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REFERENCE

Babajide, V. F. T. & Olowu, R. T. (2024). Problem Posing Teaching in Classroom. In E. O. Adu, B. I. Omodan, C. T. Tsotetsi, & B. Damoah (Eds.), *Pedagogical strategies for 21st-century classrooms* (pp. 15-22). ERRCD Forum. <https://doi.org/10.38140/obp1-2024-03>

3.1. Concept Map

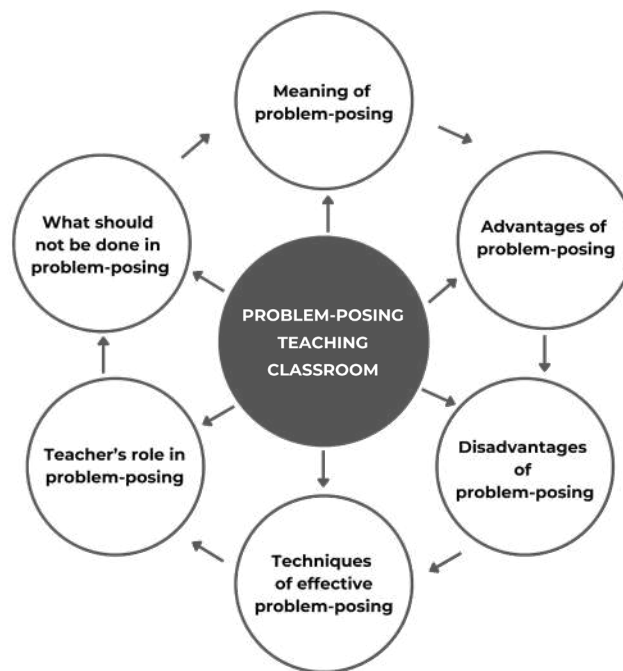


Fig 3.1 shows the concept map of a problem-posing teaching classroom. It begins with the meaning of problem posing as a teaching strategy, followed by the advantages and disadvantages of problem posing. The map also includes techniques for problem-posing teaching in the classroom, the expected roles of pre-service teachers in problem-posing classrooms, and what pre-service teachers should avoid doing in a problem-posing teaching environment.

3.2. Learning Outcomes

After studying this chapter, you should be able to:

- Explain the meaning of problem-posing teaching in the classroom.

- Set up problem-posing teaching in any subject within a classroom.
- List five advantages of problem-posing teaching in a classroom.
- List three disadvantages of problem-posing teaching in a classroom.
- Use different techniques for effective problem-posing teaching in a classroom.
- Clearly state what is expected of the pre-service teacher in a problem-posing teaching classroom.
- Precisely outline what the pre-service teacher should not do in a problem-posing teaching classroom.

3.3. Clarification of Key Terms

Problem-Posing Teaching: Lee et al. (2020) define problem-posing teaching as an instructional approach that engages students in open-ended, real-world problems to develop critical thinking, problem-solving, and collaboration skills.

Pre-service Teachers: Teachers in training in any higher institution of learning.

3.4. Introduction To Problem-Posing Teaching

Traditional teaching and learning in the classroom are dominated by the teacher’s activities, while the learner remains a passive receiver of the teacher’s information. Learners are bound and often ignorant. This method of teaching is referred to as the pedagogy of the oppressed, as described by Freire (1972) and cited by Bourn (2022). Hence, the educationist advocates for total freedom and liberation of the learners through a pedagogical shift from oppression to freedom. This method of teaching is known as Problem-Posing Teaching. The pre-service teacher using this approach makes classroom activities democratic and motivating, encouraging creativity, collaboration, and critical thinking among the learners. This chapter, therefore, discusses Problem-Posing Teaching in classrooms.

3.5. Problem-Posing Teaching In Classrooms

Problem-posing teaching in the classroom is a method that emphasises critical thinking for clarification and liberation in the acquisition of knowledge and skills. It is an active teaching approach where the pre-service teacher poses questions, and the whole class collaborates to find solutions. This method involves specific steps that the pre-service teacher must follow in the classroom. Ellerton (2015) stated that problem posing is a pedagogical approach, while Crest (2015) argued that the pedagogy of problem posing empowers students and transforms the classroom into an environment where they are considered co-designers of their educational experiences. The philosophy of problem-posing teaching forms the foundation of modern critical pedagogy, recognising that knowledge is not simply deposited by the pre-service teacher but is developed through dialogue between the pre-service teacher and the learners.

