Unearthing Techniques Teachers Apply to Teach Linear Programming in Western Province of Zambia: Hermeneutics Perspective

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ABSTRACT

This article examines the methods used by teachers in Zambia's western province as they teach linear programming. It made use of the case study design. Eighteen participants were purposefully chosen for this study, and they participated in focus groups and one-on-one interviews that produced data. A thematic approach was used to analyze the generated data. According to the teachers use peer-reflective teaching, academic assessment of students, interactive methods, gathering student input, and group projects to teach linear programming. but not to the extent that they had developed their reflective practices to the point where they were becoming critical and creative thinkers. The report recommends that education standards officers maintain the regulations in place to control enrollment and classroom congestion, enabling instructors to deliver instruction effectively and efficiently and optimizing student benefits, in light of the findings.

Keywords: Schools, Teaching Process, Linear Programming, Participatory Approaches, Ways teachers teach.

INTRODUCTION

To successfully teach linear programming, educators employ a range of techniques. To ensure that students understand the concepts, teachers should employ a variety interactive teaching. According to Prince (2004), incorporate debates, problem-solving activities, and immediate feedback enhances understanding. In order to convey the concepts of linear programming while providing succinct explanations and examples, educators commonly use interactive instruction. Multimedia resources like movies, interactive simulations, and slideshows keep students engaged.

In interactive teaching, the instructor actively involves learners through polls, discussions, hands-on exercises, questions and answers sessions, small group discussions, and the introduction of software tools like Gurobi, Excel Solver, MATLAB, or specialized linear programming software that improves problem-solving and visualization (Albright & Winston, 2014). The teacher may provide relevant references to back up their arguments at various times during the teaching.

Context

A range of techniques are used in effective linear programming teaching to help students comprehend the concepts and real-world applications. Educators often use problem-solving and interactive learning techniques. Utilizing real-world issues teachers demonstrate how to use linear programming in the real world by giving students examples such as allocating resources or scheduling production (Vanderbei, 2007). Students participate in group problem-solving activities where they tackle linear programming issues (Vanderbei, 2007). Through in- depth case studies incorporating linear programming models, student comprehend real-world applications (Winston, 2004).

Students can use interactive models to see how changing particular parameters impacts the outcomes of linear programming problems (Anderson, Sweeney, & Williams, 2016). Teachers should illustrate two-variable scenarios to students in order to help them visualize the viable region and optimal solutions (Hillier & Lieberman,

2014). Using interactive graphing tools to demonstrate how changes to objective functions (Taha, 2016).

Tackling complex linear programming issues piecemeal by piece learners comprehend concepts without challenges (Rardin, 1998). Videos that provide concepts and approaches to oral and visual in linear programming (Bradley, Hax, & Magnanti, 1977). Assigning students projects that involve using real-world data to create and solve linear programming models (Winston, 2003). include fieldwork or internships that let students see how businesses use linear programming (Ravindran, Phillips, & Solberg, 1987). Teachers can enhance their students' learning process and help them retain the subject by employing these tactics to assist students and a greater interest in linear programming.

Students can better grasp the practical applications by using case studies and real-world situations (Kolb, 1984). Teachers can demonstrate the practical uses of linear programming by using case studies from real-world industries engineering, and economics. Students' problem-solving abilities are improved by connecting theory to practical situations through the analysis of these cases. The presenter skillfully incorporates the references into the presentation, demonstrating how they advance knowledge of the subject or bolster claims. This inspires pupils to delve deeper into the subject and helps them understand the larger context. Students' comprehension and retention can be improved by assigning them tasks that require them to apply linear programming to solve complicated issues (Blumenfeld et al., 1991).

According to Bishop and Verleger (2013), flipping the classroom—in which students study the material at home and apply it in class through exercises and problem-solving—can be a highly successful educational strategy. Peer instruction facilitates deeper comprehension by encouraging students to collaborate (Johnson, Johnson, & Smith, 1998). Abstract ideas can be made more tangible by using graphs and other visual aids to illustrate ideas like viable zones, objective functions, and restrictions (McGrath & Brown, 2005). Students can better comprehend the rationale behind linear programming by breaking down problems into smaller, more manageable steps (Polya, 1945). Students' learning can be made more interesting and motivating by including game-aspect in instructional activities (Deterding, Dixon, Khaled, & Nacke, 2011). Frequent evaluations and prompt feedback support learning and point out areas in which students require additional support.

