iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** XI **Month of publication:** November 2022

DOI: https://doi.org/10.22214/ijraset.2022.47748

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue XI Nov 2022- Available at www.ijraset.com

Pedagogical Treatment of Class-IX Algebra Textbook Topic: Complement of Set under Board of Secondary Education Odisha

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Abstract: ***According to NCF 2005 -teaching and learning should be connect to outside the school. It should be practical and constructive in nature. The process of teaching should be based on the learner capacity. As we know mathematics is a very important subject in school and most of the student has the fear of learning mathematics. For the proper implementation of the teaching learning process in mathematics, the pedagogical treatment over of content is very important. It prepares a module for the teacher. A better teaching outcome can be achieved through this. The objective of my study is to analyse the content of union of Algebra Textbook into meaningful components, prepare the instructional objectives for each component with reference to revised Bloom's taxonomy, to design the appropriate objective-based learning experiences (Teaching learning material, Teacher's Activities, Student's Activities, Blackboard work) and finally to anticipate the strategies for continuous and comprehensive according to blue print design. This treatment over the class ix book helps the teacher for their effective teaching process.***

Keyword: Pedagogy: The method and practice of teaching especially as an academic subject or theoretical concept is called pedagogy.

Pedagogical treatment: Generally pedagogical treatment refers to analysing the content into meaningful parts.

Algebra textbook: Algebra textbook is one of the parts of Mathematics subject of class IX named as 'Madhyamika Bijaganit' reprinted in 2019 by 'Madhyamik Shiskhya Parisad' under Board of Secondary Education, Odisha.

Set: A collection of well defined objects is called set.

Complement of set: Complement of set is the set that includes all the elements of the universal set that are not present in the given set.

Secondary school: According to Odisha board class-ix and class-x considered as secondary school

Board of Secondary Education Odisha: The Board of Secondary Education Odisha is a body corporate constituted under the Odisha Secondary Education Act, 1953. It regulates, controls and develops Secondary Education in the state of Odisha. The function of this board is to publish and distribute/sell text books, syllabuses, lesson notes, work books and other related materials and to issue certificates of the examinations conducted by the Board and equivalence certificate to the examinations of other State Boards.

I. INTRODUCTION

Pedagogy is a method of teaching in which teachers teach, both in theory and in practice. Pedagogy is shaped by educator's teaching beliefs and involves their understanding of culture and different learning styles. It is essential for students to have meaningful classroom relationships in order to build on prior learning.It is a relationship between the culture and techniques of learning. The main aim of pedagogy is to build on previous learning of the students and work on the development of skills and attitudes of the learners. Pedagogy enables the students to get a thorough understanding of the subject and helps them in applying those learning in their daily lives outside of the classroom. Pedagogical treatment refers a type analysis based on pedagogy. Previous, we discussed pedagogy means the science of teaching. Analysis is a term stands for a process of breaking or separating a thing in two its smaller parts, elements or constituents. We break a teaching unit in to its constituents- submit, topic or single, concept etc. through the process of unit analysis. In additions, we can break the contents of the prescribed course in a subject into its various constituents- major and minor sections, Sub-sections, units and sub-units, major concepts andminor concept, topic etc. by carrying out a process of content analysis. Therefore, "the analysis of a given content material in any subject, any topic carried out well in the spirit of science of teaching.

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A. Need Of Pedagogical Treatment Over Content

1) The pedagogical analysis is needed in various purposes.
2) Pedagogical is the science of teaching is a master plan that includes a detail of what is to be done by a teacher, the instructional strategies, instructional equipments and the cardinal objectives of instruction.
3) Depending on what can actually learn and what are the exceptions set for learners of a particular stage of development, specific instructional objectives are determined and appropriate set of activities provided.
4) The teachers decided instructional objectives, equipment and strategies with every aspect of learning condition to be created.
5) Favourable conditions for positive learning cell for knowledge of various factors operating in different conditions.
6) Pedagogical analysis is selection of appropriate objectives and strategies in various instructional situations to assess the levels of actual learning at the end.
7) A comprehensive revision of required takes, strategies for realization of specific goals facilities effective learning.
8) So, pedagogical analysis offers enormous potential for improving the delivery of information in all form of education.
9) It involves various logical steps to arrive at logical inference.
10) It also helps the students to understand concepts, principles or phenomena.

