

Lived Experiences of Former Nkeyema Secondary School Pupils on their Academic Performance in Linear Programming: a Hermeneutics Phenomenology Approach

Chrispine Mulenga Mwambazi^{1*}, Setwin Mutau Mufalo², Lombe Mubanga³, Francis Simui⁴

¹Nkeyema secondary school, Nkeyema, Zambia

²Mishikishi Secondary School, Masaiti, Zambia

³School of Natural Sciences, University of Zambia

⁴Institute of Distance Education, University of Zambia

***Corresponding Author:** Chrispine Mulenga Mwambazi, Nkeyema secondary school, Nkeyema, Zambia

Abstract: This paper discusses the academic performance of pupils and what hindered them to perform well in linear programming. The research was conducted on former Nkeyema secondary school pupils in western province of Zambia. The study sample had 15 participants comprising 8 females and 7 males purposively sampled. Focus Group Discussions and semi-structured interviews were the research instruments used and the gathered data was thematically analyzed. The study revealed that pupils experienced challenges associated with linear programming which hindered their academic performance. Some of these challenges were; failure to recognize variables and their units, failure to express variables in mathematical language, lack of understanding of terms of inequality among others. Due to these highlighted challenges, it was revealed that this school was recording very poor final examination results in linear programming. Therefore, the study recommended that the Ministry of Education should collaborate with parents and other relevant stakeholders in order to mitigate these challenges by providing necessary teaching/learning materials. In order to improve the academic performance of learners in linear programming, it was also recommended that teachers should employ appropriate teaching methods to enhance effective delivery more especially learner-centered methods where pupils take a central role during teaching/learning process.

Keywords: Academic performance, Challenges, Learners, Linear programming, Quality Education, Zambia

1. INTRODUCTION

The research design was based on a hermeneutic phenomenological study of lived experiences of former and current grade twelve pupils in mathematics specifically linear programming. In using the hermeneutic approach, researchers accept the difficulty of bracketing personal view point as advanced through the transcendental phenomenology of Edmund Husserl (Simui, (2018). The rationale behind the researchers' decision was to focus on grade twelve pupils' performance in linear programming questions and related questions based on the Examination council of Zambia and examination analysis report from 2015 to 2016 question by question performance analysis in mathematics at national level (ECZ 2015, ECZ 2016).

The development of linear programming has been a major innovation in decision making under conditions of uncertainty (Catharine, 2008). Historically, development in linear programming is driven by its applications in economics and management. It stems from the invention of the simplest method by G.B. Danzig in 1947 during the Second World War, out of the necessity of solving military logistic problems and it remains one of the most used mathematical techniques in today's modern societies (Geraldo, 2015). Hence, linear programming enables pupils to be real-world problem solvers (CDC, 2013). Despite this, it is evidenced that pupils hardly perform well in linear programming related problems during national examinations (ECZ, 2014, 2015, 2016). Consequently, the performance of learners in the subject during the national examinations in many countries has constantly remained below average (Mwape and Musonda, 2014; ECZ, 2016). According to the Examination council of Zambia's general performance reports, it has been highlighted that linear

programming was one of the topics in which learners have continued to underperform during examinations at ordinary mathematics level (ECZ, 2012-2017). Therefore, table 1 below shows learners' performance analysis.

Table1. *Learners' Performance Analysis*

Year	Sets (%)	Statistics (%)	Probability (%)	Vectors (%)	Geometrical Transformation (%)	Linear Programming (%)
2012	55	40	30	55	50	20
2013	45	55	50	45	70	15
2015	35	45	55	60	55	30
2016	65	60	65	40	25	35
Average (%): 50						Average (%):25

Source: ECZ Examiners' Analysis Question by Question Booklet level (2016).

1.1. Statement of the Problem

In Ordinary Level Mathematics, Examinations council of Zambia chief examiners reports have for many years consistently highlighted that linear programming was one of the topics in which candidates usually perform poorly during national examinations (ECZ, 2013; ECZ, 2016). It has been stressed that, linear programming is the topic which most pupils avoid and that even the majority who attempt to solve it fail to get it accurately, hence losing the required marks. Yet, we do not know pupils' lived experiences in linear programming to be able to design appropriate strategies to improve their academic performance. This was the basis for which the current study was premised.

