Exploring the Students' Linear Programming Proficiency at Zambia's Munkuye Secondary School: Hermeneutic Perspective: A Delve at the Library

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ABSTRACT

This paper aims to investigate the impact of library on learners; linear programming performance, employing a qualitative approach. In this study, the effect of libraries on students' performance in linear programming is examined using a qualitative methodology. The author claims that because libraries give students access to study materials from the actual school library, they can aid in their understanding of linear programming. The author argues that effective learning of linear programming requires studying. Libraries offer a surfeit of services and resources that assist academic accomplishment, making them useful tools for student's at all educational levels. Libraries help students with complex topics and assignments by providing specialist research assistance and reference services in addition to textbooks, reference materials, and scholarly journals. Building school libraries is one way to encourage learners to put in a lot of effort in their study work, according to the study's findings. This article's goal is to disseminate the results of a qualitative study that highlights the benefits of the school library.

This has the potential to improve education and inspire students to work even harder in their academic endeavors. Additionally, students who have difficulty in class can borrow books from the school library.

The library will support students' positive attitudes toward learning and active engagement in class activities. To reduce poor performance, school should ensure that library is put in place. This will motivate learners to put extra effort into their studies. The study concludes by recommending the establishment of building more schools libraries and stocking them relevant study materials. Parents can also ask school administrators to guide them to buy the required study materials for their children to study.

Keywords: Linear Programming, Library, Student, performance, books

INTRODUCTION

Libraries offer a plethora of services and resources that assist academic accomplishment, making them useful tools for student's at all educational levels. Libraries help students with complex topics and assignments by providing specialist research assistance and reference services in addition to textbooks and reference materials. The influence of the library on pupils' academic performance is significant. Non-existence of libraries has been connected to low academic achievement.

When there is no library, it is usually exceedingly difficult to obtain books for study. Lack of a school library has negative effects on both individuals and the education community. Physical libraries in educational institutions have the potential to greatly improve learning. Numerous book consultations in the school library can lead to better academic outcomes.

Statement of the Problem

Continuous subpar linear programming is detrimental to student's academic performance on a national and personal level. The high failure rate among students is due to a lack of study materials and libraries. Libraries could help students better comprehend linear programming since they provide them with study materials from the school's actual library. This can enhance education and motivate students to put in even more effort in their academic pursuits. Students who struggle in class can also check out books, yet Munkuye secondary had no library to enable a learner access books for studying.

It is unclear what the learning settings of pupils who don't have adequate study materials in linear programming can do better, hence the study.

Aims

Explore the students' Poor performance in Linear Programming at Zambia's Munkuye Secondary looking at the library as a reason.

Research Objectives

The study was guided by the following research objective:

1. Explore how lack of library affect student Performance.

2. Describe how library can foster a positive learning atmosphere

Significance

Could help educational institutions build school libraries. The research holds significance for teachers, pupils, and the nation as a whole, since it may contribute to the understanding of how libraries assist learners in studying to improve performance regarding their academic work and behaviour. The information gathered in this study may also be useful to the administrators to appreciate the need of having a library. Additionally, the study may contribute fresh data to the corpus of existing literature.

METHODOLOGY

Research Design

This study was entirely qualitative in nature. According to Shava and Nkengbeza (2020), a qualitative research is a phenomenological investigation that employs a naturalistic method to comprehend events in particular situations. Only the hermeneutic phenomenological technique was used in the current study (Dangal, 2020). The study used a hermeneutic phenomenological design in light of this. This is because, as opposed to merely providing a complete description of the facts, hermeneutic phenomenologists exercise their freedom to interpret the unwritten, unconscious, and hidden meaning they believe to exist in the event under study (Cohen and Omery 1994 in Simui 2018).

This method allows the researcher to make inferences about informants' experiences beyond that which is conveyed (Simui, 2018). Subjectivity in knowledge production was placed using this method (Guimond-Plourden, 2009).

The interpretation of the study findings were in line with the four (4) existential dimensions as espoused by Van Manen (1990/1997 in Guimond-Plourden, 2009). The researcher integrated these existential dimensions

because they are all embedded in the life of a participant or any human being.

Eligibility Criteria

All participants signed informed consent forms outlining the research methodology, the expectations of both the researcher and the participants, the benefits of the research, the issues surrounding voluntary participation, anonymity, and confidentiality, prior to the start of data gathering from interviews and focus groups. Interview and focus group discussion schedules were set for eligible participants once they signed the consent forms.

Research Sites

An inquiry was conducted at Munkuye Secondary School of Zambia, in the western province.

Study Population

Babbie (2016) states that population is the set of people or things that researchers are interested in researching and gathering data from. This could refer to a certain demographic group or people who have a specific issue. Munkuye, or students in grade twelve, were the study's target group.

Sample Size

In research, choosing the right sample size is essential since it affects the validity and applicability of the findings. In qualitative research, theoretical saturation is when more data collection yields no longer novel insights or viewpoints on the subject under investigation. It indicates that research has reached a redundancy point, when more data will just serve to confirm current conclusions rather than produce novel ones (Strauss & Corbin, 1998). Thus, the group consisted of eight girls and six boys.

Sampling Techniques

"Sampling" is defined by Gray, Grove, and Sutherland (2016) as the process of choosing people or events to participate in a study. Furthermore, sampling can be defined as the process of choosing certain components of the aggregate based on opinion or influence on the aggregate (Salum, 2008). Probability sampling and non-probability sampling are the two (2) types of sampling techniques. For this investigation, however, a non-probability sampling strategy was selected. Purposive sampling was chosen as the non-probability sampling strategy for this investigation out of the four available types. All study participants were chosen using the homogenous purposive sampling technique because the study sample was also homogeneous.