These methods can be included in curriculum to provide a dynamic and productive learning environment that accommodates various learning preferences and improves comprehension and engagement among students. Interactive teaching establishes a dynamic learning environment in which students actively participate, are motivated to look into other resources, and develop a thoughtful grasp. Students' comprehension of linear programming ideas can be strengthened by incorporating practical activities like as role-playing games or real-world problem-solving exercises. The application of theoretical knowledge and active learning are promoted by these activities. Engaging in educational or recreational pursuits that necessitate direct engagement with tangible items or materials is known as hands-on learning. By touching, manipulating, experimenting, and creating, participants actively interact as opposed to only observing or listening. To improve learning and retention, these exercises are frequently employed in a diversity educational context, such as seminars, museums, outdoor programs, and classrooms. Science experiments, art projects, model-building, survey-taking, role-playing, and interactive games are a few examples of practical activities. The experiential learning that is encouraged by the hands-on method can strengthen comprehension, develop creativity.

Assigning group projects that require students to develop and solve linear programming issues together fosters communication and teamwork abilities. Students can better understand ideas such as viable regions, objective functions, and constraints, by using visual aids like graphs, charts, and diagrams.

Students' comprehension of linear programming concepts is reinforced through regular practice tasks, which can be completed as homework assignments or in class. To push pupils and gauge their development, teachers can assign a range of increasingly challenging assignments. Combining these strategies allows teachers to effectively teach students about linear programming fundamentals while accommodating a variety of learning styles.

Matthew and Peechattue (2017) define reflective practice as an iterative, systematic process in which teachers carefully review and adjust data related to their approaches in an attempt to analyze, dissect, and evaluate their experience to better instruct students moving forward. This assertion is supported by Moon (2004), who notes

that reflective practice is one factor that can affect the standard of instruction and learning.

When analyzing an incident, one must ascertain what happened and how deeds and emotions had a role in the experience (Fook and Gardener, 2007). This is how reflective practice works. Korthagen (2017) asserts that motivating educators teaching competencies makes them more aware of the problems in their classrooms and allows them to re-evaluate possible solutions.

Illeris (2003) also pointed out that reflection can have a significant impact. According to Illeris, learning in this setting involves both cognitive and emotional components, making dynamics pertaining learning process.

However, it should be recognized that lecturers' methods and degrees of reflection affect their students' academic performance. Study focuses on teachers in Zambia's western province, reflect on their teaching strategies. In an attempt to generate excellent outcomes, it looks into techniques teachers use to teach linear programming in Western Province of Zambia.

Theoretical Framework

Danielson (2012) emphasizes the importance of professionalism and teamwork among educators. This include participating in professional development communities, collaborating with peers to improve educational practices, and giving back to the greater school community. The holistic aspect of effective teaching as a whole is emphasized by Danielson's teaching framework, which consists of elements related to planning, instruction, classroom management, and professional responsibility. Danielson's paradigm for Teaching, developed by educational consultant Charlotte Danielson, is a well-liked paradigm for evaluating and improving teaching strategies (Danielson, 2012).

The framework identifies several key components that are often categorized into four domains: This domain's primary focus is on the instructor's ability to efficiently plan lessons. Establishing learning objectives, developing cohesive lessons, monitoring student progress, and exhibiting subject matter and pedagogical knowledge are some of its constituent parts. This section focuses on the atmosphere and traditions that the teacher establishes in the classroom. It includes tasks like creating a friendly and secure atmosphere, managing the classroom effectively, and fostering a successful and courteous learning community.

This includes the actual act of imparting instruction. Giving feedback, getting students involved in educational activities, speaking clearly and precisely, and modifying lessons to accommodate various learning styles are all part of it. This area encompasses all of the responsibilities that teachers have outside of teaching. It includes activities like working with peers, engaging with families, assessing and improving instructional practices, and participating in professional development. Danielson's model strongly emphasizes the importance of ongoing reflection and professional development in the classroom. It discusses instruction, which supports learners' growth.

Problem Statement and Objective

Problem Statement

The complexity and abstract nature of linear programming make it a difficult subject to teach in the classroom. Mathematical ideas involved in linear programming can be challenging which frequently leads to a lack of interest and comprehension. Teachers utilize diverse approaches to surmount these obstacles; nevertheless, the potency of these strategies varies (Stewart, Redlin, & Watson, 2015). To enhance students' understanding and implementation of linear programming ideas, finding and evaluating the best teaching strategies is essential (Pierce & Stacey, 2010).