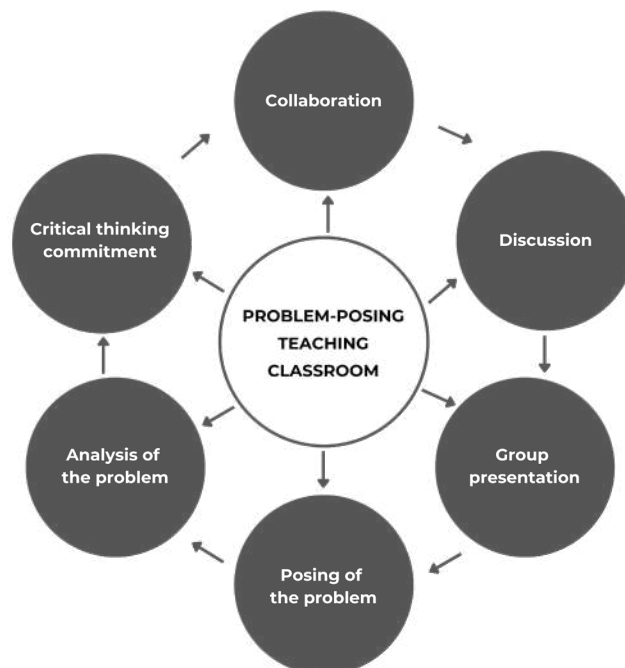


Figure 3.2 above shows the six cyclic steps in Problem-Posing Teaching in the classroom.

The first step involves the pre-service teacher posing the problem. For example, in a physics classroom, both learners and pre-service teachers are focused on learning how to produce simple electric currents from cells. The pre-service teacher assigns the learners to groups of five, comprising both boys and girls. Each group is provided with two cells of 1.5 volts, nine pairs of connecting wires, a bulb, an ammeter, a voltmeter, and a switch. The following problems are then posed to the learners:

1. How would you use the materials provided to get electric light in the bulb?
2. Draw the circuit diagram of how the materials will be set up
3. Use the circuit diagram to set up the apparatus.
4. Close the circuit and record your observation.
5. Measure the potential differences across the terminals of the two cells and record your answer
6. Measure the amount of the currents in the circuit with the two cells
7. Open the key, and remove one cell
8. Close the key and measure the potential difference across the cell
9. Measure the amount of current in the circuit when the cell is one.
10. Compare your answer in (5) with your answer in (8) what can you say?
11. Compare your answer in (6) with your answer in (8)

Step 2: The pre-service teacher allows learners to analyse the above problems by collecting information about how to solve them.

Step 3: The pre-service teacher stimulates learners and engages them in the process of critical thinking.

Step 4: The pre-service teacher allows learners to collaborate in their various groups and solve the problem.

Step 5: The pre-service teacher guides learners in the joint discussion on their findings.

Step 6: The pre-service teacher guides the learners to present their findings to the whole class group by group while the pre-service teacher gives learners feedback on each of the group presentations.

3.6. Advantages And Disadvantages Of Problem-Posing In Classrooms

Table 3.6.1: Advantages Of Problem-Posing In Classrooms

| Advantages | Description |
|--|--|
| 1.It leads to active learning processes | Learners are actively involved in doing one thing or the other in the lesson rather than as passive listeners to pre-service teacher's instruction |
| 2.It enhances the problem-solving | Learners are actively involved in solving problems posed by the pre-service teachers, hence helping in developing the problem-solving skills of the learners. |
| 3. It encourages peer learning | Learners are learning together with their peers, taking ownership of the classroom activities (their learning) |
| 4. It develops critical thinking of the learners | Learners engage in thinking (cognitive activities) on how to solve the problems posed by pre-service teachers. This process leads to the development of their critical thinking skills |
| 5. It also enhances self-learning | Problem-posing in the classroom leads to an improvement in learning on learners' own initiative with minimum supervision from the pre-service teacher. |
| 6. It improves the interactive learning of the learners. | As learners work together in a group, discussing, measuring, and connecting wires to apparatus in the classrooms improves the ability of each learner to interact with peers and the pre-service teacher |

| Advantages | Description |
|---|---|
| 7. It improves the communication skills of the learners | As learners work in a group, they communicate with each other and with the pre-service teacher. Learners also communicate during group presentations, thereby improving communication skills. |
| 8. Improves learners' engagements | The pre-service teacher engages each learner by collaborating with teams in a group; this improves the engagement skills of each learner and the preservice teacher. |
| 9. Enhances learners' freedom and liberation | Learners are no longer under the bondage of classroom boredom and passiveness but are now liberated, free, and become co-investigators. |