Additionally, in purposive sampling, the researcher determines what information is needed and identifies individuals who are willing to provide it based on their experience and knowledge endowment (Etikan et al., 2015), as cited by Mwase, Simuyaba, Mwewa, Muleya, and Simui (2020). Purposive sampling, according to Leedey (2000), is a procedure where the researcher deliberately chooses which individuals to include in the sample. It also allows the researcher to use his or her judgment in selecting cases that best allow him to answer the research questions and achieve the objectives (Saunders, 2003).

According to Denzin & Lincoln (2017), the learner's familiarity with the necessary material serves as the basis for this decision. To put it another way, purposive sampling makes it easier for the researcher to apply judgment when selecting the participants who would best contribute to the study's objectives. Therefore, the researcher should completely understand the phenomenon rather than extrapolating results to a larger group (Makondo & Makondo, 2020).

Data Generation

In-depth Interviews

Therefore, In-depth Interviews guides were used to gather data from students. During face-to-face interviews, the researcher with permission from participants also used a voice recorder and a diary. Further, during interviews and lesson observations, epoche or suspension took centre stage in order to elicit in-depth lived experiences of the participants (Shava and Nkengbeza, 2020). To grasp the issue, a thorough interview was conducted. The target audience was interviewed in-depth while the researcher took notes. The utilization of this device has several benefits. Benefits include enhanced privacy and secrecy. In-depth interviews; participants were able to clear up any questions they had; and an abundance of insightful data was acquired. Furthermore, data analysis checklists were also used during the process of data production.

Group Discussions

The participants in the focus groups were divided. Focus groups provide participants empowerment since they empower them in and of themselves. Talking with one another promotes understanding and communication, particularly when talking about challenging topics. It makes it possible to look at the parallels between experiences and methods for promoting empathy and shared perspectives. By adopting a moderate approach, the researcher enabled participants to go deeper into topics that surfaced during their one-on-one conversations. The tools used promoted interaction and communication. The study's conclusions are more credible when many strategies are used to work together and integrate the evidence. Therefore, a mixture of research instruments enabled the researcher to come up with credible results

DATA GENERATION PROCEDURE

Before data gathering process begun, the researcher obtained approval from the headmaster of Munkuye secondary school as he was a gatekeeper. A gatekeeper is "someone with the formal or informal authority to control access to a site" (Neuman, 2000). Fourteen participants were purposively selected for the study, which were visited prior to commencement of data generation process to avail the subject at hand to all participants. Finally, data generation procedure was as follows:

i) Nine (9) participants were asked to elicit important insiders' detailed life stories. During this process, a voice recorder and a diary were used in the documentation of the evidence to be used by the researcher later on.

ii) Five (5) focus group discussions were conducted during to pupils as key informants so that they could feel free to write there lived experience at their own time.

Data Analysis Procedure

McCaig (2010: 45) describe data analysis as, "a process that involves organising what you have seen, heard and read so that you can make sense of what you have learnt". Therefore, gathered data was analysed thematically. During this process, four (4) essential steps were followed namely: raw data management, data reduction, data interpretation and data representation. During the process of raw data management, the researcher undertook the process of data cleaning in order to remove redundant information from the gathered data. At this point, the only data that remained were those that were pertinent to the study questions. The researcher started chunking and coding as data reduction process. This was done by identifying similar ideas that were later grouped together in order to come up with themes (Mufalo and Kabeta, 2019). Denzin (2005) defined coding as an interpretative technique that both organises the data and

provides means to introduce the interpretations.

Further, data interpretation was the third stage where there was clustering of data. Therefore, clustered data or ideas grouped together by the researcher are termed as 'units of significance' (Sadala and Adorno, 2001). Eventually, there was data representation. This was a process were the researcher had to report or tell a story on the gathered data. After grouping participant ideas, a theme analysis of the commonalities was carried out.

Ethical Considerations

In qualitative research, ethical issues are essential to ensuring participant safety, well-being, and process integrity. Every participant received assurances that the data would be treated with extreme care, kept completely confidential, and used exclusively for that reason. Participants' names and comments will remain anonymous in order to protect their privacy (Israel & Hay, 2006).

Researchers should be aware of cultural norms and variances in order to guarantee that their research respects the values and beliefs of participants (Marshall & Rossman, 2014). According to Patterson (2014), researchers should provide participants with the opportunity for post-study debriefing and follow-up, particularly in situations where the study's subject may have provoked sensitive or emotional emotions. Following Kimmel's (2014) ethical guidelines—which include getting ethical permission, getting consent, protecting participants' privacy, and giving them pseudonyms—made this attainable.

The participants received a detailed explanation of the nature of the research, potential risks and benefits, and stop participating at any time without facing any consequences. The best practices are voluntary, informed, and documented consent (Beauchamp & Childress, 2019). Researchers should avoid cherry-picking or misrepresenting their data and instead be transparent and accurate in how they report their conclusions (Creswell, 2013).

FINDINGS AND DISCUSSION

A school library is a designated space within a school where students and sometimes faculty have access to a collection of books, periodicals, digital resources, and other educational materials. Its primary purpose is to support the educational goals of the school by providing resources for research, learning, and recreational reading. School libraries often have librarians or library staffs who manage the collection, assist students with finding resources, and provide instruction on information literacy skills.