B. Steps Of Pedagogical Treatment Over The Content

1) Divide the contents of the selected unit into the suitable sub-units and arrange the sub-units into a number of required periods.
2) Briefly write the essence of the content of the selected sub-units.
3) Write the appropriate pervious knowledge required for the sub-unit.
4) Write appropriate instructional objectives to be selected for the sub-unit.
5) Select appropriate teaching strategies for the subunit according the following instruction.
  a) Write the name of the method applied.
  b) Mention the teaching aids required.
  c) Briefly illustrate the necessary demonstration or experimentation required.
  d) Mention the necessary Black board work required.
  e) Write probing question related to the sub-unit and provide appropriate answers for them.
  f) Prepare a worksheet for the sub-unit.
6) Give suitable examples/ illustration/ analogies for the sub units.
7) Prepare a table of specification for the subunit. Write at least six criterion reference test of subunit.

II. PRESENTATION (PREPARATION OF MODULE)

A Module For The Content- Complement Of Set

1) Theme of the topic (Teaching point)
a) Complement of set
b) Example of complement of set and vehn diagram
c) Properties of complement of set

2) Specific learning objective/instructional specific objective
a) Remembering
- Learner will define complement of set
- Learner will recall different properties of complement of set
- Leaner will state different example of complement of set.

b) Understanding
- Learner will explain the complement of set.
- Learner will discuss properties of complement of set

c) Applying
- Learner will relate the concept of complement with different situation in the real life.
- Learner will solve problem related to complement of set.

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d) Creating

Learner will build concept of complement of set.

3) Previous Knowledge Assumed

a) Students must know about the union and intersection of set.

b) Student must know null set, finite set, infinite set.

4) Approaches to Teaching

Teaching approaches is a set of principles, beliefs or idea about the nature of learning which is translated into the classroom. An approach is a ways of looking at teaching and learning. Some well know approaches one students-centred approaches, teacher-centre approaches and leaning approaches. Now a days student –centred approaches is the best suited for everybody and we also consider this students-centred approaches for analysis. In this we refer to 5E model which is consist of 5 steps-Engage, Explore, Explain, Elaborate and Evaluation.

5) Teaching Method

Constructivist approaches is the well-known student centred approaches. In this research work we use analytic method. Analytic method is a teaching method which proceed from unknown to known. Analysis means breaking up the data given simple part and those will be combined to find the solution applying the previous experience and knowledge. In this method we start with what is to be found out and then think of further steps or possibilities that may connect the unknown built the known and find out the desired out.

6) Maxims of Teaching

Maxims of teaching refers to the techniques of teaching used by the teacher. These maxims of teaching are used by teacher to create and sustain interest and attention of the student in what he/she is teaching. He teaches uses –simple to complex, known to unknown, and concrete to abstract.

7) Teaching Learning Materials

Teaching learning materials are important for the teachers in teaching his/her lesson effectively as it helps him/her to a better interpretation and appreciation of the concepts, contents as well as the subject matter. Here the teacher uses different TLM (Teaching Learning Materials) for the effectiveness of teaching. Those are-

chart paper with vehn diagram of universal set, complement of set

8) General Procedure

The teacher will come to the classroom with smiling face with his/her proper teaching materials. The teacher will follow the 5E model of teaching learning process and will complete his/her teaching learning in 5E i.e.-(i) Engage (ii) Explore (iii) Explain (iv) Elaborate (v) Evaluate.

9) Teaching Learning Procedure

Teacher's Activity-

In a constructivist teaching learning process, the role of the teacher is to provide support service to the student. The teacher guides their student for the construction of knowledge. He helps them to find their own answers. He /she should create a democratic environment .The teacher facilitates a process of learning in which students are encouraged to be responsible and autonomous .In the process of pedagogical analysis ,the teacher role is very important .We can say he is the person who can change the whole process. Here we discuss the role of the teacher in various step of 5E model in given below.

Engage: - To engage the student teacher will ask the following question.

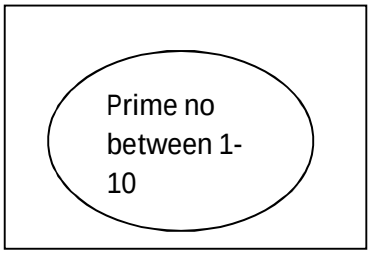
Teacher will show the picture of set Natural Number.