1.2. Purpose of the Study

The purpose of the study was to explore lived experiences of former Nkeyema Secondary school pupils on their academic performance in linear programming.

1.3. Research Objectives

The study was guided by the following research objective:

- i. Explore pupils' academic performance in linear programming.
- ii. Describe alternative strategies to enhance learner performance in linear programming

1.4. Significance of the Study

The study findings could be used to inform inclusive education policy development in institution of learning and the Ministry of Education. The study is essential to teachers, learners and a nation as a whole in that, it may enhance understanding on how linear programming can be applied in order to improve learners' decision making ability in relation to their departments and academic performance. Further, the information in this study may help entrepreneurs and economist in their daily operations since they add value to the nation.

2. STUDY METHODOLOGY

2.1. Research Design

A hermeneutics phenomenology design was applied to the study regarding lived experiences of pupils' academic performance in linear programming. The study was qualitative in nature which was guided by the stated approach and used methods and techniques of qualitative research. This is because of its requirements for rigidly adhering to certain procedures such as sampling procedures and data analysis techniques (Mulenga, 2015). The study was also qualitative in nature, aimed at assessing what people say to search for evidence, to confirm interpretations and to assess internal consistency in the data (White, 2018). In addition, the study was qualitative because it aimed at providing an in-depth understanding about poor mathematics performance at the senior secondary school level in a particular district (Creswell, 2014, cited in Harrison, et al., 2017). In this regard therefore, participants' viewpoints on the factors contributing to poor learner performance in mathematics were interrogated in this study.

2.2. Research Sites

The current study was conducted in Nkeyema district of western province of Zambia.

2.3. Target Population, Sample Size and Sampling Procedure

2.3.1. Study Population

The target population of the study was former grade twelve pupils who were at Nkeyema secondary school from 2017-2020.

2.3.2 Sample Size

The study had 15 participants comprising 8 females and 7 males.

2.3.3 Sampling Procedure

In selecting participants for this study, the researcher employed a homogenous purposive sampling method to select those to offer comprehensive information about the phenomenon. It meant that participants in purposive sampling were chosen on the basis of their knowledge of the information desired (Denzin and Lincoln, 2017). In other words, purposive sampling enables the researcher's judgment to select best participants to answer the research questions and meet the study objectives. Therefore, with purposive sampling, the goal is not to generalize findings to a larger population but to select participants who would allow the researcher to understand the phenomenon in-depth (Makondo and Makondo, 2020).

2.4. Research Instruments, Data Gathering and Analysis Procedure

2.4.1. Research Instruments

Focus Group Discussions guides and semi-structured interview guides were the instruments used to obtain data from participants because they favour interaction and dialogue with the participants (Wahyumi, 2012). Use of variety tools strengthens trustworthiness of the study findings as evidence would collaborate and triangulate from different point of view.

2.4.2. In-depth Interviews

In-depth interviews were held with the target group. Participants were asked the questions on a one to one basis whilst the researcher was taking notes. In-depth interviews were used in order to get a lot of insight information on the research topic. There are a number of advantages of using this tool. Some of them are that: the researcher was able to get a lot of insightful information; participants had chance to ask for clarification where they were not clear and the researcher had chance to clarify; and in-depth interviews also enhanced confidentiality and privacy.

2.4.3. Focus Group Discussions (FGDs)

The focus group discussions were done by putting participants in groups of five. Focus group discussions encourage communication and shared understanding especially around difficult issues. It allows for the exploration of differences as well as similarities in experiences and in thinking (Lewis, 2010). This fosters collective views and understanding. The other strength of focus group discussions according to Moyle (2013) is that, they enable the researcher to listen to participants, and this act of listening in itself empowers participants. The researcher took a moderate role so that participants could elaborate deeper on issues that rose in the individual discussions. Focus Group Discussions and semi-structured interviews were the instruments used to gather data from participants because they favour interaction and dialogue with the participants (Wahyumi, 2012).