Additionally, school libraries may offer services such as computer access, study areas, and educational programs or events. Libraries facilitate concentrated learning and academic performance by providing computer laboratories, Wi-Fi, and quiet study areas. Since these elements have a substantial impact on students' academic progress, a fuller understanding of students can only be obtained by looking into and evaluating qualities linked with library *[spatiality]* use (Tami Strang, 2015). Consistent with the above statement, Mark Thaler and Tim Pittman (2014) indicated that students can benefit much from library.

In addition to being a place to read, a library gives students access to activities related to their academic work. They can go to read books, pick up new knowledge, and have group meetings, among many other things.

The library *[Spatiality]* is the most important resource for education, according to Ayaz et al. (2017). It is an excellent tool for encouraging progress, inquisitiveness, and problem-solving abilities. By helping to differentiate education and learning across the school, school libraries *[spatiality]* support students' accomplishments and knowledge. It is an indispensable part of the school's student body [Corporeality],

which welcomes and reflects the community.

The school library *[Spatiality]* is an essential tool for promoting reading delight and illiteracy, serving as a storehouse for ideas and knowledge. As a result, without the school library *[Spatiality],* the educational program might not run smoothly (Jato, Ogunniyi, & Olubiyo, 2014). Libraries improve learning resources and spatial reference. Researchers and students can access a multitude of information and references through libraries, periodicals, and digital resources. Access to this is required in order to do in-depth research and identify a subject (Tami Strang, 2015). Libraries *[spatiality]* offer students the opportunity to acquire knowledge from multiple fields and perspectives. The resources libraries *[spatiality]* offer people help them become competent scholars. Libraries offer a focused, peaceful environment for study and research *[spatiality]*.

Libraries *[spatiality]* are centers for lifelong learning, not just for students. They offer materials that let people keep studying for the rest of their lives. Libraries *[spatiality]* are an incredibly useful tool for reference-based learning. They supply resources, improve the ability to do research, and encourage targeted study (Philomena Gbemi-Ogunleye, 2016).

According to Mandrekar and Bala (2020), studying becomes more difficult when libraries are absent *[spatiality]*. Maintaining a sufficient supply of instructional resources is essential. Books, iPads, Wi-Fi, and other modern conveniences for easy information archiving and retrieval should be included in such a library.

Academic libraries, sometimes known as spatial libraries, are meant to be used for research; however, Munkuye Secondary School had none. Students can read literature about the subject of their academic inquiry because of the library's *[spatiality]* accessibility (Soria, Fransen, & Nackerud, 2013).

Libraries are essential to the advancement and support of education, particularly locating and using references for scholarly work or self-improvement. There are many reference materials available at libraries. Due to quality and accuracy checks, students can feel safe using these sources (Tami Strang, 2015).

Libraries usually have special collections and archives with rare or historical references. These materials are very beneficial to researchers and academics (Ayaz et al., 2017). Libraries provide an assortment of resources and services that advance knowledge (Ayaz et al., 2017). They offer a dependable and well-organized way to get information.

Libraries continue to be essential to education, whether one is studying for a degree or just for personal growth.

For a secondary school student, having access to relevant learning materials and reference materials—many of which are housed in physical libraries—is equally important (Jato, Ogunniyi, & Olubiyo, 2014). There was no library at the school, despite student requests *[Spatiality]*. Furthermore, there was no internet connectivity for the pupils.

Timuna saw that students had trouble finding the necessary study resources. This problem exacerbates when teachers give their students assignments. For the pupils, there were several challenges in finding the information they required in books. *Timuna* claimed that it was hard to get textbooks at the school, and *Mungomba* agreed with her. *Mungomba* and *Timuna* observed that the area lacked a library *[spatiality]* where students could check out books for research. The infrastructure that all students thought was missing was the library *[Spatiality]*. The fourteen participants didn't know about the school library.

Libraries are crucial for improving student progress. Students who read frequently improve academically and expand their comprehension. A physical library is a traditional library where people can access books,

journals, and other materials for research or reference.

These libraries typically have reference areas with non-circulating items that are only available for use on library grounds. Among them are often atlases, dictionaries, encyclopaedias, and other reference resources. A library could also be an online database of other content. These online libraries typically have sizable reference collections that let users look up and find information on topics. The library should have resources that can be used to conduct research or study or that can be examined for information.

Libraries provide materials that push students to be critical thinkers and information analysts. They frequently match their holdings to the curricula of the schools they serve, giving students access to extra resources that enhance what they learn in class. Students who have access to pertinent resources are better able to retain academic concepts and reinforce what they learn in class.

Students can work together on group projects, have intellectual discussions, and study in libraries. Peer learning and information sharing are encouraged in these collaborative learning environments, which can improve students' comprehension of challenging material.

Lack of Library Affect Student Performance

Through their holdings, libraries introduce students to cultures, histories, and viewpoints. Students can enhance their academic experience and performance by broadening their understanding of the world through the study of literature and other materials from many places and eras. Libraries increase learner efficiency in linear programming because they give users access to an extensive array of materials, such as online tutorials, software tools, textbooks, and scholarly publications (Vanderbei, 2008).

Mawi, for instance, stated the following, as shown in the verbatim transcription:

"The school had no library where I could get information on linear programming. This made studies to be difficult" (Mawi, 11 .02. 2024).

The conclusions above are consistent with those of Bazaraa, Jarvis, & Sherali (2011), who evaluated the data and concluded that online training resources and learning platforms covering linear programming are frequently accessible through libraries. These platforms might have interactive classes, video lectures, and practice questions that let students acquire important ideas and hone their problem-solving abilities at their own speed. Similarly, textbooks and reference resources on linear programming concepts, techniques, and applications are generally widely available in libraries. Students can make use of these materials to extend their knowledge of the theoretical underpinnings of linear programming.