(1) Tell the multiple of 10 .(Ask each student of the class and record their response.)

(2) What if we subtract all the multiple of 10 from the set of Natural Number.

Then teacher declare the topic "Complement of set".
Explore: -Teacher will divide the class into 4 group and ask question to them.

(1) set of all prime number

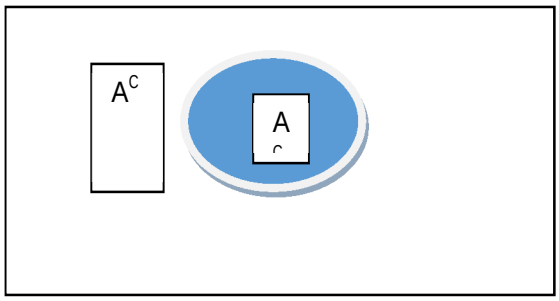


(2) U= All the student of class X
A= Girl student of class X

(2) Let U= {1,2,3,4,5 }
A= {2 ,3 }

(4) U= The set of integers
A= set of positive integers

Explain: - Now, teacher give chance to student what they have explore from the previous stage and teacher will define the definition of "complement of set". The teacher explains this with some example and show the vehn diagram of difference of set.
Elaborate: - Teacher will now extend the idea about the complement of set. He explains the different properties of difference of set and write it on the blackboard.
Evaluate: - Here teacher will evaluate what he/she has taught on the class. He will ask some objective based objective type question and extension of student performance give some homework which is refer to objectives.
Student's Activity-
In 5E method, student play a very active role. He/ She construct their own knowledge by exploring.
Engage- In this stage, student will engage in the work given by teacher They will take part in the activity by answering the question by the teacher. After giving the expected response. Then they will proceed to the next stage.
Explore: - Student will try to answer the question asked by teacher. The expected answer to be
Explain: - Here the student explains their understanding what he\she explore in the stage. Student will explain "complement of set"
Elaborate: -Here student will extend their knowledge about "complement of set". Teacher gives statement and example about properties and rules of "complement of set" with example.
Evaluation: - Now student was asked some question based on objective type. Student will give the answers.
B B WORK- Blackboard is very necessary for the effective teaching learning process.
Engage: - Here after getting the expected response teacher will declare the topic and write it on the blackboard.
Explore: - Here the teacher will ask the question which should be written in chart paper and also write it on the blackboard.
Explain: -Teacher will write the definition of complement of set.
If A be a subset of universal set E, then its complement A^C is also a set of E.
A^C =E-A = {x | x ϵ E and x not belong to A}
Then A is a complement set of A^C



Exp- E = {x | x ϵ N, x < = 10}
= {1, 2, 3, 4 ,5, 6, 7, 8, 9, 10}
A= {x | x ϵ N ,1 < x< =5} = {2,3,4,5}
A's complement set=A^c= E – A= {1, 6,7 ,8,9,10}
Elaborate: -
Properties of complement of set
(i) A and A^C both disjoint i.e. $A \cap A^C = \phi$
(ii) Union of A and A^C is universal set. i.e. $A \cup A^C = E$
(iii) Complement of a complement set is $(A^c)^c = A$
(iv) Complement of null set is E
(v) Complement of universal set is null.
Evaluation: - Teacher will write the question of evaluation in the blackboard and ask it to students.

10) Assessment Strategies

For the assessment process, teacher will adopt an assessment strategy. Teacher will choose some objective based objective question. The question must cover all the objective. The type of question may be completion type, multiple type, matching the column, and analogy etc.

Objective Based Objective Types Question:

a) Fill in the blank.

If E = {1,2,3,4,5}, then (i) S= {2,4} then S^C=_____

ii) S= {1} then S^C=____

iii) S {1,4} then S^C=_____

b) Identify the statement TRUE or FALSE

- Complement of universal set is null set.
- Null set has no complement set.
- Universal set is the union of a set and its complement set.

HOMEWORK-

If E = Z then find out the complement set of all positive number.