2.4.4. Data Analysis

Since the study was purely qualitative in nature, similar ideas from the participants were put together in order to come up with themes (Mufalo and Kabeta, 2019). Therefore, the generated data was thematically analyzed.

2.4.5. Ethical Considerations

The researcher got permission from the participants whose identities were hidden for the purpose of anonymity. Additionally, all participants were assured that the data gathered was to be strictly treated

with the maximum confidentiality it deserved and it was to be used only for its intended purposes. This was achieved by following the ethical guidelines proposed by Kimmel (2014): apply for ethical clearance; seek consents of participants; do not induce participants in any way; ensure privacy of the participants; and give participants pseudonyms. As earlier indicated, all the highlight ethical guidelines as espoused by Kimmel (2014) were put into consideration.

3. STUDY FINDINGS AND DISCUSSION

The study revealed that pupils' performance in linear programming was poor. The revelations were established after fifteen (15) participants were interviewed to describe pupils' academic performance in linear programming. Therefore, seven (7) pupils said that linear programming was poorly performed, while three (3) pupils said it was fairly performed and five (5) pupils said it was good. This indicates that the academic performance in linear programming was not good. It is cardinal to indicate that subject knowledge has a very important role to play. This is because high quality teaching rests on teachers understanding of the subjects they are teaching by knowing the structure and sequencing of concepts, developing factual knowledge essential to each subject and guiding their pupils into the different ways of knowing. It is also clear that when there is a lack of subject know-how or it is unevenly spread across teaching and pupil's examination results are at risk. Thus, the issue of high level of subject knowledge by the teacher benefit the pupil and can enhance good performance, especially linear programming. Consistent with these statements Mufalo (2021) aptly said that teachers must have a better understanding of the subject matter knowledge to avoid delivery challenges which may hinder learners from acquiring relevant knowledge and skills for their transformation.

Teachers' subject knowledge was the theme that emerged during the discussions with participants. For example, Kadzo who completed school in 2017 said the following as indicated in transcribed verbatim:

Teachers who had subject knowledge or know-how explained to pupils well and pupils got the concept without difficulties. The teacher who has a subject content at his/her finger tips makes pupils to have an interest in the subject thereby inspiring the pupils to work extremely hard (Kadzo-2017, 10 .09. 2021).

Another participant (Kande-2018) echoed similar sentiments and stated that with focus on level of topic knowledge, significant learning can be achieved.

Where children understood the explanation of the topic, pupils tend to do better because they have passion and this produces a real desire for learning that should be at the heart of any school's provision and needs relentless focus on the part of everyone from the learner to subject leaders (Kande-2018,10 .09, 2021).

Another participant, (Milangi-2018) commented that:

"I did not have the knowledge of the topic. I just learn because I had to. It did not matter as to whether I understood the topic or not, I had to be present. The performance was not good because I did not attempt any question on linear programming and the related questions in the grade twelve final examination" (Milangi-2018, 18.09. 2021).

Yet another participant (Mungomba-2019) stated that:

I did not understand anything in linear programming because the teacher was struggling in teaching the topic. I recall the teacher telling the class that don't waste time answering any question on linear programming. This was so because, teachers concentrate on the subject he was comfortable with and neglect the others topic especially linear programming (Mungomba-2019, 25.09, 2021).

Another theme that emerged was pupils confidence and Kabi who completed in 2020 commented that:

“Pupils with much confidence and the master of topic content tend to perform well in examination. They understand questions better and apply the concept correctly or as required and they are more capable of employing a variety of strategies to retain high performance and good mark” (Kabi-2020, 22 .09, 2021).

Further, Njolo who failed mathematics in 2020 because of linear programming stated that:

For more confident pupils, you could see the difference in that the majority of the pupils in class listened to teachers and pupils interact with a higher level of engagement (Njolo-2020, 17.09. 2021).