Most school libraries offer a large selection of books, reference books, and digital resources. Without a library, students could not locate pertinent material for assignments, research projects, and general reading, which would hinder their capacity to get deeper knowledge of the material and hone their critical thinking abilities. Learning engagement is strongly connected to academic performance, academic happiness, learning perseverance, and academic completion (Tatiana et al., 2022). Studying is a crucial indication of students' learning quality (Xie et al., 2020).

Libraries encourage reading by stocking books on various subjects and genres. A dearth of a library may prevent students from having as many opportunities to engage with books, which could be harmful to their overall academic success, vocabulary expansion, and literacy development (Mizani et al., 2022).

Winston, (2003) revealed that numerous libraries offer cooperative learning areas where students can collaborate on projects involving linear programming, exchange ideas, and participate in group discussions.

These areas promote information sharing, peer-to-peer support, and a feeling of community among students.

Similar thoughts were expressed by *Langi,* who said that,

"With focus on library, significant learning can be achieved. Where children have access to study materials, students tend to do better because they have the required study materials at their disposal and this produces a real desire for learning that should be at the heart of any school's provision and needs relentless focus on everyone from the learner to subject leaders" (Langi,13 .02, 2024).

The claim is in in tandem with Loertscher, Koechlin, & Rosenfeld (2018) that an area within a building set aside for study purposes is called a school library. Students should have access to comfortable seating places, group study rooms, private study carrels, and quiet locations where they can read, study, collaborate, and perform independent research

Similar to this, Todd, (2015) assert that in order to promote reading among students, the library arranges instructional events such as literacy programs, author visits, book clubs, and seminars. These provide comprehensive guidelines for setting up, maintaining, and assisting students in developing their reading and information literacy skills in school libraries.

Another participant, *Shima* commented that:

"I did not like the learning situation. The school had no library making it difficult to study. This affected learning. The performance was not good because lack of the school library" (Shima, 30.02. 2024).

The aforementioned decisions support American Library Association, (2018) that concluded that Students usually perform better in schools with libraries. According to studies, having a library beside a school enhances instruction and raises student achievement. Over the years, the libraries have assisted students in passing. According to Eisenberg & Berkowitz's (2015) research, the provision of study resources has a substantial positive impact on academic performance. Libraries are frequently used as places where students can conduct independent research and study on subjects of interest at their own speed. Without this tool, students could be forced to depend entirely on course materials and teacher guidance, losing out on the chance to pursue self-directed learning and grow in their academic autonomy.

The cognitive techniques students use, the learning behaviors they display, and the emotional experiences they have while learning are all included in learning engagement (Mader & Bry, 2019).

Libraries are essential in helping students assess reliable sources, correctly cite references, and compile data. Lack of utilization of libraries may make it harder for students to do fruitful research, which could lead to lower-quality assignments and projects. High learning engagement levels will drive students to learn and help them concentrate (Carmona-Halty et al., 2021).

It is suffice to say the benefits of having a school library demonstrate an educational setting. This helps create a learning atmosphere that is advantageous to the students. The obvious advantage of having a school library nearby is easy access to instructional resources. In schools with libraries, students often gather books for their studies.

Students may find more convenient to read books and get ready for their studies if they have less stress and study time. A better education may come from well-stocked school libraries, since they enable pupils to locate pertinent reading material and improve their performance.

However, *Kande* stated that:

"I did not understand anything in linear programming because the teacher was struggling in teaching the topic. I needed more books to research on. If the school had a library, I could have done some research" (Kande, 15.02, 2024).

The aforementioned consequences support Lance & Loertscher, (2016) assertion that libraries offer a serene, soothing atmosphere that is perfect for reflection and study, promoting academic concentration and focus. Encouraging libraries often provide spaces for collaboration, research, and artistic expression, which encourage growth and creativity (Gordon, 2013). School libraries are necessary for the growth of learners who are knowledgeable, inquisitive, and engaged (Wang, 2017).

Libraries enhance students' learning styles. Access to materials: Libraries provide a wealth of materials, some of which include online databases. Being privy to library resources students' academic achievement enhances. Libraries encourage reading, and reading is necessary to succeed academically. By sifting through information to locate pertinent information, libraries give students the chance to hone their research skills.

The confidence of the pupils also surfaced as a motif, and *Bika* noted that:

"Pupils lost confidence and the master of topic content due to lack of the school Library. I could not tell where to find books to look at whenever home work is given. The teacher did not care whether pupils understood the questions better and apply the concept," (Bika, 22 .02. 2024).

The aforementioned discovery supports Radford et al. (2018) assertion that libraries positively impact students' academic achievement. Libraries provide spaces that foster this type of learning, which can raise student performance. Libraries support self-directed learning by allowing students to discover topics of interest at their own pace. According to research by Lance & Loertscher (2018), libraries can support lifelong learning and autonomous inquiry. According to studies by Eisenberg & Berkowitz (2010), information literacy instruction in libraries enhances students' research skills and critical thinking abilities.

Libraries provide space for group study sessions, research projects, and discussions. Haddow & Joseph (2010) suggest that collaborative learning environments in libraries facilitate knowledge sharing and peer-to-peer support among students.

Timuna wrote,

"When I had schoolwork, I couldn't do research. For me, learning resources was a difficulty. I occasionally finish writing assignments before copying what they've written. I remember one day when my teacher declined to mark my work" (Timuna, 04.02.2024).

Kadzo agreed with *Timuna's* assertions by saying,

"During my three years at the school, I never saw the library. The school had no library or any other place where pupils could go to read books whenever they wanted. I found studying to be challenging" (Kadzo, 12.02.2024).

