



Original Article

Modelling Academic Performance in Science-Based Subjects in Primary Schools Using Elements of Teacher Preparation in Uganda

Alfred Wafula¹, Dr. George Oriangi, PhD^{1*}, Dr. Stephene Odama, PhD¹, Dr. Denis Thadeus Ofoyuru, PhD¹, Dr. Tom Henry Ogwang, PhD¹ & Daniel Ochieng Ologe²

¹ Gulu University, P. O. Box 166, Gulu, Uganda.

² Makerere University, P. O. Box 7062, Kampala, Uganda.

* Author for Correspondence ORCID ID: <https://orcid.org/0000-0002-4744-4034>; Email: g.oriangi@gmail.com

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Low academic performance in science subjects has continued to characterise primary education in sub-Saharan Africa, despite several interventions by stakeholders. This study investigated the influence of teachers' preparation for teaching and learning on pupils' academic performance in mathematics and integrated science in Kigumba town council in Uganda. It used a cross-sectional survey design with a sample size of 180 teachers and pupils from both government-aided and privately funded schools. Interviews were used to collect data. Descriptive statistics was used to determine teachers' level of preparation for teaching and learners' level of academic performance, while a regression model was used to establish the influence of teacher's preparation on pupils' academic performance. Findings indicate that teachers' level of preparation was generally good and significantly ($P < 0.05$) influenced by their teaching experience and access to insurance. Furthermore, academic performance in mathematics and integrated science was significantly influenced by teacher preparation ($P < 0.05$) arising from lesson planning, updating learners' discipline records, and creativity. In conclusion, teachers need to continue being creative, planning lessons on a daily basis, and updating learners' discipline records in order to improve pupil performance. In turn, the government needs to provide teachers with insurance coverage, e.g., health insurance, in order to free more of their time for lesson preparation. The study informs education and economic planning policies.

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INTRODUCTION

Policymakers and educationists have ever strived for learners improved academic performance in science-based subjects; however, what influences learners' academic performance remains a highly discussed topic (Wandera, 2019; Eberle-Sudre, 2020). In an attempt to evaluate how learners' academic performance is affected by teachers' preparation, Wandera (2019) correlated teacher preparation and learner's academic performance in English language subjects in Kenya, noting that there was a significant relationship between the availability and use of professional documents such as schemes of work, lesson plans, teaching-learning aids, learners progress reports, lesson notes, the record of learner's discipline and pupil's performance in Kenya Certificate of Primary Examination (KCPE). Additionally, Eberle-Sudré (2020) focused on how teacher training before job entry relates to student's academic performance in North Carolina, while Wilson et al. (2012) in the United States discovered that there was a consistently positive relationship between teacher preparation and teacher effectiveness and consequently the academic performance of learners. In this study, academic performance is taken to mean the overall results obtained by the learner from an overall evaluation (Lamas, 2015).

Similarly, education managers have endeavoured to promote teacher preparation in various school contexts and this is extensively regarded for its ability to enhance learner's performance in science-based subjects in many countries (Hine & Lavery 2014). In developed countries like the United States of America, Australia and Singapore, where schools have adequate resources, i.e., financial, technological and the human resource, the preparation of teachers is enhanced, while in developing countries where there are limited resources, the opposite is true (Mitchener & Jackson, 2012; Hine & Lavery, 2014; Hairon et al., 2017). Coe et al. (2014) in their meta-analysis conducted in Sub-Saharan Africa found that pedagogical interventions have the highest effect size on performance outcomes in science-based subjects in primary schools. In Uganda, teacher's preparation is emphasised in the teacher's code of conduct, where a teacher is expected to prepare schemes of work, lesson plans, teaching-learning aids, learners' progress reports, lesson notes, records of learner's discipline and pupil's performance records.

A synthesis of the aforementioned literature indicates that studies have focused much on associations between either preparation of the teacher before job entry or teacher preparation of the teaching-learning content and the learner's academic performance. What seems to be unclear is

which elements of teacher preparation have a significant effect on learners' academic performance in primary schools. Such knowledge is important for teachers to determine which elements should be given much attention in preparation for teaching. Thus, this study determined the effect of teacher preparation on the academic performance of pupils in science-based subjects in Kigumba town council in mid-central Uganda.