Another theme that emerged from the findings was, ‘difficult in graphing variable’. All the fifteen (15) participants revealed that competence in graphing variables correctly on the Cartesian plane pupils earns more marks. Pupils who focus on what they are taught and plot coordinates appropriately score more marks. Failure to graph the variables leads to poor performance. This can only be done if teachers increase their efficiency and effectiveness in teaching. One of the participants (Shimano-2019) who completed school in 2019 stated that:

“I was competent in graphing variables. This was as a result of efficiency and effective teaching by my teacher. Some pupils showed greater enthusiasm as they value the subject more and studied hard in order to deepen their knowledge” (Shimano- 2019, 30.09. 2021).

The above findings agree with that of Capraro and Joffrion in Liouaeddine et al. (2017) who stated that, among the identified common challenges that students often face when attempting to solve equations are lack of symbolic understanding of variables and coefficients within an equation as well as lack of understanding of the meaning of the equal sign, and reliance on procedural knowledge without conceptual understanding.

4. ALTERNATIVE STRATEGIES TO ENHANCE LEARNER PERFORMANCE IN LINEAR PROGRAMMING

4.1. Pre-requisite Concepts for Linear Programming

Linear programming requires the pupil to read and interpret mathematically a verbal description of a particular type of situation. The pupil must be able to understand a number of concepts and to express them in various representations (verbal, symbolic, graphical). Some of these concepts such as ‘decision variables, ‘objective function’, ‘feasible region’ and ‘optimal solution’ are specific to linear programming and should be taught as part of a linear programming unit. However, it would be assumed that the pupil would have gained certain understandings from their previous mathematical experience. Such pre-requisite concepts are as follows:

4.1.1. Variable, Equality, Inequality, The co-ordinate Plane

Each of these concepts has associated sub-concepts, details of which they would be presented. The first step in a linear programming problem is to identify the variables involved and to label them with appropriate units. The variables are those elements of the situation which are not fixed, which can change. One way of identifying these might be to ask what decision(s) must the company now make? In this problem, the only decision remaining concerns the quantity of each type of fertilizer which ought to be made in one day. Hence, we let ‘x’ be the quantity of powdered fertilizer and ‘y’ be the quantity of granule fertilizer to be made per day with both variables being measured in tonnes (not grams, which is the measure of the additive).

The second step is to determine the objective function ‘Z’ to be maximized or minimized. The objective function is that qualified by ‘maximum’ or ‘minimum’ or ‘greatest’ or ‘least’. Here, the objective function ‘Z’ is the (total) profit to be made per day. For a linear programming problem, the objective function must depend linearly on the variables. Here these variables are x and y, say the number of tonnes of powdered fertilizer and the number of tonnes of granule fertilizer respectively to

be made. Thus, we seek the linear relation between the daily profit and the number of tonnes of each type of fertilizer produced per day. The profit on the powdered fertilizer per ton, so if x tonnes of the powder are produced, the profit on those x tonnes must be x . The profit on the granule fertilizer is \$14 per ton. So if y tonnes of the granule fertilizer are produced, the profit in dollars on those y tonnes must be $14y$. Thus, the total daily profit Z is the result of combining the two partial profits: $Z = 20x + 14y$.

The third step is to determine the constraints, that is, the restrictions imposed on the variables. One type of constraint is that which is explicitly stated in the problem. One way of obtaining this might be to ask, 'what is stopping the company from making x and y infinitely large?' (In a minimum problem, one might ask, 'what is stopping the company from producing none of each variable?') Here, the factory can produce only 16 tonnes of fertilizer per day. This fertilizer includes both the powder form and the granule form. So the total amount of fertilizer produced per day is $x + y$. Since this can be 16 tonnes but no more, we have as our first constraint that is, $x + y = 16$.

There is also the need to consider any constraints which are implicit in the situation. The number of tonnes of each type of fertilizer produced cannot be negative. So, there are two further constraints, $X = 0$, $Y = 0$.