Modern libraries often offer students access to computers, internet connectivity, and digital resources. Libraries expose students to diverse perspectives, cultures, and ideas through their collections and programming. Constantino & Egan (2017) asserted that multicultural literature promotes empathy and cultural understanding among students.

School library could be the only option for children without access to books or the internet at home. Learner performance can be strongly impacted when educational materials are well-stocked and maintained in a library. Students can independently investigate areas of interest, conduct research, and expand their knowledge. Students can acquire vital research skills, like information literacy, by making use of the library's resources. Librarians can aid students in navigating intricate information environments, honing research questions, and finding pertinent resources. All of these services can improve academic proficiency.

Further, *Timuna* stated that:

"My parents were poor so they could not afford to buy me study materials. This made my studies very difficult" (Timuna, 04.02. 2024).

The evidence cited above corroborates Catherine, (2021) assertion that learners will have access to vital learning tools if the library is adequately stocked. In addition to bridging educational disparities, this fosters equity and inclusion by giving every student the opportunity to succeed academically. Libraries help people access information, offer academic support services, promote and enhance diversity and academic performance.

Suffice to mention that, the entire educational experience and academic performance can both be greatly enhanced by school libraries. Students' reading habits are fostered by libraries, and this enhances their literacy abilities.

Different students absorb concepts in different ways. Teachers can accommodate varied learning styles by offering a range of study materials, including interactive simulations, films, textbooks, and internet resources. Materials enable students to practice and repeat concepts to strengthen their grasp of them. Practice questions, tests, and additional readings, for example, provide students the chance to put what they've learned into practice, pinpoint their areas of weakness, and ask questions when they need more explanation.

Kahare said the following:

"I was facing challenges in understanding what my teacher was teaching in class. This was as a result of inefficiency and ineffective teaching by my teacher. If my school had a library I would checked for books which could have helped me understand better" (Kahare, 07.02. 2024).

Supporting the aforementioned claim, Lu et al. (2020) found that by tailoring education to each student's comprehension level and preferred method of learning, time can be spent focusing on difficult subjects. Consequently, learners experience an increase in self-assurance and empowerment throughout their educational journey, which enhances performance (Garrison & Kanuka, 2004).

Suffice to say students have different obligations and schedules outside of school. Through the provision of study materials that are easily accessible, such as digital libraries or online platforms, teachers enable students to schedule their learning around other obligations. Flexibility like this encourages autonomy and self-directed learning and raises student achievement.

Library Enhances Positive Learning

Libraries are a priceless resource for students, providing them with access to a multitude of information, developing their capacity for critical thought, bolstering the academic program, encouraging information literacy, promoting teamwork, and enhancing cross-cultural understanding—all of which lead to better

academic achievement.

One important component of education is the library. *Nande* attributed his low academic achievement to his lack of books and the library. He saw that his studies suffered *[corporeality]* from having to rely on his lecturers' notes *[relationality]*. His performance was impacted by his lack of study resources. It was difficult for him to focus and learn more, particularly in linear programming. *Kakumba* reiterated what *Kande* had said, predicting that studying without books would be challenging.

According to *Langi* and *Mawi,* slow learners had trouble focusing when they studied. Consequently, the students' academic performance declined. The students' incapacitation led to their unintentional low performance.

Study materials are essential for improving performance, as Mandrekar and Bala (2020) claim. Fuller (1985) found a relationship between a library and the exceptional academic success of students. Philomena Gbemi-Ogunleye (2016) asserts that inefficient, antiquated book libraries and a lack of organization both negatively affect students. Timuna observed that when I was given an assignment, I was unable to do library research.

Kadzo went on to say,

"In my two years at the school, I never had access to academic resources like books" (Kadzo, 12. 02.2024).

When the subject of linear programming comes up, a library *[Spatiality]* is usually used to represent prewritten code or software tools that address problems with linear programming. In order to study and apply linear programming, libraries and software tools are necessary since they simplify the implementation process, provide practical solutions, and enable students to experiment, validate, and get practical experience with the language.

The educational process and the library are related *[Spatiality]*. Secondary school students need both appropriate study materials and easily accessible reference materials, which are typically housed in physical libraries. None of the Munkuye Secondary School pupils had ever used the library to obtain reference materials, despite their willingness to do so. Students could not access the library *[spatiality]*.

Furthermore, *Mungomba* said that,

"Because the school did not have a library, it was very difficult to examine books. Not even on the internet" (Mungomba, 22 .02. 2024).

Kahare recommended that,

"The administration of the school considers allocating a space that is stocked with books so that pupils can make book requests. I managed to request books for studying," he declared (Kahare, 07.02.2024).

One of Dzao's statements was,

"My Performance was poor because I had no study materials." I sometimes ask teachers for help with study materials. This affects how well I do academically and makes it harder for me to get better results. I refer to my instructors' notes" (Dzao, 10.02.2024).

Similarly, Carvalho et al. (2020) note that limited library resources often result in subpar performance, which affects academic success.

It was *Nande* who stated that.

"Because the school had no library, I was not doing well. The library would have helped me get study resources. I'm motivated to learn even though the school doesn't have a library" (Nande, 10.02, 2024).

This data bolsters the claim made by Mader & Bry, (2019) that libraries are frequently used as places where students can conduct independent research and study on subjects of interest at their own speed. Without this tool, students could be forced to depend entirely on course materials and teacher guidance, losing out on the chance to pursue self-directed learning and grow in their academic autonomy. The cognitive techniques students use, the learning behaviors they display, and the emotional experiences they have while learning are all included in studying. According to Carvalho et al. (2020), study materials assist students who may find challenges to understand what their teacher is teaching in class.