LITERATURE REVIEW

Levels of Academic Performance in Science-Based Subjects

Any nation that wants to experience economic growth must have a strong commitment towards performance in sciences (Adikwu, 2012). This implies that science plays a significant role in the economic, technological, political, and environmental development of any nation because it permeates all facets of human life (Hasani, 2023). The Programme for International Student Assessment (PISA) which tests pupil's levels of academic performance in mathematics and science every three years, reported that between 2009 and 2015, the average scores among United States (US) pupils improved as compared to other countries (Desilver, 2017). Furthermore, Trends in International Mathematics and Science Study (TIMSS) which is another international comparative test on levels of academic performance in mathematics and science, showed that in 2019, the US had higher average scores as compared to other participating countries at both the 4th and 8th grades. This is an indication that the US is performing well compared to many countries. However, TIMSS only focuses on countries that participate in the Science, Technology, Engineering and Mathematics examinations with the exception of East African countries. Thus, a need for more assessments in this region. The finding on good performance in mathematics, specifically in the US is contrary to findings by Adeyemi (2011), which revealed low students' academic performance in basic science and basic technology in public

examinations in Osun and Ekiti States of Nigeria. However, a scarcity of information exists on the level of pupils' performance in science-based subjects in local specific areas in Uganda. Therefore, one of the specific objectives of this study was devoted to determining the level of academic performance in Kigumba town council in Kiryandongo district in Uganda.

Levels of Teacher's Preparation in the Teaching Learning Process

Teacher preparation is a core issue in the teaching and learning process which has often attracted debate (Dunn & Dunn, 2011; Wamala & Seruwagi, 2013; Wandera, 2019; Avvaru et al., 2023). Pryor et al. (2012) note that teacher preparation embodies the ability to evaluate students thinking in order to plan appropriate learning opportunities and to utilise instructional materials to develop conceptual understanding. Teacher preparation is therefore a creative process that allows the teacher to synthesise his or her understanding of the pedagogy, the curriculum, and the teaching context to help produce a more unified lesson (Muthoni et al., 2020). It gives a teacher the opportunity to think deliberately about the choice of lesson objectives, activities that will meet lesson objectives, the sequence of activities, the materials needed, how long each activity might take, and how students should be grouped (Muthoni et al., 2020).

Significant research has been done on the levels of teacher preparation for teaching in African primary schools (Pryor et al., 2012; Ngware et al., 2014; Wamala & Seruwagi, 2013; Smith, 2011). The emerging data reveals critical gaps such as teachers' insufficient knowledge, inadequate use of teaching aids and poor pedagogy. Smith (2011) observes that a great proportion of South African primary teachers have a poor foundation of knowledge and mastery of subjects which leads to poor scores in tests given. Similarly, a study in Lesotho found that teachers have poor knowledge of maths content and pedagogy, where they spend very little time on oral work, only expecting learners to repeat what they

say and hardly preparing teaching aids (Ngware et al., 2014). This is not different from the Kenya context, where Ngware et al. (2014) found that in math lessons, pupil responses were mainly choral, with lessons dominated by teacher-led recitation, rote learning, and repetition.

Pryor et al. (2012) in turn note that although Ugandan teachers are generally aware that they need to use concrete materials and practical examples in teaching basic mathematical concepts, they rely more on the chalkboard while presenting their lessons. Furthermore, the teachers' profession in Uganda requires that teachers prepare schemes of work, lesson plans, teaching-learning aids as well as other instructional materials in advance to ensure effective teaching and learning (Hine & Lavery 2014). Teacher preparation is, thus, a complex process that incorporates several components such as lesson planning, preparing schemes of work and teaching learning materials. A high-quality lesson plan that takes into account the cognitive activation of pupils is characterised by the presence of deep learning tasks that are cognitively challenging and enable pupils to construct and apply knowledge (Baumert et al., 2010; Fullan & Langworthy, 2014). It involves taking into account the different abilities, experiences, preferences, and interests of learners when planning and implementing a lesson (Fullan & Langworthy, 2014). Meanwhile, a teacher's scheme of work is his plan of action which enables him to organise adequate and appropriate teaching activities that cover a given period from those topics which are already set in the syllabus (Marzano & Toth, 2014; Ma and Ma, 2014). A well-prepared scheme of work should, among other things: give an overview of the total course content, provide for a sequential listing of learning tasks, show a relationship between content and support materials, provide a basis for long-range planning, training and evaluation of the course (Wandera, 2019).