The fourth step is to represent the constraints on a graph and thereby determine the feasible region that is, the set of feasible solutions to the linear programming problem. This region is the intersection of the four half-planes given separately by the four constraint inequalities. To sketch an inequality, the line representing the equality is first sketched. A convenient method for this purpose is generally the intercept method. To determine the intercepts, the line $ax + by + c = 0$, the following procedure is used. The x -intercept is found by letting $y = 0$ in which case the equation becomes $ax + c = 0$. Solving for x gives $-c/a$ as the x -intercept. The y -intercept is found by letting $x = 0$, whence $y = -c/b$ is obtained. The two intercepts are then plotted on the graph and joined by a straight line. A broken line is shown if the original inequality is strict ($<$ or $>$) or a continuous line is shown if the said inequality is or the correct half-plane is then determined by substituting a suitable point such as $(0, 0)$ or $(1, 1)$ into the inequality to see if the half-plane shaded contains that point. In order to achieve good performance, pupils should be involved in teaching and learning. Mtitu (2014) also identified that, for effective and efficient teaching, learner centered methods should be used because it require teachers to actively involve students in the teaching and learning process. In others ways pupils should take a central role.

4.1.2. Teachers to Inculcate Positive Attitude in Pupils

Teachers should help pupils to develop positive attitude towards Mathematics. This aids in the increase of interest in learning it (Obodo, 2012; Karigi, and Tumuti, 2015)). The teacher should make the subject interesting and exciting enough through the methods that will be used. There are quite a number of strategies which can be used in the teaching of Mathematics. Pupil's involvement is crucial in doing away with the problem of poor academic performance in Mathematics. Pupils need to spent a great deal of time as well as effort in the learning of Mathematics so as to be motivated to want to continue wanting to learn the subject. They should not be treated as passengers but as active participants. According to Ajogbeje and Alonge (2012) teacher competency is also crucial. Teachers should demonstrate competency in the pedagogic content knowledge. Also of importance is the constant and frequent feedback and remediation by the teachers. The provision of feedback and remediation on the pupils necessarily improve performance in Mathematics. Remediation aids in correcting deficiencies in pupils with the intention of making them be on the same level with other pupils. Teachers who use interactive methods achieve active participation for their learners. Discovery methods, group work and project work have proved to be effective methods in teaching and learning of Mathematics. Using humor as a teaching strategy makes a lesson interesting and enjoyable as a result pupils perform better (Ngussa and Mbuta, 2017)

5. CONCLUSION

The study revealed that former pupils who were at Nkeyema secondary school recorded poor results. This was attributed to a number of challenges among others teachers inadequate subject knowledge, lack of confidence by pupils towards the topic, difficult in graphing variables as well as failure by pupils to recognize variables and their units. Therefore, there was need for pupils to be given

considerable guidance in the early stages of using problem solving approach. Groupwork should be encouraged as an important means of helping the pupils to develop flexible thinking pattern and application. Studies have shown that teacher qualifications and ill-prepared teachers as well as teachers' poor attitudes and their lack of readiness to teach appropriately affect learners' performance (Mufalo et al., 2021; Avong, 2013; Okafor and Anaduaka, 2013).

6. RECOMMENDATION

Based on the research findings therefore, the study recommended the following:

- i. Teachers should employ appropriate teaching methods to enhance effective delivery more especially learner-centered activities where pupils take a central role during teaching/learning process. This should also include the use a variety of instructional materials and strategies for pupils to understand better (Kaabo, 2019).
- ii. Ministry of Education should employ qualified teachers of Mathematics in order to improve results in Mathematics.
- iii. Teachers should fight mathematics phobia among learners so that may have a positive attitude towards Mathematics.
- iv. The Examinations Council of Zambia should revise the Mathematics syllabus to make it manageable because the study observed that the Mathematics syllabus was too loaded.
- v. The Ministry of Education through the province and the district should organize staff development workshops at regional level, district, cluster level and school level so that teachers can share the current teaching strategies.