Minga said that:

"For study materials, I use study notes given by my teacher. I have problems with the notes as they were not detailed because they summarized the given notes. I remember my teacher giving me the homework, but I could not do it due to a lack of books to consult" (Minga, 18.02.2024).

In line with this, Carvalho et al. (2020) point out that a lack of libraries frequently contributes to low academic achievement. Agreeing with the above assertion, Mizani et al., (2022) asserts that libraries encourage reading by stocking books on various subjects and genres. A dearth of a library may prevent students from having as many opportunities to engage with books, which could be harmful to their overall academic success, vocabulary expansion, and literacy development.

Furthermore, Mbango said that,

"I was not studying regularly because of lack of libraries." (Mbango, 25.02, 2024)

The above assertion agrees with the research by Tami Strang (2015) who indicated that lack of libraries affects students' academic achievement. The libraries should stock materials that provide the required knowledge, which can impair focus and motivation during class activities. Learners opt to complete schoolwork, depending on their preferences for educational institutions and their degree of preparedness (Philomena Gbemi-Ogunleye, 2016).

The notion of establishing a school library also came up. The following observation was noted by *Bika:*

"I needed to study if I would to pass. Library is necessary for me to study more effectively (Bika; 22.02. 2024).

Lack of study materials affects students' cognitive abilities, making it harder for them to complete their education (Ehrlich et al., 2013). Most school libraries offer a large selection of books, reference books, and digital resources. Without a library, students could not locate pertinent material for assignments, research projects, and general reading, which would hinder their capacity to get deeper knowledge of the material and hone their critical thinking abilities. Learning engagement is strongly connected to academic performance, academic happiness, learning perseverance, and academic completion (Tatiana et al., 2022). Studying is a crucial indication of students' learning quality (Xie et al., 2020).

Additionally, *Minga* stated that,

"It was difficult to study without necessary materials. This contributed to poor performance due to lack of school library" (Nolo, 18.02.2024).

This view agrees with Philomena Gbemi-Ogunleye, (2016) who disclosed that the academic achievement of students is negatively impacted by the absence of study materials. The length of time spent not studying is linked to learners' subpar academic achievement. Students perform worse when they don't study.

The fourteen (14) participants were all forthright enough to admit that their difficulties studying caused them to suffer.

"My study time was affected by the lack of a school library," stated Shima. I needed books all the time. This was due to my teacher's efficacy and efficiency in the classroom. If I haven't studied, I can't remember the material" (Shima, 30.02.2024).

The results of Ng, Zakaria, Lai, & Confessore (2016), who found a substantial positive link between study time and academic achievement, confirm the previously stated point of view. To put it succinctly, the more time a student devotes to studying, the lower the probability of their academic success.

Mungomba stated that:

"School Library was a requirement to any school. I suggest that when building a school a library should be put into consideration" (Mungomba, 22.02. 2024).

The disclosure above is consistent with Lance & Loertscher (2018) who posited that libraries support self-directed learning by allowing students to discover topics of interest at their own pace and l support lifelong learning and autonomous inquiry. According to studies by Eisenberg & Berkowitz (2010), information literacy instruction in libraries enhances students' research skills and critical thinking abilities.

It is sufficient to say School libraries play a crucial role in improving academic performance in several ways:

CONCLUSION

Given that most learners have challenges with study materials, schools should provide learners with study materials to enable them to study hard. This makes learning attainable for learners. Learning is infused into new minds. Furthermore, when learners have study materials, learning happens most efficiently. This, in turn, results in learners gaining the anticipated learning outcomes or competences listed in the mathematics curriculum, which is dependent upon a number of parents, teachers, administrators, and other Ministry of Education employees.

Additionally, it is essential that schools build actual libraries and fill them with books. The study provides important, substantiated evidence of the strong correlation between student academic success and libraries, especially for math. There is much more in the library than just books for the guests to peruse. They viewed a tranquil place away from the ugliness of everyday life as a welcoming place where they could obtain the complete attention of an adult who was knowledgeable, kind, and sympathetic.

RECOMMENDATIONS

The recommendations that follow are founded on the researcher's conclusions:

1. To enhance successful learning, school library must be well stocked with relevant study material to

avoid dismissal.

2. School library must be established in schools to enable learners, educators, administrators, and other stakeholders to access study materials.

3. To reduce poor performance among students, the government should build school libraries in schools.

4. To facilitate students' easy access to these study materials, school administrators should provide them to pupils.

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Notes

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REFERENCES

1. Thomas, C. A. (2016). Going the distance! How Distance to School Relates to Student Education Outcomes. Doctoral Dissertation, University of California, Los Angeles.

2. Abu-Aisheh, A., Grant, L., Sumukadas, N., et al. (2016). Fostering engineering Students Engagement Using Problem-based Learning and Course Learner Agent Object Portfolios. Int J Eng Pedagog (iJEP) 6:45

3. American Association of School Librarians. (2018). "National School Library Standards for Learners, School Librarians, and School Libraries." Chicago, IL: American Association of School Librarians.

4. American Library Association. (2018), "Information Literacy Competency Standards for Higher Education."

5. Baafi, R. (2020). School physical environment and student academic performance. Adv Phys Educ 10(02):121

6. Babbie, E. (2016). The practice of social research. Cengage Learning.

7. Barajas, M. (2008). The effect of the availability of instructional materials on students' academic performance in science. Journal of College Teaching & Learning, 5(11), 39–44.