Babajide & Olowu fieldwork (2023)

Table 3.6.2: Disadvantages Of Problem-Posing In Classrooms

| Disadvantages of Problem-Posing Teaching Classrooms | Description |
|--|---|
| 1. It is time consuming | It consumes a lot of time to plan and execute all the activities in a normal classroom setting. |
| 2. Inadequate resources | Human and material resources for classroom implementations are grossly inadequate to be improved in some schools in Africa. |
| 3. Inconsistency in knowledge acquisition | Knowledge acquisition is not consistent. |
| 4. Lack of faculty training of pre-service teachers on the implementation of problem-posing teaching | Pre-service teachers are not trained on the classroom implementation of problem-posing teaching. |
| 5. Lack of learner motivation | Learners are not motivated to participate in classroom activities in taking ownership of their learning and in generating their knowledge |
| 6. Difficult to execute in a large class size. | Learners' large population is a big challenge in a problem-posing teaching classroom. |

Babajide & Olowu field work 2023

3.7. Preparing A Problem–Posing Teaching Classroom

The following are the Pre-Service Teacher's activities that create a Problem-Posing Teaching Classroom environment:

- i. Identify the topic of the lesson, the learning outcomes, and the assessment technique.
- ii. Design classroom activities, materials, and both theoretical and practical questions for classroom interactions.
- iii. Assign learners to small working groups of boys and girls, and explain what is expected of them.
- iv. Pose questions that draw on learners' background knowledge and experiences, presenting these to the class.
- v. Allow learners to discuss, interact, communicate, design experiments, verify findings, and collaborate, facilitating their activities.
- vi. Enable learners to make presentations, guide them during their presentations, assess their performance, and provide feedback.