REFERENCES

- [1] Simui, F. (2018). Lived experiences of students with visual impairments at Sim University in Zambia: A hermeneutic phenomenological approach. [Unpublished Doctoral Thesis, University of Zambia]. <http://dspace.unza.zm/handle/123456789/5884>
- [2] Examination Council of Zambia. (2015). Examinations performance Analysis Report, Lusaka: ECZ.
- [3] Examination Council of Zambia. (2016). Examinations performance Analysis Report, Lusaka: ECZ.
- [4] Catherine, L. (2008). Linear Programming: Theory and Applications. [https://www.whitman.edu/Documents/Academics/Mat hematics/lewis.pdf](https://www.whitman.edu/Documents/Academics/Mat%20Mathematics/lewis.pdf)
- [5] Geraldo, V. (2015): A Brief History of Computational Linear Programming Geraldo Veiga Rn Ci`encia e Tecnologia 1 st Brazilian Workshop on Interior Point Methods April 27-28, 2015 - Campinas, Brazil. <http://www.bwipm.dep.ufscar.br/webfacil/publico/File/Monday-1/Geraldo%20Veiga%20-%20Presentatio n.pdf>
- [6] Curriculum Development Centre. (2013). O level Mathematics Syllabus Grades 10 to12). Lusaka: CDC.
- [7] Mwape, J., & Musonda, A. (2014). An Investigation in the Teaching and Learning of Mathematics at Senior Secondary School Level in Solwezi District. *Research journals Journal of Mathematics*, (1)6, 1-25.
- [8] Examination Council of Zambia (2012). Examinations Performance Analysis Report. Lusaka, Zambia
- [9] Examination Council of Zambia (2014). Examinations Performance Analysis Report. Lusaka, Zambia.
- [10] Examination Council of Zambia (2015). Examinations Performance Analysis Report. Lusaka, Zambia.
- [11] Examination Council of Zambia (2016). Examinations Performance Analysis Report. Lusaka, Zambia.
- [12] Examinations Council of Zambia. (2017). ECZ in Perspective. News about the Examinations Council of Zambia, Issue No. 10. Lusaka: ECZ.
- [13] Mulenga, I. M. (2015). English Language Teacher Education Curriculum Designing: A Mixed Methods Analysis of the Programme at the University of Zambia. PhD Thesis. The University of Zambia.
- [14] White, L. (2018). Combining qualitative and quantitative research: Semiotics, structuralism and content analysis. In R. Nunkoo (Ed.), *Handbook of research methods for tourism and hospitality management* (pp. 373-383). Edward Elgar. <https://doi.org/10.4337/9781785366284>