8. Bazaraa, M. S., Jarvis, J. J., & Sherali, H. D. (2011). Linear programming and network flows. John Wiley & Sons.

9. Beauchamp, T. L., & Childress, J. F. (2019). Principles of biomedical ethics (8th ed.). Oxford University Press.

10. Bertsimas, D., & Tsitsiklis, J. N. (1997). Introduction to Linear Optimization. Athena Scientific.

11. Brophy, J. (1988). Classroom management techniques. Education and Urban Society, 20(2), 171–194.

12. Büyüköztürk, Ş., Çakmak, E. K., Özçakar, N., & Yılmaz, R. (2016). The effects of teacher immediacy, classroom justice, and punitive justice on classroom misbehavior. Procedia: Social and Behavioral Sciences, 235, 93–101.

13. Camello, N. C. (2014). Factors Affecting the Engineering Students' Performance in the OBE Assessment Examination in Mathematics. International Journal of Academic Research in Progressive

Education and Development, 3(2), 87–103. Available at: https://doi.org/10.6007/ijarped/v3-i2/913.

14. Carmona-Halty M, Salanova M, Llorens S., et al. (2021). Linking positive emotions and academic performance: The mediated role of academic psychological capital and academic engagement. Curr Psychol 40(6):2938–2947

15. Catherine, B., M. (2021). O'Donnell and Tuomey's University Architecture: Informal Learning Spaces that Enhance User Engagement. Architect Cult 9(1):98–120. https://doi.org/10.1080/20507828.2020.1794711

16. Chetty, R., Friedman, J. N., & Rockoff, J. E. (2011). The Long-Term Impacts of Teachers: Teacher Value-Added and Student Outcomes in Adulthood. National Bureau of Economic Research.

17. Constantino, R. E., & Egan, A. M. (2017). Revisiting the Case for Culturally Relevant Literature Instruction. Reading Teacher, 70(1), 91–95.

18. Creswell, J. (2014). Research design: qualitative, quantitative, and mixed-methods approaches. Lincoln: Sage Publishers.

19. Creswell, J. W. (2013). Qualitative inquiry and research design: choosing among five approaches. Sage Publications.

20. Creswell, J. W., & Creswell, J. D. (2017). Research design: qualitative, quantitative, and mixed-method approaches; Sage Publications.

21. Denzin, N. K., & Lincoln, Y. S. (2017). The SAGE Handbook of Qualitative Research. Thousand Oaks: Sage.

22. Easton, S., & Ferrari, E. (2015). Children's travel to school—the interaction of individual, neighborhood, and school factors. Transport Policy, 44, 9–18. Available at: https://doi.org/10.1016/j.tranpol.2015.05.023

23. Echazarra, A., and T. Radinger (2019). Learning in rural schools: Insights from PISA, TALIS, and the Literature, OECD Education Working Papers Series, No. 196, OECD Publishing, Paris, https://doi.org/10.1787/8b1a5cb9-en.

24. Ehrenberg, R. G., & Ehrenberg, R. A. (2002). Class size and student achievement. What's the Good of Education? The Economics of Education in the United States (pp. 119–147). Princeton University Press.

25. Eisenberg, M. B., & Berkowitz, R. E. (2010). Information literacy: essential skills for the information age. Journal of Library & Information Technology, 30(2), 3–15.

26. Eisenberg, M. B., & Berkowitz, R. E. (2015). "Big 6 Skills: Information & Technology Skills for Student Achievement." Linworth.

27. Examinations Council of Zambia. (2017). ECZ in Perspective. News about the Examinations Council of Zambia, Issue No. 10. Lusaka: ECZ.

28. Garrison, D. R., & Kanuka, H. (2004). Blended Learning: Uncovering its Transformative Potential in Higher Education. The Internet and Higher Education, 7(2), 95–105.

29. Gershenson, S., A. Jacknowitz, and A. Brannegan (2017), Are Student Absences Worth the Worry in U.S. Primary Schools? Education Finance and Policy, Vol. 12/2, pp. 137–165, https://doi.org/10.1162/EDFP_a_00207.

30. Getachew, B. (2018). Factors Affecting Student's Academic Performance in Ahuntegen General Secondary School, North Wollo Zone, Ethiopia. Journal of Education and Learning (EduLearn), 12(2), 198–206. Available at: https://doi.org/10.11591/edulearn.v12i2.8404.

31. Glickman, D., Servon, L., & Hamilton, E. (2010). Main Street for Kids: The Promise of Place-Based Community Schools. In T. B. Rogers & C. R. Buss (Eds.), Center for Local, State, and Urban Policy. University of Michigan.

32. Gordon, C. A. (2013). "The Collection Program in Schools: Concepts, Practices, and Information Sources." ABC-CLIO.

33. Gottfried, M. (2017). Does truancy beget truancy? Evidence from Elementary School, The Elementary School Journal, Vol. 118/1, pp. 128–148, https://doi.org/10.1086/692938.

34. Guimond-Plourde, R. (2009). A Hermeneutic Phenomenological Approach to Understanding Stress: Coping as an Existential Phenomenon Lived by Healthy Adolescents. The Indo-Pacific Journal of

Phenomenology (IPJP), vol. 9, 2nd ed., 1–13.

35. Haddow, G., & Joseph, C. (2010). Libraries, collaboration, and community. Journal of Library Administration, 50(7–8), 819–833.

36. Hillier, F. S., & Lieberman, G. J. (2013). Introduction to Operations Research. McGraw-Hill Education.

37. Israel, M., & Hay, I. (2006). Research ethics for social scientists: Between ethical conduct and regulatory compliance. SAGE Publications.