Objective

1. This study's goal is to examine and contrast the various methods that teachers use to teach linear programming.
2. The goal is to uncover best practices so that teachers may enhance eventually, better the performance of

their students in linear programming.

METHODOLOGY AND RESEARCH DESIGN

It's crucial to take a methodical and thorough approach when creating a methodology and research design to examine how instructors use different approaches to teach linear programming. A qualitative research approach was used. This was to investigate in-depth understanding instructional strategies and the experiences of educators and learners. Four Heads of department (HOD), four deputy head teachers and ten math teachers were among the eighteen respondents who were interviewed to obtain qualitative insights into their approaches, difficulties, and accomplishments. Participants were secondary math teachers who were purposively selected based on their experience teaching linear programming and employed a range of methodologies.

Research Design

Study Design:

This was a qualitative study with a case study design. This was meant for four Secondary Schools. The constructivist and relativist ontology worldviews, maintain that social contact with persons is essential for knowledge generation and comprehension of the reality of a given phenomenon. This indicates that the researcher got the opportunity to speak with participants from the targeted schools to value teachers'/teacher's place on reflective teaching practices. Thematic analysis and coding were used to extract themes and patterns from observations and interviews (Creswell, 2014). It offers extensive guidance on creating research designs, that incorporates mixed- methods techniques. It provides thorough methods for conducting case studies that may be modified for interviews (Patton, 2015). Miles, Huberman, and Saldaña (2014) discuss qualitative data collecting and analysis procedures that are beneficial for thematic analysis and interviews. It provides thorough techniques for qualitative data analysis, which are helpful for theme analysis of observational and interview data (Fraenkel, Wallen, & Hyun, 2019)

Sample Size and Sampling Technique

For the study, eighteen participants were selected from four schools. The sample consisted of four deputy head teachers, four department heads and ten math teachers. Purposive sampling was utilized in the participant recruitment process. The intention was to recruit individuals who possessed characteristics relevant to the study (Creswell and Poth, 2017; Ritchie et al., 2014).

Tools for Data Production

Interview guides with semi-structured questions were employed to collect primary data for the study. The investigators acquired extensive data through interviews, offering a full understanding of the teachers' beliefs regarding reflective practice (Creswell, 2013). However, before conducting participant interviews, permission from the relevant authorities was sought.

FINDINGS AND DISCUSSION

Methods Utilized by Teachers

Participants were invited to share their thoughts on the methods teachers use to teach linear programming. Participants included deputy heads, math teachers and heads of departments from respective secondary schools. They stated that because some teachers had failed to implement effective programs to assist students in improving their performance, some Techniques had not done so. New key themes that emerged included: ways to teach and care for students; the participatory approach; getting feedback from students; and action research, all of which are important for ensuring that students learn properly.

Ways of Teaching Process

Effective linear programming instruction combines conceptual knowledge, real-world application, and

interesting teaching strategies. Graphical methods and visual aids should be used to support the teaching of linear programming. Graphical representations are the most effective method for teaching linear programming, claims Vanderbei (2014). Present the basics of linear programming using 2D and 3D graphical techniques. Using graphs to represent limitations, feasible zones, and optimal solutions can foster understanding. Students can alter constraints and view real-time changes in the solution by creating dynamic visualizations with interactive tools like GeoGebra or Desmos.

The ideal approach is to use case-based learning. Winston (2003) demonstrates how to involve students in case studies and practical issues that may be represented and resolved by linear programming. Because of this, learning is applicable and practical. To demonstrate the practicality of linear programming, examples from a range of industries, including manufacturing, transportation, banking, and healthcare, can be used. Encourage students to solve problems to learn linear programming. Give them challenges to solve that call for the application of linear programming strategies. Peer learning can improve comprehension in group projects where students collaborate on linear programming problems (Prince, 2004). Giving students homework to do, such as watching lectures on video or reading linear programming materials, will free up class time for discussion and problem-solving. In 2013, Bishop &Verleger praised During class time, and assign practical exercises that were allowed in a monitored setting.

According to Hamari, Koivisto, & Sarsa (2014), gamification is to aid learners' comprehension when teaching linear programming. creating or utilizing games that, like linear programming problems, need resource optimization within limits to make learning interesting and enjoyable.

Prior to using the simplex algorithm or other solution techniques, stress the need to comprehend the fundamental ideas of linear programming, such as feasibility, boundedness, and duality. To strengthen their conceptual knowledge, encourage students to argue and discuss various methods for creating and resolving linear programming problems (Bazaraa, Jarvis, & Sherali, 2010).