In the context of Uganda from experience, however, audio-visual aids and materials are often unavailable and the teacher is left with two choices:

to rely on simple materials which may be produced either by the teacher or adapt materials which may have been produced for a different country or related subject. This study sees that the basic principles to be considered when using instructional materials by the teacher remain the most influential part of the learning process, and the amount of information a student retains is directly related to how that material is prepared and presented. Again, despite numerous interventions and the importance of teacher preparation as highlighted, experience indicates that most teachers do not prepare while some attempt to prepare to do it for formality. Most of them recycle lessons and schemes of work, which affects their effectiveness and consequently impacts learners' academic performance. Thus, the general picture of teacher preparation in mathematics and science-based teaching in Africa, and more specifically Uganda is far from ideal. This study therefore seeks to distil this with specific regard to schools in Kigumba Town Council in Kiryandongo District in relation to the teaching and learning of science-based subjects and consequently how this affects pupils' academic performance.

Influence of Teacher's Preparation for Teaching and Learning on Learners' Academic Performance

The influence of teachers' preparation on learners' academic performance is widely recognised in education literature. Ngware et al. (2014) argue that the quality of instructional delivery determines how far the teaching process impacts learning achievement. They emphasise that the teaching and learning process has an effect on the quality of education. Hattie (2009, as cited in Ngware 2014) concluded, after synthesising over 800 meta-analyses that the major contributors to learning include, among others the teacher's conception of teaching, quality of teaching, and teaching approaches. On his part, Waterman (2011) found that pupils' academic performance is directly affected by the level of teachers' preparation to teach. He notes that pupils' performance is better

when teachers prepare schemes of work, lesson plans, and even take more time to study what they are going to teach. Lesson plans guide the content to be delivered and the learning materials to be used during lesson delivery (Wandera, 2019). As a result, both teachers and learners remain focused and interested (Loucks-Horsley et al., 2010). In this study, this relationship will be narrowed to planning to teach science-based subjects in primary schools.

In a related study conducted by Wilson et al. (2012) in the United States, it was discovered that there is a consistently positive relationship between teacher preparation and teacher effectiveness and, consequently the academic performance of learners. Wilson further argues that there are cases where there are qualified teachers and adequate materials, but students' academic performance still remains poor; hence, going back to how prepared the teacher is which is one of the objectives of this study in the context of mathematics and integrated science. Hollins (2011) states that over the past two decades, there has been a great deal of focus on the reform in teacher preparation aimed at improving the performance of learners, but how these influence learner's performance in the context of Uganda is still a question to be answered by this study. More still, Kporyi and Arko (2020) examined the relationship between teachers' pedagogical practices and senior high school student's academic performance in the Ada East district of the greater Accra region in Ghana. While, Ssebyatika and Awichi (2020) assessed the effects of supervision of teaching, availability of teaching and learning resources, continuous school assessment and classroom environment on academic performance in primary schools in the Wakiso district. The aforementioned literature focus on specific cases; thus, there is a dearth of knowledge on how teachers' preparation for the teaching-learning process influences the academic performance of pupils in mathematics and science, particularly in Kigumba town council in Uganda, which this study has sought to address.