38. Kim, H., and Son, D. (2021). Effects of Learner-to-Learner Academic and Social-Emotional Interactions on Learning Engagement and Cooperative Learning Satisfaction in Online Cooperative Learning. J Educ Sci 52(4):27–49

39. Kimmel, J. A. (2014). Ethical Issues in Behavioral Research: Basic and Applied Perspectives. India: Blackwell.

40. Krashen, S. (2004). "The Power of Reading: Insights from the Research." Libraries Unlimited.

41. Kuhlthau, C. C., Maniotes, L. K., & Caspari, A. K. (2007). "Guided Inquiry: Learning in the 21st Century." Libraries Unlimited.

42. Lance, K. C., & Loertscher, D. V. (2016). "Powering Achievement: School Library Media Programs Make a Difference: The Evidence." Hi, Willow Research & Publishing.

43. Lance, K. C., & Loertscher, D. V. (2018). The Impact of School Libraries on Student Achievement: Exploring the School Library Impact Studies. 3rd ed. Salt Lake City, UT: Hi Willow Research and Publishing.

44. Loertscher, D. V., Koechlin, C., & Rosenfeld, E. (2018). "The New School Library: Where Learners Win!" Salt Lake City, UT: Hi Willow Research & Publishing.

45. Lu K, Shi Y, Li J, et al. (2022). An Investigation of College Students' Learning Engagement and Classroom Preferences in the Smart Classroom Environment. SN Comput Sci 3:205. https://doi.org/10.1007/s42979-022-01093-1

46. Mader, S., and Bry, F. (2019). Fun and Engagement in Lecture Halls through Social Gamification.

47. Marshall, C., & Rossman, G. B. (2014). Designing Qualitative Research, Sage Publications.

48. Moore, M. G., & Kearsley, G. (2011). Distance Education: A Systems View of Online Learning. Cengage Learning.

49. Morse, J. M., Swanson, J. M., & Kuzel, A. J. (2001). The nature of qualitative evidence. Sage.

50. Mwambazi, C. M., Mubanga, L., & Francis, S. (2023). Disablers Affecting Pupils Academic Performance in Linear Programming at Nkeyema Secondary School in Zambia: A Hermeneutic Perspective. American Journal of Multidisciplinary Research and Innovation, 2(3), 1–8. https://doi.org/10.54536/ajmri.v2i3.1454

51. National Commission on Reading. (1985). Becoming a Nation of Readers: The Report of the Commission on Reading. Washington, DC: National Institute of Education.

52. Neuman, S. B., & Celano, D. (2001). Access to print in low-income and middle-income communities: An ecological study of four neighborhoods. Reading Research Quarterly, 36(1), 8–26.

53. Neuman, W. L. (2014). Social Research Methods: Qualitative and Quantitative Approaches. Pearson.

54. Onderi, H., and Kiplangat, R. influencewino, J. (2014). Factors Contributing to Poor Academic Performance in the Kenya Certificate of Secondary Education in Public Secondary Schools in Kerich Sub-County, Kericho County, Kenya. Kenyan Journal of Educational Planning, Economics, and Management, 7(2), 1–14.

55. Patton, M. Q. (2014). Qualitative research & evaluation methods: Integrating theory and practice. Sage publications.

56. Piza, C., Alexis, I., Galarza, P., J. L., Barahona, T., L. I., & Nivela, Z. W. V. (2019). Estimation of the level of influence and impact that study hours and self-esteem have on the academic performance of the students of the Regional Autonomous University of the Andes. Babahoyo headquarters. Contemporary Dilemmas: Education, Politics and Values, 7(1), 1-16

57. Puritat, K. (2019). Enhanced knowledge and Engagement of Students through the Gamification Concept of Game Elements. Int J Eng Pedagog (iJEP) 9:41

58. Raby, R., & Frey, P. (2018). A Qualitative Analysis of the Relationship Between Employee Punctuality and Performance in a Higher Education Context. Journal of Education for Business, 93(4), 145–152.

59. School Library Journal. (2016). School libraries transform learning. Retrieved from https://www.schoollibraryjournal.com/?detailStory=school-libraries-transform-learning.

60. Scott-Webber, L., Konyndyk, R., and French, J. (2018). Significant results. Space makes a difference in increasing student academic engagement levels. Eur Sci J 14(16):1857–7881

61. Shava, G. N., & Nkengbeza, D. (2020). Qualitative Research Paradigm: A Design for Distance Education Researchers. Namibia CDP Journal for Educators, 237–258.

62. Silverman, D. (2016). Qualitative research (4th ed.). Sage.

63. Tatiana B., Kobicheva A., and Tokareva E. (2022). The Relationship between Students' Psychological Security Level, Academic Engagement and Performance Variables in the Digital Educational Environment. Educ Inf Technol 27:9385–9399

64. Todd, R. J. (2008). "School Reform and the School Library Media Specialist." Libraries Unlimited.

65. Todd, R. J. (Ed.). (2015). "School Library Management." Santa Barbara, CA: Libraries Unlimited.

66. Wang, S. (2017). "The Power of Reading: Insights from the Research." Routledge.

67. Wells, A. S., Warner, M., & Grzesikowski, C. (2013). The story of meaningful school choice: lessons from interdistrict transfer plans. In G. Orfield, E. Frankenberg & associates (Eds.), Educational delusions?: Why choice can deepen inequality and how to make schools fair (pp. 187–218). Oakland: University of California Press.

68. 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

69. Xie, K., Vongkulluksn, V.,W., Lu L et al. (2020). A Person-Centered Approach to Examining High-School Students' Motivation, Engagement and Academic Performance. Contemp Educ Psychol 62:101877. https://doi.org/10.1016/j.cedpsych.2020.101877