachers workload affects teachers use of instructional materials and learners performance in teaching mathematics competencies as reflected by most teacher response of 20 (47.6%). A majority head teachers held that instructional materials in public pre-primary schools is insufficient as a result of being provided by parents whose majority come from low socio-economic status. Similarly, most head teachers argued that almost all instructional materials used in pre-primary schools are expensive, difficult to improvise and lack of teachers effective training in application. It was noted that most teachers do not use instructional materials such as digital devices due to lack of information communication technology techniques, internet connectivity, electricity and insecurity in public pre-primary schools. The finding was consistence with Desouky & Allam (2017) who averred that teachers burn outs affects teachers preparation of schemes of work and lesson plan, effective curriculum implementation, class supervision, attending to co-curriculum activities, students' assessments, preparation and usage of an instruction material, and maintaining and motivating student's discipline and achievement.

Relationship between teachers use of instructional materials and teaching mathematics competencies

The study established the relationship teachers use of instructional materials and teaching mathematics competencies. The inferential statistics; ANOVA was used to test for the null hypothesis that "*there is no statistic relationship between teachers use of instructional materials and teaching mathematics competencies*" as indicated in Table 3.

Table 3: ANOVA results of teachers use of instructional materials and teaching of mathematics competencies.

ANOVA						
Model		Sum of squares	df	Mean Square	F	Sig.
1	Regression	29.523	5	5.905	356.491	.000
	Residual	.596	36	.017		
	Total	30.119	41			
a. Dependent Variable: Performance						
b. Predictors: (Constant), Burn out, Application, Pedagogical strategies, Capability, Time						

The findings in Table 3 above, indicate that the F = 356.491 and the significance value 0.000. Thus, the significance level was less than the alpha value of 0.05. This implies that there was a relationship between

teachers use of instructional materials and teaching mathematics competencies. Therefore, the null hypothesis that stated "*There is no significance relationship between teachers use of instructional materials and teaching mathematics competencies* was rejected and alternative hypothesis that *" there is a significant relationship between teachers use of instructional materials and teaching mathematics competencies* was accepted in Malindi Sub County, Kilifi County, Kenya. The finding is consistence with that of Okiridu and Yiraodi (2021) and Oliech, Nzivu and Wambiya (2024) who note that heavy teachers workload affected effective implementation of the curriculum.

CONCLUSION

The study concluded that high teacher workload caused by high learners enrollment, teachers job dissatisfaction, negative attitude, time constrains and teachers professional development influence teachers use of instructional materials in public pre-primary schools. Therefore, in order to ensure effective implementation of the competency based curriculum, consistent teacher staffing review, involvement of parents and blended learning should be incorporated during implementation of the curriculum.

Suggestion for further study

The study suggested that further study be conducted on high teachers in teaching mathematics competencies in public pre-primary schools among grade one learners in other Sub Counties so as to compare and contrast the findings of this study.

RECOMMENDATIONS

The study recommended for provision of government capitation and employment of more trained teachers in order to bridge the gap between providing and use of instructional materials among all learners in public pre-primary schools.

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REFERENCES

1. Afzal, A., & Rafiq, S. (2022). The Impact of Teachers' Instructional Techniques on Students' Involvement in Class: A Case Study. UMT Education Review, 5(2).
2. Desouky D, Allam H (2017). Occupational stress, anxiety and depression among Egyptian teachers. Journal of epidemiology and global health, vol. 7, issue 3, pg191-198.
3. Hester, O. R., Bridges, S. A., & Rollins, L. H. (2020). 'Overworked and underappreciated': special education teachers describe stress and attrition. Teacher Development, 24(3), 348-365.
4. Kibet, A. J. (2017). Pre-school teachers' perceptions of the influence of selected instructional factors on pupil's competency skills in public pre-school centres in Keiyo South Sub County, Kenya. (Unpublished Master's thesis), Egerton University, Nairobi, Kenya.
5. Kimwomi, M. M., Wambiri, G., & Mweru, M. M. (2019). Teachers' perceptions on the relationship between teachers working conditions and pupils' reading ability in pre-primary schools in Nakuru County, Kenya. Journal of Education and Practice, Vol.10, No.18, page 171-180.
6. Kucuk, I. (2020). Instructional related factors and student's performance in mathematics at the Kenya Certificate of Secondary Education in public secondary schools in Njiru Sub County, Kenya. (Unpublished master's project), University of Nairobi, Kenya.
7. Mugabo, L. R., Ozawa, H., & Nkundabakura, T. (2021). Science Competence-based Curriculum Implementation in Rwanda: A Multiple Case Study of the Relationship between a School's Profile of

Implementation and its Capacity to Innovate. African Journal of Research in Mathematics, Science and Technology Education, 25 (4) 1-14.

8. Muia, C. W., Kimiti, R. P., & Ndivo, L. (2020). the effect of workload of teachers of English on the use of ICT in teaching of english in public secondary schools in Tulimani division, Mbooni-west sub-county. Scholarly Research Journal for Humanity Science & English Language, Pg. 12275-12285.
9. Mullen, R., Backer, A., Chae, N., & Li, H. (2020). School counselors' work-related rumination as predictor of burnout, turnover intentions, job satisfaction, work engagement. Professional School Counseling, 24(1), 2156759X20957253.
10. Muthengi, B. K., Kalai, J. & Njagi, N. (2024). Teacher Workload and Implementation of Digital Literacy Programme in Public Primary Schools in Kitui West Subcounty, Kenya. Journal of Education and Practice, Vol.8, Issue No.3, pp. 67 – 76.
11. Ndambo, S. M., Maithya, P., & Mwaura, K. (2021). Effects of teaching work load on teacher performance in public secondary schools in Kitui County, Kenya. International Journal of Innovative Research & Development, Vol 10 Issue 8, page 24-34.
12. Nzii, P. M. (2019). influence of use of instructional materials on acquisition of mathematical competencies among grade one learners in Nakuru County, Kenya. (Unpublished, Master's project), Kenyatta University, Nairobi, Kenya.
13. Okiridu, O. S. F., & Yiraodi, G. J. (2021). Teachers' Workload and Effective Instructional Delivery of Business Education Courses in Rivers State Universities.International Journal of Innovative Social & Science Education Research 9 (1):60-66.
14. Oliech, O. J., Nzivu, E. N., & Wambiya, P. (2024). Influence of competency based curriculum implementation on head teacher's administration of public primary schools in Nyatike Sub County, Migori County, Kenya. International Journal of Social and Development Concerns, volume 21, issue 8, page 143-153.
15. Oluchi, C. A. (2024).Teachers Workload and Effective Teaching.International Journal of Scientific Research in Education, JUNE 2024, Vol. 17(2), 194-207.
16. Rose, A. B., & Sika, J. O. (2019). Determining Influence of Teacher's Workload on Academic Performance in Secondary Schools, Suba Sub-County Kenya. Advances in Social Sciences Research Journal 6(3) 287-295.
17. Wagura, J. N. (2015). Challenges facing teachers in utilizing instructional resources when teaching mathematics in public secondary schools in Nairobi County, Kenya. (Unpublished Master's thesis), Kenyatta University, Nairobi, Kenya.