Assignments and quizzes regularly basis can support learning and offer timely feedback (Black & Wiliam, 1998). Peer reviews should be included in assignments to promote group learning and enhance critical thinking abilities. Adopt a hybrid paradigm so that students can gain from both in-person assistance (like office hours and tutorials) and online resources (like interactive modules and recorded lectures) (Graham, 2006). Give students access to self-paced study modules so they may enhance their classroom education. It is sufficient to mention that teachers can give students studying linear programming a thorough and interesting learning experience by combining these approaches.

It was requested that the participants talk and reflect in their instruction. This article found that teachers reflected ways based on a variety of oral submissions; however, the most common approaches were action research, peer reflective teaching, academic student assessment, using participatory approaches, getting student feedback, and collaborative laboratory work.

Based on the oral recollections of the participants, teachers primarily analyse their instructional approaches by assigning homework, administering exams, and providing assessments to students. This is evident from the following spoken responses.

Teacher 2 said that,

"According to school policy, assessments must be presented to students before the final exam. This suggests that they ought to create examinations to assess their understanding of courses or subjects they were taught. In addition to that, there are assignments designed to assess students' comprehension of a specific subject" (T2,9.06.2024).

I employ a range of strategies to help me reflect on my teaching. Initially, I provide homework to my students like quizzes, which I subsequently grade when the term is over or when they are writing an exam. I can determine whether or not my pupils grasped the content I was giving them by examining their exam responses, which you will be marking. If not, I can then choose whether to continue using the current strategy or try something new to

aid in their adoption of the principles they are learning.

Teacher 3 commented that,

"Given that linear programming is primarily about application, a student who is conceptually unprepared will not be able to apply" (T 3, 9.06.2024).

We also give them regular evaluations, which are another way for us to reflect on each person's comprehension of a particular subject. As a result, there are instances in which time constraints, a heavy workload, and having a lot on your plate prevent you from having time to reflect after class.

Teacher 4 said that,

"Rather, when you give them a test or quiz, you get to watch and then you try to help them again, go over the material again, and find out more" (T 4, 8.06.2024)

According to the study's findings, evaluating students academically was a significant and effective ways public health educators reflected on their instruction. Given this, the study found a number of ways to evaluate students depending on the teachings they had learned in class, including homework assignments, evaluations, or quizzes on particular topics before their final exam.

Given that teachers can assess students' performance, exams and quizzes aid in the promotion of reflective teaching in the classroom. Arguments were made by participants that the purpose of testing and issuing tasks was to assess pupils while they were marking the provided work. Still, while grading exams, instructors can determine whether or not their students grasped the material covered in class based on how well they answered the questions.

The conclusion presented above is in line with Illeris's (2003) findings that introspection can help with learning. According to Illeris, there are cognitive and affective aspects to learning. One of the three learning aspects that were identified was emotional, and social dimensions. Their study's findings showed that, in practice, it is simplest to assess the cognitive components through exam scores or student performance. This suggests facilitating practice reflection could be to assess students intellectually.

Peer Reflective Teaching

The following spoken responses make this clear:

We offer help to ungifted learners Teachers regularly visit students' classrooms to observe how we are interacting with others. The participants explained that when a student is given a class to teach, peer reflective teaching takes place.

Teacher 1 said that,

"I was given the responsibility of doing it every time to let people know that there are people who are worried about the quality of training. Usually, I try to see four or five students before making a comment that implies the student might be alright" (T 1, 9.06.2024).

When applied to reflective teaching—a collaborative approach in which teachers watch one another teach and evaluate each other's methods—can greatly improve students' comprehension by bringing in diverse viewpoints and honing teaching techniques. Farrell (2013) confirms that this method makes use of the advantages of both collaboration and continuous improvement in subjects like linear programming. Through reflecting on the instruction of their peers, educators can pinpoint common misconceptions or challenges those students encounter, such as comprehending constraints or the idea of feasible regions.

Taking on these problems together facilitates the development of solutions. To promote comprehension, teachers can discuss on more effective ways to describe or illustrate the feasible region if they observe that students in a

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peer's class are frequently having trouble understanding it (Brookfield, 1995)

HOD 1, said that,

"If a teacher is not involving learners in a lot of problems, for instance, asking a gifted learner to guide the friends; most learners were finding challenges" (H1, 09.06.2024).