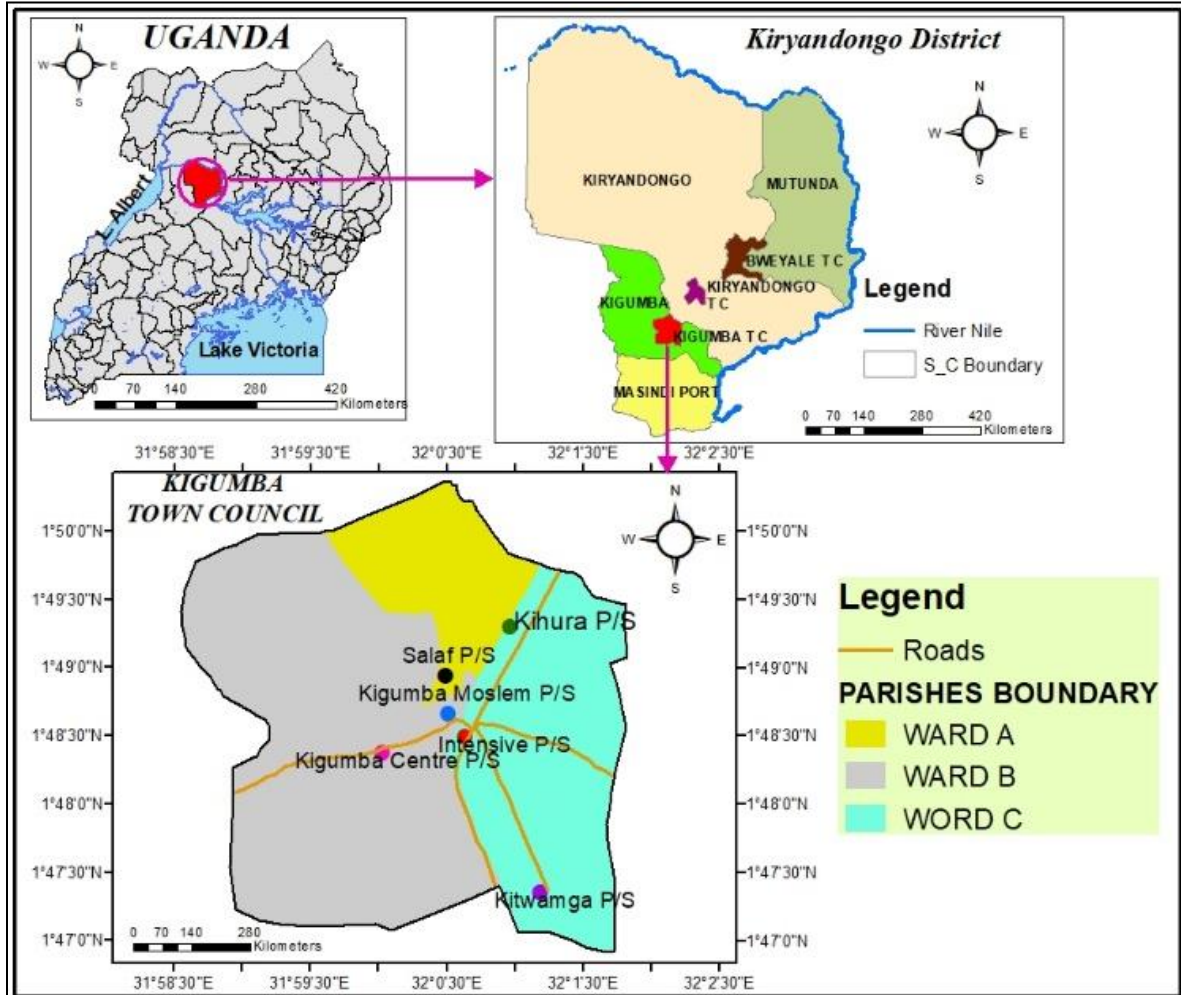
Several studies have also assessed how learners' academic performance is influenced by factors such as the teacher's gender, qualification, experience, attitudes, interest, self-efficacy, age; school location and type, supervision of professional documents; teacher's pedagogical practices, availability of learning resources, continuous school assessment, classroom environment etc. (Özçakir et al., 2020; Oginni & Oginni, 2019; Muthoni et al., 2020; Kporyi & Arko, 2020; Ssebyatika & Awichi, 2020; Warsame, 2023). Meanwhile, Wamala and Seruwagi (2013) in their study on teacher competence in Uganda, noted that the academic achievement of sixth-grade students in numeracy was significantly associated with teacher competency. Similarly, Smith (2011) observes that the in-school effects that benefit learners in South Africa include being taught by an experienced teacher. Conversely, Pryor et al. (2012) note that weaknesses in teachers' pedagogical content knowledge and classroom practice undermine effective student learning and achievement. Ozçakir (2020) focused on the relationships between teachers' gender, student performance, and teacher activity preparation in science, technology, engineering, and mathematics in a university in north Turkey and reported that the gender of teachers has an influence on their preparation in the teaching-learning process in science-related subjects and consequently on students' academic performance.