- [15] Harrison, H., Birks, M., Franklin, R., & Mills, J. (2017). Case study research: Foundations and methodological orientations. *Forum: Qualitative Social Research*, 18(1). <https://doi.org/10.17169/fqs-18.1.2655>
- [16] Denzin, N. K., & Lincoln, Y. S. (2017). *The SAGE Handbook of Qualitative Research*. Thousand Oaks: SAGE.
- [17] Makondo, P. V., & Makondo, D. (2020). Causes of Poor Academic Performance in Mathematics at Ordinary Level: A Case of Mavuzani High School, Zimbabwe. *International Journal of Humanities and Social Science Invention (IJHSSI)*, 9(6), 10-18.
- [18] Wahyuni, D. (2012). The research design maze: understanding paradigms, cases, methods and methodologies. *Journal of Applied Management Accounting Research*, (10)1, 69-80.
- [19] Lewis, M. (2010). Focus group interviews in qualitative research: A review of the literature. 2020[http://www2.fhs.usvd.edu.au/arow/arer/pdf%20eReport%20version / 002.pdf](http://www2.fhs.usvd.edu.au/arow/arer/pdf%20eReport%20version%20002.pdf)
- [20] Moyle, K. (2013). Focus groups in educational research: using ICT to assist in meaningful data collection. <http://www.aare.edu.au/Q6pap/moy06634.pdf>
- [21] Mufalo, S. M. & Kabeta, R. M. (2019). Challenges of School Re-Entry among Learner Mothers and Mitigation Strategies Instituted by Stakeholders in Schools in Masaiti District. *International Journal of Humanities Social Sciences and Education*, 6(9), 73-82.
- [22] Kimmel J. A. (2014). *Ethical Issues in Behavioral Research: Basic and Applied Perspectives*. India: Blackwell.
- [23] Mufalo, S. M. (2021). Exploring Civic Education as a Catalyst to Learner Transformation in Zambian Schools: A Glance on the Developed Civic Education Pedagogical Content Knowledge (CEPCK) Model. *International Journal of Research and Scientific Innovation (IJRSI)*, 8(7), 89-95.
- [24] Liouaeddine, M., Bijou, M., & Naji, F. (2017). The Main Determinants of Moroccan Students' Outcomes; *American Journal of Educational Research*, (5)4, 367-383.
- [25] Mtitu, E. A. (2014). Learner-centred teaching in Tanzania: Geography teachers' perceptions and experiences. [Unpublished doctoral thesis] Victoria University of Wellington.
- [26] Obodo, G. C. (2012). *Principles and practices of mathematics education in Nigeria*. Enugu: Flowstone Press.
- [27] Karigi, M. W., & Tumuti, S. (2015) Students and Teachers Attitude Factors Contributing to poor Performance in Mathematics in K.C.S.E in selected public secondary schools in Kiambaa Division of Central Province, Kenya. *Strategic Journal of Business and Change Management*, 2(58), 317-332.
- [28] Ajogbeje, J. & Alonge, F. (2012). Effect of Feedback and Remediation on Students' Achievement in Junior Secondary School Mathematics. *International Education Studies*. Vol. 5, No. 5.
- [29] Ngussa, B. M., & Mbuti, E. E. (2017). The Influence of Humour on Learners' Attitude and Mathematics Achievement: A Case of Secondary Schools in Arusha City, Tanzania. *Journal of Educational Research*, 2(3), 170 –
- [30] Avong, H. N. (2013). Poor Performance in Mathematics among Senior Secondary School Students in Kaduna State: What to blame? *Journal of Research in National Development*, 11(2), 319-324.
- [31] Okafor, C. F. & Anaduaka, U. S. (2013). Nigerian School Children and Mathematics Phobia: How the Mathematics Teacher can help. *American Journal of Educational Research*, 1(7), 247-251.
- [32] Mufalo, S. M., Mulubale, S., Muleya, G., & Simui, F. (2021). Challenges faced by Combined Schools in Masaiti district which hinders the provision of Quality Education. *International Journal of Research and Innovation in Social Science (IJRISS)*, 5(3), 146-154.

AUTHORS' BIOGRAPHY



Chrispine Mulenga Mwambazi, is a Head of Department Mathematics at Nkeyema secondary school. He holds a secondary teacher 'diploma, bachelors of arts degree in Civic Education and History, bachelors of science (Mathematics/Biology) and a Master's degree in Education Mathematics. He has 15 years of teaching experience. Currently he is pursuing his Doctor of Philosophy (PhD) degree in Educational Mathematics with the University of Zambia.



Setwin Mutau Mufalo, is a Head of Department Social Sciences at Mishikishi secondary school. He has 17 years of teaching experience. He holds a certificate in primary teaching, a diploma in secondary teaching, Bachelor of Arts with Education (Civic Education/RS), a Master of Arts in Civic Education and Transformational Leadership and currently pursuing a Doctor of Philosophy (PhD) in Civic Education at the University of Zambia.



Dr. Lombe, is a Lecturer in the Department of Mathematics and Statistics at the University of Zambia. Her key contribution to the actuarial profession was the development of the first ever Actuarial Science Curriculum which she spearheaded. This has created a wider local talent pool for the insurance and pensions industry.



Dr. Francis Simui, serves as a Senior Lecturer with keen interest in the welfare of the vulnerable persons who has served the University of Zambia in various capacities. Has vast experience in ODL Quality Assurance, having been part of the core team, which developed the SADC ODL M & E Framework, Zambian ODL Framework and University of Zambia ODL Policy. Francis is a member of the Advisory Board of the Network of Open Educational Resources & Multimodal Self-Directed Learning in Southern Africa through North-West University, South Africa.

Citation: *Chrispine Mulenga Mwambazi et al. "Lived Experiences of Former Nkeyema Secondary School Pupils on their Academic Performance in Linear Programming: a Hermeneutics Phenomenology Approach" International Journal of Humanities Social Sciences and Education (IJHSSE), vol 9, no. 2, 2022, pp. 58-66. doi: <https://doi.org/10.20431/2349-0381.0902007>.*

Copyright: © 2022 Authors. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.