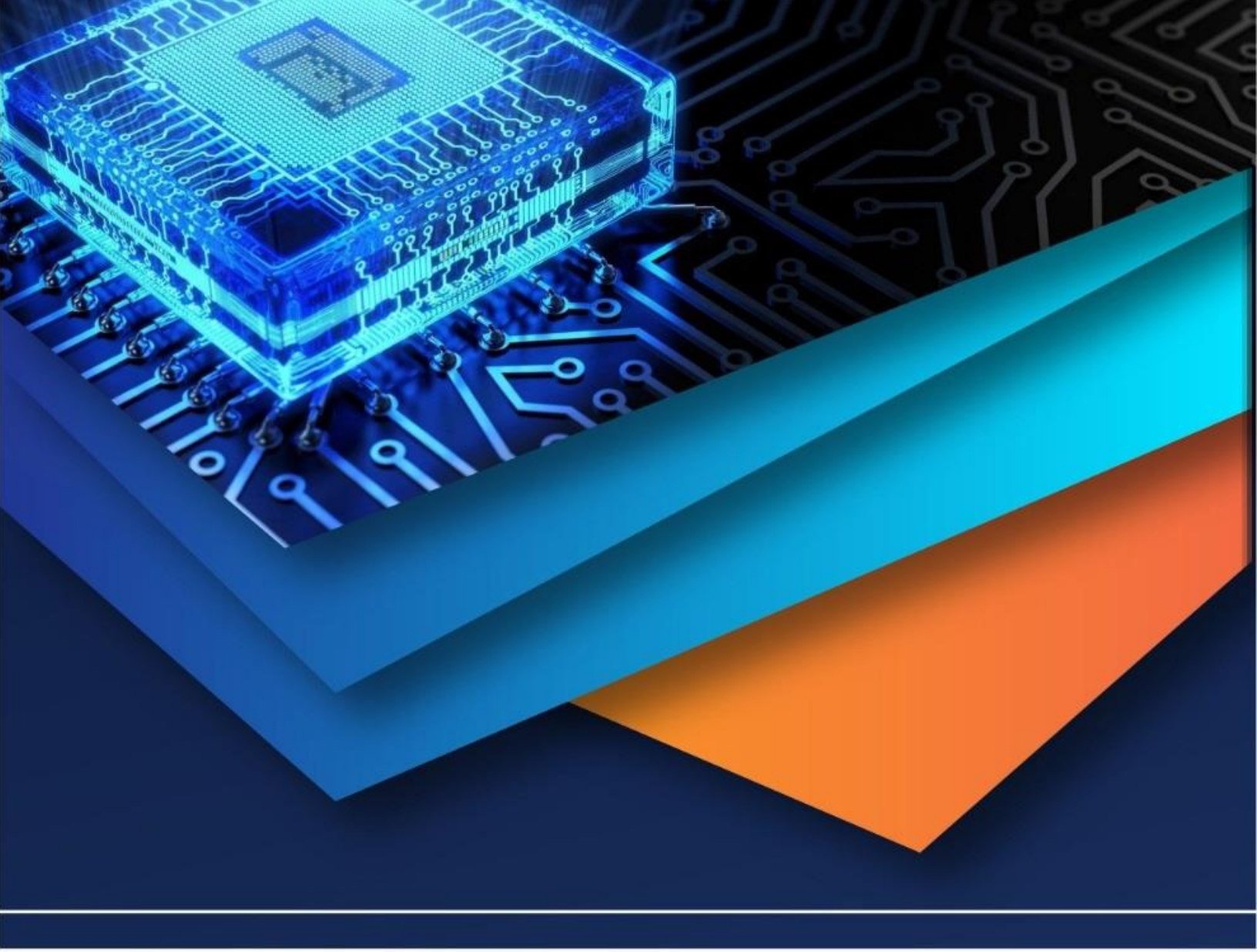
III. CONCLUSION

Pedagogical treatment is very necessary for an effective conduction of classroom process. It will help to develop an interesting classroom. It will make mathematics as interesting subject for all category of student. It will develop their reasoning aptitude by constructive approach. It will help the teacher to plan classroom teaching and implement it successfully and can evaluate the learning outcome of the students. A better learning outcome could be archived through this process.Mishra & Bandichhor (2022)-Pedagogical Analysis refers to culture of teaching and learning process of modern era.

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