MATERIALS AND METHODS

This study was conducted in government and privately funded primary schools in Kigumba Town Council, Kiryandongo district in Western Uganda (*Figure 1*). Kigumba Town Council has a population of 18,698 (UBOS, 2016) and a total of 8 primary schools, 4 government-aided and 4 privately funded primary schools. All eight primary schools were selected in the study (*Table 1*). The choice of the schools was based on the existence of seven primary (7) classes for over ten (10) years and the poor performance in these schools, particularly

the government-aided primary schools, as reported by Watch-dog (2019).

Figure 1: Location of Kigumba Town Council and the schools that were studied in Mid-Western Uganda



Source: (Self-generated geographical information science map, based on UBOS shape files, 2020).

Study Design

The study employed a cross-sectional survey design. This enabled the researcher to obtain opinions, knowledge, understanding and attitudes on the level of teacher preparation, the level of pupils' performance and the influence of teacher preparation on the academic performance of pupils in science-based subjects. The elements of the research design of this study, i.e., target population, sample size and sampling techniques are described below.

Target Population, Sample Size and Sampling Technique

The target population of the study constituted: teachers and pupils from eight schools. The teachers were chosen based on their knowledge and expertise on study issues and being the ones that prepare for the teaching-learning process. The pupils in primary five, six, and seven were included because they were the primary subjects of the research.

A sample size of 180 respondents was used. These comprised 83 teachers and 97 pupils from 8 schools

in Kigumba town council. The sample size was arrived at using Israel's (1992) sample size procedure.

The study employed simple random sampling to select the teachers and pupils. This gave an equal and independent chance for each participant to be selected (Oso & Onen, 2009), being cognizant that each teacher bears responsibility for teaching preparation, while the learners are equally affected by the teachers' preparations.

Data Collection

Face-to-face and telephone interviews were used to collect data from the teachers and pupils. The interview method was chosen based on its high response rate and the possibility of clarifying questions to guide the respondent appropriately. Data collected included: socio-demographic characteristics of the respondents, data on teachers' level of preparation, and pupils' academic performance. Structured interviews were administered to the target respondents using an interview schedule/questionnaire. The respondents were approached in their respective schools. Each interview with a respondent took approximately 30 minutes.

Data Analysis

Linear regression was used to (a) determine the influence of socio-demographic characteristics of teachers on their levels of preparation. Teachers' level of preparation formed the dependent variable, while the socio-demographic characteristics such as age, academic qualification, income level, gender, religion, teachers' experience, type of school, location of the school and the distance the teacher travels daily to reach school, formed the independent variables. (b) determine the influence of teachers' level of preparation on pupils' academic performance in science-based subjects in PLE. Teachers' level of preparation formed the

independent variable, while the indicators of pupils' performance, i.e., scores in classroom assignments, mid-term tests and end-of-term examinations, formed the dependent variables. Significance in relationships was determined at $P < 0.05$. Linear regression analysis was used because both the dependent and the independent variables were assumed to be linearly related. Before running the regression analyses, a collinearity test was undertaken to select the independent variables to be considered for the final regression analysis.

Descriptive statistics for example, frequencies and percentages, were employed to determine the level of teacher preparation in the teaching-learning process.

RESULTS

This section presents study findings on the level of pupils' academic performance, teachers' preparation for the teaching-learning process and the influence of teachers' preparation on academic performance.