It's not as though we're attempting to evaluate the students precisely; it's just a part of observing how you interact with them. I might sit down with the speaker, for example, if they are in my area of expertise, and explain that something is wrong—that it was meant to be this way—while you just act straightforwardly.

Teacher 6 said that,

Peer teaching was found to be an additional way by which teachers engaged in reflection while imparting knowledge. Regarding this, participants mentioned that peer teaching frequently helped students to understand the concept easily.

"I was engaged to guide others. When I pointed out something, they would appreciate and sometimes they took it well at first. I keep reminding them that they make use of time; rather, I just want to make sure that the information is understood correctly" (S6, 09.06.2024).

Engage students with interactive activities like in-class problem-solving, group work, and discussions. If they identify any problems, they get together with the appropriate peers to talk about their successes and failures.

Appealing Approach

Participatory reflective teaching techniques that are frequently used include class group projects, summarizing the previous lecture, and question-and-answer sessions. This is made evident by the spoken responses that follow:

Normally, after an instruction, you ask them one or two questions. The way someone answers, I can tell if they're trying to explain something to me or not. I'll then try to figure out how to make sense of it for them.

HOD 2

"For instance, I might go over it again with them or use the same questions in an assignment so that when they return, we can talk. about it again," Teacher 7 stated. To help them understand what they are learning, I'll attempt a different approach" (H2, 09.06.2024).

According to Mayer (2002), understanding is solidified by repetition. Repetition of the same questions aids in reinforcing the basic ideas of linear programming.

Repetition transfers information from working memory to long-term memory, cognitive burden, according to Sweller's (2011) Cognitive burden Theory. The ability to access pertinent information more quickly increases issue-type familiarity, which is important in a topic like linear programming where solving complicated problems is required. When they come across similar challenges, they can try out various strategies and become more adept at solving problems. This is especially crucial for linear programming since problems can be solved using a variety of graphical methods and simplex algorithms.

By going over the same problems again, students can make corrections and figure out where they went wrong. Learning the subtleties aided by this repeated process of making mistakes and fixing them. Students' confidence grows via repetition as they become more accustomed to the kinds of issues they may run into. Regular practice also helps to lower math anxiety by reducing the sense of intimidation and making the topic feel more approachable. This may eventually result in a more optimistic outlook on learning linear programming. Information to new and unfamiliar situations is developed in students who work on the same kinds of linear programming tasks regularly. They established a solid understanding base that they can employ.

Students can concentrate on higher-level thinking and problem interpretation when they can automate repetitive tasks, such as solving linear equations and setting up algebraic systems. So, if they didn't get it, repeating the topic should serve as a defense. because education is a lifelong process. Through the internalization of concepts, skill development, and confidence-building, learners can take on increasingly complicated challenges with this approach.

Teacher 8 went on to explain,

"I would ask them questions based on my reflection; I need to go over what I taught last time. Furthermore, I invite students to contact us. That's one method of trying to achieve better outcomes" (T8, 09.06.2024).

The survey also found that one other strategy used by the teachers in their reflection was the interactive method. This shows that teachers who help learners identify learning difficulties they have can develop strategies to help them. The participants revealed that teachers typically give students one or two questions to gauge their level of understanding before beginning a new lesson. Occasionally, after a lesson, the teacher will provide questions to see how well the students comprehend the material.

If every student participates, it shows that they have grasped the topic; however, if don't give correct answers, the teacher looks for other ways to hold their interest while still assisting with understanding. The above results are supported by Hargreaves (2016), who found that learning opportunities and structured support included in the spiral curriculum proved to be fostering deeper and more meaningful reflective practice over time. The study discovered that the main elements of assisted (scaffolded) learning are small-group discussions and the tutor's or coach's questions to promote continuing reflection—a characteristic shared by most models of a reflective process.

Comments from the Students: Key informants state that heads of department (HOD) interact with learners about challenges they face as learners and how teachers present lessons. This meeting is only the class representative and the HOD to allow the students to open up and talk about the issues affecting their welfare without feeling uncomfortable. Additionally, the HOD meets separately with the teachers to hear their perspectives and solicit feedback. Students occasionally consult with teachers to get feedback. From there, they decide how to best improve the learning process for both pupils.

The Deputy Head claims that teachers reflect by employing various approaches, occasionally listening to their students and other educators, and receiving feedback from students while they are working on a group project or in class to let them know if they are meeting expectations. I might then inquire about the students' feelings and whether they had learned anything new from the instruction.

Deputy Head 3 said that,

"From there, I can identify what went wrong and figure out how to make it better" (DH3, 09.06.2024).