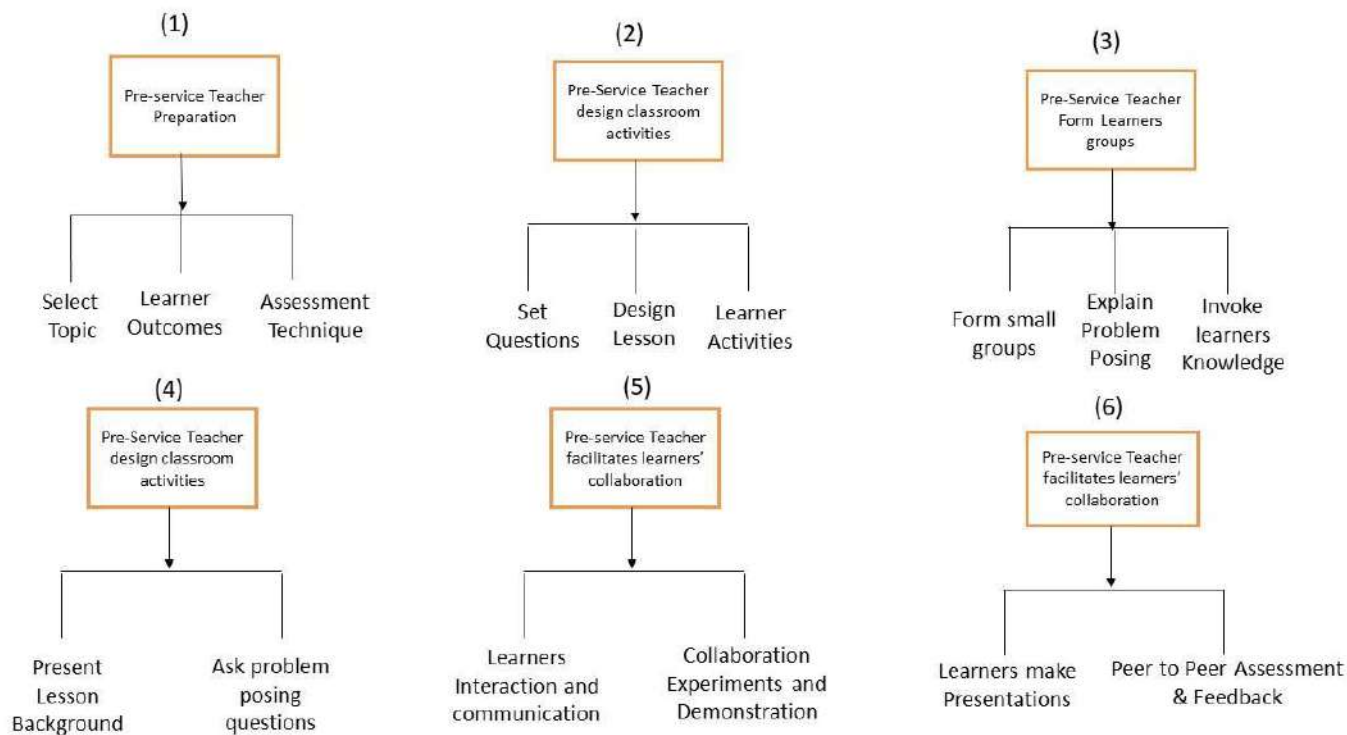


Fig 3.3: Planning, Preparation for a Problem posing Classroom Environments

3.8. Techniques In Effective Problem Posing Classroom

- **Brainstorming:** Pre-service teachers have learners create lists of related content for the topics they are currently studying. This will enrich their understanding when solving problems. Learners discuss with their teams how to solve these problems.
- **Clue me:** This is a form of detective game that encourages problem-solving, critical thinking, and cognitive development. The pre-service teacher allows learners to collect several items, which may take the form of questions they need clarification on that are associated with the lesson topic, and deposit them in a bag. Learners should be informed about the number of items each is allowed to pick and provide answers to until they arrive at the correct response.
- **Problem-solving as a group:** The pre-service teacher instructs learners to create and decorate a medium-sized box with a slot in the top, labelling it as a “problem-solving box.” Both learners and pre-service teachers can drop their questions into the box. Each learner then pulls out a question from the box and reads it aloud. The group listens to the answer that each learner provides in response to the question.
- **Survivor Scenario:** The pre-service teacher creates a practical pretend scenario for learners that encourages them to think creatively about each lesson topic. Examples include: (i) Madam Precious is stranded in a location for four days; (ii) there is a power failure in your area for three days; and (iii) Mr. John’s car suddenly breaks down while travelling to his village, leaving him stranded in the bush for two days. The pre-service teacher allows learners to propose solutions on how the individuals in each of these scenarios can survive during their periods of stranding.
- **Moral Dilemma:** Pre-service teachers guide learners in creating various moral dilemmas encountered in life. Examples include: (i) a taxi driver mistakenly gives a passenger too much change; (ii) a student in a science class erroneously assigns the wrong value to an object; (iii) a large amount of money suddenly falls from a man’s bag, and you happen to pick it up. Allow learners to suggest answers to each of these scenarios. Learners’ abilities and interests. Pre-service teachers must ensure that each problem-posing teaching technique aligns with the learners’ abilities and interests

3.9. Dos And Don'ts In Problem–Posing Teaching

3.9.1. The Dos in problem-posing teaching

The dos outline the expectations for pre-service teachers (roles) before and during classroom interactions when using problem-based teaching

- i. The pre-service teacher is expected to plan effectively for the class, including materials, questions, and activities to engage the learners.
- ii. Provide sufficient information to learners.
- iii. Design learner activities clearly.
- iv. Facilitate classroom activities effectively by guiding and supporting learners.
- v. Encourage learners to search for solutions to the posed problems.
- vi. Be flexible.
- vii. Show a level of empathy.
- viii. Demonstrate high levels of integrity.
- ix. Assist learners in developing critical thinking, collaboration, communication, and presentation skills.