Level of Academic Performance in Mathematics and Integrated Science Subjects

Generally, findings on the level of academic performance in mathematics and integrated science in primary schools in Kigumba town council (Table 1) revealed that 2% of the respondents reported that the level of academic performance was poor, 28% reported that the level of academic performance was fair, 60% reported that the level of academic performance was good and 10% indicated that level of performance was very good in mathematics and integrated science. Therefore, the majority of the respondents reported that the level of academic performance of pupils in mathematics and integrated science was good. Details on the level of performance in Primary Leaving Examinations (PLE), class assignments, mid-term tests and end-of-term examinations can be referred to in *Table 1*.

Table 1: Level of pupil's academic performance in mathematics and integrated science in Kigumba town council, mid-western Uganda between 2010-2019

Performance in mathematics and integrated science	Level of academic performance in percentage			
	Poor	Fair	Good	Very good
In PLE	3	35	55	71
End of Term	1	33	64	2
Mid Term Exams	1	34	59	6
Class assignments	1	17	69	13
Performance compared to other schools	2	25	51	22
Average level of performance	2	28	60	10

Level of Teachers' Preparation for Teaching and Learning Process

Findings on teachers' level of preparation for the teaching-learning process (*Table 2*) revealed that 15% of the respondents indicated that their level of

preparation was average; 59% said that their level of preparation was good, while 27% indicated that their level of preparation was very good. Hence, the majority of teachers reported that their level of preparation in lesson preparation was good.

Table 2: Teacher's level of preparation for the teaching-learning process in mathematics and integrated science in primary schools in Kigumba town council, mid-western Uganda.

Level	Percentage response
Average	15
Good	59
Very good	27

Influence of Spatial and Socio-Demographic Characteristics of Teachers on their Level of Preparation

Findings on the influence of spatial and socio-demographic characteristics of teachers on their level of preparation (*Table 3*) revealed that the experience of the teacher ($P=0.050$) had a significant negative influence on teachers' level of preparation. This implies that the longer the teacher stays in the teaching service, the lower the level of his/her preparation in the teaching-learning process and the lesser the teachers' experience, the higher their level of preparation. Furthermore, access to insurance by the teachers had a significant positive influence ($P=0.031$) on their level of preparation. This implies that if the teacher has access to insurance, then his/her level of preparation for the teaching-learning process will be high because

insurance cover will try to cater for other basic needs such as health and education for the children and in the process, may relieve the teacher from the extra burden of trying to do several things to generate alternative income in order to meet all the basic needs of life given the low salary scale in the country and in the process, the teacher will have enough time for lesson preparation. When the teacher has no insurance coverage of any form, their level of preparation tends to be low. However, the teachers' age; qualification; distance from school to teachers' home; teachers' gender; marital status; monthly income; daily expenditure; alternative Source of income; access to remittances; access to credit; chronic illness of any of their household members and responsibility held by the teacher at school did not have a significant influence on teachers' level of preparation in the teaching-learning process.

Table 3: The influence of spatial and socio-demographic characteristics of teachers on their levels of preparation

Independent variable (Spatial and socio-demographic characteristics of teachers)	Unstandardised Coefficients		Standardised Coefficients	Sig.	Collinearity Statistics
	B	Std. Error	Beta		VIF
Distance from home to school	.074	.131	.071	.571	1.215
Age bracket	.130	.127	.188	.311	2.642
Gender	-.082	.191	-.064	.668	1.721
Teachers' qualification	.085	.167	.088	.612	2.306
Marital status	.008	.070	.017	.908	1.622
Teacher's experience	-.297	.149	-.349	.050	2.389
Monthly income	-.007	.164	-.008	.965	2.658
Daily expenditure	.154	.169	.138	.365	1.773
Savings	-.213	.197	-.151	.283	1.510
Alternative Source of income	.073	.163	.058	.655	1.309
Access to remittance	.039	.197	.026	.844	1.375
Access to credit	.096	.183	.075	.603	1.590
Access to insurance	.451	.204	.298	.031	1.423
Chronic illness	-.142	.163	-.115	.386	1.361
Responsibility held in the school	-.027	.085	-.057	.750	2.476
(Constant)	2.768	.586		.000	
R Square	.165				
Standard error of the estimate	.641				
Regression significance	.614				

Teacher Preparation and Pupils' Academic Performance in Science-Based Subjects

The influence of teacher preparation on the academic performance of pupils in science-based subjects in primary schools in Kigumba town council was investigated and shown in (Table 4). Results revealed that the availability of lesson plans ($p=0.015$), teachers' creativity ($p=0.056$), and

updating learners' discipline records ($p=0.030$) had a significant positive effect on the academic performance of learners in mathematics and science subjects. However, the availability of daily records, learner's progress records, appropriate syllabus, the record of learner's discipline, teachers' ethical conduct book and updating lesson notes did not have a significant influence on pupils' academic performance.