The study's findings recommend that educators solicit feedback from their students as a way to participate in reflective practices. This will assist educators in evaluating their benefits and drawbacks over time. This claim is consistent with that made by Marzano, Frontier, and Livingston (2011), who claimed that a teaching framework can act as teachers' reflection to examine framework components to improve their instruction.

Teachers ought to consider the situation and conclude that the pupils do not understand the subject if they are unable to put the abilities they have learned in class into practice.

Teacher 10 said that,

"Students should practice and engage in reflective learning. If students are unable to finish a task that was discussed in class, then their grasp of the subject is not complete. Then I'll make the necessary adjustments so they can act appropriately" (T10, 09.06.2024).

There's a noticeable shift in theoretical classes. Because they can see actual events, they can relate to and

understand them better.

HOD 4 echoed teacher 10.

"These images can help them to understand" (H4, 06, 9, 2024).

The study also found that hands-on activities are one of the few ways teachers se them. The responses revealed that employing hands-on learning is crucial for improving student comprehension. Every student must display the abilities they have acquired in class.

To fully grasp the interaction between situational analysis and critical thinking, one must possess strong reflecting abilities. Building capacity for deep learning and reflective practice is crucial to ensuring that the complex components are identified (Kaufman and Mann 2010). Rich cognitive networks that are useful in the actual world can be created by combining deep learning with prior knowledge and experience.

Moon (2004) argues that although contemplation and thinking have many similarities, reflection has more nuanced content. In addition, Moon states that reflection is not just a mental processing activity but also "a process of reorganizing knowledge and emotional orientations to achieve further insights." This result suggests that learning has taken place when pupils are able to apply the concepts they have learned.

Given this, the study found that educators generally employ action research using a range of techniques, including giving students homework projects that encourage them to perform research and create presentations.

CONCLUSION

To draw conclusions on which teaching methods for linear programming are most effective, teachers should take into account a number of factors, such as student performance, comprehension, and engagement. Different Instructional Strategies Improve Learning. A range of instructional techniques, such as technology-based tools, problem-solving in the real world, and interactive lectures, can improve students' understanding of linear programming. Peer teaching, group projects, and class discussions are learning practices that can greatly boost student participation.

Teachers can improve their students' understanding and passion for linear programming by presenting case studies and real-world examples from the corporate world. Students can recognize their improvement when they receive timely feedback and regular assessments. Formative assessments such as quizzes and in-class exercises, when combined with constructive criticism, can help students perform better.

Using virtual laboratories, interactive modules, and online simulations, teachers could provide their students with real-world experience and timely feedback. Technology integration helps create a more engaging and dynamic learning environment. However, action research, collaborative laboratory work, student academic evaluation, peer-reflective teaching, using participatory methods, getting student feedback, and using participatory methods are the most important ones. This demonstrates how teachers' freely shared reflective practice strategies, when applied effectively, can assist students in gaining the information and abilities necessary to handle challenging, intricate, and real-world health concerns.

RECOMMENDATIONS

The study's conclusions led to the formulation of the following recommendations: fully comprehend the ideas, effective linear programming instruction calls for a combination of theoretical knowledge, real-world application, and engagement strategies.

1. Teachers ought to conduct interactive teaching in which they invite questions from the class and solve problems together. This method aids in removing confusion and strengthening ideas (Prince, 2004).

2. Teachers can demonstrate by using visual aids like graphs, diagrams, and software tools and deliver a more concrete understanding of topics such as feasible regions, limitations, and goal functions.

3. If teachers want their pupils to be proficient at solving complicated issues, they should use technology tools and software such as MATLAB, Excel Solver, and specialist linear programming applications. For their future employment, this practical familiarity with technology is essential (Kneebone, 2002).

4. Teachers ought to support cooperative learning activities and group projects where students can collaborate. A stronger comprehension might result from group discussions and peer learning (Johnson, Johnson, & Smith, 1998) Introduce ideas step-by-step, beginning with easy-to-solve issues and then adding intricacy. As students grow in knowledge and abilities, provide them with scaffolding approaches (Wood, Bruner, & Ross, 1976).

6. Conduct assessments regularly and give prompt, helpful comments. This assists in identifying areas in which students struggle (Hattie & Timperley, 2007).

7. Students watch videos and read books at home to get a theoretical comprehension, and then participate in practical problem-solving sessions in class. This method makes the most of student interaction and practical experience (Bishop, & Verleger, 2013).

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