3.9.2. The don'ts in problem-posing teaching

The pre-service teacher is not expected to do any of the following:

1. Must not go to the classroom without adequate preparation.
2. Must not give factual and incomprehensive, inadequate information to the learning activities.
3. The learner's questions must not be posed without preparing activities for the learners to do to find solutions to the problems.
4. Must not dominate classroom activities
5. Must not discourage learners from finding solutions to the problems
6. Must not be rigid
7. Pre-service teachers must not be harsh on the learners.
8. Must not exhibit any act of unfairness in the classroom
9. The learners' development of collaboration, communication, critical thinking, and presentation skills must not be neglected.

3.10. Case Studies In Problem-Posing Teaching

Case Study 1 involved university undergraduate students from the Faculty of Education at the University of Lagos, Nigeria. These students worked under the classroom facilitation of the first author of this chapter, Veronica F.T. Babajide, in a Science Education classroom. The students were organised into cooperative groups of five, comprising a mix of genders (male and female) and academic abilities (high, average, and low), using problem-based teaching as the instructional strategy facilitated by the university teacher (the first author of this chapter).

Case Study 1 comprised six different groups. Each group was assigned different topics (the meaning of science, technology, the benefits of science and technology in society, scientific methods, steps in scientific methods, and characteristics of scientific methods) in the form of problem posing, which needed to be discussed by individuals within the group. They were required to think critically as individuals, then brainstorm collectively, consult artificial intelligence (AI) and other sources, reflect on answers from various sources and individual ideas, and jointly agree on the answers to the questions.

For a period of 30 minutes, the teacher moved around the groups to monitor their activities. The secretary in each group recorded the group's decisions. Each group nominated a presenter to share their findings regarding the problem posed. Each group had five minutes to present their findings. All these classroom activities were recorded on video.

Video Transcript 1 of the presentation from a group.

Science and Technology

Due to science, it helps us to generate solutions for everyday life. What are the problems we are facing in our society? Oh, ok, the problem is that we have so many dirty plates. We have so many dirty clothes. Our women are tired from too much hard work, and then we come up with the invention of technology. Using science, we can get our washing machines, we get our dishwashers, and we get things that make our lives easier. It is science that has done that. Another benefit is that it makes.

Communication networks

It's in communication, and I'm able to speak freely with somebody who is in Scotland, and I don't need to move from where I am. All I need is my phone to get a Skype or even a video call, and I'm able to get across or post whatever information I want. It not only saves energy. Also, say it's fine. Thank you.

Video Transcript 2 of the presentation from another group

Scientific Networking

They are the rules and the procedures for the pursuit of knowledge involving the finding and stating of a problem. We can now see it as an example according to the definition: an acid is a substance we dissolve in water. Do you say it turns blue litmus paper red, and more so before they can add that to the properties they will have to experiment with? So, this scientific method is used in all sciences, including chemistry, physics, geology, psychology, and the other sciences. In this field, they ask questions and perform different tests. Science fiction also helps scientists today to continue to evolve. They find the scientific method as they employ new techniques and new areas of science.

Scientific Methods

The scientific method is a systematic approach to inquiry. It begins with asking a question, which leads to forming a hypothesis and developing a testable explanation. For example, consider a toasted piece of bread. You plug it into a socket, but upon observation, you notice that the bread is not toasted. This prompts you to ask, "Why is this?" You then check the socket, which is also under observation, and form a hypothesis by unplugging the device and plugging it into another socket. This process is crucial, as it involves asking questions and seeking to understand why things are the way they are. Thus, the scientific method plays a vital role in investigation and critical thinking.

Teacher Assessment: The teacher (facilitator) assesses each group's presentations and provides final comments for students to take home.

3.11. Conclusion

This chapter has discussed Problem-Posing Teaching in the classroom and how a pre-service teacher can implement it effectively. We have examined its advantages and disadvantages, as well as various techniques that a pre-service teacher could adopt for successful problem-posing teaching. Finally, the expectations of a pre-service teacher and what they should avoid were specifically addressed.

3.12. Reflective Questions

1. Briefly explain what you understand by problem-posing teaching.

2. Describe precisely how you would set up a problem-posing teaching method to teach a topic of your choice in your area of specialisation.
3. List and explain five advantages and three disadvantages of problem-posing teaching in your area of study.
4. Choose a problem-posing technique of your choice and explain how you would use it to teach a specific topic in the classroom.
5. Clearly state five roles expected of a pre-service teacher in a problem-posing teaching classroom.
6. Briefly explain three things a pre-service teacher should not do in a problem-posing teaching classroom.

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