Table 4: The influence of teacher preparation on the academic performance of pupils in science-based subjects in Kigumba town council, mid-central Uganda

Model	Unstandardised Coefficients		Standardised Coefficients	Sig.	Collinearity Statistics
	B	Std. Er	Beta		VIF
	Availability of lesson plans	1.529	.607		.443
Availability of daily records of assessment and evaluation	.195	.224	.119	.388	1.587
Availability of learner's progress records	-.378	.288	-.198	.195	1.922
Availability of appropriate syllabus	-.668	.678	-.138	.328	1.643
Availability of records of learners' discipline	.175	.268	.149	.518	4.392
Availability of records of teachers' creativity	-.325	.279	-.302	.249	5.671
Availability of teachers' ethical conduct book	.102	.234	.079	.664	2.777
Updated scheme of work	.011	.071	.022	.874	1.632
Updating lesson notes for the class you teach	-.090	.142	-.094	.531	1.859
Updating learner's progress records for the class you teach	-.150	.086	-.252	.085	1.748
Updating learners' discipline records	.153	.069	.310	.030	1.629
(Constant)	8.392	2.389		.001	
R Square	.323				
Standard error of the estimate	.526				
Regression significance	.296				

DISCUSSION OF STUDY FINDINGS

This section presents a discussion of the study findings. It emphasises the level of academic performance, the level of teacher preparation for the teaching-learning process and the influence of teacher preparation on the academic performance of pupils in science-based subjects.

Generally, the level of academic performance in mathematics and integrated science in primary schools in Kigumba town council was perceived to be good. This perception could have been driven by the recent 2020 PLE results, which indicated generally good pupils' academic performance. This finding however, does not corroborate with the findings by Adeyemi (2011), which revealed poor students' performance in science subjects in public examinations in Osun and Ekiti states of Nigeria and that of Osuolale (2014), which revealed students' poor performance in the East African region.

The level of teacher preparation in primary schools in Kigumba town council was generally good. The perceived good level of teacher preparation in Kigumba town council could be due to the fact that preparation is one of the teachers' key responsibilities that ensures proper teaching and learning, commitment on the side of the teachers, the agreed pupil's academic performance targets set by the schools, tense supervision by the administrators and other stakeholders particularly are private schools (Zuze & Leibbrandt, 2011). This finding disagrees with a report from Ngware et al. (2014) who reported that teachers in Kenya do little in terms of lesson preparation, which makes their lessons dominated by teacher-led recitation, rote learning, and repetition.

Findings on how spatial and socio-demographic characteristics of teachers influence their level of preparation showed that the experience of a teacher

had a significant negative influence on teachers' level of preparation. This implies that the longer the teacher stays in the teaching service, the lower the level of his/her preparation in the teaching-learning process and the lesser the teacher's experience, the higher their level of preparation. This could be due to more commitment in lesson preparation by less experienced teachers and fewer responsibilities compared to experienced teachers who have to juggle administrative responsibilities and teaching. Sometimes the older, experienced teachers have health-related issues like sight and hearing challenges, while less experienced teachers are in most cases young and energetic enough to work in anticipation of promotion. This finding agrees with a report by Kukla-Acevedo (2009) who indicated that teachers' experience is an important predictor of students' academic achievement. Furthermore, teachers' access to insurance had a significant positive influence on their level of preparation, meaning that if the teacher has access to insurance, his/her level of preparation will be high and vice versa. This could be due to the importance that insurance plays in meeting other basic needs of life and reducing some burdens on individuals. Therefore, if a teacher has insurance coverage, it is likely that he/she may concentrate on lesson preparation. This study finding is in line with García and Weiss (2019) who reported that teachers' working ambience and other ingredients that facilitate teachers' effectiveness in the teaching-learning process need to be addressed.

However, the teachers' age, qualification, the distance of the teachers' home from school, gender, marital status, monthly income, daily expenditure, an alternative source of income, access to credit and remittances, chronic illness by a household member, and the responsibility held by the teacher in school did not have a significant influence on their level of preparation. This disagrees with the findings by Kukla-Acevedo (2009), who reported that teachers' qualification has a positive influence on their preparation and performance. Furthermore, this study's finding disagrees with that of Ozcari

(2020) in North Turkey, who reported that the gender of teachers had a significant influence on their level of preparation in science-based subjects.

Availability of lesson plans, teachers' creativity, and updating of learners' discipline records were the elements of teacher preparation that had a significant positive effect on the academic performance of learners in mathematics and integrated science. The significant positive influence of teachers' lesson planning on the academic performance of pupils in science-based subjects implies that the more the teacher prepares his or her lessons, the better the performance of learners. This could be because the more the teachers prepare, the more students will understand the lesson content. Furthermore, the more the teacher prepares, the more research and preparation of teaching-learning material he/she will make and consequently, the appropriate methodology for content delivery will be selected. Lesson planning is thus a very important tool that gives a teacher the opportunity to think deliberately about the choice of lesson objectives, types of activities that will meet the objectives, sequence of activities and materials needed. This finding is corroborated by reports from several studies that highlight the importance of lesson planning (Ngware et al., 2014; Wamala & Seruwagi, 2013; Smith, 2011).

The significant positive influence of teachers' creativity on the academic performance of pupils in science-based subjects indicates the importance of teachers' creativity in terms of role play, making posters, modelling etc. These activities improve learners' participation in the lesson activities. Creativity enhances learners' motivation to learn, arouses their interest, creates a conducive learning environment, and consequently enables better understanding and retention of content by learners, which consequently leads to good academic performance. This finding is in line with the findings of Manning et al. (2009) who underscored the importance of creativity in the teaching of all subjects.

The significant positive influence of updating learners' discipline records on the academic performance of pupils in science-based subjects could be because it gives teachers the basis for counselling and guiding pupils and enables them to find alternative ways of punishing and rewarding learners. This study finding agrees with that of Ololube (2013) who pointed out the importance of good record keeping, which translates into short- and long-term benefits on the overall achievement of educational objectives. However, the availability of learners' progress records, appropriate syllabi, the record of learners' discipline, teachers' ethical code of conduct, and updating of lesson notes did not have a significant influence on pupils' academic performance. This disagrees with the finding of Ngware et al. (2014) and Pryor et al. (2012), who note that availability of these documents is important.

CONCLUSION AND RECOMMENDATIONS

Although the level of teachers' preparation and the relative academic performance of students was perceived to be good, findings showed that those teachers who have access to some form of an insurance prepare more for their lessons as compared to those who do not. This has an implication on education policies to consider creating more incentives than they exist currently. This is likely to improve teachers' lesson preparation and lesson delivery and, consequently learners' academic performance at the primary level of education in Uganda.

Furthermore, the experience of the teachers had a significant negative influence on teachers' level of preparation. Meaning that the longer the teacher stays in the teaching service, the lower the level of preparation in the teaching-learning process and the lesser the teachers' experience, the higher their level of preparation. This implies that education policies need to advocate absorbing more experienced teachers in administrative positions and engage the younger and less experienced teachers more in the teaching process.

Additionally, study findings distil the profound positive effect that lesson planning, teachers' creativity and updating learners' discipline records have on learners' academic performance. This reveals the need for teachers to continue embracing these activities for enhanced teaching-learning processes that would result in improved learners' academic performance in primary schools in Uganda.

This study investigated the influence of teacher preparation on pupils' academic performance in science-based subjects in primary schools in Kigumba town council in Kiryandongo district in mid-western Uganda. Future studies could focus on the influence of teacher preparation on academic performance in science-based subjects in rural primary schools as well as in secondary schools in Uganda.

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